

## Wet Tantalum Capacitors, Military Established Reliability, MIL-PRF-39006 Qualified Styles CLR65, 79, 81, 90, 91



### FEATURES

- Hermetically sealed
- Metal cased
- Axial lead
- Tubular

### SPECIFICATIONS

- Style CLR65, M39006/09
- Style CLR69, M39006/21
- Style CLR79, M39006/22
- Style CLR81, M39006/25
- Style CLR90, M39006/30
- Style CLR91, M39006/31

**Established Reliability Tantalum Capacitors to Military Specification MIL-PRF-39006:** In accordance with the Military Specification, MIL-PRF-39006 all capacitors are marked with the Military Part Number (M39006/xx-xxxx) rather than the older Style designation (CLRxxxxxxxx) and should be ordered as such.

For information on the performance characteristics of these capacitors, please refer to the latest issue of the Military

Specification. MIL-PRF-39006 establishes 1000 h failure rate levels of 2 %, 1 %, 0.1 %, and 0.01 %. When ordering these parts, care must be exercised that the correct part number expressing the appropriate failure level be specified.

Each order for Military Style capacitors requiring government inspection must state whether inspection is to be at the destination or at the Vishay Sprague plant. Orders requiring source inspection cannot be shipped until this has been accomplished



**Note**

The material in this section has been abstracted from MIL-PRF-39006/09/22/25/30/31.



| CASE CODE | BARE CASE                   |   | WITH INSULATING SLEEVE |               | E LEAD LENGTH                | WEIGHT (oz./g) (Max.) |
|-----------|-----------------------------|---|------------------------|---------------|------------------------------|-----------------------|
|           | D                           | L   | D (Max.)               | L (Max.)      |                              |                       |
| T1        | 0.188 ± 0.016 [4.78 ± 0.41] | 0.453 + 0.031 - 0.016 [11.51 + 0.79 - 0.41] | 0.219 [5.56]           | 0.515 [13.08] | 1.500 ± 0.250 [38.10 ± 6.35] | 0.07 [2.0]            |
| T2        | 0.281 ± 0.016 [7.14 ± 0.41] | 0.641 + 0.031 - 0.016 [16.28 + 0.79 - 0.41] | 0.312 [7.92]           | 0.704 [17.88] | 2.250 ± 0.250 [57.15 ± 6.35] | 0.18 [5.1]            |
| T3        | 0.375 ± 0.016 [9.53 ± 0.41] | 0.766 + 0.031 - 0.016 [19.46 + 0.79 - 0.41] | 0.406 [10.31]          | 0.828 [21.03] | 2.250 ± 0.250 [57.15 ± 6.35] | 0.36 [10.2]           |
| T4        | 0.375 ± 0.016 [9.53 ± 0.41] | 1.062 + 0.031 - 0.016 [26.97 + 0.79 - 0.41] | 0.406 [10.31]          | 1.126 [28.60] | 2.250 ± 0.250 [57.15 ± 6.35] | 0.49 [13.9]           |



| CASE CODE | BARE CASE                   |   | WITH INSULATING SLEEVE |               | E LEAD LENGTH                | WEIGHT (oz./g) (Max.) |
|-----------|-----------------------------|---|------------------------|---------------|------------------------------|-----------------------|
|           | D                           | L   | D (Max.)               | L (Max.)      |                              |                       |
| T1        | 0.188 ± 0.016 [4.78 ± 0.41] | 0.453 + 0.031 - 0.016 [11.51 + 0.79 - 0.41] | 0.219 [5.56]           | 0.515 [13.08] | 1.500 ± 0.250 [38.10 ± 6.35] | 0.09 [2.6]            |
| T2        | 0.281 ± 0.016 [7.14 ± 0.41] | 0.641 + 0.031 - 0.016 [16.28 + 0.79 - 0.41] | 0.312 [7.92]           | 0.704 [17.88] | 2.250 ± 0.250 [57.15 ± 6.35] | 0.22 [6.2]            |
| T3        | 0.375 ± 0.016 [9.53 ± 0.41] | 0.766 + 0.031 - 0.016 [19.46 + 0.79 - 0.41] | 0.406 [10.31]          | 0.828 [21.03] | 2.250 ± 0.250 [57.15 ± 6.35] | 0.41 [11.6]           |
| T4        | 0.375 ± 0.016 [9.53 ± 0.41] | 1.062 + 0.031 - 0.016 [26.97 + 0.79 - 0.41] | 0.406 [10.31]          | 1.126 [28.60] | 2.250 ± 0.250 [57.15 ± 6.35] | 0.62 [17.7]           |



| <b>STANDARD/EXTENDED RATINGS: CLR65*, M39006/09-XXXX</b> |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
|--|--------------|-----------------------|--|------|------|------|---------------------|---------------------|------------------------------------|--------------------------------------|-----------------------------------|---------|----------|
| CAPACITANCE<br>(μF)                                      | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/09-<br>FAILURE RATE LEVEL (%/1000 h) |      |      |      | MAX. DCL (μA)<br>at |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          |
|  |              |                       | L  | M    | P    | R    | + 25 °C             | + 85 °C<br>+ 125 °C |                                    |                                      | - 55 °C                           | + 85 °C | + 125 °C |
|  |              |                       | 2.0  | 1.0  | 0.1  | 0.01 |                     |                     |                                    |                                      |                                   |         |          |
| <b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>        |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 30.0   | T1           | 20                    | 8001   | 8206 | 8411 | 8616 | 1.0                 | 2.0                 | 9.1                                | 100                                  | - 40                              | + 10.5  | + 12     |
| 30.0   | T1           | 10                    | 8002   | 8207 | 8412 | 8617 | 1.0                 | 2.0                 | 9.1                                | 100                                  | - 40                              | + 10.5  | + 12     |
| 30.0   | T1           | 5                     | 8003   | 8208 | 8413 | 8618 | 1.0                 | 2.0                 | 9.1                                | 100                                  | - 40                              | + 10.5  | + 12     |
| 68.0   | T1           | 20                    | 8004   | 8209 | 8414 | 8619 | 1.0                 | 2.0                 | 20.4                               | 60                                   | - 40                              | + 14    | + 16     |
| 68.0   | T1           | 10                    | 8005   | 8210 | 8415 | 8620 | 1.0                 | 2.0                 | 20.4                               | 60                                   | - 40                              | + 14    | + 16     |
| 68.0   | T1           | 5                     | 8006   | 8211 | 8416 | 8621 | 1.0                 | 2.0                 | 20.4                               | 60                                   | - 40                              | + 14    | + 16     |
| 140.0  | T2           | 20                    | 8007   | 8212 | 8417 | 8622 | 1.0                 | 3.0                 | 21.3                               | 40                                   | - 40                              | + 14    | + 16     |
| 140.0  | T2           | 10                    | 8008   | 8213 | 8418 | 8623 | 1.0                 | 3.0                 | 21.3                               | 40                                   | - 40                              | + 14    | + 16     |
| 140.0  | T2           | 5                     | 8009   | 8214 | 8419 | 8624 | 1.0                 | 3.0                 | 21.3                               | 40                                   | - 40                              | + 14    | + 16     |
| 270.0  | T2           | 20                    | 8010   | 8215 | 8420 | 8625 | 1.0                 | 6.5                 | 81.8                               | 25                                   | - 44                              | + 17.5  | + 20     |
| 270.0  | T2           | 10                    | 8011   | 8216 | 8421 | 8626 | 1.0                 | 6.5                 | 81.8                               | 25                                   | - 44                              | + 17.5  | + 20     |
| 270.0  | T2           | 5                     | 8012   | 8217 | 8422 | 8627 | 1.0                 | 6.5                 | 81.8                               | 25                                   | - 44                              | + 17.5  | + 20     |
| 330.0  | T3           | 20                    | 8013   | 8218 | 8423 | 8628 | 2.0                 | 7.9                 | 49.6                               | 20                                   | - 44                              | + 14    | + 16     |
| 330.0  | T3           | 10                    | 8014   | 8219 | 8424 | 8629 | 2.0                 | 7.9                 | 49.6                               | 20                                   | - 44                              | + 14    | + 16     |
| 330.0  | T3           | 5                     | 8015   | 8220 | 8425 | 8630 | 2.0                 | 7.9                 | 49.6                               | 20                                   | - 44                              | + 14    | + 16     |
| 560.0  | T3           | 20                    | 8016   | 8221 | 8426 | 8631 | 2.0                 | 13.0                | 128.0                              | 25                                   | - 64                              | + 17.5  | + 20     |
| 560.0  | T3           | 10                    | 8017   | 8222 | 8427 | 8632 | 2.0                 | 13.0                | 128.0                              | 25                                   | - 64                              | + 17.5  | + 20     |
| 560.0  | T3           | 5                     | 8018   | 8223 | 8428 | 8633 | 2.0                 | 13.0                | 128.0                              | 25                                   | - 64                              | + 17.5  | + 20     |
| 1200.0   | T4           | 20                    | 8019   | 8224 | 8429 | 8634 | 3.0                 | 14.0                | 144.4                              | 20                                   | - 80                              | + 25    | + 25     |
| 1200.0   | T4           | 10                    | 8020   | 8225 | 8430 | 8635 | 3.0                 | 14.0                | 144.4                              | 20                                   | - 80                              | + 25    | + 25     |
| <b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>        |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 25.0   | T1           | 20                    | 8021   | 8226 | 8431 | 8636 | 1.0                 | 2.0                 | 7.6                                | 100                                  | - 40                              | + 10.5  | + 12     |
| 25.0   | T1           | 10                    | 8022   | 8227 | 8432 | 8637 | 1.0                 | 2.0                 | 7.6                                | 100                                  | - 40                              | + 10.5  | + 12     |
| 25.0   | T1           | 5                     | 8023   | 8228 | 8433 | 8638 | 1.0                 | 2.0                 | 7.6                                | 100                                  | - 40                              | + 10.5  | + 12     |
| 56.0   | T1           | 20                    | 8024   | 8229 | 8434 | 8639 | 1.0                 | 2.0                 | 17.0                               | 59                                   | - 40                              | + 14    | + 16     |
| 56.0   | T1           | 10                    | 8025   | 8230 | 8435 | 8640 | 1.0                 | 2.0                 | 17.0                               | 59                                   | - 40                              | + 14    | + 16     |
| 56.0   | T1           | 5                     | 8026   | 8231 | 8436 | 8641 | 1.0                 | 2.0                 | 17.0                               | 59                                   | - 40                              | + 14    | + 16     |
| 220.0  | T2           | 20                    | 8027   | 8232 | 8437 | 8642 | 1.0                 | 7.0                 | 66.4                               | 30                                   | - 44                              | + 17.5  | + 20     |
| 220.0  | T2           | 10                    | 8028   | 8233 | 8438 | 8643 | 1.0                 | 7.0                 | 66.4                               | 30                                   | - 44                              | + 17.5  | + 20     |
| 220.0  | T2           | 5                     | 8029   | 8234 | 8439 | 8644 | 1.0                 | 7.0                 | 66.4                               | 30                                   | - 44                              | + 17.5  | + 20     |
| 430.0  | T3           | 20                    | 8030   | 8235 | 8440 | 8645 | 2.0                 | 14.0                | 91.5                               | 25                                   | - 64                              | + 17.5  | + 20     |
| 430.0  | T3           | 10                    | 8031   | 8236 | 8441 | 8646 | 2.0                 | 14.0                | 91.5                               | 25                                   | - 64                              | + 17.5  | + 20     |
| 430.0  | T3           | 5                     | 8032   | 8237 | 8442 | 8647 | 2.0                 | 14.0                | 91.5                               | 25                                   | - 64                              | + 17.5  | + 20     |
| 850.0  | T4           | 20                    | 8033   | 8238 | 8443 | 8648 | 4.0                 | 16.0                | 65.8                               | 22                                   | - 80                              | + 25    | + 25     |
| 850.0  | T4           | 10                    | 8034   | 8239 | 8444 | 8649 | 4.0                 | 16.0                | 65.8                               | 22                                   | - 80                              | + 25    | + 25     |
| <b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>       |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 20.0   | T1           | 20                    | 8035   | 8240 | 8445 | 8650 | 1.0                 | 2.0                 | 6.1                                | 175                                  | - 32                              | + 10.5  | + 12     |
| 20.0   | T1           | 10                    | 8036   | 8241 | 8446 | 8651 | 1.0                 | 2.0                 | 6.1                                | 175                                  | - 32                              | + 10.5  | + 12     |
| 20.0   | T1           | 5                     | 8037   | 8242 | 8447 | 8652 | 1.0                 | 2.0                 | 6.1                                | 175                                  | - 32                              | + 10.5  | + 12     |
| 47.0   | T1           | 20                    | 8038   | 8243 | 8448 | 8653 | 1.0                 | 2.0                 | 18.1                               | 100                                  | - 36                              | + 14    | + 16     |
| 47.0   | T1           | 10                    | 8039   | 8244 | 8449 | 8654 | 1.0                 | 2.0                 | 18.1                               | 100                                  | - 36                              | + 14    | + 16     |
| 47.0   | T1           | 5                     | 8040   | 8245 | 8450 | 8655 | 1.0                 | 2.0                 | 18.1                               | 100                                  | - 36                              | + 14    | + 16     |
| 100.0  | T2           | 20                    | 8041   | 8246 | 8451 | 8656 | 1.0                 | 4.0                 | 15.2                               | 60                                   | - 36                              | + 14    | + 16     |
| 100.0  | T2           | 10                    | 8042   | 8247 | 8452 | 8657 | 1.0                 | 4.0                 | 15.2                               | 60                                   | - 36                              | + 14    | + 16     |
| 100.0  | T2           | 5                     | 8043   | 8248 | 8453 | 8658 | 1.0                 | 4.0                 | 15.2                               | 60                                   | - 36                              | + 14    | + 16     |
| 180.0  | T2           | 20                    | 8044   | 8249 | 8454 | 8659 | 1.0                 | 7.0                 | 54.4                               | 40                                   | - 36                              | + 14    | + 16     |
| 180.0  | T2           | 10                    | 8045   | 8250 | 8455 | 8660 | 1.0                 | 7.0                 | 54.4                               | 40                                   | - 36                              | + 14    | + 16     |
| 180.0  | T2           | 5                     | 8046   | 8251 | 8456 | 8661 | 1.0                 | 7.0                 | 54.4                               | 40                                   | - 36                              | + 14    | + 16     |
| 250.0  | T3           | 20                    | 8047   | 8252 | 8457 | 8662 | 2.0                 | 10.0                | 37.8                               | 30                                   | - 40                              | + 14    | + 16     |
| 250.0  | T3           | 10                    | 8048   | 8253 | 8458 | 8663 | 2.0                 | 10.0                | 37.8                               | 30                                   | - 40                              | + 14    | + 16     |
| 250.0  | T3           | 5                     | 8049   | 8254 | 8459 | 8664 | 2.0                 | 10.0                | 37.8                               | 30                                   | - 40                              | + 14    | + 16     |
| 390.0  | T3           | 20                    | 8050   | 8255 | 8460 | 8665 | 2.0                 | 16.0                | 87.6                               | 25                                   | - 64                              | + 17.5  | + 20     |
| 390.0  | T3           | 10                    | 8051   | 8256 | 8461 | 8666 | 2.0                 | 16.0                | 87.6                               | 25                                   | - 64                              | + 17.5  | + 20     |
| 390.0  | T3           | 5                     | 8052   | 8257 | 8462 | 8667 | 2.0                 | 16.0                | 87.6                               | 25                                   | - 64                              | + 17.5  | + 20     |
| 750.0  | T4           | 20                    | 8053   | 8258 | 8463 | 8668 | 4.0                 | 16.0                | 56.5                               | 23                                   | - 80                              | + 25    | + 25     |
| 750.0  | T4           | 10                    | 8054   | 8259 | 8464 | 8669 | 4.0                 | 16.0                | 56.5                               | 23                                   | - 80                              | + 25    | + 25     |

**Note**

\* Style CLR65 is inactive for new military design. For new design use Style CLR79.



| <b>STANDARD/EXTENDED RATINGS: CLR65*, M39006/09-XXXX</b> |              |                       |  |      |      |      |                     |         |                                    |                                      |                                   |         |          |
|--|--------------|-----------------------|--|------|------|------|---------------------|---------|------------------------------------|--------------------------------------|-----------------------------------|---------|----------|
| CAPACITANCE<br>(µF)                                      | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/09-<br>FAILURE RATE LEVEL (%/1000 h) |      |      |      | MAX. DCL (µA)<br>at |         | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          |
|  |              |                       | L  | M    | P    | R    | + 25 °C             | + 85 °C |                                    |                                      | - 55 °C                           | + 85 °C | + 125 °C |
|  |              |                       | 2.0  | 1.0  | 0.1  | 0.01 |                     |         |                                    |                                      |                                   |         |          |
| <b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |         |                                    |                                      |                                   |         |          |
| 15.0   | T1           | 20                    | 8055   | 8260 | 8465 | 8670 | 1.0                 | 2.0     | 5.7                                | 155                                  | - 24                              | + 10.5  | + 12     |
| 15.0   | T1           | 10                    | 8056   | 8261 | 8466 | 8671 | 1.0                 | 2.0     | 5.7                                | 155                                  | - 24                              | + 10.5  | + 12     |
| 15.0   | T1           | 5                     | 8057   | 8262 | 8467 | 8672 | 1.0                 | 2.0     | 5.7                                | 155                                  | - 24                              | + 10.5  | + 12     |
| 33.0   | T1           | 20                    | 8058   | 8263 | 8468 | 8673 | 1.0                 | 2.0     | 12.5                               | 90                                   | - 28                              | + 14    | + 16     |
| 33.0   | T1           | 10                    | 8059   | 8264 | 8469 | 8674 | 1.0                 | 2.0     | 12.5                               | 90                                   | - 28                              | + 14    | + 16     |
| 33.0   | T1           | 5                     | 8060   | 8265 | 8470 | 8675 | 1.0                 | 2.0     | 12.5                               | 90                                   | - 28                              | + 14    | + 16     |
| 70.0   | T2           | 20                    | 8061   | 8266 | 8471 | 8676 | 1.0                 | 4.0     | 13.1                               | 75                                   | - 28                              | + 14    | + 16     |
| 70.0   | T2           | 10                    | 8062   | 8267 | 8472 | 8677 | 1.0                 | 4.0     | 13.1                               | 75                                   | - 28                              | + 14    | + 16     |
| 70.0   | T2           | 5                     | 8063   | 8268 | 8473 | 8678 | 1.0                 | 4.0     | 13.1                               | 75                                   | - 28                              | + 14    | + 16     |
| 120.0  | T2           | 20                    | 8064   | 8269 | 8474 | 8679 | 1.0                 | 7.0     | 36.8                               | 50                                   | - 28                              | + 17.5  | + 20     |
| 120.0  | T2           | 10                    | 8065   | 8270 | 8475 | 8680 | 1.0                 | 7.0     | 36.8                               | 50                                   | - 28                              | + 17.5  | + 20     |
| 120.0  | T2           | 5                     | 8066   | 8271 | 8476 | 8681 | 1.0                 | 7.0     | 36.8                               | 50                                   | - 28                              | + 17.5  | + 20     |
| 170.0  | T3           | 20                    | 8067   | 8272 | 8477 | 8682 | 2.0                 | 10.0    | 25.4                               | 35                                   | - 32                              | + 14    | + 16     |
| 170.0  | T3           | 10                    | 8068   | 8273 | 8478 | 8683 | 2.0                 | 10.0    | 25.4                               | 35                                   | - 32                              | + 14    | + 16     |
| 170.0  | T3           | 5                     | 8069   | 8274 | 8479 | 8684 | 2.0                 | 10.0    | 25.4                               | 35                                   | - 32                              | + 14    | + 16     |
| 270.0  | T3           | 20                    | 8070   | 8275 | 8480 | 8685 | 2.0                 | 16.0    | 60.9                               | 30                                   | - 56                              | + 17.5  | + 20     |
| 270.0  | T3           | 10                    | 8071   | 8276 | 8481 | 8686 | 2.0                 | 16.0    | 60.9                               | 30                                   | - 56                              | + 17.5  | + 20     |
| 270.0  | T3           | 5                     | 8072   | 8277 | 8482 | 8687 | 2.0                 | 16.0    | 60.9                               | 30                                   | - 56                              | + 17.5  | + 20     |
| 540.0  | T4           | 20                    | 8073   | 8278 | 8483 | 8688 | 6.0                 | 24.0    | 49.0                               | 23                                   | - 80                              | + 25    | + 25     |
| 540.0  | T4           | 10                    | 8074   | 8279 | 8484 | 8689 | 6.0                 | 24.0    | 49.0                               | 23                                   | - 80                              | + 25    | + 25     |
| <b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |         |                                    |                                      |                                   |         |          |
| 10.0   | T1           | 20                    | 8075   | 8280 | 8485 | 8690 | 1.0                 | 2.0     | 4.6                                | 220                                  | - 16                              | + 8     | + 9      |
| 10.0   | T1           | 10                    | 8076   | 8281 | 8486 | 8691 | 1.0                 | 2.0     | 4.6                                | 220                                  | - 16                              | + 8     | + 9      |
| 10.0   | T1           | 5                     | 8077   | 8282 | 8487 | 8692 | 1.0                 | 2.0     | 4.6                                | 220                                  | - 16                              | + 8     | + 9      |
| 22.0   | T1           | 20                    | 8078   | 8283 | 8488 | 8693 | 1.0                 | 2.0     | 8.3                                | 140                                  | - 20                              | + 10.5  | + 12     |
| 22.0   | T1           | 10                    | 8079   | 8284 | 8489 | 8694 | 1.0                 | 2.0     | 8.3                                | 140                                  | - 20                              | + 10.5  | + 12     |
| 22.0   | T1           | 5                     | 8080   | 8285 | 8490 | 8695 | 1.0                 | 2.0     | 8.3                                | 140                                  | - 20                              | + 10.5  | + 12     |
| 100.0  | T2           | 20                    | 8081   | 8286 | 8491 | 8696 | 1.0                 | 10.0    | 31.4                               | 50                                   | - 28                              | + 13    | + 15     |
| 100.0  | T2           | 10                    | 8082   | 8287 | 8492 | 8697 | 1.0                 | 10.0    | 31.4                               | 50                                   | - 28                              | + 13    | + 15     |
| 100.0  | T2           | 5                     | 8083   | 8288 | 8493 | 8698 | 1.0                 | 10.0    | 31.4                               | 50                                   | - 28                              | + 13    | + 15     |
| 180.0  | T3           | 20                    | 8084   | 8289 | 8494 | 8699 | 2.0                 | 18.0    | 54.3                               | 32                                   | - 48                              | + 13    | + 15     |
| 180.0  | T3           | 10                    | 8085   | 8290 | 8495 | 8700 | 2.0                 | 18.0    | 54.3                               | 32                                   | - 48                              | + 13    | + 15     |
| 180.0  | T3           | 5                     | 8086   | 8291 | 8496 | 8701 | 2.0                 | 18.0    | 54.3                               | 32                                   | - 48                              | + 13    | + 15     |
| 350.0  | T4           | 20                    | 8087   | 8292 | 8497 | 8702 | 7.0                 | 28.0    | 35.0                               | 24                                   | - 70                              | + 25    | + 25     |
| 350.0  | T4           | 10                    | 8088   | 8293 | 8498 | 8703 | 7.0                 | 28.0    | 35.0                               | 24                                   | - 70                              | + 25    | + 25     |
| <b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |         |                                    |                                      |                                   |         |          |
| 8.0  | T1           | 20                    | 8089   | 8294 | 8499 | 8704 | 1.0                 | 2.0     | 4.5                                | 275                                  | - 16                              | + 8     | + 12     |
| 8.0  | T1           | 10                    | 8090   | 8295 | 8500 | 8705 | 1.0                 | 2.0     | 4.5                                | 275                                  | - 16                              | + 8     | + 12     |
| 8.0  | T1           | 5                     | 8091   | 8296 | 8501 | 8706 | 1.0                 | 2.0     | 4.5                                | 275                                  | - 16                              | + 8     | + 12     |
| 15.0   | T1           | 20                    | 8092   | 8297 | 8502 | 8707 | 1.0                 | 2.0     | 9.1                                | 175                                  | - 20                              | + 10.5  | + 12     |
| 15.0   | T1           | 10                    | 8093   | 8298 | 8503 | 8708 | 1.0                 | 2.0     | 9.1                                | 175                                  | - 20                              | + 10.5  | + 12     |
| 15.0   | T1           | 5                     | 8094   | 8299 | 8504 | 8709 | 1.0                 | 2.0     | 9.1                                | 175                                  | - 20                              | + 10.5  | + 12     |
| 40.0   | T2           | 20                    | 8095   | 8300 | 8505 | 8710 | 1.0                 | 5.0     | 12.2                               | 65                                   | - 24                              | + 10.5  | + 12     |
| 40.0   | T2           | 10                    | 8096   | 8301 | 8506 | 8711 | 1.0                 | 5.0     | 12.2                               | 65                                   | - 24                              | + 10.5  | + 12     |
| 40.0   | T2           | 5                     | 8097   | 8302 | 8507 | 8712 | 1.0                 | 5.0     | 12.2                               | 65                                   | - 24                              | + 10.5  | + 12     |
| 68.0   | T2           | 20                    | 8098   | 8303 | 8508 | 8713 | 1.0                 | 8.0     | 31.0                               | 60                                   | - 24                              | + 13    | + 15     |
| 68.0   | T2           | 10                    | 8099   | 8304 | 8509 | 8714 | 1.0                 | 8.0     | 31.0                               | 60                                   | - 24                              | + 13    | + 15     |
| 68.0   | T2           | 5                     | 8100   | 8305 | 8510 | 8715 | 1.0                 | 8.0     | 31.0                               | 60                                   | - 24                              | + 13    | + 15     |
| 100.0  | T3           | 20                    | 8101   | 8306 | 8511 | 8716 | 2.0                 | 12.0    | 19.0                               | 40                                   | - 28                              | + 10.5  | + 12     |
| 100.0  | T3           | 10                    | 8102   | 8307 | 8512 | 8717 | 2.0                 | 12.0    | 19.0                               | 40                                   | - 28                              | + 10.5  | + 12     |
| 100.0  | T3           | 5                     | 8103   | 8308 | 8513 | 8718 | 2.0                 | 12.0    | 19.0                               | 40                                   | - 28                              | + 10.5  | + 12     |
| 150.0  | T3           | 20                    | 8104   | 8309 | 8514 | 8719 | 2.0                 | 18.0    | 46.0                               | 35                                   | - 48                              | + 13    | + 15     |
| 150.0  | T3           | 10                    | 8105   | 8310 | 8515 | 8720 | 2.0                 | 18.0    | 46.0                               | 35                                   | - 48                              | + 13    | + 15     |
| 150.0  | T3           | 5                     | 8106   | 8311 | 8516 | 8721 | 2.0                 | 18.0    | 46.0                               | 35                                   | - 48                              | + 13    | + 15     |
| 300.0  | T4           | 20                    | 8107   | 8312 | 8517 | 8722 | 8.0                 | 32.0    | 35.0                               | 25                                   | - 60                              | + 25    | + 25     |
| 300.0  | T4           | 10                    | 8108   | 8313 | 8518 | 8723 | 8.0                 | 32.0    | 35.0                               | 25                                   | - 60                              | + 25    | + 25     |

**Note**

\* Style CLR65 is inactive for new military design. For new design use Style CLR79.



| <b>STANDARD/EXTENDED RATINGS: CLR65*, M39006/09-XXXX</b> |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
|--|--------------|-----------------------|--|------|------|------|---------------------|---------------------|------------------------------------|--------------------------------------|-----------------------------------|---------|----------|
| CAPACITANCE<br>(μF)                                      | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/09-<br>FAILURE RATE LEVEL (%/1000 h) |      |      |      | MAX. DCL (μA)<br>at |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | Max. CAPACITANCE<br>CHANGE (%) at |         |          |
|  |              |                       | L  | M    | P    | R    | + 25 °C             | + 85 °C<br>+ 125 °C |                                    |                                      | - 55 °C                           | + 85 °C | + 125 °C |
|  |              |                       | 2.0  | 1.0  | 0.1  | 0.01 |                     |                     |                                    |                                      |                                   |         |          |
| <b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 5.0  | T1           | 20                    | 8109   | 8314 | 8519 | 8724 | 1.0                 | 2.0                 | 3.4                                | 400                                  | - 16                              | + 5     | + 6      |
| 5.0  | T1           | 10                    | 8110   | 8315 | 8520 | 8725 | 1.0                 | 2.0                 | 3.4                                | 400                                  | - 16                              | + 5     | + 6      |
| 5.0  | T1           | 5                     | 8111   | 8316 | 8521 | 8726 | 1.0                 | 2.0                 | 3.4                                | 400                                  | - 16                              | + 5     | + 6      |
| 10.0   | T1           | 20                    | 8112   | 8317 | 8522 | 8727 | 1.0                 | 2.0                 | 6.0                                | 250                                  | - 24                              | + 8     | + 9      |
| 10.0   | T1           | 10                    | 8113   | 8318 | 8523 | 8728 | 1.0                 | 2.0                 | 6.0                                | 250                                  | - 24                              | + 8     | + 9      |
| 10.0   | T1           | 5                     | 8114   | 8319 | 8524 | 8729 | 1.0                 | 2.0                 | 6.0                                | 250                                  | - 24                              | + 8     | + 9      |
| 25.0   | T2           | 20                    | 8115   | 8320 | 8525 | 8730 | 1.0                 | 5.0                 | 11.2                               | 95                                   | - 20                              | + 10.5  | + 12     |
| 25.0   | T2           | 10                    | 8116   | 8321 | 8526 | 8731 | 1.0                 | 5.0                 | 11.2                               | 95                                   | - 20                              | + 10.5  | + 12     |
| 25.0   | T2           | 5                     | 8117   | 8322 | 8527 | 8732 | 1.0                 | 5.0                 | 11.2                               | 95                                   | - 20                              | + 10.5  | + 12     |
| 47.0   | T2           | 20                    | 8118   | 8323 | 8528 | 8733 | 1.0                 | 9.0                 | 21.4                               | 70                                   | - 28                              | + 13    | + 15     |
| 47.0   | T2           | 10                    | 8119   | 8324 | 8529 | 8734 | 1.0                 | 9.0                 | 21.4                               | 70                                   | - 28                              | + 13    | + 15     |
| 47.0   | T2           | 5                     | 8120   | 8325 | 8530 | 8735 | 1.0                 | 9.0                 | 21.4                               | 70                                   | - 28                              | + 13    | + 15     |
| 60.0   | T3           | 20                    | 8121   | 8326 | 8531 | 8736 | 2.0                 | 12.0                | 13.6                               | 45                                   | - 16                              | + 10.5  | + 12     |
| 60.0   | T3           | 10                    | 8122   | 8327 | 8532 | 8737 | 2.0                 | 12.0                | 13.6                               | 45                                   | - 16                              | + 10.5  | + 12     |
| 60.0   | T3           | 5                     | 8123   | 8328 | 8533 | 8738 | 2.0                 | 12.0                | 13.6                               | 45                                   | - 16                              | + 10.5  | + 12     |
| 82.0   | T3           | 20                    | 8124   | 8329 | 8534 | 8739 | 2.0                 | 16.0                | 24.9                               | 45                                   | - 32                              | + 13    | + 15     |
| 82.0   | T3           | 10                    | 8125   | 8330 | 8535 | 8740 | 2.0                 | 16.0                | 24.9                               | 45                                   | - 32                              | + 13    | + 15     |
| 82.0   | T3           | 5                     | 8126   | 8331 | 8536 | 8741 | 2.0                 | 16.0                | 24.9                               | 45                                   | - 32                              | + 13    | + 15     |
| 160.0  | T4           | 20                    | 8127   | 8332 | 8537 | 8742 | 8.0                 | 32.0                | 25.7                               | 27                                   | - 50                              | + 25    | + 25     |
| 160.0  | T4           | 10                    | 8128   | 8333 | 8538 | 8743 | 8.0                 | 32.0                | 25.7                               | 27                                   | - 50                              | + 25    | + 25     |
| <b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 4.0  | T1           | 20                    | 8129   | 8334 | 8539 | 8744 | 1.0                 | 2.0                 | 3.0                                | 550                                  | - 16                              | + 5     | + 6      |
| 4.0  | T1           | 10                    | 8130   | 8335 | 8540 | 8745 | 1.0                 | 2.0                 | 3.0                                | 550                                  | - 16                              | + 5     | + 6      |
| 4.0  | T1           | 5                     | 8131   | 8336 | 8541 | 8746 | 1.0                 | 2.0                 | 3.0                                | 550                                  | - 16                              | + 5     | + 6      |
| 8.2  | T1           | 20                    | 8132   | 8337 | 8542 | 8747 | 1.0                 | 2.0                 | 5.0                                | 275                                  | - 24                              | + 8     | + 9      |
| 8.2  | T1           | 10                    | 8133   | 8338 | 8543 | 8748 | 1.0                 | 2.0                 | 5.0                                | 275                                  | - 24                              | + 8     | + 9      |
| 8.2  | T1           | 5                     | 8134   | 8339 | 8544 | 8749 | 1.0                 | 2.0                 | 5.0                                | 275                                  | - 24                              | + 8     | + 9      |
| 20.0   | T2           | 20                    | 8135   | 8340 | 8545 | 8750 | 1.0                 | 5.0                 | 7.6                                | 105                                  | - 16                              | + 10.5  | + 12     |
| 20.0   | T2           | 10                    | 8136   | 8341 | 8546 | 8751 | 1.0                 | 5.0                 | 7.6                                | 105                                  | - 16                              | + 10.5  | + 12     |
| 20.0   | T2           | 5                     | 8137   | 8342 | 8547 | 8752 | 1.0                 | 5.0                 | 7.6                                | 105                                  | - 16                              | + 10.5  | + 12     |
| 39.0   | T2           | 20                    | 8138   | 8343 | 8548 | 8753 | 1.0                 | 9.0                 | 20.7                               | 90                                   | - 28                              | + 10.5  | + 12     |
| 39.0   | T2           | 10                    | 8139   | 8344 | 8549 | 8754 | 1.0                 | 9.0                 | 20.7                               | 90                                   | - 28                              | + 10.5  | + 12     |
| 39.0   | T2           | 5                     | 8140   | 8345 | 8550 | 8755 | 1.0                 | 9.0                 | 20.7                               | 90                                   | - 28                              | + 10.5  | + 12     |
| 50.0   | T3           | 20                    | 8141   | 8346 | 8551 | 8756 | 2.0                 | 12.0                | 15.3                               | 50                                   | - 16                              | + 10.5  | + 12     |
| 50.0   | T3           | 10                    | 8142   | 8347 | 8552 | 8757 | 2.0                 | 12.0                | 15.3                               | 50                                   | - 16                              | + 10.5  | + 12     |
| 50.0   | T3           | 5                     | 8143   | 8348 | 8553 | 8758 | 2.0                 | 12.0                | 15.3                               | 50                                   | - 16                              | + 10.5  | + 12     |
| 68.0   | T3           | 20                    | 8144   | 8349 | 8554 | 8759 | 2.0                 | 16.0                | 30.7                               | 50                                   | - 32                              | + 10.5  | + 12     |
| 68.0   | T3           | 10                    | 8145   | 8350 | 8555 | 8760 | 2.0                 | 16.0                | 30.7                               | 50                                   | - 32                              | + 10.5  | + 12     |
| 68.0   | T3           | 5                     | 8146   | 8351 | 8556 | 8761 | 2.0                 | 16.0                | 30.7                               | 50                                   | - 32                              | + 10.5  | + 12     |
| 140.0  | T4           | 20                    | 8147   | 8352 | 8557 | 8762 | 8.0                 | 32.0                | 25.7                               | 28                                   | - 40                              | + 20    | + 20     |
| 140.0  | T4           | 10                    | 8148   | 8353 | 8558 | 8763 | 8.0                 | 32.0                | 25.7                               | 28                                   | - 40                              | + 20    | + 20     |
| <b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 3.5  | T1           | 20                    | 8149   | 8354 | 8559 | 8764 | 1.0                 | 2.0                 | 2.5                                | 650                                  | - 16                              | + 5     | + 6      |
| 3.5  | T1           | 10                    | 8150   | 8355 | 8560 | 8765 | 1.0                 | 2.0                 | 2.5                                | 650                                  | - 16                              | + 5     | + 6      |
| 3.5  | T1           | 5                     | 8151   | 8356 | 8561 | 8766 | 1.0                 | 2.0                 | 2.5                                | 650                                  | - 16                              | + 5     | + 6      |
| 6.8  | T1           | 20                    | 8152   | 8357 | 8562 | 8767 | 1.0                 | 2.0                 | 4.1                                | 300                                  | - 20                              | + 8     | + 9      |
| 6.8  | T1           | 10                    | 8153   | 8358 | 8563 | 8768 | 1.0                 | 2.0                 | 4.1                                | 300                                  | - 20                              | + 8     | + 9      |
| 6.8  | T1           | 5                     | 8154   | 8359 | 8564 | 8769 | 1.0                 | 2.0                 | 4.1                                | 300                                  | - 20                              | + 8     | + 9      |
| 15.0   | T2           | 20                    | 8155   | 8360 | 8565 | 8770 | 1.0                 | 5.0                 | 7.5                                | 150                                  | - 16                              | + 8     | + 9      |
| 15.0   | T2           | 10                    | 8156   | 8361 | 8566 | 8771 | 1.0                 | 5.0                 | 7.5                                | 150                                  | - 16                              | + 8     | + 9      |
| 15.0   | T2           | 5                     | 8157   | 8362 | 8567 | 8772 | 1.0                 | 5.0                 | 7.4                                | 150                                  | - 16                              | + 8     | + 9      |
| 33.0   | T2           | 20                    | 8158   | 8363 | 8568 | 8773 | 1.0                 | 10.0                | 17.5                               | 90                                   | - 24                              | + 10.5  | + 15     |
| 33.0   | T2           | 10                    | 8159   | 8364 | 8569 | 8774 | 1.0                 | 10.0                | 17.5                               | 90                                   | - 24                              | + 10.5  | + 15     |
| 33.0   | T2           | 5                     | 8160   | 8365 | 8570 | 8775 | 1.0                 | 10.0                | 17.5                               | 90                                   | - 24                              | + 10.5  | + 15     |
| 40.0   | T3           | 20                    | 8161   | 8366 | 8571 | 8776 | 2.0                 | 12.0                | 15.2                               | 60                                   | - 16                              | + 10.5  | + 12     |
| 40.0   | T3           | 10                    | 8162   | 8367 | 8572 | 8777 | 2.0                 | 12.0                | 15.2                               | 60                                   | - 16                              | + 10.5  | + 12     |
| 40.0   | T3           | 5                     | 8163   | 8368 | 8573 | 8778 | 2.0                 | 12.0                | 15.2                               | 60                                   | - 16                              | + 10.5  | + 12     |
| 56.0   | T3           | 20                    | 8164   | 8369 | 8574 | 8779 | 2.0                 | 17.0                | 26.0                               | 60                                   | - 28                              | + 10.5  | + 15     |
| 56.0   | T3           | 10                    | 8165   | 8370 | 8575 | 8780 | 2.0                 | 17.0                | 26.0                               | 60                                   | - 28                              | + 10.5  | + 15     |
| 56.0   | T3           | 5                     | 8166   | 8371 | 8576 | 8781 | 2.0                 | 17.0                | 26.0                               | 60                                   | - 28                              | + 10.5  | + 15     |
| 110.0  | T4           | 20                    | 8167   | 8372 | 8577 | 8782 | 9.0                 | 36.0                | 25.7                               | 29                                   | - 35                              | + 20    | + 20     |
| 110.0  | T4           | 10                    | 8168   | 8373 | 8578 | 8783 | 9.0                 | 36.0                | 25.7                               | 29                                   | - 35                              | + 20    | + 20     |

**Note**

\* Style CLR65 is inactive for new military design. For new design use Style CLR79.



| STANDARD/EXTENDED RATINGS: CLR65*, M39006/09-XXXX  |           |                 |  |       |       |        |                  |                |                       |                         |                                |        |         |
|--|-----------|-----------------|--|-------|-------|--------|------------------|----------------|-----------------------|-------------------------|--------------------------------|--------|---------|
| CAPACITANCE (µF)                                   | CASE CODE | CAP. TOL. (± %) | PART NO. M39006/09-FAILURE RATE LEVEL (%/1000 h) |       |       |        | MAX. DCL (µA) at |                | MAX. DF at +25 °C (%) | MAX. IMP. at -55 °C (Ω) | MAX. CAPACITANCE CHANGE (%) at |        |         |
|  |           |                 | L 2.0  | M 1.0 | P 0.1 | R 0.01 | +25 °C           | +85 °C +125 °C |                       |                         | -55 °C                         | +85 °C | +125 °C |
| <b>100 WVDC at +85 °C . . . 65 WVDC at +125 °C</b> |           |                 |  |       |       |        |                  |                |                       |                         |                                |        |         |
| 2.5  | T1        | 20              | 8169   | 8374  | 8579  | 8784   | 1.0              | 2.0            | 5.0                   | 950                     | -16                            | +7     | +8      |
| 2.5  | T1        | 10              | 8170   | 8375  | 8580  | 8785   | 1.0              | 2.0            | 5.0                   | 950                     | -16                            | +7     | +8      |
| 2.5  | T1        | 5               | 8171   | 8376  | 8581  | 8786   | 1.0              | 2.0            | 5.0                   | 950                     | -16                            | +7     | +8      |
| 4.7  | T1        | 20              | 8172   | 8377  | 8582  | 8787   | 1.0              | 2.0            | 3.6                   | 500                     | -16                            | +7     | +8      |
| 4.7  | T1        | 10              | 8173   | 8378  | 8583  | 8788   | 1.0              | 2.0            | 3.6                   | 500                     | -16                            | +7     | +8      |
| 4.7  | T1        | 5               | 8174   | 8379  | 8584  | 8789   | 1.0              | 2.0            | 3.6                   | 500                     | -16                            | +7     | +8      |
| 11.0   | T2        | 20              | 8175   | 8380  | 8585  | 8790   | 1.0              | 4.0            | 5.0                   | 200                     | -16                            | +7     | +8      |
| 11.0   | T2        | 10              | 8176   | 8381  | 8586  | 8791   | 1.0              | 4.0            | 5.0                   | 200                     | -16                            | +7     | +8      |
| 11.0   | T2        | 5               | 8177   | 8382  | 8587  | 8792   | 1.0              | 4.0            | 5.0                   | 200                     | -16                            | +7     | +8      |
| 22.0   | T2        | 20              | 8178   | 8383  | 8588  | 8793   | 1.0              | 9.0            | 11.8                  | 100                     | -16                            | +7     | +8      |
| 22.0   | T2        | 10              | 8179   | 8384  | 8589  | 8794   | 1.0              | 9.0            | 11.8                  | 100                     | -16                            | +7     | +8      |
| 22.0   | T2        | 5               | 8180   | 8385  | 8590  | 8795   | 1.0              | 9.0            | 11.8                  | 100                     | -16                            | +7     | +8      |
| 30.0   | T3        | 20              | 8181   | 8386  | 8591  | 8796   | 2.0              | 12.0           | 9.1                   | 80                      | -16                            | +7     | +8      |
| 30.0   | T3        | 10              | 8182   | 8387  | 8592  | 8797   | 2.0              | 12.0           | 9.1                   | 80                      | -16                            | +7     | +8      |
| 30.0   | T3        | 5               | 8183   | 8388  | 8593  | 8798   | 2.0              | 12.0           | 9.1                   | 80                      | -16                            | +7     | +8      |
| 43.0   | T3        | 20              | 8184   | 8389  | 8594  | 8799   | 2.0              | 17.0           | 19.7                  | 70                      | -20                            | +7     | +8      |
| 43.0   | T3        | 10              | 8185   | 8390  | 8595  | 8800   | 2.0              | 17.0           | 19.7                  | 70                      | -20                            | +7     | +8      |
| 43.0   | T3        | 5               | 8186   | 8391  | 8596  | 8801   | 2.0              | 17.0           | 19.7                  | 70                      | -20                            | +7     | +8      |
| 86.0   | T4        | 20              | 8187   | 8392  | 8597  | 8802   | 9.0              | 36.0           | 20.7                  | 30                      | -25                            | +15    | +15     |
| 86.0   | T4        | 10              | 8188   | 8393  | 8598  | 8803   | 9.0              | 36.0           | 20.7                  | 30                      | -25                            | +15    | +15     |
| <b>125 WVDC at +85 °C . . . 85 WVDC at +125 °C</b> |           |                 |  |       |       |        |                  |                |                       |                         |                                |        |         |
| 1.7  | T1        | 20              | 8189   | 8394  | 8599  | 8804   | 1.0              | 2.0            | 7.0                   | 1250                    | -16                            | +7     | +8      |
| 1.7  | T1        | 10              | 8190   | 8395  | 8600  | 8805   | 1.0              | 2.0            | 7.0                   | 1250                    | -16                            | +7     | +8      |
| 1.7  | T1        | 5               | 8191   | 8396  | 8601  | 8806   | 1.0              | 2.0            | 7.0                   | 1250                    | -16                            | +7     | +8      |
| 3.6  | T1        | 20              | 8192   | 8397  | 8602  | 8807   | 1.0              | 2.0            | 4.1                   | 600                     | -16                            | +7     | +8      |
| 3.6  | T1        | 10              | 8193   | 8398  | 8603  | 8808   | 1.0              | 2.0            | 4.1                   | 600                     | -16                            | +7     | +8      |
| 3.6  | T1        | 5               | 8194   | 8399  | 8604  | 8809   | 1.0              | 2.0            | 4.1                   | 600                     | -16                            | +7     | +8      |
| 9.0  | T2        | 20              | 8195   | 8400  | 8605  | 8810   | 1.0              | 5.0            | 10.2                  | 240                     | -16                            | +7     | +8      |
| 9.0  | T2        | 10              | 8196   | 8401  | 8606  | 8811   | 1.0              | 5.0            | 10.2                  | 240                     | -16                            | +7     | +8      |
| 9.0  | T2        | 5               | 8197   | 8402  | 8607  | 8812   | 1.0              | 5.0            | 10.2                  | 240                     | -16                            | +7     | +8      |
| 14.0   | T2        | 20              | 8198   | 8403  | 8608  | 8813   | 1.0              | 7.0            | 12.7                  | 167                     | -16                            | +7     | +8      |
| 14.0   | T2        | 10              | 8199   | 8404  | 8609  | 8814   | 1.0              | 7.0            | 12.7                  | 167                     | -16                            | +7     | +8      |
| 14.0   | T2        | 5               | 8200   | 8405  | 8610  | 8815   | 1.0              | 7.0            | 12.7                  | 167                     | -16                            | +7     | +8      |
| 18.0   | T3        | 20              | 8201   | 8406  | 8611  | 8816   | 2.0              | 9.0            | 15.0                  | 129                     | -16                            | +7     | +8      |
| 18.0   | T3        | 10              | 8202   | 8407  | 8612  | 8817   | 2.0              | 9.0            | 15.0                  | 129                     | -16                            | +7     | +8      |
| 18.0   | T3        | 5               | 8203   | 8408  | 8613  | 8818   | 2.0              | 9.0            | 15.0                  | 129                     | -16                            | +7     | +8      |
| 25.0   | T3        | 20              | 8204   | 8409  | 8614  | 8819   | 2.0              | 13.0           | 19.0                  | 93                      | -16                            | +7     | +8      |
| 25.0   | T3        | 10              | 8205   | 8410  | 8615  | 8820   | 2.0              | 13.0           | 19.0                  | 93                      | -16                            | +7     | +8      |
| 25.0   | T3        | 5               | 9026   | 9029  | 9032  | 9035   | 2.0              | 13.0           | 19.0                  | 93                      | -16                            | +7     | +8      |
| 56.0   | T4        | 20              | 9027   | 9030  | 9033  | 9036   | 10.0             | 40.0           | 17.5                  | 32                      | -25                            | +15    | +15     |
| 56.0   | T4        | 10              | 9028   | 9031  | 9034  | 9037   | 10.0             | 40.0           | 17.5                  | 32                      | -25                            | +15    | +15     |

**Note**  
\* Style CLR65 is inactive for new military design. For new design use Style CLR79.





| <b>STANDARD/EXTENDED RATINGS: CLR69*, M39006/21-XXXX</b> |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
|--|--------------|-----------------------|--|------|------|------|---------------------|---------------------|------------------------------------|--------------------------------------|-----------------------------------|---------|----------|
| CAPACITANCE<br>(μF)                                      | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/21-<br>FAILURE RATE LEVEL (%/1000 h) |      |      |      | MAX. DCL (μA)<br>at |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          |
|  |              |                       | L  | M    | P    | R    | + 25 °C             | + 85 °C<br>+ 125 °C |                                    |                                      | - 55 °C                           | + 85 °C | + 125 °C |
|  |              |                       | 2.0  | 1.0  | 0.1  | 0.01 |                     |                     |                                    |                                      |                                   |         |          |
| <b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>        |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 220.0  | T1           | 20                    | 0001   | 0089 | 0177 | 0265 | 2.0                 | 9.0                 | 50                                 | 36                                   | - 64                              | + 13    | + 16     |
| 220.0  | T1           | 10                    | 0002   | 0090 | 0178 | 0266 | 2.0                 | 9.0                 | 50                                 | 36                                   | - 64                              | + 13    | + 16     |
| 820.0  | T2           | 20                    | 0003   | 0091 | 0179 | 0267 | 3.0                 | 14.0                | 155                                | 18                                   | - 88                              | + 16    | + 20     |
| 820.0  | T2           | 10                    | 0004   | 0092 | 0180 | 0268 | 3.0                 | 14.0                | 155                                | 18                                   | - 88                              | + 16    | + 20     |
| 1500.0   | T3           | 20                    | 0005   | 0093 | 0181 | 0269 | 5.0                 | 20.0                | 172                                | 18                                   | - 90                              | + 20    | + 25     |
| 1500.0   | T3           | 10                    | 0006   | 0094 | 0182 | 0270 | 5.0                 | 20.0                | 172                                | 18                                   | - 90                              | + 20    | + 25     |
| 2200.0   | T4           | 20                    | 0007   | 0095 | 0183 | 0271 | 6.0                 | 24.0                | 170                                | 13                                   | - 90                              | + 25    | + 30     |
| 2200.0   | T4           | 10                    | 0008   | 0096 | 0184 | 0272 | 6.0                 | 24.0                | 170                                | 13                                   | - 90                              | + 25    | + 30     |
| <b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>        |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 180.0  | T1           | 20                    | 0009   | 0097 | 0185 | 0273 | 2.0                 | 9.0                 | 41                                 | 45                                   | - 60                              | + 13    | + 16     |
| 180.0  | T1           | 10                    | 0010   | 0098 | 0186 | 0274 | 2.0                 | 9.0                 | 41                                 | 45                                   | - 60                              | + 13    | + 16     |
| 680.0  | T2           | 20                    | 0011   | 0099 | 0187 | 0275 | 3.0                 | 14.0                | 130                                | 22                                   | - 83                              | + 16    | + 20     |
| 680.0  | T2           | 10                    | 0012   | 0100 | 0188 | 0276 | 3.0                 | 14.0                | 130                                | 22                                   | - 83                              | + 16    | + 20     |
| 1500.0   | T3           | 20                    | 0013   | 0101 | 0189 | 0277 | 5.0                 | 20.0                | 170                                | 18                                   | - 90                              | + 20    | + 25     |
| 1500.0   | T3           | 10                    | 0014   | 0102 | 0190 | 0278 | 5.0                 | 20.0                | 170                                | 18                                   | - 90                              | + 20    | + 25     |
| 1800.0   | T4           | 20                    | 0015   | 0103 | 0191 | 0279 | 7.0                 | 25.0                | 138                                | 14                                   | - 90                              | + 25    | + 30     |
| 1800.0   | T4           | 10                    | 0016   | 0104 | 0192 | 0280 | 7.0                 | 25.0                | 138                                | 14                                   | - 90                              | + 25    | + 30     |
| <b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>       |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 150.0  | T1           | 20                    | 0017   | 0105 | 0193 | 0281 | 2.0                 | 9.0                 | 34                                 | 54                                   | - 55                              | + 13    | + 16     |
| 150.0  | T1           | 10                    | 0018   | 0106 | 0194 | 0282 | 2.0                 | 9.0                 | 34                                 | 54                                   | - 55                              | + 13    | + 16     |
| 560.0  | T2           | 20                    | 0019   | 0107 | 0195 | 0283 | 3.0                 | 16.0                | 106                                | 27                                   | - 77                              | + 16    | + 20     |
| 560.0  | T2           | 10                    | 0020   | 0108 | 0196 | 0284 | 3.0                 | 16.0                | 106                                | 27                                   | - 77                              | + 16    | + 20     |
| 1200.0   | T3           | 20                    | 0021   | 0109 | 0197 | 0285 | 5.0                 | 20.0                | 137                                | 18                                   | - 88                              | + 20    | + 25     |
| 1200.0   | T3           | 10                    | 0022   | 0110 | 0198 | 0286 | 5.0                 | 20.0                | 137                                | 18                                   | - 88                              | + 20    | + 25     |
| 1500.0   | T4           | 20                    | 0023   | 0111 | 0199 | 0287 | 7.0                 | 25.0                | 114                                | 15                                   | - 88                              | + 25    | + 30     |
| 1500.0   | T4           | 10                    | 0024   | 0112 | 0200 | 0288 | 7.0                 | 25.0                | 114                                | 15                                   | - 88                              | + 25    | + 30     |
| <b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 100.0  | T1           | 20                    | 0025   | 0113 | 0201 | 0289 | 2.0                 | 9.0                 | 30                                 | 72                                   | - 44                              | + 13    | + 16     |
| 100.0  | T1           | 10                    | 0026   | 0114 | 0202 | 0290 | 2.0                 | 9.0                 | 30                                 | 72                                   | - 44                              | + 13    | + 16     |
| 390.0  | T2           | 20                    | 0027   | 0115 | 0203 | 0291 | 3.0                 | 16.0                | 74                                 | 31                                   | - 66                              | + 16    | + 20     |
| 390.0  | T2           | 10                    | 0028   | 0116 | 0204 | 0292 | 3.0                 | 16.0                | 74                                 | 31                                   | - 66                              | + 16    | + 20     |
| 820.0  | T3           | 20                    | 0029   | 0117 | 0205 | 0293 | 6.0                 | 24.0                | 111                                | 22                                   | - 77                              | + 20    | + 25     |
| 820.0  | T3           | 10                    | 0030   | 0118 | 0206 | 0294 | 6.0                 | 24.0                | 111                                | 22                                   | - 77                              | + 20    | + 25     |
| 1000.0   | T4           | 20                    | 0031   | 0119 | 0207 | 0295 | 8.0                 | 32.0                | 92                                 | 17                                   | - 77                              | + 25    | + 30     |
| 1000.0   | T4           | 10                    | 0032   | 0120 | 0208 | 0296 | 8.0                 | 32.0                | 92                                 | 17                                   | - 77                              | + 25    | + 30     |
| <b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 68.0   | T1           | 20                    | 0033   | 0121 | 0209 | 0297 | 2.0                 | 9.0                 | 22                                 | 90                                   | - 40                              | + 12    | + 15     |
| 68.0   | T1           | 10                    | 0034   | 0122 | 0210 | 0298 | 2.0                 | 9.0                 | 22                                 | 90                                   | - 40                              | + 12    | + 15     |
| 270.0  | T2           | 20                    | 0035   | 0123 | 0211 | 0299 | 3.0                 | 16.0                | 55                                 | 33                                   | - 62                              | + 13    | + 16     |
| 270.0  | T2           | 10                    | 0036   | 0124 | 0212 | 0300 | 3.0                 | 16.0                | 55                                 | 33                                   | - 62                              | + 13    | + 16     |
| 560.0  | T3           | 20                    | 0037   | 0125 | 0213 | 0301 | 7.0                 | 28.0                | 76                                 | 24                                   | - 72                              | + 20    | + 25     |
| 560.0  | T3           | 10                    | 0038   | 0126 | 0214 | 0302 | 7.0                 | 28.0                | 76                                 | 24                                   | - 72                              | + 20    | + 25     |
| 680.0  | T4           | 20                    | 0039   | 0127 | 0215 | 0303 | 8.0                 | 32.0                | 63                                 | 19                                   | - 72                              | + 25    | + 30     |
| 680.0  | T4           | 10                    | 0040   | 0128 | 0216 | 0304 | 8.0                 | 32.0                | 63                                 | 19                                   | - 72                              | + 25    | + 30     |
| <b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>      |              |                       |  |      |      |      |                     |                     |                                    |                                      |                                   |         |          |
| 56.0   | T1           | 20                    | 0041   | 0129 | 0217 | 0305 | 2.0                 | 9.0                 | 22                                 | 100                                  | - 38                              | + 12    | + 15     |
| 56.0   | T1           | 10                    | 0042   | 0130 | 0218 | 0306 | 2.0                 | 9.0                 | 22                                 | 100                                  | - 38                              | + 12    | + 15     |
| 220.0  | T2           | 20                    | 0043   | 0131 | 0219 | 0307 | 3.0                 | 16.0                | 42                                 | 36                                   | - 60                              | + 13    | + 16     |
| 220.0  | T2           | 10                    | 0044   | 0132 | 0220 | 0308 | 3.0                 | 16.0                | 42                                 | 36                                   | - 60                              | + 13    | + 16     |
| 470.0  | T3           | 20                    | 0045   | 0133 | 0221 | 0309 | 8.0                 | 32.0                | 64                                 | 25                                   | - 65                              | + 20    | + 25     |
| 470.0  | T3           | 10                    | 0046   | 0134 | 0222 | 0310 | 8.0                 | 32.0                | 64                                 | 25                                   | - 65                              | + 20    | + 25     |
| 560.0  | T4           | 20                    | 0047   | 0135 | 0223 | 0311 | 9.0                 | 36.0                | 55                                 | 20                                   | - 65                              | + 25    | + 30     |
| 560.0  | T4           | 10                    | 0048   | 0136 | 0224 | 0312 | 9.0                 | 36.0                | 55                                 | 20                                   | - 65                              | + 25    | + 30     |

**Note**

\* Style CLR65 is inactive for new military design. For new design use Style CLR81.





| <b>STANDARD/EXTENDED RATINGS: CLR69*, M39006/21-XXXX</b> |              |                            |                               |          |          |           |                     |                     |                                    |   |                                   |         |          |
|--|--------------|----------------------------|-------------------------------|----------|----------|-----------|---------------------|---------------------|------------------------------------|---|-----------------------------------|---------|----------|
| CAPACITANCE<br>( $\mu$ F)                                | CASE<br>CODE | CAP.<br>TOL.<br>( $\pm$ %) | PART NO. M39006/21-           |          |          |           | MAX. DCL ( $\mu$ A) |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>( $\Omega$ ) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          |
|  |              |                            | FAILURE RATE LEVEL (%/1000 h) |          |          |           | at                  |                     |                                    |   | - 55 °C                           | + 85 °C | + 125 °C |
|  |              |                            | L<br>2.0                      | M<br>1.0 | P<br>0.1 | R<br>0.01 | + 25 °C             | + 85 °C<br>+ 125 °C |                                    |   |                                   |         |          |
| <b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>      |              |                            |                               |          |          |           |                     |                     |                                    |   |                                   |         |          |
| 33.0   | T1           | 20                         | 0049                          | 0137     | 0225     | 0313      | 2.0                 | 9.0                 | 12.3                               | 135   | - 29                              | + 10    | + 12     |
| 33.0   | T1           | 10                         | 0050                          | 0138     | 0226     | 0314      | 2.0                 | 9.0                 | 12.3                               | 135   | - 29                              | + 10    | + 12     |
| 120.0  | T2           | 20                         | 0051                          | 0139     | 0227     | 0315      | 4.0                 | 24.0                | 22.5                               | 49  | - 42                              | + 12    | + 15     |
| 120.0  | T2           | 10                         | 0052                          | 0140     | 0228     | 0316      | 4.0                 | 24.0                | 22.5                               | 49  | - 42                              | + 12    | + 15     |
| 270.0  | T3           | 20                         | 0053                          | 0141     | 0229     | 0317      | 8.0                 | 32.0                | 37                                 | 29  | - 46                              | + 20    | + 25     |
| 270.0  | T3           | 10                         | 0054                          | 0142     | 0230     | 0318      | 8.0                 | 32.0                | 37                                 | 29  | - 46                              | + 20    | + 25     |
| 330.0  | T4           | 20                         | 0055                          | 0143     | 0231     | 0319      | 9.0                 | 36.0                | 38                                 | 22  | - 46                              | + 25    | + 30     |
| 330.0  | T4           | 10                         | 0056                          | 0144     | 0232     | 0320      | 9.0                 | 36.0                | 38                                 | 22  | - 46                              | + 25    | + 30     |
| <b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>      |              |                            |                               |          |          |           |                     |                     |                                    |   |                                   |         |          |
| 27.0   | T1           | 20                         | 0057                          | 0145     | 0233     | 0321      | 3.0                 | 12.0                | 10.2                               | 144   | - 24                              | + 10    | + 12     |
| 27.0   | T1           | 10                         | 0058                          | 0146     | 0234     | 0322      | 3.0                 | 12.0                | 10.2                               | 144   | - 24                              | + 10    | + 12     |
| 100.0  | T2           | 20                         | 0059                          | 0147     | 0235     | 0323      | 4.0                 | 20.0                | 19                                 | 54  | - 36                              | + 12    | + 15     |
| 100.0  | T2           | 10                         | 0060                          | 0148     | 0236     | 0324      | 4.0                 | 20.0                | 19                                 | 54  | - 36                              | + 12    | + 15     |
| 220.0  | T3           | 20                         | 0061                          | 0149     | 0237     | 0325      | 8.0                 | 32.0                | 30                                 | 29  | - 40                              | + 16    | + 20     |
| 220.0  | T3           | 10                         | 0062                          | 0150     | 0238     | 0326      | 8.0                 | 32.0                | 30                                 | 29  | - 40                              | + 16    | + 20     |
| 270.0  | T4           | 20                         | 0063                          | 0151     | 0239     | 0327      | 9.0                 | 36.0                | 27                                 | 23  | - 45                              | + 20    | + 25     |
| 270.0  | T4           | 10                         | 0064                          | 0152     | 0240     | 0328      | 9.0                 | 36.0                | 27                                 | 23  | - 45                              | + 20    | + 25     |
| <b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>      |              |                            |                               |          |          |           |                     |                     |                                    |   |                                   |         |          |
| 22.0   | T1           | 20                         | 0065                          | 0153     | 0241     | 0329      | 3.0                 | 12.0                | 8.5                                | 157   | - 19                              | + 10    | + 12     |
| 22.0   | T1           | 10                         | 0066                          | 0154     | 0242     | 0330      | 3.0                 | 12.0                | 8.5                                | 157   | - 19                              | + 10    | + 12     |
| 82.0   | T2           | 20                         | 0067                          | 0155     | 0243     | 0331      | 4.0                 | 24.0                | 15.2                               | 63  | - 30                              | + 12    | + 15     |
| 82.0   | T2           | 10                         | 0068                          | 0156     | 0244     | 0332      | 4.0                 | 24.0                | 15.2                               | 63  | - 30                              | + 12    | + 15     |
| 180.0  | T3           | 20                         | 0069                          | 0157     | 0245     | 0333      | 9.0                 | 36.0                | 24.4                               | 30  | - 35                              | + 16    | + 20     |
| 180.0  | T3           | 10                         | 0070                          | 0158     | 0246     | 0334      | 9.0                 | 36.0                | 24.4                               | 30  | - 35                              | + 16    | + 20     |
| 220.0  | T4           | 20                         | 0071                          | 0159     | 0247     | 0335      | 10.0                | 40.0                | 37.0                               | 24  | - 40                              | + 20    | + 25     |
| 220.0  | T4           | 10                         | 0072                          | 0160     | 0248     | 0336      | 10.0                | 40.0                | 37.0                               | 24  | - 40                              | + 20    | + 25     |
| <b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>     |              |                            |                               |          |          |           |                     |                     |                                    |   |                                   |         |          |
| 10.0   | T1           | 20                         | 0073                          | 0161     | 0249     | 0337      | 3.0                 | 12.0                | 4.5                                | 200   | - 17                              | + 10    | + 12     |
| 10.0   | T1           | 10                         | 0074                          | 0162     | 0250     | 0338      | 3.0                 | 12.0                | 4.5                                | 200   | - 17                              | + 10    | + 12     |
| 39.0   | T2           | 20                         | 0075                          | 0163     | 0251     | 0339      | 5.0                 | 24.0                | 10.4                               | 80  | - 20                              | + 12    | + 15     |
| 39.0   | T2           | 10                         | 0076                          | 0164     | 0252     | 0340      | 5.0                 | 24.0                | 10.4                               | 80  | - 20                              | + 12    | + 15     |
| 68.0   | T3           | 20                         | 0077                          | 0165     | 0253     | 0341      | 10.0                | 40.0                | 11.3                               | 40  | - 30                              | + 14    | + 16     |
| 68.0   | T3           | 10                         | 0078                          | 0166     | 0254     | 0342      | 10.0                | 40.0                | 11.3                               | 40  | - 30                              | + 14    | + 16     |
| 120.0  | T4           | 20                         | 0079                          | 0167     | 0255     | 0343      | 12.0                | 48.0                | 25                                 | 30  | - 35                              | + 15    | + 17     |
| 120.0  | T4           | 10                         | 0080                          | 0168     | 0256     | 0344      | 12.0                | 48.0                | 25                                 | 30  | - 35                              | + 15    | + 17     |
| <b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>     |              |                            |                               |          |          |           |                     |                     |                                    |   |                                   |         |          |
| 6.8  | T1           | 20                         | 0081                          | 0169     | 0257     | 0345      | 3.0                 | 12.0                | 6.0                                | 300   | - 14                              | + 10    | + 12     |
| 6.8  | T1           | 10                         | 0082                          | 0170     | 0258     | 0346      | 3.0                 | 12.0                | 6.0                                | 300   | - 14                              | + 10    | + 12     |
| 27.0   | T2           | 20                         | 0083                          | 0171     | 0259     | 0347      | 5.0                 | 24.0                | 7.2                                | 90  | - 18                              | + 12    | + 15     |
| 27.0   | T2           | 10                         | 0084                          | 0172     | 0260     | 0348      | 5.0                 | 24.0                | 7.2                                | 90  | - 18                              | + 12    | + 15     |
| 47.0   | T3           | 20                         | 0085                          | 0173     | 0261     | 0349      | 10.0                | 40.0                | 7.9                                | 50  | - 26                              | + 14    | + 16     |
| 47.0   | T3           | 10                         | 0086                          | 0174     | 0262     | 0350      | 10.0                | 40.0                | 7.9                                | 50  | - 26                              | + 14    | + 16     |
| 82.0   | T4           | 20                         | 0087                          | 0175     | 0263     | 0351      | 12.0                | 48.0                | 17.4                               | 32  | - 30                              | + 15    | + 17     |
| 82.0   | T4           | 10                         | 0088                          | 0176     | 0264     | 0352      | 12.0                | 48.0                | 17.4                               | 32  | - 30                              | + 15    | + 17     |

**Note**

\* Style CLR65 is inactive for new military design. For new design use Style CLR81.





| <b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b> |              |                       |  |      |      |                     |                     |            |              |                                   |         |          |                             |
|---|--------------|-----------------------|--|------|------|---------------------|---------------------|------------|--------------|-----------------------------------|---------|----------|-----------------------------|
| CAPACITANCE<br>(µF)                                     | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/22-*<br>FAILURE RATE LEVEL<br>(%/1000 h) |      |      | MAX. DCL (µA)<br>at |                     | MAX.<br>DF | MAX.<br>IMP. | MAX. CAPACITANCE<br>CHANGE (%) at |         |          | MAX.**<br>RIPPLE<br>CURRENT |
|   |              |                       | M  | P    | R    | + 25 °C             | + 85 °C<br>+ 125 °C | + 25 °C    | - 55 °C      | - 55 °C                           | + 85 °C | + 125 °C | at + 85 °C                  |
|   |              |                       | 1.0  | 0.1  | 0.01 | (%)                 | (%)                 | (%)        | (Ω)          |                                   |         |          | 40 kHz<br>(mA)              |
| <b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>       |              |                       |  |      |      |                     |                     |            |              |                                   |         |          |                             |
| 30.0  | T1           | 20                    | 0001   | 0221 | 0441 | 1.0                 | 2.0                 | 9          | 100          | - 40                              | + 10.5  | + 12     | 820                         |
| 30.0  | T1           | 10                    | 0002   | 0222 | 0442 | 1.0                 | 2.0                 | 9          | 100          | - 40                              | + 10.5  | + 12     | 820                         |
| 30.0  | T1           | 5                     | 0003   | 0223 | 0443 | 1.0                 | 2.0                 | 9          | 100          | - 40                              | + 10.5  | + 12     | 820                         |
| 68.0  | T1           | 20                    | 0004   | 0224 | 0444 | 1.0                 | 2.0                 | 15         | 60           | - 40                              | + 14    | + 16     | 960                         |
| 68.0  | T1           | 10                    | 0005   | 0225 | 0445 | 1.0                 | 2.0                 | 15         | 60           | - 40                              | + 14    | + 16     | 960                         |
| 68.0  | T1           | 5                     | 0006   | 0226 | 0446 | 1.0                 | 2.0                 | 15         | 60           | - 40                              | + 14    | + 16     | 960                         |
| 140.0   | T2           | 20                    | 0007   | 0227 | 0447 | 1.0                 | 3.0                 | 21         | 40           | - 40                              | + 14    | + 16     | 1200                        |
| 140.0   | T2           | 10                    | 0008   | 0228 | 0448 | 1.0                 | 3.0                 | 21         | 40           | - 40                              | + 14    | + 16     | 1200                        |
| 140.0   | T2           | 5                     | 0009   | 0229 | 0449 | 1.0                 | 3.0                 | 21         | 40           | - 40                              | + 14    | + 16     | 1200                        |
| 270.0   | T2           | 20                    | 0010   | 0230 | 0450 | 1.0                 | 6.5                 | 45         | 25           | - 44                              | + 17.5  | + 20     | 1375                        |
| 270.0   | T2           | 10                    | 0011   | 0231 | 0451 | 1.0                 | 6.5                 | 45         | 25           | - 44                              | + 17.5  | + 20     | 1375                        |
| 270.0   | T2           | 5                     | 0012   | 0232 | 0452 | 1.0                 | 6.5                 | 45         | 25           | - 44                              | + 17.5  | + 20     | 1375                        |
| 330.0   | T3           | 20                    | 0013   | 0233 | 0453 | 2.0                 | 7.9                 | 36         | 20           | - 44                              | + 14    | + 16     | 1800                        |
| 330.0   | T3           | 10                    | 0014   | 0234 | 0454 | 2.0                 | 7.9                 | 36         | 20           | - 44                              | + 14    | + 16     | 1800                        |
| 330.0   | T3           | 5                     | 0015   | 0235 | 0455 | 2.0                 | 7.9                 | 36         | 20           | - 44                              | + 14    | + 16     | 1800                        |
| 560.0   | T3           | 20                    | 0016   | 0236 | 0456 | 2.0                 | 13.0                | 55         | 25           | - 64                              | + 17.5  | + 20     | 1900                        |
| 560.0   | T3           | 10                    | 0017   | 0237 | 0457 | 2.0                 | 13.0                | 55         | 25           | - 64                              | + 17.5  | + 20     | 1900                        |
| 560.0   | T3           | 5                     | 0018   | 0238 | 0458 | 2.0                 | 13.0                | 55         | 25           | - 64                              | + 17.5  | + 20     | 1900                        |
| 1200.0  | T4           | 20                    | 0019   | 0239 | 0459 | 3.0                 | 14.0                | 90         | 20           | - 80                              | + 25    | + 25     | 2265                        |
| 1200.0  | T4           | 10                    | 0020   | 0240 | 0460 | 3.0                 | 14.0                | 90         | 20           | - 80                              | + 25    | + 25     | 2265                        |
| <b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>       |              |                       |  |      |      |                     |                     |            |              |                                   |         |          |                             |
| 25.0  | T1           | 20                    | 0021   | 0241 | 0461 | 1.0                 | 2.0                 | 7.5        | 100          | - 40                              | + 10.5  | + 12     | 820                         |
| 25.0  | T1           | 10                    | 0022   | 0242 | 0462 | 1.0                 | 2.0                 | 7.5        | 100          | - 40                              | + 10.5  | + 12     | 820                         |
| 25.0  | T1           | 5                     | 0023   | 0243 | 0463 | 1.0                 | 2.0                 | 7.5        | 100          | - 40                              | + 10.5  | + 12     | 820                         |
| 56.0  | T1           | 20                    | 0024   | 0244 | 0464 | 1.0                 | 2.0                 | 14         | 59           | - 40                              | + 14    | + 16     | 900                         |
| 56.0  | T1           | 10                    | 0025   | 0245 | 0465 | 1.0                 | 2.0                 | 14         | 59           | - 40                              | + 14    | + 16     | 900                         |
| 56.0  | T1           | 5                     | 0026   | 0246 | 0466 | 1.0                 | 2.0                 | 14         | 59           | - 40                              | + 14    | + 16     | 900                         |
| 120.0   | T2           | 20                    | 0027   | 0247 | 0467 | 1.0                 | 2.0                 | 20         | 50           | - 44                              | + 17.5  | + 20     | 1220                        |
| 120.0   | T2           | 10                    | 0028   | 0248 | 0468 | 1.0                 | 2.0                 | 20         | 50           | - 44                              | + 17.5  | + 20     | 1220                        |
| 120.0   | T2           | 5                     | 0029   | 0249 | 0469 | 1.0                 | 2.0                 | 20         | 50           | - 44                              | + 17.5  | + 20     | 1220                        |
| 220.0   | T2           | 20                    | 0030   | 0250 | 0470 | 1.0                 | 7.0                 | 37         | 30           | - 44                              | + 17.5  | + 20     | 1370                        |
| 220.0   | T2           | 10                    | 0031   | 0251 | 0471 | 1.0                 | 7.0                 | 37         | 30           | - 44                              | + 17.5  | + 20     | 1370                        |
| 220.0   | T2           | 5                     | 0032   | 0252 | 0472 | 1.0                 | 7.0                 | 37         | 30           | - 44                              | + 17.5  | + 20     | 1370                        |
| 290.0   | T3           | 20                    | 0033   | 0253 | 0473 | 2.0                 | 6.0                 | 34         | 25           | - 64                              | + 17.5  | + 20     | 1770                        |
| 290.0   | T3           | 10                    | 0034   | 0254 | 0474 | 2.0                 | 6.0                 | 34         | 25           | - 64                              | + 17.5  | + 20     | 1770                        |
| 290.0   | T3           | 5                     | 0035   | 0255 | 0475 | 2.0                 | 6.0                 | 34         | 25           | - 64                              | + 17.5  | + 20     | 1770                        |
| 430.0   | T3           | 20                    | 0036   | 0256 | 0476 | 2.0                 | 14.0                | 46         | 25           | - 64                              | + 17.5  | + 20     | 1825                        |
| 430.0   | T3           | 10                    | 0037   | 0257 | 0477 | 2.0                 | 14.0                | 46         | 25           | - 64                              | + 17.5  | + 20     | 1825                        |
| 430.0   | T3           | 5                     | 0038   | 0258 | 0478 | 2.0                 | 14.0                | 46         | 25           | - 64                              | + 17.5  | + 20     | 1825                        |
| 850.0   | T4           | 20                    | 0039   | 0259 | 0479 | 4.0                 | 16.0                | 60         | 22           | - 80                              | + 25    | + 25     | 2330                        |
| 850.0   | T4           | 10                    | 0040   | 0260 | 0480 | 4.0                 | 16.0                | 60         | 22           | - 80                              | + 25    | + 25     | 2330                        |
| <b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>      |              |                       |  |      |      |                     |                     |            |              |                                   |         |          |                             |
| 20.0  | T1           | 20                    | 0041   | 0261 | 0481 | 1.0                 | 2.0                 | 6          | 175          | - 32                              | + 10.5  | + 12     | 820                         |
| 20.0  | T1           | 10                    | 0042   | 0262 | 0482 | 1.0                 | 2.0                 | 6          | 175          | - 32                              | + 10.5  | + 12     | 820                         |
| 20.0  | T1           | 5                     | 0043   | 0263 | 0483 | 1.0                 | 2.0                 | 6          | 175          | - 32                              | + 10.5  | + 12     | 820                         |
| 47.0  | T1           | 20                    | 0044   | 0264 | 0484 | 1.0                 | 2.0                 | 13         | 100          | - 36                              | + 14    | + 16     | 855                         |
| 47.0  | T1           | 10                    | 0045   | 0265 | 0485 | 1.0                 | 2.0                 | 13         | 100          | - 36                              | + 14    | + 16     | 855                         |
| 47.0  | T1           | 5                     | 0046   | 0266 | 0486 | 1.0                 | 2.0                 | 13         | 100          | - 36                              | + 14    | + 16     | 855                         |
| 100.0   | T2           | 20                    | 0047   | 0267 | 0487 | 1.0                 | 4.0                 | 15         | 60           | - 36                              | + 14    | + 16     | 1200                        |
| 100.0   | T2           | 10                    | 0048   | 0268 | 0488 | 1.0                 | 4.0                 | 15         | 60           | - 36                              | + 14    | + 16     | 1200                        |
| 100.0   | T2           | 5                     | 0049   | 0269 | 0489 | 1.0                 | 4.0                 | 15         | 60           | - 36                              | + 14    | + 16     | 1200                        |
| 180.0   | T2           | 20                    | 0050   | 0270 | 0490 | 1.0                 | 7.0                 | 30         | 40           | - 36                              | + 14    | + 16     | 1365                        |

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



| STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX    |              |                       |                                  |      |      |               |                     |                             |                               |                                   |         |          |   |
|---|--------------|-----------------------|----------------------------------|------|------|---------------|---------------------|-----------------------------|-------------------------------|-----------------------------------|---------|----------|---|
| CAPACITANCE<br>(µF)                                 | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/22-*             |      |      | MAX. DCL (µA) |                     | MAX.<br>DF<br>at<br>+ 25 °C | MAX.<br>IMP.<br>at<br>- 55 °C | MAX. CAPACITANCE<br>CHANGE (%) at |         |          | MAX.**<br>RIPPLE<br>CURRENT<br>at + 85 °C<br>40 kHz<br>(mA) |
|   |              |                       | FAILURE RATE LEVEL<br>(%/1000 h) |      |      | at            |                     |                             |                               | +                                 |         |          |   |
|   |              |                       | M                                | P    | R    | + 25 °C       | + 85 °C<br>+ 125 °C | + 25 °C                     | - 55 °C                       | - 55 °C                           | + 85 °C | + 125 °C |   |
| <b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>  |              |                       |                                  |      |      |               |                     |                             |                               |                                   |         |          |   |
| 180.0   | T2           | 10                    | 0051                             | 0271 | 0491 | 1.0           | 7.0                 | 30                          | 40                            | - 36                              | + 14    | + 16     | 1365  |
| 180.0   | T2           | 5                     | 0052                             | 0272 | 0492 | 1.0           | 7.0                 | 30                          | 40                            | - 36                              | + 14    | + 16     | 1365  |
| 250.0   | T3           | 20                    | 0053                             | 0273 | 0493 | 2.0           | 10.0                | 30                          | 30                            | - 40                              | + 14    | + 16     | 1720  |
| 250.0   | T3           | 10                    | 0054                             | 0274 | 0494 | 2.0           | 10.0                | 30                          | 30                            | - 40                              | + 14    | + 16     | 1720  |
| 250.0   | T3           | 5                     | 0055                             | 0275 | 0495 | 2.0           | 10.0                | 30                          | 30                            | - 40                              | + 14    | + 16     | 1720  |
| 390.0   | T3           | 20                    | 0056                             | 0276 | 0496 | 2.0           | 16.0                | 44                          | 25                            | - 64                              | + 17.5  | + 20     | 1800  |
| 390.0   | T3           | 10                    | 0057                             | 0277 | 0497 | 2.0           | 16.0                | 44                          | 25                            | - 64                              | + 17.5  | + 20     | 1800  |
| 390.0   | T3           | 5                     | 0058                             | 0278 | 0498 | 2.0           | 16.0                | 44                          | 25                            | - 64                              | + 17.5  | + 20     | 1800  |
| 750.0   | T4           | 20                    | 0059                             | 0279 | 0499 | 4.0           | 16.0                | 50                          | 23                            | - 80                              | + 25    | + 25     | 2360  |
| 750.0   | T4           | 10                    | 0060                             | 0280 | 0500 | 4.0           | 16.0                | 50                          | 23                            | - 80                              | + 25    | + 25     | 2360  |
| <b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b> |              |                       |                                  |      |      |               |                     |                             |                               |                                   |         |          |   |
| 15.0  | T1           | 20                    | 0061                             | 0281 | 0501 | 1.0           | 2.0                 | 5                           | 155                           | - 24                              | + 10.5  | + 12     | 780   |
| 15.0  | T1           | 10                    | 0062                             | 0282 | 0502 | 1.0           | 2.0                 | 5                           | 155                           | - 24                              | + 10.5  | + 12     | 780   |
| 15.0  | T1           | 5                     | 0063                             | 0283 | 0503 | 1.0           | 2.0                 | 5                           | 155                           | - 24                              | + 10.5  | + 12     | 780   |
| 33.0  | T1           | 20                    | 0064                             | 0284 | 0504 | 1.0           | 2.0                 | 10                          | 90                            | - 28                              | + 14    | + 16     | 820   |
| 33.0  | T1           | 10                    | 0065                             | 0285 | 0505 | 1.0           | 2.0                 | 10                          | 90                            | - 28                              | + 14    | + 16     | 820   |
| 33.0  | T1           | 5                     | 0066                             | 0286 | 0506 | 1.0           | 2.0                 | 10                          | 90                            | - 28                              | + 14    | + 16     | 820   |
| 70.0  | T2           | 20                    | 0067                             | 0287 | 0507 | 1.0           | 4.0                 | 13                          | 75                            | - 28                              | + 14    | + 16     | 1150  |
| 70.0  | T2           | 10                    | 0068                             | 0288 | 0508 | 1.0           | 4.0                 | 13                          | 75                            | - 28                              | + 14    | + 16     | 1150  |
| 70.0  | T2           | 5                     | 0069                             | 0289 | 0509 | 1.0           | 4.0                 | 13                          | 75                            | - 28                              | + 14    | + 16     | 1150  |
| 120.0   | T2           | 20                    | 0070                             | 0290 | 0510 | 1.0           | 7.0                 | 18                          | 50                            | - 28                              | + 17.5  | + 20     | 1450  |
| 120.0   | T2           | 10                    | 0071                             | 0291 | 0511 | 1.0           | 7.0                 | 18                          | 50                            | - 28                              | + 17.5  | + 20     | 1450  |
| 120.0   | T2           | 5                     | 0072                             | 0292 | 0512 | 1.0           | 7.0                 | 18                          | 50                            | - 28                              | + 17.5  | + 20     | 1450  |
| 170.0   | T3           | 20                    | 0073                             | 0293 | 0513 | 2.0           | 10.0                | 25                          | 35                            | - 32                              | + 14    | + 16     | 1480  |
| 170.0   | T3           | 10                    | 0074                             | 0294 | 0514 | 2.0           | 10.0                | 25                          | 35                            | - 32                              | + 14    | + 16     | 1480  |
| 170.0   | T3           | 5                     | 0075                             | 0295 | 0515 | 2.0           | 10.0                | 25                          | 35                            | - 32                              | + 14    | + 16     | 1480  |
| 270.0   | T3           | 20                    | 0076                             | 0296 | 0516 | 2.0           | 16.0                | 32                          | 30                            | - 56                              | + 17.5  | + 20     | 1740  |
| 270.0   | T3           | 10                    | 0077                             | 0297 | 0517 | 2.0           | 16.0                | 32                          | 30                            | - 56                              | + 17.5  | + 20     | 1740  |
| 270.0   | T3           | 5                     | 0078                             | 0298 | 0518 | 2.0           | 16.0                | 32                          | 30                            | - 56                              | + 17.5  | + 20     | 1740  |
| 540.0   | T4           | 20                    | 0079                             | 0299 | 0519 | 6.0           | 24.0                | 40                          | 23                            | - 80                              | + 25    | + 25     | 2330  |
| 540.0   | T4           | 10                    | 0080                             | 0300 | 0520 | 6.0           | 24.0                | 40                          | 23                            | - 80                              | + 25    | + 25     | 2330  |
| <b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b> |              |                       |                                  |      |      |               |                     |                             |                               |                                   |         |          |   |
| 10.0  | T1           | 20                    | 0081                             | 0301 | 0521 | 1.0           | 2.0                 | 4                           | 220                           | - 16                              | + 8     | + 9      | 715   |
| 10.0  | T1           | 10                    | 0082                             | 0302 | 0522 | 1.0           | 2.0                 | 4                           | 220                           | - 16                              | + 8     | + 9      | 715   |
| 10.0  | T1           | 5                     | 0083                             | 0303 | 0523 | 1.0           | 2.0                 | 4                           | 220                           | - 16                              | + 8     | + 9      | 715   |
| 22.0  | T1           | 20                    | 0084                             | 0304 | 0524 | 1.0           | 2.0                 | 6.6                         | 140                           | - 20                              | + 10.5  | + 12     | 825   |
| 22.0  | T1           | 10                    | 0085                             | 0305 | 0525 | 1.0           | 2.0                 | 6.6                         | 140                           | - 20                              | + 10.5  | + 12     | 825   |
| 22.0  | T1           | 5                     | 0086                             | 0306 | 0526 | 1.0           | 2.0                 | 6.6                         | 140                           | - 20                              | + 10.5  | + 12     | 825   |
| 50.0  | T2           | 20                    | 0087                             | 0307 | 0527 | 1.0           | 2.0                 | 11.0                        | 70                            | - 28                              | + 13    | + 15     | 1130  |
| 50.0  | T2           | 10                    | 0088                             | 0308 | 0528 | 1.0           | 2.0                 | 11.0                        | 70                            | - 28                              | + 13    | + 15     | 1130  |
| 50.0  | T2           | 5                     | 0089                             | 0309 | 0529 | 1.0           | 2.0                 | 11.0                        | 70                            | - 28                              | + 13    | + 15     | 1130  |
| 100.0   | T2           | 20                    | 0090                             | 0310 | 0530 | 1.0           | 10.0                | 15                          | 50                            | - 28                              | + 13    | + 15     | 1435  |
| 100.0   | T2           | 10                    | 0091                             | 0311 | 0531 | 1.0           | 10.0                | 15                          | 50                            | - 28                              | + 13    | + 15     | 1435  |
| 100.0   | T2           | 5                     | 0092                             | 0312 | 0532 | 1.0           | 10.0                | 15                          | 50                            | - 28                              | + 13    | + 15     | 1435  |
| 120.0   | T3           | 20                    | 0093                             | 0313 | 0533 | 2.0           | 6.0                 | 21                          | 38                            | - 32                              | + 13    | + 15     | 1450  |
| 120.0   | T3           | 10                    | 0094                             | 0314 | 0534 | 2.0           | 6.0                 | 21                          | 38                            | - 32                              | + 13    | + 15     | 1450  |
| 120.0   | T3           | 5                     | 0095                             | 0315 | 0535 | 2.0           | 6.0                 | 21                          | 38                            | - 32                              | + 13    | + 15     | 1450  |
| 180.0   | T3           | 20                    | 0096                             | 0316 | 0536 | 2.0           | 18.0                | 26                          | 32                            | - 48                              | + 13    | + 15     | 1525  |
| 180.0   | T3           | 10                    | 0097                             | 0317 | 0537 | 2.0           | 18.0                | 26                          | 32                            | - 48                              | + 13    | + 15     | 1525  |
| 180.0   | T3           | 5                     | 0098                             | 0318 | 0538 | 2.0           | 18.0                | 26                          | 32                            | - 48                              | + 13    | + 15     | 1525  |
| 350.0   | T4           | 20                    | 0099                             | 0319 | 0539 | 7.0           | 28.0                | 35                          | 24                            | - 70                              | + 25    | + 25     | 1970  |
| 350.0   | T4           | 10                    | 0100                             | 0320 | 0540 | 7.0           | 28.0                | 35                          | 24                            | - 70                              | + 25    | + 25     | 1970  |

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



| <b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b> |              |                       |  |      |      |                     |                     |                                    |                                      |                                   |         |          |   |
|---|--------------|-----------------------|--|------|------|---------------------|---------------------|------------------------------------|--------------------------------------|-----------------------------------|---------|----------|---|
| CAPACITANCE<br>(µF)                                     | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/22-*<br>FAILURE RATE LEVEL<br>(%/1000 h) |      |      | MAX. DCL (µA)<br>at |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          | MAX.**<br>RIPPLE<br>CURRENT<br>at + 85 °C<br>40 kHz<br>(mA) |
|   |              |                       | M  | P    | R    | + 25 °C             | + 85 °C<br>+ 125 °C |                                    |                                      | - 55 °C                           | + 85 °C | + 125 °C |   |
|   |              |                       | 1.0  | 0.1  | 0.01 |                     |                     |                                    |                                      |                                   |         |          |   |
| <b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>     |              |                       |  |      |      |                     |                     |                                    |                                      |                                   |         |          |   |
| 8.0   | T1           | 20                    | 0101   | 0321 | 0541 | 1.0                 | 2.0                 | 4                                  | 275                                  | - 16                              | + 8     | + 12     | 640   |
| 8.0   | T1           | 10                    | 0102   | 0322 | 0542 | 1.0                 | 2.0                 | 4                                  | 275                                  | - 16                              | + 8     | + 12     | 640   |
| 8.0   | T1           | 5                     | 0103   | 0323 | 0543 | 1.0                 | 2.0                 | 4                                  | 275                                  | - 16                              | + 8     | + 12     | 640   |
| 15.0  | T1           | 20                    | 0104   | 0324 | 0544 | 1.0                 | 2.0                 | 5                                  | 175                                  | - 20                              | + 10.5  | + 12     | 780   |
| 15.0  | T1           | 10                    | 0105   | 0325 | 0545 | 1.0                 | 2.0                 | 5                                  | 175                                  | - 20                              | + 10.5  | + 12     | 780   |
| 15.0  | T1           | 5                     | 0106   | 0326 | 0546 | 1.0                 | 2.0                 | 5                                  | 175                                  | - 20                              | + 10.5  | + 12     | 780   |
| 40.0  | T2           | 20                    | 0107   | 0327 | 0547 | 1.0                 | 5.0                 | 10                                 | 65                                   | - 24                              | + 10.5  | + 12     | 1120  |
| 40.0  | T2           | 10                    | 0108   | 0328 | 0548 | 1.0                 | 5.0                 | 10                                 | 65                                   | - 24                              | + 10.5  | + 12     | 1120  |
| 40.0  | T2           | 5                     | 0109   | 0329 | 0549 | 1.0                 | 5.0                 | 10                                 | 65                                   | - 24                              | + 10.5  | + 12     | 1120  |
| 68.0  | T2           | 20                    | 0110   | 0330 | 0550 | 1.0                 | 8.0                 | 13                                 | 60                                   | - 24                              | + 13    | + 15     | 1285  |
| 68.0  | T2           | 10                    | 0111   | 0331 | 0551 | 1.0                 | 8.0                 | 13                                 | 60                                   | - 24                              | + 13    | + 15     | 1285  |
| 68.0  | T2           | 5                     | 0112   | 0332 | 0552 | 1.0                 | 8.0                 | 13                                 | 60                                   | - 24                              | + 13    | + 15     | 1285  |
| 100.0   | T3           | 20                    | 0113   | 0333 | 0553 | 2.0                 | 12.0                | 17                                 | 40                                   | - 28                              | + 10.5  | + 12     | 1450  |
| 100.0   | T3           | 10                    | 0114   | 0334 | 0554 | 2.0                 | 12.0                | 17                                 | 40                                   | - 28                              | + 10.5  | + 12     | 1450  |
| 100.0   | T3           | 5                     | 0115   | 0335 | 0555 | 2.0                 | 12.0                | 17                                 | 40                                   | - 28                              | + 10.5  | + 12     | 1450  |
| 150.0   | T3           | 20                    | 0116   | 0336 | 0556 | 2.0                 | 18.0                | 23                                 | 35                                   | - 48                              | + 13    | + 15     | 1525  |
| 150.0   | T3           | 10                    | 0117   | 0337 | 0557 | 2.0                 | 18.0                | 23                                 | 35                                   | - 48                              | + 13    | + 15     | 1525  |
| 150.0   | T3           | 5                     | 0118   | 0338 | 0558 | 2.0                 | 18.0                | 23                                 | 35                                   | - 48                              | + 13    | + 15     | 1525  |
| 300.0   | T4           | 20                    | 0119   | 0339 | 0559 | 8.0                 | 32.0                | 31                                 | 25                                   | - 60                              | + 25    | + 25     | 1950  |
| 300.0   | T4           | 10                    | 0120   | 0340 | 0560 | 8.0                 | 32.0                | 31                                 | 25                                   | - 60                              | + 25    | + 25     | 1950  |
| <b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>     |              |                       |  |      |      |                     |                     |                                    |                                      |                                   |         |          |   |
| 5.0   | T1           | 20                    | 0121   | 0341 | 0561 | 1.0                 | 2.0                 | 3                                  | 400                                  | - 16                              | + 5     | + 6      | 580   |
| 5.0   | T1           | 10                    | 0122   | 0342 | 0562 | 1.0                 | 2.0                 | 3                                  | 400                                  | - 16                              | + 5     | + 6      | 580   |
| 5.0   | T1           | 5                     | 0123   | 0343 | 0563 | 1.0                 | 2.0                 | 3                                  | 400                                  | - 16                              | + 5     | + 6      | 580   |
| 10.0  | T1           | 20                    | 0124   | 0344 | 0564 | 1.0                 | 2.0                 | 4                                  | 250                                  | - 24                              | + 8     | + 9      | 715   |
| 10.0  | T1           | 10                    | 0125   | 0345 | 0565 | 1.0                 | 2.0                 | 4                                  | 250                                  | - 24                              | + 8     | + 9      | 715   |
| 10.0  | T1           | 5                     | 0126   | 0346 | 0566 | 1.0                 | 2.0                 | 4                                  | 250                                  | - 24                              | + 8     | + 9      | 715   |
| 25.0  | T2           | 20                    | 0127   | 0347 | 0567 | 1.0                 | 5.0                 | 8                                  | 95                                   | - 20                              | + 10.5  | + 12     | 1005  |
| 25.0  | T2           | 10                    | 0128   | 0348 | 0568 | 1.0                 | 5.0                 | 8                                  | 95                                   | - 20                              | + 10.5  | + 12     | 1005  |
| 25.0  | T2           | 5                     | 0129   | 0349 | 0569 | 1.0                 | 5.0                 | 8                                  | 95                                   | - 20                              | + 10.5  | + 12     | 1005  |
| 47.0  | T2           | 20                    | 0130   | 0350 | 0570 | 1.0                 | 9.0                 | 11                                 | 70                                   | - 28                              | + 13    | + 15     | 1155  |
| 47.0  | T2           | 10                    | 0131   | 0351 | 0571 | 1.0                 | 9.0                 | 11                                 | 70                                   | - 28                              | + 13    | + 15     | 1155  |
| 47.0  | T2           | 5                     | 0132   | 0352 | 0572 | 1.0                 | 9.0                 | 11                                 | 70                                   | - 28                              | + 13    | + 15     | 1155  |
| 60.0  | T3           | 20                    | 0133   | 0353 | 0573 | 2.0                 | 12.0                | 12                                 | 45                                   | - 16                              | + 10.5  | + 12     | 1335  |
| 60.0  | T3           | 10                    | 0134   | 0354 | 0574 | 2.0                 | 12.0                | 12                                 | 45                                   | - 16                              | + 10.5  | + 12     | 1335  |
| 60.0  | T3           | 5                     | 0135   | 0355 | 0575 | 2.0                 | 12.0                | 12                                 | 45                                   | - 16                              | + 10.5  | + 12     | 1335  |
| 82.0  | T3           | 20                    | 0136   | 0356 | 0576 | 2.0                 | 16.0                | 15                                 | 45                                   | - 32                              | + 13    | + 15     | 1400  |
| 82.0  | T3           | 10                    | 0137   | 0357 | 0577 | 2.0                 | 16.0                | 15                                 | 45                                   | - 32                              | + 13    | + 15     | 1400  |
| 82.0  | T3           | 5                     | 0138   | 0358 | 0578 | 2.0                 | 16.0                | 15                                 | 45                                   | - 32                              | + 13    | + 15     | 1400  |
| 160.0   | T4           | 20                    | 0139   | 0359 | 0579 | 8.0                 | 32.0                | 17                                 | 27                                   | - 50                              | + 25    | + 25     | 1900  |
| 160.0   | T4           | 10                    | 0140   | 0360 | 0580 | 8.0                 | 32.0                | 17                                 | 27                                   | - 50                              | + 25    | + 25     | 1900  |
| <b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>     |              |                       |  |      |      |                     |                     |                                    |                                      |                                   |         |          |   |
| 4.0   | T1           | 20                    | 0141   | 0361 | 0581 | 1.0                 | 2.0                 | 2.8                                | 550                                  | - 16                              | + 5     | + 6      | 525   |
| 4.0   | T1           | 10                    | 0142   | 0362 | 0582 | 1.0                 | 2.0                 | 2.8                                | 550                                  | - 16                              | + 5     | + 6      | 525   |
| 4.0   | T1           | 5                     | 0143   | 0363 | 0583 | 1.0                 | 2.0                 | 2.8                                | 550                                  | - 16                              | + 5     | + 6      | 525   |
| 8.2   | T1           | 20                    | 0144   | 0364 | 0584 | 1.0                 | 2.0                 | 4                                  | 275                                  | - 24                              | + 8     | + 9      | 625   |
| 8.2   | T1           | 10                    | 0145   | 0365 | 0585 | 1.0                 | 2.0                 | 4                                  | 275                                  | - 24                              | + 8     | + 9      | 625   |
| 8.2   | T1           | 5                     | 0146   | 0366 | 0586 | 1.0                 | 2.0                 | 4                                  | 275                                  | - 24                              | + 8     | + 9      | 625   |
| 20.0  | T2           | 20                    | 0147   | 0367 | 0587 | 1.0                 | 5.0                 | 7                                  | 105                                  | - 16                              | + 10.5  | + 12     | 930   |
| 20.0  | T2           | 10                    | 0148   | 0368 | 0588 | 1.0                 | 5.0                 | 7                                  | 105                                  | - 16                              | + 10.5  | + 12     | 930   |
| 20.0  | T2           | 5                     | 0149   | 0369 | 0589 | 1.0                 | 5.0                 | 7                                  | 105                                  | - 16                              | + 10.5  | + 12     | 930   |
| 39.0  | T2           | 20                    | 0150   | 0370 | 0590 | 1.0                 | 9.0                 | 10                                 | 90                                   | - 28                              | + 10.5  | + 12     | 1110  |

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



| <b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b> |              |                            |  |      |      |                           |          |         |              |                                   |         |          |                             |
|---|--------------|----------------------------|--|------|------|---------------------------|----------|---------|--------------|-----------------------------------|---------|----------|-----------------------------|
| CAPACITANCE<br>( $\mu$ F)                               | CASE<br>CODE | CAP.<br>TOL.<br>( $\pm$ %) | PART NO. M39006/22-*<br>FAILURE RATE LEVEL<br>(%/1000 h) |      |      | MAX. DCL ( $\mu$ A)<br>at |          | MAX. DF | MAX.<br>IMP. | MAX. CAPACITANCE<br>CHANGE (%) at |         |          | MAX.**<br>RIPPLE<br>CURRENT |
|   |              |                            | M  | P    | R    | + 25 °C                   | + 85 °C  | at      | - 55 °C      | - 55 °C                           | + 85 °C | + 125 °C | at + 85 °C                  |
|   |              |                            | 1.0  | 0.1  | 0.01 | + 25 °C                   | + 125 °C | (%)     | ( $\Omega$ ) | - 55 °C                           | + 85 °C | + 125 °C | 40 kHz (mA)                 |
| <b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>     |              |                            |  |      |      |                           |          |         |              |                                   |         |          |                             |
| 39.0  | T2           | 10                         | 0151   | 0371 | 0591 | 1.0                       | 9.0      | 10      | 90           | - 28                              | + 10.5  | + 12     | 1110                        |
| 39.0  | T2           | 5                          | 0152   | 0372 | 0592 | 1.0                       | 9.0      | 10      | 90           | - 28                              | + 10.5  | + 12     | 1110                        |
| 50.0  | T3           | 20                         | 0153   | 0373 | 0593 | 2.0                       | 12.0     | 10      | 50           | - 16                              | + 10.5  | + 12     | 1330                        |
| 50.0  | T3           | 10                         | 0154   | 0374 | 0594 | 2.0                       | 12.0     | 10      | 50           | - 16                              | + 10.5  | + 12     | 1330                        |
| 50.0  | T3           | 5                          | 0155   | 0375 | 0595 | 2.0                       | 12.0     | 10      | 50           | - 16                              | + 10.5  | + 12     | 1330                        |
| 68.0  | T3           | 20                         | 0156   | 0376 | 0596 | 2.0                       | 16.0     | 13      | 50           | - 32                              | + 10.5  | + 12     | 1365                        |
| 68.0  | T3           | 10                         | 0157   | 0377 | 0597 | 2.0                       | 16.0     | 13      | 50           | - 32                              | + 10.5  | + 12     | 1365                        |
| 68.0  | T3           | 5                          | 0158   | 0378 | 0598 | 2.0                       | 16.0     | 13      | 50           | - 32                              | + 10.5  | + 12     | 1365                        |
| 140.0   | T4           | 20                         | 0159   | 0379 | 0599 | 8.0                       | 32.0     | 16      | 28           | - 40                              | + 20    | + 20     | 1850                        |
| 140.0   | T4           | 10                         | 0160   | 0380 | 0600 | 8.0                       | 32.0     | 16      | 28           | - 40                              | + 20    | + 20     | 1850                        |
| <b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>     |              |                            |  |      |      |                           |          |         |              |                                   |         |          |                             |
| 3.5   | T1           | 20                         | 0161   | 0381 | 0601 | 1.0                       | 2.0      | 2.5     | 650          | - 16                              | + 5     | + 6      | 525                         |
| 3.5   | T1           | 10                         | 0162   | 0382 | 0602 | 1.0                       | 2.0      | 2.5     | 650          | - 16                              | + 5     | + 6      | 525                         |
| 3.5   | T1           | 5                          | 0163   | 0383 | 0603 | 1.0                       | 2.0      | 2.5     | 650          | - 16                              | + 5     | + 6      | 525                         |
| 6.8   | T1           | 20                         | 0164   | 0384 | 0604 | 1.0                       | 2.0      | 3.5     | 300          | - 20                              | + 8     | + 9      | 610                         |
| 6.8   | T1           | 10                         | 0165   | 0385 | 0605 | 1.0                       | 2.0      | 3.5     | 300          | - 20                              | + 8     | + 9      | 610                         |
| 6.8   | T1           | 5                          | 0166   | 0386 | 0606 | 1.0                       | 2.0      | 3.5     | 300          | - 20                              | + 8     | + 9      | 610                         |
| 15.0  | T2           | 20                         | 0167   | 0387 | 0607 | 1.0                       | 5.0      | 6       | 150          | - 16                              | + 8     | + 9      | 890                         |
| 15.0  | T2           | 10                         | 0168   | 0388 | 0608 | 1.0                       | 5.0      | 6       | 150          | - 16                              | + 8     | + 9      | 890                         |
| 15.0  | T2           | 5                          | 0169   | 0389 | 0609 | 1.0                       | 5.0      | 6       | 150          | - 16                              | + 8     | + 9      | 890                         |
| 33.0  | T2           | 20                         | 0170   | 0390 | 0610 | 1.0                       | 10.0     | 10      | 90           | - 24                              | + 10.5  | + 15     | 1000                        |
| 33.0  | T2           | 10                         | 0171   | 0391 | 0611 | 1.0                       | 10.0     | 10      | 90           | - 24                              | + 10.5  | + 15     | 1000                        |
| 33.0  | T2           | 5                          | 0172   | 0392 | 0612 | 1.0                       | 10.0     | 10      | 90           | - 24                              | + 10.5  | + 15     | 1000                        |
| 40.0  | T3           | 20                         | 0173   | 0393 | 0613 | 2.0                       | 12.0     | 9       | 60           | - 16                              | + 10.5  | + 12     | 1250                        |
| 40.0  | T3           | 10                         | 0174   | 0394 | 0614 | 2.0                       | 12.0     | 9       | 60           | - 16                              | + 10.5  | + 12     | 1250                        |
| 40.0  | T3           | 5                          | 0175   | 0395 | 0615 | 2.0                       | 12.0     | 9       | 60           | - 16                              | + 10.5  | + 12     | 1250                        |
| 56.0  | T3           | 20                         | 0176   | 0396 | 0616 | 2.0                       | 17.0     | 11      | 60           | - 28                              | + 10.5  | + 15     | 1335                        |
| 56.0  | T3           | 10                         | 0177   | 0397 | 0617 | 2.0                       | 17.0     | 11      | 60           | - 28                              | + 10.5  | + 15     | 1335                        |
| 56.0  | T3           | 5                          | 0178   | 0398 | 0618 | 2.0                       | 17.0     | 11      | 60           | - 28                              | + 10.5  | + 15     | 1335                        |
| 110.0   | T4           | 20                         | 0179   | 0399 | 0619 | 9.0                       | 36.0     | 12      | 29           | - 35                              | + 20    | + 20     | 1850                        |
| 110.0   | T4           | 10                         | 0180   | 0400 | 0620 | 9.0                       | 36.0     | 12      | 29           | - 35                              | + 20    | + 20     | 1850                        |
| <b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>    |              |                            |  |      |      |                           |          |         |              |                                   |         |          |                             |
| 2.5   | T1           | 20                         | 0181   | 0401 | 0621 | 1.0                       | 2.0      | 2       | 950          | - 16                              | + 7     | + 8      | 505                         |
| 2.5   | T1           | 10                         | 0182   | 0402 | 0622 | 1.0                       | 2.0      | 2       | 950          | - 16                              | + 7     | + 8      | 505                         |
| 2.5   | T1           | 5                          | 0183   | 0403 | 0623 | 1.0                       | 2.0      | 2       | 950          | - 16                              | + 7     | + 8      | 505                         |
| 4.7   | T1           | 20                         | 0184   | 0404 | 0624 | 1.0                       | 2.0      | 3       | 500          | - 16                              | + 7     | + 8      | 565                         |
| 4.7   | T1           | 10                         | 0185   | 0405 | 0625 | 1.0                       | 2.0      | 3       | 500          | - 16                              | + 7     | + 8      | 565                         |
| 4.7   | T1           | 5                          | 0186   | 0406 | 0626 | 1.0                       | 2.0      | 3       | 500          | - 16                              | + 7     | + 8      | 565                         |
| 11.0  | T2           | 20                         | 0187   | 0407 | 0627 | 1.0                       | 4.0      | 5       | 200          | - 16                              | + 8     | + 8      | 835                         |
| 11.0  | T2           | 10                         | 0188   | 0408 | 0628 | 1.0                       | 4.0      | 5       | 200          | - 16                              | + 8     | + 8      | 835                         |
| 11.0  | T2           | 5                          | 0189   | 0409 | 0629 | 1.0                       | 4.0      | 5       | 200          | - 16                              | + 8     | + 8      | 835                         |
| 22.0  | T2           | 20                         | 0190   | 0410 | 0630 | 1.0                       | 9.0      | 7.5     | 100          | - 16                              | + 8     | + 8      | 965                         |
| 22.0  | T2           | 10                         | 0191   | 0411 | 0631 | 1.0                       | 9.0      | 7.5     | 100          | - 16                              | + 8     | + 8      | 965                         |
| 22.0  | T2           | 5                          | 0192   | 0412 | 0632 | 1.0                       | 9.0      | 7.5     | 100          | - 16                              | + 8     | + 8      | 965                         |
| 30.0  | T3           | 20                         | 0193   | 0413 | 0633 | 2.0                       | 12.0     | 7       | 80           | - 16                              | + 8     | + 8      | 1240                        |
| 30.0  | T3           | 10                         | 0194   | 0414 | 0634 | 2.0                       | 12.0     | 7       | 80           | - 16                              | + 8     | + 8      | 1240                        |
| 30.0  | T3           | 5                          | 0195   | 0415 | 0635 | 2.0                       | 12.0     | 7       | 80           | - 16                              | + 8     | + 8      | 1240                        |
| 43.0  | T3           | 20                         | 0196   | 0416 | 0636 | 2.0                       | 17.0     | 8.5     | 70           | - 20                              | + 8     | + 8      | 1335                        |
| 43.0  | T3           | 10                         | 0197   | 0417 | 0637 | 2.0                       | 17.0     | 8.5     | 70           | - 20                              | + 8     | + 8      | 1335                        |
| 43.0  | T3           | 5                          | 0198   | 0418 | 0638 | 2.0                       | 17.0     | 8.5     | 70           | - 20                              | + 8     | + 8      | 1335                        |
| 86.0  | T4           | 20                         | 0199   | 0419 | 0639 | 9.0                       | 36.0     | 10      | 30           | - 25                              | + 15    | + 15     | 1800                        |
| 86.0  | T4           | 10                         | 0200   | 0420 | 0640 | 9.0                       | 36.0     | 10      | 30           | - 25                              | + 15    | + 15     | 1800                        |

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



| <b>STANDARD/EXTENDED RATINGS: CLR79, M39006/22-XXXX</b> |              |                            |  |      |      |                           |                     |                                    |   |                                   |         |          |   |
|---|--------------|----------------------------|--|------|------|---------------------------|---------------------|------------------------------------|---|-----------------------------------|---------|----------|---|
| CAPACITANCE<br>( $\mu$ F)                               | CASE<br>CODE | CAP.<br>TOL.<br>( $\pm$ %) | PART NO. M39006/22-*<br>FAILURE RATE LEVEL<br>(%/1000 h) |      |      | MAX. DCL ( $\mu$ A)<br>at |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>( $\Omega$ ) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          | MAX.**<br>RIPPLE<br>CURRENT<br>at + 85 °C<br>40 kHz<br>(mA) |
|   |              |                            | M  | P    | R    | + 25 °C                   | + 85 °C<br>+ 125 °C |                                    |   | - 55 °C                           | + 85 °C | + 125 °C |   |
|   |              |                            | 1.0  | 0.1  | 0.01 |                           |                     |                                    |   |                                   |         |          |   |
| <b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>    |              |                            |  |      |      |                           |                     |                                    |   |                                   |         |          |   |
| 1.7   | T1           | 20                         | 0201   | 0421 | 0641 | 1.0                       | 2.0                 | 2                                  | 1250  | - 16                              | + 7     | + 8      | 415   |
| 1.7   | T1           | 10                         | 0202   | 0422 | 0642 | 1.0                       | 2.0                 | 2                                  | 1250  | - 16                              | + 7     | + 8      | 415   |
| 1.7   | T1           | 5                          | 0203   | 0423 | 0643 | 1.0                       | 2.0                 | 2                                  | 1250  | - 16                              | + 7     | + 8      | 415   |
| 3.6   | T1           | 20                         | 0204   | 0424 | 0644 | 1.0                       | 2.0                 | 2.7                                | 600   | - 16                              | + 7     | + 8      | 520   |
| 3.6   | T1           | 10                         | 0205   | 0425 | 0645 | 1.0                       | 2.0                 | 2.7                                | 600   | - 16                              | + 7     | + 8      | 520   |
| 3.6   | T1           | 5                          | 0206   | 0426 | 0646 | 1.0                       | 2.0                 | 2.7                                | 600   | - 16                              | + 7     | + 8      | 520   |
| 9.0   | T2           | 20                         | 0207   | 0427 | 0647 | 1.0                       | 5.0                 | 5                                  | 240   | - 16                              | + 7     | + 8      | 755   |
| 9.0   | T2           | 10                         | 0208   | 0428 | 0648 | 1.0                       | 5.0                 | 5                                  | 240   | - 16                              | + 7     | + 8      | 755   |
| 9.0   | T2           | 5                          | 0209   | 0429 | 0649 | 1.0                       | 5.0                 | 5                                  | 240   | - 16                              | + 7     | + 8      | 755   |
| 14.0  | T2           | 20                         | 0210   | 0430 | 0650 | 1.0                       | 7.0                 | 6                                  | 167   | - 16                              | + 7     | + 8      | 860   |
| 14.0  | T2           | 10                         | 0211   | 0431 | 0651 | 1.0                       | 7.0                 | 6                                  | 167   | - 16                              | + 7     | + 8      | 860   |
| 14.0  | T2           | 5                          | 0212   | 0432 | 0652 | 1.0                       | 7.0                 | 6                                  | 167   | - 16                              | + 7     | + 8      | 860   |
| 18.0  | T3           | 20                         | 0213   | 0433 | 0653 | 2.0                       | 9.0                 | 5                                  | 129   | - 16                              | + 7     | + 8      | 1130  |
| 18.0  | T3           | 10                         | 0214   | 0434 | 0654 | 2.0                       | 9.0                 | 5                                  | 129   | - 16                              | + 7     | + 8      | 1130  |
| 18.0  | T3           | 5                          | 0215   | 0435 | 0655 | 2.0                       | 9.0                 | 5                                  | 129   | - 16                              | + 7     | + 8      | 1130  |
| 25.0  | T3           | 20                         | 0216   | 0436 | 0656 | 2.0                       | 13.0                | 6                                  | 93  | - 16                              | + 7     | + 8      | 1200  |
| 25.0  | T3           | 10                         | 0217   | 0437 | 0657 | 2.0                       | 13.0                | 6                                  | 93  | - 16                              | + 7     | + 8      | 1200  |
| 25.0  | T3           | 5                          | 0218   | 0438 | 0658 | 2.0                       | 13.0                | 6                                  | 93  | - 16                              | + 7     | + 8      | 1200  |
| 56.0  | T4           | 20                         | 0219   | 0439 | 0659 | 10.0                      | 40.0                | 6.5                                | 32  | - 25                              | + 15    | + 15     | 1800  |
| 56.0  | T4           | 10                         | 0220   | 0440 | 0660 | 10.0                      | 40.0                | 6.5                                | 32  | - 25                              | + 15    | + 15     | 1800  |

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.

| <b>STANDARD/EXTENDED RATINGS: CLR81, M39006/25-XXXX</b> |              |                            |  |      |      |                           |                     |                                    |   |                                   |         |          |   |
|---|--------------|----------------------------|--|------|------|---------------------------|---------------------|------------------------------------|---|-----------------------------------|---------|----------|---|
| CAPACITANCE<br>( $\mu$ F)                               | CASE<br>CODE | CAP.<br>TOL.<br>( $\pm$ %) | PART NO. M39006/25-*<br>FAILURE RATE LEVEL<br>(%/1000 h) |      |      | MAX. DCL ( $\mu$ A)<br>at |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>( $\Omega$ ) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          | MAX.**<br>RIPPLE<br>CURRENT<br>at + 85 °C<br>40 kHz<br>(mA) |
|   |              |                            | M  | P    | R    | + 25 °C                   | + 85 °C<br>+ 125 °C |                                    |   | - 55 °C                           | + 85 °C | + 125 °C |   |
|   |              |                            | 1.0  | 0.1  | 0.01 |                           |                     |                                    |   |                                   |         |          |   |
| <b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>       |              |                            |  |      |      |                           |                     |                                    |   |                                   |         |          |   |
| 220.0   | T1           | 20                         | 0001   | 0089 | 0177 | 2.0                       | 9.0                 | 50                                 | 36  | - 64                              | + 13    | + 16     | 1000  |
| 220.0   | T1           | 10                         | 0002   | 0090 | 0178 | 2.0                       | 9.0                 | 50                                 | 36  | - 64                              | + 13    | + 16     | 1000  |
| 820.0   | T2           | 20                         | 0003   | 0091 | 0179 | 3.0                       | 14.0                | 155                                | 18  | - 88                              | + 16    | + 20     | 1500  |
| 820.0   | T2           | 10                         | 0004   | 0092 | 0180 | 3.0                       | 14.0                | 155                                | 18  | - 88                              | + 16    | + 20     | 1500  |
| 1500.0  | T3           | 20                         | 0005   | 0093 | 0181 | 5.0                       | 20.0                | 172                                | 18  | - 90                              | + 20    | + 25     | 1900  |
| 1500.0  | T3           | 10                         | 0006   | 0094 | 0182 | 5.0                       | 20.0                | 172                                | 18  | - 90                              | + 20    | + 25     | 1900  |
| 2200.0  | T4           | 20                         | 0007   | 0095 | 0183 | 6.0                       | 24.0                | 170                                | 13  | - 90                              | + 25    | + 30     | 2300  |
| 2200.0  | T4           | 10                         | 0008   | 0096 | 0184 | 6.0                       | 24.0                | 170                                | 13  | - 90                              | + 25    | + 30     | 2300  |
| <b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>       |              |                            |  |      |      |                           |                     |                                    |   |                                   |         |          |   |
| 180.0   | T1           | 20                         | 0009   | 0097 | 0185 | 2.0                       | 9.0                 | 41                                 | 45  | - 60                              | + 13    | + 16     | 1000  |
| 180.0   | T1           | 10                         | 0010   | 0098 | 0186 | 2.0                       | 9.0                 | 41                                 | 45  | - 60                              | + 13    | + 16     | 1000  |
| 680.0   | T2           | 20                         | 0011   | 0099 | 0187 | 3.0                       | 14.0                | 130                                | 22  | - 83                              | + 16    | + 20     | 1500  |
| 680.0   | T2           | 10                         | 0012   | 0100 | 0188 | 3.0                       | 14.0                | 130                                | 22  | - 83                              | + 16    | + 20     | 1500  |
| 1500.0  | T3           | 20                         | 0013   | 0101 | 0189 | 5.0                       | 20.0                | 170                                | 18  | - 90                              | + 20    | + 25     | 1900  |
| 1500.0  | T3           | 10                         | 0014   | 0102 | 0190 | 5.0                       | 20.0                | 170                                | 18  | - 90                              | + 20    | + 25     | 1900  |
| 1800.0  | T4           | 20                         | 0015   | 0103 | 0191 | 7.0                       | 25.0                | 138                                | 14  | - 90                              | + 25    | + 30     | 2300  |
| 1800.0  | T4           | 10                         | 0016   | 0104 | 0192 | 7.0                       | 25.0                | 138                                | 14  | - 90                              | + 25    | + 30     | 2300  |

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.



| <b>STANDARD/EXTENDED RATINGS: CLR81, M39006/25-XXXX</b> |              |                       |                                  |          |           |               |                     |                                    |                                      |                                   |         |         |   |
|---|--------------|-----------------------|----------------------------------|----------|-----------|---------------|---------------------|------------------------------------|--------------------------------------|-----------------------------------|---------|---------|---|
| CAPACITANCE<br>(µF)                                     | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/25-*             |          |           | MAX. DCL (µA) |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) at |         |         | MAX.**<br>RIPPLE<br>CURRENT<br>at + 85 °C<br>40 kHz<br>(mA) |
|   |              |                       | FAILURE RATE LEVEL<br>(%/1000 h) |          |           | at            |                     |                                    |                                      | at                                |         |         |   |
|   |              |                       | M<br>1.0                         | P<br>0.1 | R<br>0.01 | + 25 °C       | + 85 °C<br>+ 125 °C |                                    |                                      | - 55 °C                           | - 55 °C | + 85 °C |   |
| <b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>      |              |                       |                                  |          |           |               |                     |                                    |                                      |                                   |         |         |   |
| 150.0   | T1           | 20                    | 0017                             | 0105     | 0193      | 2.0           | 9.0                 | 34                                 | 54                                   | - 55                              | + 13    | + 16    | 900   |
| 150.0   | T1           | 10                    | 0018                             | 0106     | 0194      | 2.0           | 9.0                 | 34                                 | 54                                   | - 55                              | + 13    | + 16    | 900   |
| 560.0   | T2           | 20                    | 0019                             | 0107     | 0195      | 3.0           | 16.0                | 106                                | 27                                   | - 77                              | + 16    | + 20    | 1450  |
| 560.0   | T2           | 10                    | 0020                             | 0108     | 0196      | 3.0           | 16.0                | 106                                | 27                                   | - 77                              | + 16    | + 20    | 1450  |
| 1200.0  | T3           | 20                    | 0021                             | 0109     | 0197      | 5.0           | 20.0                | 137                                | 18                                   | - 88                              | + 20    | + 25    | 1850  |
| 1200.0  | T3           | 10                    | 0022                             | 0110     | 0198      | 5.0           | 20.0                | 137                                | 18                                   | - 88                              | + 20    | + 25    | 1850  |
| 1500.0  | T4           | 20                    | 0023                             | 0111     | 0199      | 7.0           | 25.0                | 114                                | 15                                   | - 88                              | + 25    | + 30    | 2300  |
| 1500.0  | T4           | 10                    | 0024                             | 0112     | 0200      | 7.0           | 25.0                | 114                                | 15                                   | - 88                              | + 25    | + 30    | 2300  |
| <b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b>     |              |                       |                                  |          |           |               |                     |                                    |                                      |                                   |         |         |   |
| 100.0   | T1           | 20                    | 0025                             | 0113     | 0201      | 2.0           | 9.0                 | 30                                 | 72                                   | - 44                              | + 13    | + 16    | 900   |
| 100.0   | T1           | 10                    | 0026                             | 0114     | 0202      | 2.0           | 9.0                 | 30                                 | 72                                   | - 44                              | + 13    | + 16    | 900   |
| 390.0   | T2           | 20                    | 0027                             | 0115     | 0203      | 3.0           | 16.0                | 74                                 | 31                                   | - 66                              | + 16    | + 20    | 1450  |
| 390.0   | T2           | 10                    | 0028                             | 0116     | 0204      | 3.0           | 16.0                | 74                                 | 31                                   | - 66                              | + 16    | + 20    | 1450  |
| 820.0   | T3           | 20                    | 0029                             | 0117     | 0205      | 6.0           | 24.0                | 111                                | 22                                   | - 77                              | + 20    | + 25    | 1800  |
| 820.0   | T3           | 10                    | 0030                             | 0118     | 0206      | 6.0           | 24.0                | 111                                | 22                                   | - 77                              | + 20    | + 25    | 1800  |
| 1000.0  | T4           | 20                    | 0031                             | 0119     | 0207      | 8.0           | 32.0                | 92                                 | 17                                   | - 77                              | + 25    | + 30    | 2300  |
| 1000.0  | T4           | 10                    | 0032                             | 0120     | 0208      | 8.0           | 32.0                | 92                                 | 17                                   | - 77                              | + 25    | + 30    | 2300  |
| <b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b>     |              |                       |                                  |          |           |               |                     |                                    |                                      |                                   |         |         |   |
| 68.0  | T1           | 20                    | 0033                             | 0121     | 0209      | 2.0           | 9.0                 | 22                                 | 90                                   | - 40                              | + 12    | + 15    | 850   |
| 68.0  | T1           | 10                    | 0034                             | 0122     | 0210      | 2.0           | 9.0                 | 22                                 | 90                                   | - 40                              | + 12    | + 15    | 850   |
| 270.0   | T2           | 20                    | 0035                             | 0123     | 0211      | 3.0           | 16.0                | 55                                 | 33                                   | - 62                              | + 13    | + 16    | 1400  |
| 270.0   | T2           | 10                    | 0036                             | 0124     | 0212      | 3.0           | 16.0                | 55                                 | 33                                   | - 62                              | + 13    | + 16    | 1400  |
| 560.0   | T3           | 20                    | 0037                             | 0125     | 0213      | 7.0           | 28.0                | 76                                 | 24                                   | - 72                              | + 20    | + 25    | 1750  |
| 560.0   | T3           | 10                    | 0038                             | 0126     | 0214      | 7.0           | 28.0                | 76                                 | 24                                   | - 72                              | + 20    | + 25    | 1750  |
| 680.0   | T4           | 20                    | 0039                             | 0127     | 0215      | 8.0           | 32.0                | 63                                 | 19                                   | - 72                              | + 25    | + 30    | 2100  |
| 680.0   | T4           | 10                    | 0040                             | 0128     | 0216      | 8.0           | 32.0                | 63                                 | 19                                   | - 72                              | + 25    | + 30    | 2100  |
| <b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>     |              |                       |                                  |          |           |               |                     |                                    |                                      |                                   |         |         |   |
| 56.0  | T1           | 20                    | 0041                             | 0129     | 0217      | 2.0           | 9.0                 | 22                                 | 100                                  | - 38                              | + 12    | + 15    | 800   |
| 56.0  | T1           | 10                    | 0042                             | 0130     | 0218      | 2.0           | 9.0                 | 22                                 | 100                                  | - 38                              | + 12    | + 15    | 800   |
| 220.0   | T2           | 20                    | 0043                             | 0131     | 0219      | 3.0           | 16.0                | 42                                 | 36                                   | - 60                              | + 13    | + 16    | 1200  |
| 220.0   | T2           | 10                    | 0044                             | 0132     | 0220      | 3.0           | 16.0                | 42                                 | 36                                   | - 60                              | + 13    | + 16    | 1200  |
| 470.0   | T3           | 20                    | 0045                             | 0133     | 0221      | 8.0           | 32.0                | 64                                 | 25                                   | - 65                              | + 20    | + 25    | 1500  |
| 470.0   | T3           | 10                    | 0046                             | 0134     | 0222      | 8.0           | 32.0                | 64                                 | 25                                   | - 65                              | + 20    | + 25    | 1500  |
| 560.0   | T4           | 20                    | 0047                             | 0135     | 0223      | 9.0           | 36.0                | 55                                 | 20                                   | - 65                              | + 25    | + 30    | 2000  |
| 560.0   | T4           | 10                    | 0048                             | 0136     | 0224      | 9.0           | 36.0                | 55                                 | 20                                   | - 65                              | + 25    | + 30    | 2000  |
| <b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>     |              |                       |                                  |          |           |               |                     |                                    |                                      |                                   |         |         |   |
| 33.0  | T1           | 20                    | 0049                             | 0137     | 0225      | 2.0           | 9.0                 | 12.3                               | 135                                  | - 29                              | + 10    | + 12    | 700   |
| 33.0  | T1           | 10                    | 0050                             | 0138     | 0226      | 2.0           | 9.0                 | 12.3                               | 135                                  | - 29                              | + 10    | + 12    | 700   |
| 120.0   | T2           | 20                    | 0051                             | 0139     | 0227      | 4.0           | 24.0                | 22.5                               | 49                                   | - 42                              | + 12    | + 15    | 1200  |
| 120.0   | T2           | 10                    | 0052                             | 0140     | 0228      | 4.0           | 24.0                | 22.5                               | 49                                   | - 42                              | + 12    | + 15    | 1200  |
| 270.0   | T3           | 20                    | 0053                             | 0141     | 0229      | 8.0           | 32.0                | 37                                 | 29                                   | - 46                              | + 20    | + 25    | 1450  |
| 270.0   | T3           | 10                    | 0054                             | 0142     | 0230      | 8.0           | 32.0                | 37                                 | 29                                   | - 46                              | + 20    | + 25    | 1450  |
| 330.0   | T4           | 20                    | 0055                             | 0143     | 0231      | 9.0           | 36.0                | 38                                 | 22                                   | - 46                              | + 25    | + 30    | 1900  |
| 330.0   | T4           | 10                    | 0056                             | 0144     | 0232      | 9.0           | 36.0                | 38                                 | 22                                   | - 46                              | + 25    | + 30    | 1900  |
| <b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>     |              |                       |                                  |          |           |               |                     |                                    |                                      |                                   |         |         |   |
| 27.0  | T1           | 20                    | 0057                             | 0145     | 0233      | 3.0           | 12.0                | 10.2                               | 144                                  | - 24                              | + 10    | + 12    | 700   |
| 27.0  | T1           | 10                    | 0058                             | 0146     | 0234      | 3.0           | 12.0                | 10.2                               | 144                                  | - 24                              | + 10    | + 12    | 700   |
| 100.0   | T2           | 20                    | 0059                             | 0147     | 0235      | 4.0           | 20.0                | 19                                 | 54                                   | - 36                              | + 12    | + 15    | 1100  |
| 100.0   | T2           | 10                    | 0060                             | 0148     | 0236      | 4.0           | 20.0                | 19                                 | 54                                   | - 36                              | + 12    | + 15    | 1100  |
| 220.0   | T3           | 20                    | 0061                             | 0149     | 0237      | 8.0           | 32.0                | 30                                 | 29                                   | - 40                              | + 16    | + 20    | 1400  |
| 220.0   | T3           | 10                    | 0062                             | 0150     | 0238      | 8.0           | 32.0                | 30                                 | 29                                   | - 40                              | + 16    | + 20    | 1400  |
| 270.0   | T4           | 20                    | 0063                             | 0151     | 0239      | 9.0           | 36.0                | 27                                 | 23                                   | - 45                              | + 20    | + 25    | 1850  |
| 270.0   | T4           | 10                    | 0064                             | 0152     | 0240      | 9.0           | 36.0                | 27                                 | 23                                   | - 45                              | + 20    | + 25    | 1850  |

**Notes**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).

\*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.





| <b>STANDARD/EXTENDED RATINGS: CLR81, M39006/25-XXXX</b> |              |                       |                                  |      |      |               |                     |                                    |                                      |                                    |         |         |   |
|---|--------------|-----------------------|----------------------------------|------|------|---------------|---------------------|------------------------------------|--------------------------------------|------------------------------------|---------|---------|---|
| CAPACITANCE<br>(μF)                                     | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/25-*             |      |      | MAX. DCL (μA) |                     | MAX.<br>DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | MAX.. CAPACITANCE<br>CHANGE (%) at |         |         | MAX.**<br>RIPPLE<br>CURRENT<br>at + 85 °C<br>40 kHz<br>(mA) |
|   |              |                       | FAILURE RATE LEVEL<br>(%/1000 h) |      |      | at            |                     |                                    |                                      | + 25 °C                            |         |         |   |
|   |              |                       | M                                | P    | R    | + 25 °C       | + 85 °C<br>+ 125 °C |                                    |                                      | + 25 °C                            | - 55 °C | - 55 °C |   |
| <b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>     |              |                       |                                  |      |      |               |                     |                                    |                                      |                                    |         |         |   |
| 22.0  | T1           | 20                    | 0065                             | 0153 | 0241 | 3.0           | 12.0                | 8.5                                | 157                                  | - 19                               | + 10    | + 12    | 600   |
| 22.0  | T1           | 10                    | 0066                             | 0154 | 0242 | 3.0           | 12.0                | 8.5                                | 157                                  | - 19                               | + 10    | + 12    | 600   |
| 82.0  | T2           | 20                    | 0067                             | 0155 | 0243 | 4.0           | 24.0                | 15.2                               | 63                                   | - 30                               | + 12    | + 15    | 1000  |
| 82.0  | T2           | 10                    | 0068                             | 0156 | 0244 | 4.0           | 24.0                | 15.2                               | 63                                   | - 30                               | + 12    | + 15    | 1000  |
| 180.0   | T3           | 20                    | 0069                             | 0157 | 0245 | 9.0           | 36.0                | 24.4                               | 30                                   | - 35                               | + 16    | + 20    | 1300  |
| 180.0   | T3           | 10                    | 0070                             | 0158 | 0246 | 9.0           | 36.0                | 24.4                               | 30                                   | - 35                               | + 16    | + 20    | 1300  |
| 220.0   | T4           | 20                    | 0071                             | 0159 | 0247 | 10.0          | 40.0                | 37.0                               | 24                                   | - 40                               | + 20    | + 25    | 1800  |
| 220.0   | T4           | 10                    | 0072                             | 0160 | 0248 | 10.0          | 40.0                | 37.0                               | 24                                   | - 40                               | + 20    | + 25    | 1800  |
| <b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>    |              |                       |                                  |      |      |               |                     |                                    |                                      |                                    |         |         |   |
| 10.0  | T1           | 20                    | 0073                             | 0161 | 0249 | 3.0           | 12.0                | 4.5                                | 200                                  | - 17                               | + 10    | + 12    | 800   |
| 10.0  | T1           | 10                    | 0074                             | 0162 | 0250 | 3.0           | 12.0                | 4.5                                | 200                                  | - 17                               | + 10    | + 12    | 800   |
| 39.0  | T2           | 20                    | 0075                             | 0163 | 0251 | 5.0           | 24.0                | 10.4                               | 80                                   | - 20                               | + 12    | + 15    | 1300  |
| 39.0  | T2           | 10                    | 0076                             | 0164 | 0252 | 5.0           | 24.0                | 10.4                               | 80                                   | - 20                               | + 12    | + 15    | 1300  |
| 68.0  | T3           | 20                    | 0077                             | 0165 | 0253 | 10.0          | 40.0                | 11.3                               | 40                                   | - 30                               | + 14    | + 16    | 1600  |
| 68.0  | T3           | 10                    | 0078                             | 0166 | 0254 | 10.0          | 40.0                | 11.3                               | 40                                   | - 30                               | + 14    | + 16    | 1600  |
| 120.0   | T4           | 20                    | 0079                             | 0167 | 0255 | 12.0          | 48.0                | 25                                 | 30                                   | - 35                               | + 15    | + 17    | 2000  |
| 120.0   | T4           | 10                    | 0080                             | 0168 | 0256 | 12.0          | 48.0                | 25                                 | 30                                   | - 35                               | + 15    | + 17    | 2000  |
| <b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>    |              |                       |                                  |      |      |               |                     |                                    |                                      |                                    |         |         |   |
| 6.8   | T1           | 20                    | 0081                             | 0169 | 0257 | 3.0           | 12.0                | 6.0                                | 300                                  | - 14                               | + 10    | + 12    | 700   |
| 6.8   | T1           | 10                    | 0082                             | 0170 | 0258 | 3.0           | 12.0                | 6.0                                | 300                                  | - 14                               | + 10    | + 12    | 700   |
| 27.0  | T2           | 20                    | 0083                             | 0171 | 0259 | 5.0           | 24.0                | 7.2                                | 90                                   | - 18                               | + 12    | + 15    | 1200  |
| 27.0  | T2           | 10                    | 0084                             | 0172 | 0260 | 5.0           | 24.0                | 7.2                                | 90                                   | - 18                               | + 12    | + 15    | 1200  |
| 47.0  | T3           | 20                    | 0085                             | 0173 | 0261 | 10.0          | 40.0                | 7.9                                | 50                                   | - 26                               | + 14    | + 16    | 1500  |
| 47.0  | T3           | 10                    | 0086                             | 0174 | 0262 | 10.0          | 40.0                | 7.9                                | 50                                   | - 26                               | + 14    | + 16    | 1500  |
| 82.0  | T4           | 20                    | 0087                             | 0175 | 0263 | 12.0          | 48.0                | 17.4                               | 32                                   | - 30                               | + 15    | + 17    | 1900  |
| 82.0  | T4           | 10                    | 0088                             | 0176 | 0264 | 12.0          | 48.0                | 17.4                               | 32                                   | - 30                               | + 15    | + 17    | 1900  |

**Notes**

- \* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).
- \*\* For ripple current limits at various temperatures, voltages and frequencies, see Ripple Current Table.

| <b>CLR79, CLR81 RIPPLE CURRENT MULTIPLIERS VS. FREQUENCY, TEMPERATURE AND APPLIED PEAK VOLTAGE</b> |          |         |      |      |      |         |      |      |      |         |      |      |      |         |      |      |      |         |      |      |      |         |      |      |      |      |    |     |     |
|--|----------|---------|------|------|------|---------|------|------|------|---------|------|------|------|---------|------|------|------|---------|------|------|------|---------|------|------|------|------|----|-----|-----|
| FREQUENCY OF APPLIED RIPPLE CURRENT  |          | 120 Hz  |      |      |      | 800 Hz  |      |      |      | 1 kHz   |      |      |      | 10 kHz  |      |      |      | 40 kHz  |      |      |      | 100 kHz |      |      |      |      |    |     |     |
|  |          | TEMP °C |      |      |      | TEMP °C |      |      |      | TEMP °C |      |      |      | TEMP °C |      |      |      | TEMP °C |      |      |      | TEMP °C |      |      |      |      |    |     |     |
| AMBIENT STILL AIR  |          | ≤ 55    | 85   | 105  | 125  | ≤ 55    | 85   | 105  | 125  | ≤ 55    | 85   | 105  | 125  | ≤ 55    | 85   | 105  | 125  | ≤ 55    | 85   | 105  | 125  | ≤ 55    | 85   | 105  | 125  | ≤ 55 | 85 | 105 | 125 |
| % of APPLIED VOLTAGE   | 100 %    | 0.60    | 0.39 | -    | -    | 0.71    | 0.43 | -    | -    | 0.72    | 0.46 | -    | -    | 0.88    | 0.55 | -    | -    | 1.0     | 0.63 | -    | -    | 1.1     | 0.69 | -    | -    |      |    |     |     |
|  | 90 %     | 0.60    | 0.46 | -    | -    | 0.71    | 0.55 | -    | -    | 0.72    | 0.55 | -    | -    | 0.88    | 0.67 | -    | -    | 1.0     | 0.77 | -    | -    | 1.1     | 0.85 | -    | -    |      |    |     |     |
|  | 80 %     | 0.60    | 0.52 | 0.35 | -    | 0.71    | 0.62 | 0.42 | -    | 0.72    | 0.62 | 0.42 | -    | 0.88    | 0.76 | 0.52 | -    | 1.0     | 0.87 | 0.59 | -    | 1.1     | 0.96 | 0.65 | -    |      |    |     |     |
|  | 70 %     | 0.60    | 0.58 | 0.44 | -    | 0.71    | 0.69 | 0.52 | -    | 0.72    | 0.70 | 0.52 | -    | 0.88    | 0.85 | 0.64 | -    | 1.0     | 0.97 | 0.73 | -    | 1.1     | 1.07 | 0.80 | -    |      |    |     |     |
|  | 66 2/3 % | 0.60    | 0.60 | 0.46 | 0.27 | 0.71    | 0.71 | 0.55 | 0.32 | 0.72    | 0.72 | 0.55 | 0.32 | 0.88    | 0.88 | 0.68 | 0.40 | 1.0     | 1.0  | 0.77 | 0.45 | 1.1     | 1.1  | 0.85 | 0.50 |      |    |     |     |

**Notes**

- At + 125 °C the rated voltage of the capacitors decreases to 66 2/3 percent of the + 85 °C rated voltage.
- The peak of the applied AC ripple voltage plus the applied DC voltage must not exceed the DC voltage rating of the capacitor either forward or reverse.
- The ripple current listed represents a rating calculated using a maximum internal temperature rise (ΔT) of + 50 °C at 40 kHz at + 85 °C ambient with a maximum peak rated voltage of 66 2/3 percent of the + 85 °C peak voltage rating.
- The maximum allowable internal temperature rise (ΔT) decreases linearly to a calculated + 10 °C rise at + 125 °C ambient.
- The internal temperature rise is directly proportional to the equivalent series resistance of the capacitor and equivalent series resistance increases with decreasing frequency.





| STANDARD/EXTENDED RATINGS: CLR90, M39006/30-XXXX |           |                 |  |      |      |                  |                |                       |                         |                                |        |         |                               |
|--|-----------|-----------------|--|------|------|------------------|----------------|-----------------------|-------------------------|--------------------------------|--------|---------|-------------------------------|
| CAPACITANCE (µF)                                 | CASE CODE | CAP. TOL. (± %) | PART NO. M39006/30-* FAILURE RATE LEVEL (%/1000 h) |      |      | MAX. DCL (µA) at |                | MAX. DF at +25 °C (%) | MAX. IMP. at -55 °C (Ω) | MAX. CAPACITANCE CHANGE (%) at |        |         | MAX. ESR at +25 °C 120 Hz (Ω) |
|  |           |                 | M  | P    | R    | +25 °C           | +85 °C +125 °C |                       |                         | -55 °C                         | +85 °C | +125 °C |                               |
|  |           |                 | 1.0  | 0.1  | 0.01 |                  |                |                       |                         |                                |        |         |                               |
| <b>6 WVDC at +85 °C . . . 4 WVDC at +125 °C</b>  |           |                 |  |      |      |                  |                |                       |                         |                                |        |         |                               |
| 30.0   | T1        | 20              | 0001   | 0221 | 0441 | 1.0              | 2.0            | 4.5                   | 100                     | -40                            | +10.5  | +12     | 1.99                          |
| 30.0   | T1        | 10              | 0002   | 0222 | 0442 | 1.0              | 2.0            | 4.5                   | 100                     | -40                            | +10.5  | +12     | 1.99                          |
| 30.0   | T1        | 5               | 0003   | 0223 | 0443 | 1.0              | 2.0            | 4.5                   | 100                     | -40                            | +10.5  | +12     | 1.99                          |
| 68.0   | T1        | 20              | 0004   | 0224 | 0444 | 1.0              | 2.0            | 7.5                   | 60                      | -40                            | +14    | +16     | 1.58                          |
| 68.0   | T1        | 10              | 0005   | 0225 | 0445 | 1.0              | 2.0            | 7.5                   | 60                      | -40                            | +14    | +16     | 1.58                          |
| 68.0   | T1        | 5               | 0006   | 0226 | 0446 | 1.0              | 2.0            | 7.5                   | 60                      | -40                            | +14    | +16     | 1.58                          |
| 140.0  | T2        | 20              | 0007   | 0227 | 0447 | 1.0              | 3.0            | 10.5                  | 40                      | -40                            | +14    | +16     | 0.99                          |
| 140.0  | T2        | 10              | 0008   | 0228 | 0448 | 1.0              | 3.0            | 10.5                  | 40                      | -40                            | +14    | +16     | 0.99                          |
| 140.0  | T2        | 5               | 0009   | 0229 | 0449 | 1.0              | 3.0            | 10.5                  | 40                      | -40                            | +14    | +16     | 0.99                          |
| 270.0  | T2        | 20              | 0010   | 0230 | 0450 | 1.0              | 6.5            | 22.5                  | 25                      | -44                            | +17.5  | +20     | 1.11                          |
| 270.0  | T2        | 10              | 0011   | 0231 | 0451 | 1.0              | 6.5            | 22.5                  | 25                      | -44                            | +17.5  | +20     | 1.11                          |
| 270.0  | T2        | 5               | 0012   | 0232 | 0452 | 1.0              | 6.5            | 22.5                  | 25                      | -44                            | +17.5  | +20     | 1.11                          |
| 330.0  | T3        | 20              | 0013   | 0233 | 0453 | 2.0              | 7.9            | 18.0                  | 20                      | -44                            | +14    | +16     | 0.73                          |
| 330.0  | T3        | 10              | 0014   | 0234 | 0454 | 2.0              | 7.9            | 18.0                  | 20                      | -44                            | +14    | +16     | 0.73                          |
| 330.0  | T3        | 5               | 0015   | 0235 | 0455 | 2.0              | 7.9            | 18.0                  | 20                      | -44                            | +14    | +16     | 0.73                          |
| 560.0  | T3        | 20              | 0016   | 0236 | 0456 | 2.0              | 13.0           | 27.5                  | 25                      | -64                            | +17.5  | +20     | 0.65                          |
| 560.0  | T3        | 10              | 0017   | 0237 | 0457 | 2.0              | 13.0           | 27.5                  | 25                      | -64                            | +17.5  | +20     | 0.65                          |
| 560.0  | T3        | 5               | 0018   | 0238 | 0458 | 2.0              | 13.0           | 27.5                  | 25                      | -64                            | +17.5  | +20     | 0.65                          |
| 1200.0   | T4        | 20              | 0019   | 0239 | 0459 | 3.0              | 14.0           | 45.0                  | 20                      | -80                            | +25    | +25     | 0.50                          |
| 1200.0   | T4        | 10              | 0020   | 0240 | 0460 | 3.0              | 14.0           | 45.0                  | 20                      | -80                            | +25    | +25     | 0.50                          |
| <b>8 WVDC at +85 °C . . . 5 WVDC at +125 °C</b>  |           |                 |  |      |      |                  |                |                       |                         |                                |        |         |                               |
| 25   | T1        | 20              | 0021   | 0241 | 0461 | 1.0              | 2.0            | 3.75                  | 100                     | -40                            | +10.5  | +12     | 1.99                          |
| 25   | T1        | 10              | 0022   | 0242 | 0462 | 1.0              | 2.0            | 3.75                  | 100                     | -40                            | +10.5  | +12     | 1.99                          |
| 25   | T1        | 5               | 0023   | 0243 | 0463 | 1.0              | 2.0            | 3.75                  | 100                     | -40                            | +10.5  | +12     | 1.99                          |
| 56   | T1        | 20              | 0024   | 0244 | 0464 | 1.0              | 2.0            | 7.0                   | 59                      | -40                            | +14    | +16     | 1.66                          |
| 56   | T1        | 10              | 0025   | 0245 | 0465 | 1.0              | 2.0            | 7.0                   | 59                      | -40                            | +14    | +16     | 1.66                          |
| 56   | T1        | 5               | 0026   | 0246 | 0466 | 1.0              | 2.0            | 7.0                   | 59                      | -40                            | +14    | +16     | 1.66                          |
| 120  | T2        | 20              | 0027   | 0247 | 0467 | 1.0              | 2.0            | 10.0                  | 50                      | -44                            | +17.5  | +20     | 1.11                          |
| 120  | T2        | 10              | 0028   | 0248 | 0468 | 1.0              | 2.0            | 10.0                  | 50                      | -44                            | +17.5  | +20     | 1.11                          |
| 120  | T2        | 5               | 0029   | 0249 | 0469 | 1.0              | 2.0            | 10.0                  | 50                      | -44                            | +17.5  | +20     | 1.11                          |
| 220  | T2        | 20              | 0030   | 0250 | 0470 | 1.0              | 7.0            | 18.5                  | 30                      | -44                            | +17.5  | +20     | 1.12                          |
| 220  | T2        | 10              | 0031   | 0251 | 0471 | 1.0              | 7.0            | 18.5                  | 30                      | -44                            | +17.5  | +20     | 1.12                          |
| 220  | T2        | 5               | 0032   | 0252 | 0472 | 1.0              | 7.0            | 18.5                  | 30                      | -44                            | +17.5  | +20     | 1.12                          |
| 290  | T3        | 20              | 0033   | 0253 | 0473 | 2.0              | 6.0            | 17.0                  | 25                      | -64                            | +17.5  | +20     | 0.78                          |
| 290  | T3        | 10              | 0034   | 0254 | 0474 | 2.0              | 6.0            | 17.0                  | 25                      | -64                            | +17.5  | +20     | 0.78                          |
| 290  | T3        | 5               | 0035   | 0255 | 0475 | 2.0              | 6.0            | 17.0                  | 25                      | -64                            | +17.5  | +20     | 0.78                          |
| 430  | T3        | 20              | 0036   | 0256 | 0476 | 2.0              | 14.0           | 23.0                  | 25                      | -64                            | +17.5  | +20     | 0.71                          |
| 430  | T3        | 10              | 0037   | 0257 | 0477 | 2.0              | 14.0           | 23.0                  | 25                      | -64                            | +17.5  | +20     | 0.71                          |
| 430  | T3        | 5               | 0038   | 0258 | 0478 | 2.0              | 14.0           | 23.0                  | 25                      | -64                            | +17.5  | +20     | 0.71                          |
| 850  | T4        | 20              | 0039   | 0259 | 0479 | 4.0              | 16.0           | 30.0                  | 22                      | -80                            | +25    | +25     | 0.47                          |
| 850  | T4        | 10              | 0040   | 0260 | 0480 | 4.0              | 16.0           | 30.0                  | 22                      | -80                            | +25    | +25     | 0.47                          |
| <b>10 WVDC at +85 °C . . . 7 WVDC at +125 °C</b> |           |                 |  |      |      |                  |                |                       |                         |                                |        |         |                               |
| 20   | T1        | 20              | 0041   | 0261 | 0481 | 1.0              | 2.0            | 3.0                   | 175                     | -32                            | +10.5  | +12     | 1.99                          |
| 20   | T1        | 10              | 0042   | 0262 | 0482 | 1.0              | 2.0            | 3.0                   | 175                     | -32                            | +10.5  | +12     | 1.99                          |
| 20   | T1        | 5               | 0043   | 0263 | 0483 | 1.0              | 2.0            | 3.0                   | 175                     | -32                            | +10.5  | +12     | 1.99                          |
| 47   | T1        | 20              | 0044   | 0264 | 0484 | 1.0              | 2.0            | 6.5                   | 100                     | -36                            | +14    | +16     | 1.84                          |
| 47   | T1        | 10              | 0045   | 0265 | 0485 | 1.0              | 2.0            | 6.5                   | 100                     | -36                            | +14    | +16     | 1.84                          |
| 47   | T1        | 5               | 0046   | 0266 | 0486 | 1.0              | 2.0            | 6.5                   | 100                     | -36                            | +14    | +16     | 1.84                          |
| 100  | T2        | 20              | 0047   | 0267 | 0487 | 1.0              | 4.0            | 7.5                   | 60                      | -36                            | +14    | +16     | 0.99                          |
| 100  | T2        | 10              | 0048   | 0268 | 0488 | 1.0              | 4.0            | 7.5                   | 60                      | -36                            | +14    | +16     | 0.99                          |
| 100  | T2        | 5               | 0049   | 0269 | 0489 | 1.0              | 4.0            | 7.5                   | 60                      | -36                            | +14    | +16     | 0.99                          |
| 180  | T2        | 20              | 0050   | 0270 | 0490 | 1.0              | 7.0            | 15.0                  | 40                      | -36                            | +14    | +16     | 1.11                          |
| 180  | T2        | 10              | 0051   | 0271 | 0491 | 1.0              | 7.0            | 15.0                  | 40                      | -36                            | +14    | +16     | 1.11                          |
| 180  | T2        | 5               | 0052   | 0272 | 0492 | 1.0              | 7.0            | 15.0                  | 40                      | -36                            | +14    | +16     | 1.11                          |
| 250  | T3        | 20              | 0053   | 0273 | 0493 | 2.0              | 10.0           | 15.0                  | 30                      | -40                            | +14    | +16     | 0.80                          |
| 250  | T3        | 10              | 0054   | 0274 | 0494 | 2.0              | 10.0           | 15.0                  | 30                      | -40                            | +14    | +16     | 0.80                          |
| 250  | T3        | 5               | 0055   | 0275 | 0495 | 2.0              | 10.0           | 15.0                  | 30                      | -40                            | +14    | +16     | 0.80                          |
| 390  | T3        | 20              | 0056   | 0276 | 0496 | 2.0              | 16.0           | 22.0                  | 25                      | -64                            | +17.5  | +20     | 0.75                          |

**Note**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).



| STANDARD/EXTENDED RATINGS: CLR90, M39006/30-XXXX    |              |                       |  |      |      |                     |                     |                                 |                                      |                                   |         |          |  |
|---|--------------|-----------------------|--|------|------|---------------------|---------------------|---------------------------------|--------------------------------------|-----------------------------------|---------|----------|--|
| CAPACITANCE<br>(μF)                                 | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/30-*<br>FAILURE RATE LEVEL<br>(%/1000 h) |      |      | MAX. DCL (μA)<br>at |                     | MAX. DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) at |         |          | MAX.<br>ESR<br>at + 25 °C<br>120 Hz<br>(Ω) |
|   |              |                       | M  | P    | R    | + 25 °C             | + 85 °C<br>+ 125 °C |                                 |                                      | - 55 °C                           | + 85 °C | + 125 °C |  |
|   |              |                       | 1.0  | 0.1  | 0.01 |                     |                     |                                 |                                      |                                   |         |          |  |
| <b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>  |              |                       |  |      |      |                     |                     |                                 |                                      |                                   |         |          |  |
| 390   | T3           | 10                    | 0057   | 0277 | 0497 | 2.0                 | 16.0                | 22.0                            | 25                                   | - 64                              | + 17.5  | + 20     | 0.75                                       |
| 390   | T3           | 5                     | 0058   | 0278 | 0498 | 2.0                 | 16.0                | 22.0                            | 25                                   | - 64                              | + 17.5  | + 20     | 0.75                                       |
| 750   | T4           | 20                    | 0059   | 0279 | 0499 | 4.0                 | 16.0                | 25.0                            | 23                                   | - 80                              | + 25    | + 25     | 0.44                                       |
| 750   | T4           | 10                    | 0060   | 0280 | 0500 | 4.0                 | 16.0                | 25.0                            | 23                                   | - 80                              | + 25    | + 25     | 0.44                                       |
| <b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b> |              |                       |  |      |      |                     |                     |                                 |                                      |                                   |         |          |  |
| 15  | T1           | 20                    | 0061   | 0281 | 0501 | 1.0                 | 2.0                 | 2.5                             | 155                                  | - 24                              | + 10.5  | + 12     | 1.99                                       |
| 15  | T1           | 10                    | 0062   | 0282 | 0502 | 1.0                 | 2.0                 | 2.5                             | 155                                  | - 24                              | + 10.5  | + 12     | 1.99                                       |
| 15  | T1           | 5                     | 0063   | 0283 | 0503 | 1.0                 | 2.0                 | 2.5                             | 155                                  | - 24                              | + 10.5  | + 12     | 1.99                                       |
| 33  | T1           | 20                    | 0064   | 0284 | 0504 | 1.0                 | 2.0                 | 5.0                             | 90                                   | - 28                              | + 14    | + 16     | 1.66                                       |
| 33  | T1           | 10                    | 0065   | 0285 | 0505 | 1.0                 | 2.0                 | 5.0                             | 90                                   | - 28                              | + 14    | + 16     | 1.66                                       |
| 33  | T1           | 5                     | 0066   | 0286 | 0506 | 1.0                 | 2.0                 | 5.0                             | 90                                   | - 28                              | + 14    | + 16     | 1.66                                       |
| 70  | T2           | 20                    | 0067   | 0287 | 0507 | 1.0                 | 4.0                 | 6.5                             | 75                                   | - 28                              | + 14    | + 16     | 1.11                                       |
| 70  | T2           | 10                    | 0068   | 0288 | 0508 | 1.0                 | 4.0                 | 6.5                             | 75                                   | - 28                              | + 14    | + 16     | 1.11                                       |
| 70  | T2           | 5                     | 0069   | 0289 | 0509 | 1.0                 | 4.0                 | 6.5                             | 75                                   | - 28                              | + 14    | + 16     | 1.11                                       |
| 120   | T2           | 20                    | 0070   | 0290 | 0510 | 1.0                 | 7.0                 | 9.0                             | 50                                   | - 28                              | + 17.5  | + 20     | 1.12                                       |
| 120   | T2           | 10                    | 0071   | 0291 | 0511 | 1.0                 | 7.0                 | 9.0                             | 50                                   | - 28                              | + 17.5  | + 20     | 1.12                                       |
| 120   | T2           | 5                     | 0072   | 0292 | 0512 | 1.0                 | 7.0                 | 9.0                             | 50                                   | - 28                              | + 17.5  | + 20     | 1.12                                       |
| 170   | T3           | 20                    | 0073   | 0293 | 0513 | 2.0                 | 10.0                | 12.5                            | 35                                   | - 32                              | + 14    | + 16     | 0.78                                       |
| 170   | T3           | 10                    | 0074   | 0294 | 0514 | 2.0                 | 10.0                | 12.5                            | 35                                   | - 32                              | + 14    | + 16     | 0.78                                       |
| 170   | T3           | 5                     | 0075   | 0295 | 0515 | 2.0                 | 10.0                | 12.5                            | 35                                   | - 32                              | + 14    | + 16     | 0.78                                       |
| 270   | T3           | 20                    | 0076   | 0296 | 0516 | 2.0                 | 16.0                | 16.0                            | 30                                   | - 56                              | + 17.5  | + 20     | 0.71                                       |
| 270   | T3           | 10                    | 0077   | 0297 | 0517 | 2.0                 | 16.0                | 16.0                            | 30                                   | - 56                              | + 17.5  | + 20     | 0.71                                       |
| 270   | T3           | 5                     | 0078   | 0298 | 0518 | 2.0                 | 16.0                | 16.0                            | 30                                   | - 56                              | + 17.5  | + 20     | 0.71                                       |
| 540   | T4           | 20                    | 0079   | 0299 | 0519 | 6.0                 | 24.0                | 20.0                            | 23                                   | - 80                              | + 25    | + 25     | 0.47                                       |
| 540   | T4           | 10                    | 0080   | 0300 | 0520 | 6.0                 | 24.0                | 20.0                            | 23                                   | - 80                              | + 25    | + 25     | 0.47                                       |
| <b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b> |              |                       |  |      |      |                     |                     |                                 |                                      |                                   |         |          |  |
| 10  | T1           | 20                    | 0081   | 0301 | 0521 | 1.0                 | 2.0                 | 2.0                             | 220                                  | - 16                              | + 8     | + 9      | 2.66                                       |
| 10  | T1           | 10                    | 0082   | 0302 | 0522 | 1.0                 | 2.0                 | 2.0                             | 220                                  | - 16                              | + 8     | + 9      | 2.66                                       |
| 10  | T1           | 5                     | 0083   | 0303 | 0523 | 1.0                 | 2.0                 | 2.0                             | 220                                  | - 16                              | + 8     | + 9      | 2.66                                       |
| 22  | T1           | 20                    | 0084   | 0304 | 0524 | 1.0                 | 2.0                 | 3.3                             | 140                                  | - 20                              | + 10.5  | + 12     | 1.99                                       |
| 22  | T1           | 10                    | 0085   | 0305 | 0525 | 1.0                 | 2.0                 | 3.3                             | 140                                  | - 20                              | + 10.5  | + 12     | 1.99                                       |
| 22  | T1           | 5                     | 0086   | 0306 | 0526 | 1.0                 | 2.0                 | 3.3                             | 140                                  | - 20                              | + 10.5  | + 12     | 1.99                                       |
| 50  | T2           | 20                    | 0087   | 0307 | 0527 | 1.0                 | 2.0                 | 5.5                             | 70                                   | - 28                              | + 13    | + 15     | 1.46                                       |
| 50  | T2           | 10                    | 0088   | 0308 | 0528 | 1.0                 | 2.0                 | 5.5                             | 70                                   | - 28                              | + 13    | + 15     | 1.46                                       |
| 50  | T2           | 5                     | 0089   | 0309 | 0529 | 1.0                 | 2.0                 | 5.5                             | 70                                   | - 28                              | + 13    | + 15     | 1.46                                       |
| 100   | T2           | 20                    | 0090   | 0310 | 0530 | 1.0                 | 10.0                | 7.5                             | 50                                   | - 28                              | + 13    | + 15     | 0.99                                       |
| 100   | T2           | 10                    | 0091   | 0311 | 0531 | 1.0                 | 10.0                | 7.5                             | 50                                   | - 28                              | + 13    | + 15     | 0.99                                       |
| 100   | T2           | 5                     | 0092   | 0312 | 0532 | 1.0                 | 10.0                | 7.5                             | 50                                   | - 28                              | + 13    | + 15     | 0.99                                       |
| 120   | T3           | 20                    | 0093   | 0313 | 0533 | 2.0                 | 6.0                 | 10.5                            | 38                                   | - 32                              | + 13    | + 15     | 1.16                                       |
| 120   | T3           | 10                    | 0094   | 0314 | 0534 | 2.0                 | 6.0                 | 10.5                            | 38                                   | - 32                              | + 13    | + 15     | 1.16                                       |
| 120   | T3           | 5                     | 0095   | 0315 | 0535 | 2.0                 | 6.0                 | 10.5                            | 38                                   | - 32                              | + 13    | + 15     | 1.16                                       |
| 180   | T3           | 20                    | 0096   | 0316 | 0536 | 2.0                 | 18.0                | 13.0                            | 32                                   | - 48                              | + 13    | + 15     | 0.96                                       |
| 180   | T3           | 10                    | 0097   | 0317 | 0537 | 2.0                 | 18.0                | 13.0                            | 32                                   | - 48                              | + 13    | + 15     | 0.96                                       |
| 180   | T3           | 5                     | 0098   | 0318 | 0538 | 2.0                 | 18.0                | 13.0                            | 32                                   | - 48                              | + 13    | + 15     | 0.96                                       |
| 350   | T4           | 20                    | 0099   | 0319 | 0539 | 7.0                 | 28.0                | 17.5                            | 24                                   | - 70                              | + 25    | + 25     | 0.67                                       |
| 350   | T4           | 10                    | 0100   | 0320 | 0540 | 7.0                 | 28.0                | 17.5                            | 24                                   | - 70                              | + 25    | + 25     | 0.67                                       |
| <b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b> |              |                       |  |      |      |                     |                     |                                 |                                      |                                   |         |          |  |
| 8   | T1           | 20                    | 0101   | 0321 | 0541 | 1.0                 | 2.0                 | 2.0                             | 275                                  | - 16                              | + 8     | + 12     | 3.32                                       |
| 8   | T1           | 10                    | 0102   | 0322 | 0542 | 1.0                 | 2.0                 | 2.0                             | 275                                  | - 16                              | + 8     | + 12     | 3.32                                       |
| 8   | T1           | 5                     | 0103   | 0323 | 0543 | 1.0                 | 2.0                 | 2.0                             | 275                                  | - 16                              | + 8     | + 12     | 3.32                                       |
| 15  | T1           | 20                    | 0104   | 0324 | 0544 | 1.0                 | 2.0                 | 2.5                             | 175                                  | - 20                              | + 10.5  | + 12     | 2.21                                       |
| 15  | T1           | 10                    | 0105   | 0325 | 0545 | 1.0                 | 2.0                 | 2.5                             | 175                                  | - 20                              | + 10.5  | + 12     | 2.21                                       |
| 15  | T1           | 5                     | 0106   | 0326 | 0546 | 1.0                 | 2.0                 | 2.5                             | 175                                  | - 20                              | + 10.5  | + 12     | 2.21                                       |
| 40  | T2           | 20                    | 0107   | 0327 | 0547 | 1.0                 | 5.0                 | 5.0                             | 65                                   | - 24                              | + 10.5  | + 12     | 1.66                                       |
| 40  | T2           | 10                    | 0108   | 0328 | 0548 | 1.0                 | 5.0                 | 5.0                             | 65                                   | - 24                              | + 10.5  | + 12     | 0.66                                       |
| 40  | T2           | 5                     | 0109   | 0329 | 0549 | 1.0                 | 5.0                 | 5.0                             | 65                                   | - 24                              | + 10.5  | + 12     | 0.66                                       |
| 68  | T2           | 20                    | 0110   | 0330 | 0550 | 1.0                 | 8.0                 | 6.5                             | 60                                   | - 24                              | + 13    | + 15     | 1.27                                       |

**Note**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).



| <b>STANDARD/EXTENDED RATINGS: CLR90, M39006/30-XXXX</b> |           |                 |   |      |      |                  |                |                       |                         |                                |        |         |                               |
|---|-----------|-----------------|---|------|------|------------------|----------------|-----------------------|-------------------------|--------------------------------|--------|---------|-------------------------------|
| CAPACITANCE (µF)  | CASE CODE | CAP. TOL. (± %) | PART NO. M39006/30-*<br>FAILURE RATE LEVEL (%/1000 h) |      |      | MAX. DCL (µA) at |                | MAX. DF at +25 °C (%) | MAX. IMP. at -55 °C (Ω) | MAX. CAPACITANCE CHANGE (%) at |        |         | MAX. ESR at +25 °C 120 Hz (Ω) |
|   |           |                 | M   | P    | R    | +25 °C           | +85 °C +125 °C |                       |                         | -55 °C                         | +85 °C | +125 °C |                               |
|   |           |                 | 1.0   | 0.1  | 0.01 |                  |                |                       |                         |                                |        |         |                               |
| <b>30 WVDC at +85 °C . . . 20 WVDC at +125 °C</b>       |           |                 |   |      |      |                  |                |                       |                         |                                |        |         |                               |
| 68  | T2        | 10              | 0111  | 0331 | 0551 | 1.0              | 8.0            | 6.5                   | 60                      | -24                            | +13    | +15     | 1.27                          |
| 68  | T2        | 5               | 0112  | 0332 | 0552 | 1.0              | 8.0            | 6.5                   | 60                      | -24                            | +13    | +15     | 1.27                          |
| 100   | T3        | 20              | 0113  | 0333 | 0553 | 2.0              | 12.0           | 8.5                   | 40                      | -28                            | +10.5  | +12     | 1.13                          |
| 100   | T3        | 10              | 0114  | 0334 | 0554 | 2.0              | 12.0           | 8.5                   | 40                      | -28                            | +10.5  | +12     | 1.13                          |
| 100   | T3        | 5               | 0115  | 0335 | 0555 | 2.0              | 12.0           | 8.5                   | 40                      | -28                            | +10.5  | +12     | 1.13                          |
| 150   | T3        | 20              | 0116  | 0336 | 0556 | 2.0              | 18.0           | 11.5                  | 35                      | -48                            | +13    | +15     | 1.02                          |
| 150   | T3        | 10              | 0117  | 0337 | 0557 | 2.0              | 18.0           | 11.5                  | 35                      | -48                            | +13    | +15     | 1.02                          |
| 150   | T3        | 5               | 0118  | 0338 | 0558 | 2.0              | 18.0           | 11.5                  | 35                      | -48                            | +13    | +15     | 1.02                          |
| 300   | T4        | 20              | 0119  | 0339 | 0559 | 8.0              | 32.0           | 15.5                  | 25                      | -60                            | +25    | +25     | 0.69                          |
| 300   | T4        | 10              | 0120  | 0340 | 0560 | 8.0              | 32.0           | 15.5                  | 25                      | -60                            | +25    | +25     | 0.69                          |
| <b>50 WVDC at +85 °C . . . 30 WVDC at +125 °C</b>       |           |                 |   |      |      |                  |                |                       |                         |                                |        |         |                               |
| 5   | T1        | 20              | 0121  | 0341 | 0561 | 1.0              | 2.0            | 1.5                   | 400                     | -16                            | +5     | +6      | 3.98                          |
| 5   | T1        | 10              | 0122  | 0342 | 0562 | 1.0              | 2.0            | 1.5                   | 400                     | -16                            | +5     | +6      | 3.98                          |
| 5   | T1        | 5               | 0123  | 0343 | 0563 | 1.0              | 2.0            | 1.5                   | 400                     | -16                            | +5     | +6      | 3.98                          |
| 10  | T1        | 20              | 0124  | 0344 | 0564 | 1.0              | 2.0            | 2.0                   | 250                     | -24                            | +8     | +9      | 2.66                          |
| 10  | T1        | 10              | 0125  | 0345 | 0565 | 1.0              | 2.0            | 2.0                   | 250                     | -24                            | +8     | +9      | 2.66                          |
| 10  | T1        | 5               | 0126  | 0346 | 0566 | 1.0              | 2.0            | 2.0                   | 250                     | -24                            | +8     | +9      | 2.66                          |
| 25  | T2        | 20              | 0127  | 0347 | 0567 | 1.0              | 5.0            | 4.0                   | 95                      | -20                            | +10.5  | +12     | 2.13                          |
| 25  | T2        | 10              | 0128  | 0348 | 0568 | 1.0              | 5.0            | 4.0                   | 95                      | -20                            | +10.5  | +12     | 2.13                          |
| 25  | T2        | 5               | 0129  | 0349 | 0569 | 1.0              | 5.0            | 4.0                   | 95                      | -20                            | +10.5  | +12     | 2.13                          |
| 47  | T2        | 20              | 0130  | 0350 | 0570 | 1.0              | 9.0            | 5.0                   | 70                      | -28                            | +13    | +15     | 1.56                          |
| 47  | T2        | 10              | 0131  | 0351 | 0571 | 1.0              | 9.0            | 5.0                   | 70                      | -28                            | +13    | +15     | 1.56                          |
| 47  | T2        | 5               | 0132  | 0352 | 0572 | 1.0              | 9.0            | 5.0                   | 70                      | -28                            | +13    | +15     | 1.56                          |
| 60  | T3        | 20              | 0133  | 0353 | 0573 | 2.0              | 12.0           | 6.0                   | 45                      | -16                            | +10.5  | +12     | 1.33                          |
| 60  | T3        | 10              | 0134  | 0354 | 0574 | 2.0              | 12.0           | 6.0                   | 45                      | -16                            | +10.5  | +12     | 1.33                          |
| 60  | T3        | 5               | 0135  | 0355 | 0575 | 2.0              | 12.0           | 6.0                   | 45                      | -16                            | +10.5  | +12     | 1.33                          |
| 82  | T3        | 20              | 0136  | 0356 | 0576 | 2.0              | 16.0           | 7.5                   | 45                      | -32                            | +13    | +15     | 1.22                          |
| 82  | T3        | 10              | 0137  | 0357 | 0577 | 2.0              | 16.0           | 7.5                   | 45                      | -32                            | +13    | +15     | 1.22                          |
| 82  | T3        | 5               | 0138  | 0358 | 0578 | 2.0              | 16.0           | 7.5                   | 45                      | -32                            | +13    | +15     | 1.22                          |
| 160   | T4        | 20              | 0139  | 0359 | 0579 | 6.0              | 32.0           | 8.5                   | 27                      | -50                            | +25    | +25     | 0.71                          |
| 160   | T4        | 10              | 0140  | 0360 | 0580 | 6.0              | 32.0           | 8.5                   | 27                      | -50                            | +25    | +25     | 0.71                          |
| <b>60 WVDC at +85 °C . . . 40 WVDC at +125 °C</b>       |           |                 |   |      |      |                  |                |                       |                         |                                |        |         |                               |
| 4   | T1        | 20              | 0141  | 0361 | 0581 | 1.0              | 2.0            | 1.4                   | 550                     | -16                            | +5     | +6      | 4.65                          |
| 4   | T1        | 10              | 0142  | 0362 | 0582 | 1.0              | 2.0            | 1.4                   | 550                     | -16                            | +5     | +6      | 4.65                          |
| 4   | T1        | 5               | 0143  | 0363 | 0583 | 1.0              | 2.0            | 1.4                   | 550                     | -16                            | +5     | +6      | 4.65                          |
| 8.2   | T1        | 20              | 0144  | 0364 | 0584 | 1.0              | 2.0            | 2.0                   | 275                     | -24                            | +8     | +9      | 3.24                          |
| 8.2   | T1        | 10              | 0145  | 0365 | 0585 | 1.0              | 2.0            | 2.0                   | 275                     | -24                            | +8     | +9      | 3.24                          |
| 8.2   | T1        | 5               | 0146  | 0366 | 0586 | 1.0              | 2.0            | 2.0                   | 275                     | -24                            | +8     | +9      | 3.24                          |
| 20  | T2        | 20              | 0147  | 0367 | 0587 | 1.0              | 5.0            | 3.5                   | 105                     | -16                            | +10.5  | +12     | 2.32                          |
| 20  | T2        | 10              | 0148  | 0368 | 0588 | 1.0              | 5.0            | 3.5                   | 105                     | -16                            | +10.5  | +12     | 2.32                          |
| 20  | T2        | 5               | 0149  | 0369 | 0589 | 1.0              | 5.0            | 3.5                   | 105                     | -16                            | +10.5  | +12     | 2.32                          |
| 39  | T2        | 20              | 0150  | 0370 | 0590 | 1.0              | 9.0            | 5.0                   | 90                      | -28                            | +10.5  | +12     | 1.70                          |
| 39  | T2        | 10              | 0151  | 0371 | 0591 | 1.0              | 9.0            | 5.0                   | 90                      | -28                            | +10.5  | +12     | 1.70                          |
| 39  | T2        | 5               | 0152  | 0372 | 0592 | 1.0              | 9.0            | 5.0                   | 90                      | -28                            | +10.5  | +12     | 1.70                          |
| 50  | T3        | 20              | 0153  | 0373 | 0593 | 2.0              | 12.0           | 5.0                   | 50                      | -16                            | +10.5  | +12     | 1.33                          |
| 50  | T3        | 10              | 0154  | 0374 | 0594 | 2.0              | 12.0           | 5.0                   | 50                      | -16                            | +10.5  | +12     | 1.33                          |
| 50  | T3        | 5               | 0155  | 0375 | 0595 | 2.0              | 12.0           | 5.0                   | 50                      | -16                            | +10.5  | +12     | 1.33                          |
| 68  | T3        | 20              | 0156  | 0376 | 0596 | 2.0              | 16.0           | 6.5                   | 50                      | -32                            | +10.5  | +12     | 1.27                          |
| 68  | T3        | 10              | 0157  | 0377 | 0597 | 2.0              | 16.0           | 6.5                   | 50                      | -32                            | +10.5  | +12     | 1.27                          |
| 68  | T3        | 5               | 0158  | 0378 | 0598 | 2.0              | 16.0           | 6.5                   | 50                      | -32                            | +10.5  | +12     | 1.27                          |
| 140   | T4        | 20              | 0159  | 0379 | 0599 | 8.0              | 32.0           | 8.0                   | 28                      | -40                            | +20    | +20     | 0.76                          |
| 140   | T4        | 10              | 0160  | 0380 | 0600 | 8.0              | 32.0           | 8.0                   | 28                      | -40                            | +20    | +20     | 0.76                          |
| <b>75 WVDC at +85 °C . . . 50 WVDC at +125 °C</b>       |           |                 |   |      |      |                  |                |                       |                         |                                |        |         |                               |
| 3.5   | T1        | 20              | 0161  | 0381 | 0601 | 1.0              | 2.0            | 1.25                  | 650                     | -16                            | +5     | +6      | 4.74                          |
| 3.5   | T1        | 10              | 0162  | 0382 | 0602 | 1.0              | 2.0            | 1.25                  | 650                     | -16                            | +5     | +6      | 4.74                          |
| 3.5   | T1        | 5               | 0163  | 0383 | 0603 | 1.0              | 2.0            | 1.25                  | 650                     | -16                            | +5     | +6      | 4.74                          |
| 6.8   | T1        | 20              | 0164  | 0384 | 0604 | 1.0              | 2.0            | 1.75                  | 300                     | -20                            | +8     | +9      | 3.42                          |

**Note**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).



| <b>STANDARD/EXTENDED RATINGS: CLR90, M39006/30-XXXX</b> |              |                       |                                  |      |      |               |          |         |           |                  |         |          |            |
|---|--------------|-----------------------|----------------------------------|------|------|---------------|----------|---------|-----------|------------------|---------|----------|------------|
| CAPACITANCE<br>(µF)                                     | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/30-*             |      |      | MAX. DCL (µA) |          | MAX. DF | MAX. IMP. | MAX. CAPACITANCE |         |          | MAX. ESR   |
|   |              |                       | FAILURE RATE LEVEL<br>(%/1000 h) |      |      | at            |          | at      | at        | CHANGE (%) at    |         |          | at + 25 °C |
|   |              |                       | M                                | P    | R    | + 25 °C       | + 85 °C  | + 25 °C | - 55 °C   | - 55 °C          | + 85 °C | + 125 °C | 120 Hz     |
|   |              |                       | 1.0                              | 0.1  | 0.01 | + 25 °C       | + 125 °C | (%)     | (Ω)       |                  |         |          | (Ω)        |
| <b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>     |              |                       |                                  |      |      |               |          |         |           |                  |         |          |            |
| 6.8   | T1           | 10                    | 0165                             | 0385 | 0605 | 1.0           | 2.0      | 1.75    | 300       | - 20             | + 8     | + 9      | 3.42       |
| 6.8   | T1           | 5                     | 0166                             | 0386 | 0606 | 1.0           | 2.0      | 1.75    | 300       | - 20             | + 8     | + 9      | 3.42       |
| 15  | T2           | 20                    | 0167                             | 0387 | 0607 | 1.0           | 5.0      | 3.0     | 150       | - 16             | + 8     | + 9      | 2.66       |
| 15  | T2           | 10                    | 0168                             | 0388 | 0608 | 1.0           | 5.0      | 3.0     | 150       | - 16             | + 8     | + 9      | 2.66       |
| 15  | T2           | 5                     | 0169                             | 0389 | 0609 | 1.0           | 5.0      | 3.0     | 150       | - 16             | + 8     | + 9      | 2.66       |
| 33  | T2           | 20                    | 0170                             | 0390 | 0610 | 1.0           | 10.0     | 5.0     | 90        | - 24             | + 10.5  | + 15     | 2.01       |
| 33  | T2           | 10                    | 0171                             | 0391 | 0611 | 1.0           | 10.0     | 5.0     | 90        | - 24             | + 10.5  | + 15     | 2.01       |
| 33  | T2           | 5                     | 0172                             | 0392 | 0612 | 1.0           | 10.0     | 5.0     | 90        | - 24             | + 10.5  | + 15     | 2.01       |
| 40  | T3           | 20                    | 0173                             | 0393 | 0613 | 2.0           | 12.0     | 4.5     | 60        | - 16             | + 10.5  | + 12     | 1.50       |
| 40  | T3           | 10                    | 0174                             | 0394 | 0614 | 2.0           | 12.0     | 4.5     | 60        | - 16             | + 10.5  | + 12     | 1.50       |
| 40  | T3           | 5                     | 0175                             | 0395 | 0615 | 2.0           | 12.0     | 4.5     | 60        | - 16             | + 10.5  | + 12     | 1.50       |
| 56  | T3           | 20                    | 0176                             | 0396 | 0616 | 2.0           | 17.0     | 5.5     | 60        | - 28             | + 10.5  | + 15     | 1.31       |
| 56  | T3           | 10                    | 0177                             | 0397 | 0617 | 2.0           | 17.0     | 5.5     | 60        | - 28             | + 10.5  | + 15     | 1.31       |
| 56  | T3           | 5                     | 0178                             | 0398 | 0618 | 2.0           | 17.0     | 5.5     | 60        | - 28             | + 10.5  | + 15     | 1.31       |
| 110   | T4           | 20                    | 0179                             | 0399 | 0619 | 9.0           | 36.0     | 6.0     | 29        | - 35             | + 20    | + 20     | 0.73       |
| 110   | T4           | 10                    | 0180                             | 0400 | 0620 | 9.0           | 36.0     | 6.0     | 29        | - 35             | + 20    | + 20     | 0.73       |
| <b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>    |              |                       |                                  |      |      |               |          |         |           |                  |         |          |            |
| 2.5   | T1           | 20                    | 0181                             | 0401 | 0621 | 1.0           | 2.0      | 1.0     | 950       | - 16             | + 7     | + 8      | 5.31       |
| 2.5   | T1           | 10                    | 0182                             | 0402 | 0622 | 1.0           | 2.0      | 1.0     | 950       | - 16             | + 7     | + 8      | 5.31       |
| 2.5   | T1           | 5                     | 0183                             | 0403 | 0623 | 1.0           | 2.0      | 1.0     | 950       | - 16             | + 7     | + 8      | 5.31       |
| 4.7   | T1           | 20                    | 0184                             | 0404 | 0624 | 1.0           | 2.0      | 1.5     | 500       | - 16             | + 7     | + 8      | 4.24       |
| 4.7   | T1           | 10                    | 0185                             | 0405 | 0625 | 1.0           | 2.0      | 1.5     | 500       | - 16             | + 7     | + 8      | 4.24       |
| 4.7   | T1           | 5                     | 0186                             | 0406 | 0626 | 1.0           | 2.0      | 1.5     | 500       | - 16             | + 7     | + 8      | 4.24       |
| 11.0  | T2           | 20                    | 0187                             | 0407 | 0627 | 1.0           | 4.0      | 2.5     | 200       | - 16             | + 8     | + 8      | 3.02       |
| 11.0  | T2           | 10                    | 0188                             | 0408 | 0628 | 1.0           | 4.0      | 2.5     | 200       | - 16             | + 8     | + 8      | 3.02       |
| 11.0  | T2           | 5                     | 0189                             | 0409 | 0629 | 1.0           | 4.0      | 2.5     | 200       | - 16             | + 8     | + 8      | 3.02       |
| 22.0  | T2           | 20                    | 0190                             | 0410 | 0630 | 1.0           | 9.0      | 3.75    | 100       | - 16             | + 8     | + 8      | 2.26       |
| 22.0  | T2           | 10                    | 0191                             | 0411 | 0631 | 1.0           | 9.0      | 3.75    | 100       | - 16             | + 8     | + 8      | 2.26       |
| 22.0  | T2           | 5                     | 0192                             | 0412 | 0632 | 1.0           | 9.0      | 3.75    | 100       | - 16             | + 8     | + 8      | 2.26       |
| 30.0  | T3           | 20                    | 0193                             | 0413 | 0633 | 2.0           | 12.0     | 3.5     | 80        | - 16             | + 8     | + 8      | 1.55       |
| 30.0  | T3           | 10                    | 0194                             | 0414 | 0634 | 2.0           | 12.0     | 3.5     | 80        | - 16             | + 8     | + 8      | 1.55       |
| 30.0  | T3           | 5                     | 0195                             | 0415 | 0635 | 2.0           | 12.0     | 3.5     | 80        | - 16             | + 8     | + 8      | 1.55       |
| 43.0  | T3           | 20                    | 0196                             | 0416 | 0636 | 2.0           | 17.0     | 4.25    | 70        | - 20             | + 8     | + 8      | 1.31       |
| 43.0  | T3           | 10                    | 0197                             | 0417 | 0637 | 2.0           | 17.0     | 4.25    | 70        | - 20             | + 8     | + 8      | 1.31       |
| 43.0  | T3           | 5                     | 0198                             | 0418 | 0638 | 2.0           | 17.0     | 4.25    | 70        | - 20             | + 8     | + 8      | 1.31       |
| 86.0  | T4           | 20                    | 0199                             | 0419 | 0639 | 9.0           | 36.0     | 5.0     | 30        | - 25             | + 15    | + 15     | 0.77       |
| 86.0  | T4           | 10                    | 0200                             | 0420 | 0640 | 9.0           | 36.0     | 5.0     | 30        | - 25             | + 15    | + 15     | 0.77       |
| <b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>    |              |                       |                                  |      |      |               |          |         |           |                  |         |          |            |
| 1.7   | T1           | 20                    | 0201                             | 0421 | 0641 | 1.0           | 2.0      | 1.0     | 1250      | - 16             | + 7     | + 8      | 7.81       |
| 1.7   | T1           | 10                    | 0202                             | 0422 | 0642 | 1.0           | 2.0      | 1.0     | 1250      | - 16             | + 7     | + 8      | 7.81       |
| 1.7   | T1           | 5                     | 0203                             | 0423 | 0643 | 1.0           | 2.0      | 1.0     | 1250      | - 16             | + 7     | + 8      | 7.81       |
| 3.6   | T1           | 20                    | 0204                             | 0424 | 0644 | 1.0           | 2.0      | 1.35    | 600       | - 24             | + 7     | + 8      | 4.98       |
| 3.6   | T1           | 10                    | 0205                             | 0425 | 0645 | 1.0           | 2.0      | 1.35    | 600       | - 16             | + 7     | + 8      | 4.98       |
| 3.6   | T1           | 5                     | 0206                             | 0426 | 0646 | 1.0           | 2.0      | 1.35    | 600       | - 16             | + 7     | + 8      | 4.98       |
| 9.0   | T2           | 20                    | 0207                             | 0427 | 0647 | 1.0           | 5.0      | 2.5     | 240       | - 16             | + 7     | + 8      | 3.69       |
| 9.0   | T2           | 10                    | 0208                             | 0428 | 0648 | 1.0           | 5.0      | 2.5     | 240       | - 16             | + 7     | + 8      | 3.69       |
| 9.0   | T2           | 5                     | 0209                             | 0429 | 0649 | 1.0           | 5.0      | 2.5     | 240       | - 16             | + 7     | + 8      | 3.69       |
| 14.0  | T2           | 20                    | 0210                             | 0430 | 0650 | 1.0           | 7.0      | 3.0     | 167       | - 16             | + 7     | + 8      | 2.85       |
| 14.0  | T2           | 10                    | 0211                             | 0431 | 0651 | 1.0           | 7.0      | 3.0     | 167       | - 16             | + 7     | + 8      | 2.85       |
| 14.0  | T2           | 5                     | 0212                             | 0432 | 0652 | 1.0           | 7.0      | 3.0     | 167       | - 16             | + 7     | + 8      | 2.85       |
| 18.0  | T3           | 20                    | 0213                             | 0433 | 0653 | 2.0           | 9.0      | 2.5     | 129       | - 16             | + 7     | + 8      | 1.85       |
| 18.0  | T3           | 10                    | 0214                             | 0434 | 0654 | 2.0           | 9.0      | 2.5     | 129       | - 16             | + 7     | + 8      | 1.85       |
| 18.0  | T3           | 5                     | 0215                             | 0435 | 0655 | 2.0           | 9.0      | 2.5     | 129       | - 16             | + 7     | + 8      | 1.85       |
| 25.0  | T3           | 20                    | 0216                             | 0436 | 0656 | 2.0           | 13.0     | 3.0     | 93        | - 16             | + 7     | + 8      | 1.59       |
| 25.0  | T3           | 10                    | 0217                             | 0437 | 0657 | 2.0           | 13.0     | 3.0     | 93        | - 16             | + 7     | + 8      | 1.59       |
| 25.0  | T3           | 5                     | 0218                             | 0438 | 0658 | 2.0           | 13.0     | 3.0     | 93        | - 16             | + 7     | + 8      | 1.59       |
| 56.0  | T4           | 20                    | 0219                             | 0439 | 0659 | 10.0          | 40.0     | 3.25    | 32        | - 25             | + 15    | + 15     | 0.77       |
| 56.0  | T4           | 10                    | 0220                             | 0440 | 0660 | 10.0          | 40.0     | 3.25    | 32        | - 25             | + 15    | + 15     | 0.77       |

**Note**  
\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).



| <b>STANDARD/EXTENDED RATINGS: CLR91, M39006/31-XXXX</b> |              |                            |                                  |          |           |                     |                     |                                 |   |                                    |          |    |   |
|---|--------------|----------------------------|----------------------------------|----------|-----------|---------------------|---------------------|---------------------------------|---|------------------------------------|----------|----|---|
| CAPACITANCE<br>( $\mu$ F)                               | CASE<br>CODE | CAP.<br>TOL.<br>( $\pm$ %) | PART NO. M39006/31-*             |          |           | MAX. DCL ( $\mu$ A) |                     | MAX. DF<br>at<br>+ 25 °C<br>(%) | MAX.<br>IMP.<br>at<br>- 55 °C<br>( $\Omega$ ) | MAX.. CAPACITANCE<br>CHANGE (%) at |          |    | MAX.<br>ESR<br>at + 25 °C<br>120 Hz<br>( $\Omega$ ) |
|   |              |                            | FAILURE RATE LEVEL<br>(%/1000 h) |          |           | at                  |                     |                                 |   | + 25 °C + 85 °C + 125 °C           |          |    |   |
|   |              |                            | M<br>1.0                         | P<br>0.1 | R<br>0.01 | + 25 °C             | + 85 °C<br>+ 125 °C | - 55 °C                         | - 55 °C                                       | + 85 °C                            | + 125 °C |    |   |
| <b>6 WVDC at + 85 °C . . . 4 WVDC at + 125 °C</b>       |              |                            |                                  |          |           |                     |                     |                                 |   |                                    |          |    |   |
| 220   | T1           | 20                         | 0001                             | 0089     | 0177      | 2                   | 9                   | 25                              | 36  | - 64                               | 13       | 16 | 1.51  |
| 220   | T1           | 10                         | 0002                             | 0090     | 0178      | 2                   | 9                   | 25                              | 36  | - 64                               | 13       | 16 | 1.51  |
| 820   | T2           | 20                         | 0003                             | 0091     | 0179      | 3                   | 14                  | 77.5                            | 18  | - 88                               | 16       | 20 | 1.26  |
| 820   | T2           | 10                         | 0004                             | 0092     | 0180      | 3                   | 14                  | 77.5                            | 18  | - 88                               | 16       | 20 | 1.26  |
| 1500  | T3           | 20                         | 0005                             | 0093     | 0181      | 5                   | 20                  | 86                              | 18  | - 90                               | 20       | 25 | 0.76  |
| 1500  | T3           | 10                         | 0006                             | 0094     | 0182      | 5                   | 20                  | 86                              | 18  | - 90                               | 20       | 25 | 0.76  |
| 2200  | T4           | 20                         | 0007                             | 0095     | 0183      | 6                   | 24                  | 85                              | 13  | - 90                               | 25       | 30 | 0.52  |
| 2200  | T4           | 10                         | 0008                             | 0096     | 0184      | 6                   | 24                  | 85                              | 13  | - 90                               | 25       | 30 | 0.52  |
| <b>8 WVDC at + 85 °C . . . 5 WVDC at + 125 °C</b>       |              |                            |                                  |          |           |                     |                     |                                 |   |                                    |          |    |   |
| 180   | T1           | 20                         | 0009                             | 0097     | 0185      | 2                   | 9                   | 20.5                            | 45  | - 60                               | 13       | 16 | 1.51  |
| 180   | T1           | 10                         | 0010                             | 0098     | 0186      | 2                   | 9                   | 20.5                            | 45  | - 60                               | 13       | 16 | 1.51  |
| 680   | T2           | 20                         | 0011                             | 0099     | 0187      | 3                   | 14                  | 65                              | 22  | - 83                               | 16       | 20 | 1.27  |
| 680   | T2           | 10                         | 0012                             | 0100     | 0188      | 3                   | 14                  | 65                              | 22  | - 83                               | 16       | 20 | 1.27  |
| 1500  | T3           | 20                         | 0013                             | 0101     | 0189      | 5                   | 20                  | 85                              | 18  | - 90                               | 20       | 25 | 0.75  |
| 1500  | T3           | 10                         | 0014                             | 0102     | 0190      | 5                   | 20                  | 85                              | 18  | - 90                               | 20       | 25 | 0.75  |
| 1800  | T4           | 20                         | 0015                             | 0103     | 0191      | 7                   | 25                  | 69                              | 14  | - 90                               | 25       | 30 | 0.51  |
| 1800  | T4           | 10                         | 0016                             | 0104     | 0192      | 7                   | 25                  | 69                              | 14  | - 90                               | 25       | 30 | 0.51  |
| <b>10 WVDC at + 85 °C . . . 7 WVDC at + 125 °C</b>      |              |                            |                                  |          |           |                     |                     |                                 |   |                                    |          |    |   |
| 150   | T1           | 20                         | 0017                             | 0105     | 0193      | 2                   | 9                   | 17                              | 54  | - 55                               | 13       | 16 | 1.51  |
| 150   | T1           | 10                         | 0018                             | 0106     | 0194      | 2                   | 9                   | 17                              | 54  | - 55                               | 13       | 16 | 1.51  |
| 560   | T2           | 20                         | 0019                             | 0107     | 0195      | 3                   | 16                  | 53                              | 27  | - 77                               | 16       | 20 | 1.26  |
| 560   | T2           | 10                         | 0020                             | 0108     | 0196      | 3                   | 16                  | 53                              | 27  | - 77                               | 16       | 20 | 1.26  |
| 1200  | T3           | 20                         | 0021                             | 0109     | 0197      | 5                   | 20                  | 68.5                            | 18  | - 88                               | 20       | 25 | 0.76  |
| 1200  | T3           | 10                         | 0022                             | 0110     | 0198      | 5                   | 20                  | 68.5                            | 18  | - 88                               | 20       | 25 | 0.76  |
| 1500  | T4           | 20                         | 0023                             | 0111     | 0199      | 7                   | 25                  | 57                              | 15  | - 88                               | 25       | 30 | 0.51  |
| 1500  | T4           | 10                         | 0024                             | 0112     | 0200      | 7                   | 25                  | 57                              | 15  | - 88                               | 25       | 30 | 0.51  |
| <b>15 WVDC at + 85 °C . . . 10 WVDC at + 125 °C</b>     |              |                            |                                  |          |           |                     |                     |                                 |   |                                    |          |    |   |
| 100   | T1           | 20                         | 0025                             | 0113     | 0201      | 2                   | 9                   | 15                              | 72  | - 44                               | 13       | 16 | 1.99  |
| 100   | T1           | 10                         | 0026                             | 0114     | 0202      | 2                   | 9                   | 15                              | 72  | - 44                               | 13       | 16 | 1.99  |
| 390   | T2           | 20                         | 0027                             | 0115     | 0203      | 3                   | 16                  | 37                              | 31  | - 66                               | 16       | 20 | 1.26  |
| 390   | T2           | 10                         | 0028                             | 0116     | 0204      | 3                   | 16                  | 37                              | 31  | - 66                               | 16       | 20 | 1.26  |
| 820   | T3           | 20                         | 0029                             | 0117     | 0205      | 6                   | 24                  | 55.5                            | 22  | - 77                               | 20       | 25 | 0.9   |
| 820   | T3           | 10                         | 0030                             | 0118     | 0206      | 6                   | 24                  | 55.5                            | 22  | - 77                               | 20       | 25 | 0.9   |
| 1000  | T4           | 20                         | 0031                             | 0119     | 0207      | 8                   | 32                  | 46                              | 17  | - 77                               | 25       | 30 | 0.61  |
| 1000  | T4           | 10                         | 0032                             | 0120     | 0208      | 8                   | 32                  | 46                              | 17  | - 77                               | 25       | 30 | 0.61  |
| <b>25 WVDC at + 85 °C . . . 15 WVDC at + 125 °C</b>     |              |                            |                                  |          |           |                     |                     |                                 |   |                                    |          |    |   |
| 68  | T1           | 20                         | 0033                             | 0121     | 0209      | 2                   | 9                   | 11                              | 90  | - 40                               | 12       | 15 | 2.15  |
| 68  | T1           | 10                         | 0034                             | 0122     | 0210      | 2                   | 9                   | 11                              | 90  | - 40                               | 12       | 15 | 2.15  |
| 270   | T2           | 20                         | 0035                             | 0123     | 0211      | 3                   | 16                  | 27.5                            | 33  | - 62                               | 13       | 16 | 1.35  |
| 270   | T2           | 10                         | 0036                             | 0124     | 0212      | 3                   | 16                  | 27.5                            | 33  | - 62                               | 13       | 16 | 1.35  |
| 560   | T3           | 20                         | 0037                             | 0125     | 0213      | 7                   | 28                  | 38                              | 24  | - 72                               | 20       | 25 | 0.9   |
| 560   | T3           | 10                         | 0038                             | 0126     | 0214      | 7                   | 28                  | 38                              | 24  | - 72                               | 20       | 25 | 0.9   |
| 680   | T4           | 20                         | 0039                             | 0127     | 0215      | 8                   | 32                  | 31.5                            | 19  | - 72                               | 25       | 30 | 0.62  |
| 680   | T4           | 10                         | 0040                             | 0128     | 0216      | 8                   | 32                  | 31.5                            | 19  | - 72                               | 25       | 30 | 0.62  |
| <b>30 WVDC at + 85 °C . . . 20 WVDC at + 125 °C</b>     |              |                            |                                  |          |           |                     |                     |                                 |   |                                    |          |    |   |
| 56  | T1           | 20                         | 0041                             | 0129     | 0217      | 2                   | 9                   | 11                              | 100   | - 38                               | 12       | 15 | 2.61  |
| 56  | T1           | 10                         | 0042                             | 0130     | 0218      | 2                   | 9                   | 11                              | 100   | - 38                               | 12       | 15 | 2.61  |
| 220   | T2           | 20                         | 0043                             | 0131     | 0219      | 3                   | 16                  | 21                              | 36  | - 60                               | 13       | 16 | 1.27  |
| 220   | T2           | 10                         | 0044                             | 0132     | 0220      | 3                   | 16                  | 21                              | 36  | - 60                               | 13       | 16 | 1.27  |
| 470   | T3           | 20                         | 0045                             | 0133     | 0221      | 8                   | 32                  | 32                              | 25  | - 65                               | 20       | 25 | 0.91  |
| 470   | T3           | 10                         | 0046                             | 0134     | 0222      | 8                   | 32                  | 32                              | 25  | - 65                               | 20       | 25 | 0.91  |
| 560   | T4           | 20                         | 0047                             | 0135     | 0223      | 9                   | 36                  | 27.5                            | 20  | - 65                               | 25       | 30 | 0.65  |
| 560   | T4           | 10                         | 0048                             | 0136     | 0224      | 9                   | 36                  | 27.5                            | 20  | - 65                               | 25       | 30 | 0.65  |

**Note**

\* Dash number will include the letter "H" to indicate the optional vibration and shock requirements (i.e., 51 g random vibration, 80 g sinusoidal vibration and 500 g shock).



| <b>STANDARD/EXTENDED RATINGS: CLR91, M39006/31-XXXX</b> |              |                       |  |      |      |                     |                     |         |                |                                   |    |    |               |
|---|--------------|-----------------------|--|------|------|---------------------|---------------------|---------|----------------|-----------------------------------|----|----|---------------|
| CAPACITANCE<br>(µF)                                     | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO. M39006/31-*<br>FAILURE RATE LEVEL<br>(%/1000 h) |      |      | MAX. DCL (µA)<br>at |                     | MAX. DF | MAX. IMP.      | MAX. CAPACITANCE<br>CHANGE (%) at |    |    | MAX. ESR      |
|   |              |                       | M  | P    | R    | + 25 °C             |                     | + 25 °C | at             | - 55 °C + 85 °C + 125 °C          |    |    | at + 25 °C    |
|   |              |                       | 1.0  | 0.1  | 0.01 | + 25 °C             | + 85 °C<br>+ 125 °C | (%)     | - 55 °C<br>(Ω) |                                   |    |    | 120 Hz<br>(Ω) |
| <b>50 WVDC at + 85 °C . . . 30 WVDC at + 125 °C</b>     |              |                       |  |      |      |                     |                     |         |                |                                   |    |    |               |
| 33  | T1           | 20                    | 0049   | 0137 | 0225 | 2                   | 9                   | 6.15    | 135            | - 29                              | 10 | 12 | 2.48          |
| 33  | T1           | 10                    | 0050   | 0138 | 0226 | 2                   | 9                   | 6.15    | 135            | - 29                              | 10 | 12 | 2.48          |
| 120   | T2           | 20                    | 0051   | 0139 | 0227 | 4                   | 24                  | 11.3    | 49             | - 42                              | 12 | 15 | 1.25          |
| 120   | T2           | 10                    | 0052   | 0140 | 0228 | 4                   | 24                  | 11.3    | 49             | - 42                              | 12 | 15 | 1.25          |
| 270   | T3           | 20                    | 0053   | 0141 | 0229 | 8                   | 32                  | 18.5    | 29             | - 46                              | 20 | 25 | 0.91          |
| 270   | T3           | 10                    | 0054   | 0142 | 0230 | 8                   | 32                  | 18.5    | 29             | - 46                              | 20 | 25 | 0.91          |
| 330   | T4           | 20                    | 0055   | 0143 | 0231 | 9                   | 36                  | 19      | 22             | - 46                              | 25 | 30 | 0.77          |
| 330   | T4           | 10                    | 0056   | 0144 | 0232 | 9                   | 36                  | 19      | 22             | - 46                              | 25 | 30 | 0.77          |
| <b>60 WVDC at + 85 °C . . . 40 WVDC at + 125 °C</b>     |              |                       |  |      |      |                     |                     |         |                |                                   |    |    |               |
| 27  | T1           | 20                    | 0057   | 0145 | 0233 | 3                   | 12                  | 5.1     | 144            | - 24                              | 10 | 12 | 2.51          |
| 27  | T1           | 10                    | 0058   | 0146 | 0234 | 3                   | 12                  | 5.1     | 144            | - 24                              | 10 | 12 | 2.51          |
| 100   | T2           | 20                    | 0059   | 0147 | 0235 | 4                   | 20                  | 9.5     | 54             | - 36                              | 12 | 15 | 1.26          |
| 100   | T2           | 10                    | 0060   | 0148 | 0236 | 4                   | 20                  | 9.5     | 54             | - 36                              | 12 | 15 | 1.26          |
| 220   | T3           | 20                    | 0061   | 0149 | 0237 | 8                   | 32                  | 15      | 29             | - 40                              | 16 | 20 | 0.91          |
| 220   | T3           | 10                    | 0062   | 0150 | 0238 | 8                   | 32                  | 15      | 29             | - 40                              | 16 | 20 | 0.91          |
| 270   | T4           | 20                    | 0063   | 0151 | 0239 | 9                   | 36                  | 13.5    | 23             | - 45                              | 20 | 25 | 0.67          |
| 270   | T4           | 10                    | 0064   | 0152 | 0240 | 9                   | 36                  | 13.5    | 23             | - 45                              | 20 | 25 | 0.67          |
| <b>75 WVDC at + 85 °C . . . 50 WVDC at + 125 °C</b>     |              |                       |  |      |      |                     |                     |         |                |                                   |    |    |               |
| 22  | T1           | 20                    | 0065   | 0153 | 0241 | 3                   | 12                  | 4.25    | 157            | - 19                              | 10 | 12 | 2.57          |
| 22  | T1           | 10                    | 0066   | 0154 | 0242 | 3                   | 12                  | 4.25    | 157            | - 19                              | 10 | 12 | 2.57          |
| 82  | T2           | 20                    | 0067   | 0155 | 0243 | 4                   | 24                  | 7.6     | 63             | - 30                              | 12 | 15 | 1.23          |
| 82  | T2           | 10                    | 0068   | 0156 | 0244 | 4                   | 24                  | 7.6     | 63             | - 30                              | 12 | 15 | 1.23          |
| 180   | T3           | 20                    | 0069   | 0157 | 0245 | 9                   | 36                  | 12.2    | 30             | - 35                              | 16 | 20 | 0.9           |
| 180   | T3           | 10                    | 0070   | 0158 | 0246 | 9                   | 36                  | 12.2    | 30             | - 35                              | 16 | 20 | 0.9           |
| 220   | T4           | 20                    | 0071   | 0159 | 0247 | 10                  | 40                  | 18.5    | 24             | - 40                              | 20 | 25 | 1.12          |
| 220   | T4           | 10                    | 0072   | 0160 | 0248 | 10                  | 40                  | 18.5    | 24             | - 40                              | 20 | 25 | 1.12          |
| <b>100 WVDC at + 85 °C . . . 65 WVDC at + 125 °C</b>    |              |                       |  |      |      |                     |                     |         |                |                                   |    |    |               |
| 10  | T1           | 20                    | 0073   | 0161 | 0249 | 3                   | 12                  | 2.25    | 200            | - 17                              | 10 | 12 | 2.99          |
| 10  | T1           | 10                    | 0074   | 0162 | 0250 | 3                   | 12                  | 2.25    | 200            | - 17                              | 10 | 12 | 2.99          |
| 39  | T2           | 20                    | 0075   | 0163 | 0251 | 5                   | 24                  | 5.2     | 80             | - 20                              | 12 | 15 | 1.77          |
| 39  | T2           | 10                    | 0076   | 0164 | 0252 | 5                   | 24                  | 5.2     | 80             | - 20                              | 12 | 15 | 1.77          |
| 68  | T3           | 20                    | 0077   | 0165 | 0253 | 10                  | 40                  | 5.65    | 40             | - 30                              | 14 | 16 | 1.11          |
| 68  | T3           | 10                    | 0078   | 0166 | 0254 | 10                  | 40                  | 5.65    | 40             | - 30                              | 14 | 16 | 1.11          |
| 120   | T4           | 20                    | 0079   | 0167 | 0255 | 12                  | 48                  | 12.5    | 30             | - 35                              | 15 | 17 | 1.38          |
| 120   | T4           | 10                    | 0080   | 0168 | 0256 | 12                  | 48                  | 12.5    | 30             | - 35                              | 15 | 17 | 1.38          |
| <b>125 WVDC at + 85 °C . . . 85 WVDC at + 125 °C</b>    |              |                       |  |      |      |                     |                     |         |                |                                   |    |    |               |
| 6.8   | T1           | 20                    | 0081   | 0169 | 0257 | 3                   | 12                  | 3       | 300            | - 14                              | 10 | 12 | 5.86          |
| 6.8   | T1           | 10                    | 0082   | 0170 | 0258 | 3                   | 12                  | 3       | 300            | - 14                              | 10 | 12 | 5.86          |
| 27  | T2           | 20                    | 0083   | 0171 | 0259 | 5                   | 24                  | 3.6     | 90             | - 18                              | 12 | 15 | 1.77          |
| 27  | T2           | 10                    | 0084   | 0172 | 0260 | 5                   | 24                  | 3.6     | 90             | - 18                              | 12 | 15 | 1.77          |
| 47  | T3           | 20                    | 0085   | 0173 | 0261 | 10                  | 40                  | 3.95    | 50             | - 26                              | 14 | 16 | 1.12          |
| 47  | T3           | 10                    | 0086   | 0174 | 0262 | 10                  | 40                  | 3.95    | 50             | - 26                              | 14 | 16 | 1.12          |
| 82  | T4           | 20                    | 0087   | 0175 | 0263 | 12                  | 48                  | 8.7     | 32             | - 30                              | 15 | 17 | 1.41          |
| 82  | T4           | 10                    | 0088   | 0176 | 0264 | 12                  | 48                  | 8.7     | 32             | - 30                              | 15 | 17 | 1.41          |

**Note**

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