

### Type TYRV Series



Tyco Electronics radial leaded aluminum electrolytic capacitors are designed for through-hole PCB population where board space is restricted.

The TYRV series offers a wide capacitance range at voltages from 6.3 to 450Vd.c.

Suitable for a broad range of general purpose filtering, bypassing, power supply coupling/decoupling, telecomm-unications and audio-video applications.

### Key Features

- General purpose polarized aluminum foil electrolytic capacitors
- Radial leads
- Aluminum case with insulating sleeve
- 85°C temperature rating
- 2000 to 3000 hours load life assured
- RoHS Compliant

### Standard Product Table

| Rated Voltage V.DC | Capacitance |      | Case Size Dia x L | Lead Pitch | Case Code | Dissipation Factor (%)* | Ripple Current (mA)* | Part Number    |
|--------------------|-------------|------|-------------------|------------|-----------|-------------------------|----------------------|----------------|
|                    | µF          | Code |                   |            |           |                         |                      |                |
| 6.3                | 33          | 336  | 5x11              | 2.0        | A11       | 23                      | 72                   | TYRV0J336A11ML |
| 6.3                | 47          | 476  | 5x11              | 2.0        | A11       | 23                      | 90                   | TYRV0J476A11ML |
| 6.3                | 100         | 107  | 5x11              | 2.0        | A11       | 23                      | 130                  | TYRV0J107A11ML |
| 6.3                | 220         | 227  | 5x11              | 2.0        | A11       | 23                      | 200                  | TYRV0J227A11ML |
| 6.3                | 330         | 337  | 6.3x11            | 2.5        | B11       | 23                      | 270                  | TYRV0J337B11ML |
| 6.3                | 470         | 477  | 6.3x11            | 2.5        | B11       | 23                      | 320                  | TYRV0J477B11ML |
| 6.3                | 1000        | 108  | 8x11.5            | 3.5        | C11       | 23                      | 540                  | TYRV0J108C11ML |
| 6.3                | 2200        | 228  | 10x20             | 5.0        | D20       | 23                      | 1000                 | TYRV0J228D20ML |
| 6.3                | 3300        | 338  | 10x20             | 5.0        | D20       | 23                      | 1185                 | TYRV0J338D20ML |
| 6.3                | 4700        | 478  | 12.5x20           | 5.0        | E20       | 23                      | 1545                 | TYRV0J478E20ML |
| 6.3                | 6800        | 688  | 12.5x25           | 5.0        | E25       | 23                      | 1880                 | TYRV0J688E25ML |
| 6.3                | 10000       | 109  | 16x25             | 7.5        | F25       | 23                      | 2330                 | TYRV0J109F25ML |
| 6.3                | 22000       | 229  | 18x40             | 7.5        | G40       | 23                      | 3320                 | TYRV0J229G40ML |
| 6.3                | 22000       | 229  | 22x40             | 10         | H40       | 23                      | 3700                 | TYRV0J229H40ML |
| 10                 | 22          | 226  | 5x11              | 2.0        | A11       | 20                      | 70                   | TYRV1A226A11ML |
| 10                 | 33          | 336  | 5x11              | 2.0        | A11       | 20                      | 84                   | TYRV1A336A11ML |
| 10                 | 47          | 476  | 5x11              | 2.0        | A11       | 20                      | 100                  | TYRV1A476A11ML |
| 10                 | 100         | 107  | 5x11              | 2.0        | A11       | 20                      | 145                  | TYRV1A107A11ML |
| 10                 | 220         | 227  | 6.3x11            | 2.5        | B11       | 20                      | 250                  | TYRV1A227B11ML |
| 10                 | 330         | 337  | 6.3x11            | 2.5        | B11       | 20                      | 290                  | TYRV1A337B11ML |
| 10                 | 470         | 477  | 6.3x11            | 2.5        | B11       | 20                      | 350                  | TYRV1A477B11ML |
| 10                 | 1000        | 108  | 10x12.5           | 5.0        | D12       | 20                      | 650                  | TYRV1A108D12ML |
| 10                 | 2200        | 228  | 10x20             | 5.0        | D20       | 20                      | 1070                 | TYRV1A228D20ML |
| 10                 | 3300        | 338  | 12.5x20           | 5.0        | E20       | 20                      | 1420                 | TYRV1A338E20ML |
| 10                 | 4700        | 478  | 12.5x25           | 5.0        | E25       | 20                      | 1780                 | TYRV1A478E25ML |
| 10                 | 6800        | 688  | 16x25             | 7.5        | F25       | 20                      | 2220                 | TYRV1A688F25ML |
| 10                 | 10000       | 109  | 16x35.5           | 7.5        | F35       | 20                      | 2670                 | TYRV1A109F35ML |
| 10                 | 22000       | 229  | 22x40             | 10         | H40       | 20                      | 3790                 | TYRV1A229H40ML |
| 16                 | 10          | 106  | 5x11              | 2.0        | A11       | 16                      | 49                   | TYRV1C106A11ML |
| 16                 | 22          | 226  | 5x11              | 2.0        | A11       | 16                      | 75                   | TYRV1C226A11ML |
| 16                 | 33          | 336  | 5x11              | 2.0        | A11       | 16                      | 90                   | TYRV1C336A11ML |
| 16                 | 47          | 476  | 5x11              | 2.0        | A11       | 16                      | 110                  | TYRV1C476A11ML |
| 16                 | 100         | 107  | 5x11              | 2.0        | A11       | 16                      | 160                  | TYRV1C107A11ML |
| 16                 | 220         | 227  | 6.3x11            | 2.5        | B11       | 16                      | 260                  | TYRV1C227B11ML |
| 16                 | 330         | 337  | 8x11.5            | 3.5        | C11       | 16                      | 370                  | TYRV1C337C11ML |
| 16                 | 470         | 477  | 8x11.5            | 3.5        | C11       | 16                      | 440                  | TYRV1C477C11ML |
| 16                 | 1000        | 108  | 10x16             | 5.0        | D16       | 16                      | 785                  | TYRV1C108D16ML |
| 16                 | 2200        | 228  | 12.5x20           | 5.0        | E20       | 16                      | 1295                 | TYRV1C228E20ML |
| 16                 | 3300        | 338  | 12.5x25           | 5.0        | E25       | 16                      | 1655                 | TYRV1C338E25ML |
| 16                 | 4700        | 478  | 16x25             | 7.5        | F25       | 16                      | 2090                 | TYRV1C478F25ML |
| 16                 | 6800        | 688  | 16x31.5           | 7.5        | F31       | 16                      | 2520                 | TYRV1C688F31ML |
| 16                 | 10000       | 109  | 18x35.5           | 7.5        | G35       | 16                      | 2920                 | TYRV1C109G35ML |
| 16                 | 22000       | 229  | 22x40             | 10         | H40       | 16                      | 3900                 | TYRV1C229H40ML |
| 25                 | 4.7         | 475  | 5x11              | 2.0        | A11       | 14                      | 31                   | TYRV1E475A11ML |
| 25                 | 10          | 106  | 5x11              | 2.0        | A11       | 14                      | 54                   | TYRV1E106A11ML |
| 25                 | 22          | 226  | 5x11              | 2.0        | A11       | 14                      | 80                   | TYRV1E226A11ML |
| 25                 | 33          | 336  | 5x11              | 2.0        | A11       | 14                      | 97                   | TYRV1E336A11ML |
| 25                 | 47          | 476  | 5x11              | 2.0        | A11       | 14                      | 115                  | TYRV1E476A11ML |
| 25                 | 100         | 107  | 6.3x11            | 2.5        | B11       | 14                      | 190                  | TYRV1E107B11ML |
| 25                 | 220         | 227  | 8x11.5            | 3.5        | C11       | 14                      | 320                  | TYRV1E227C11ML |
| 25                 | 330         | 337  | 8x11.5            | 3.5        | C11       | 14                      | 440                  | TYRV1E337C11ML |

\* DF measured at 120Hz, 20°C

\* RC measured at 120Hz, 85°C

### Standard Product Table (continued)

| Rated Voltage V.DC | Capacitance |      | Case Size Dia x L | Lead Pitch | Case Code | Dissipation Factor (%)* | Ripple Current (mA)* | Part Number    |
|--------------------|-------------|------|-------------------|------------|-----------|-------------------------|----------------------|----------------|
|                    | µF          | Code |                   |            |           |                         |                      |                |
| 25                 | 330         | 337  | 10x12.5           | 5.0        | D12       | 14                      | 470                  | TYRV1E337D12ML |
| 25                 | 470         | 477  | 10x12.5           | 5.0        | D12       | 14                      | 545                  | TYRV1E477D12ML |
| 25                 | 1000        | 108  | 10x20             | 5.0        | D20       | 14                      | 955                  | TYRV1E108D20ML |
| 25                 | 2200        | 228  | 12.5x25           | 5.0        | E25       | 14                      | 1540                 | TYRV1E228E25ML |
| 25                 | 3300        | 338  | 16x25             | 7.5        | F25       | 14                      | 1975                 | TYRV1E338F25ML |
| 25                 | 4700        | 478  | 16x31.5           | 7.5        | F31       | 14                      | 2420                 | TYRV1E478F31ML |
| 25                 | 6800        | 688  | 18x35.5           | 7.5        | G35       | 14                      | 2880                 | TYRV1E688G35ML |
| 25                 | 10000       | 109  | 22x40             | 10         | H40       | 14                      | 3440                 | TYRV1E109H40ML |
| 35                 | 4.7         | 475  | 5x11              | 2.0        | A11       | 12                      | 40                   | TYRV1V475A11ML |
| 35                 | 10          | 106  | 5x11              | 2.0        | A11       | 12                      | 58                   | TYRV1V106A11ML |
| 35                 | 22          | 226  | 5x11              | 2.0        | A11       | 12                      | 87                   | TYRV1V226A11ML |
| 35                 | 33          | 336  | 5x11              | 2.0        | A11       | 12                      | 108                  | TYRV1V336A11ML |
| 35                 | 47          | 476  | 5x11              | 2.0        | A11       | 12                      | 130                  | TYRV1V476A11ML |
| 35                 | 100         | 107  | 6.3x11            | 2.5        | B11       | 12                      | 210                  | TYRV1V107B11ML |
| 35                 | 220         | 227  | 8x11.5            | 3.5        | C11       | 12                      | 385                  | TYRV1V227C11ML |
| 35                 | 220         | 227  | 10x12.5           | 5.0        | D12       | 12                      | 420                  | TYRV1V227D12ML |
| 35                 | 330         | 337  | 10x12.5           | 5.0        | D12       | 12                      | 490                  | TYRV1V337D12ML |
| 35                 | 470         | 477  | 10x16             | 5.0        | D16       | 12                      | 740                  | TYRV1V477D16ML |
| 35                 | 1000        | 108  | 12.5x20           | 5.0        | E20       | 12                      | 1145                 | TYRV1V108E20ML |
| 35                 | 2200        | 228  | 16x25             | 7.5        | F25       | 12                      | 1785                 | TYRV1V228F25ML |
| 35                 | 3300        | 338  | 16x35.5           | 7.5        | F35       | 12                      | 2275                 | TYRV1V338F35ML |
| 35                 | 4700        | 478  | 18x35.5           | 7.5        | G35       | 12                      | 2700                 | TYRV1V478G35ML |
| 50                 | 0.1         | 104  | 5x11              | 2.0        | A11       | 10                      | 1.5                  | TYRV1H104A11ML |
| 50                 | 0.22        | 224  | 5x11              | 2.0        | A11       | 10                      | 3.5                  | TYRV1H224A11ML |
| 50                 | 0.33        | 334  | 5x11              | 2.0        | A11       | 10                      | 5.0                  | TYRV1H334A11ML |
| 50                 | 0.47        | 474  | 5x11              | 2.0        | A11       | 10                      | 7.0                  | TYRV1H474A11ML |
| 50                 | 1.0         | 105  | 5x11              | 2.0        | A11       | 10                      | 15                   | TYRV1H105A11ML |
| 50                 | 2.2         | 225  | 5x11              | 2.0        | A11       | 10                      | 29                   | TYRV1H225A11ML |
| 50                 | 3.3         | 335  | 5x11              | 2.0        | A11       | 10                      | 35                   | TYRV1H335A11ML |
| 50                 | 4.7         | 475  | 5x11              | 2.0        | A11       | 10                      | 42                   | TYRV1H475A11ML |
| 50                 | 10          | 106  | 5x11              | 2.0        | A11       | 10                      | 65                   | TYRV1H106A11ML |
| 50                 | 22          | 226  | 5x11              | 2.0        | A11       | 10                      | 95                   | TYRV1H226A11ML |
| 50                 | 33          | 336  | 5x11              | 2.0        | A11       | 10                      | 125                  | TYRV1H336A11ML |
| 50                 | 47          | 476  | 6.3x11            | 2.5        | B11       | 10                      | 165                  | TYRV1H476B11ML |
| 50                 | 100         | 107  | 8x11.5            | 3.5        | C11       | 10                      | 260                  | TYRV1H107C11ML |
| 50                 | 220         | 227  | 10x12.5           | 5.0        | D12       | 10                      | 455                  | TYRV1H227D12ML |
| 50                 | 330         | 337  | 10x16             | 5.0        | D16       | 10                      | 585                  | TYRV1H337D16ML |
| 50                 | 470         | 477  | 10x20             | 5.0        | D20       | 10                      | 755                  | TYRV1H477D20ML |
| 50                 | 1000        | 108  | 12.5x25           | 5.0        | E25       | 10                      | 1340                 | TYRV1H108E25ML |
| 50                 | 2200        | 228  | 16x35.5           | 7.5        | F35       | 10                      | 2075                 | TYRV1H228F35ML |
| 50                 | 3300        | 338  | 18x35.5           | 7.5        | G35       | 10                      | 2500                 | TYRV1H338G35ML |
| 50                 | 3300        | 338  | 22x40             | 10         | H40       | 10                      | 2785                 | TYRV1H338H40ML |
| 50                 | 4700        | 478  | 22x40             | 10         | H40       | 10                      | 3155                 | TYRV1H478H40ML |
| 50                 | 4700        | 478  | 25x40             | 12.5       | J40       | 10                      | 3300                 | TYRV1H478J40ML |
| 63                 | 10          | 106  | 5x11              | 2.0        | A11       | 9                       | 70                   | TYRV1J106A11ML |
| 63                 | 22          | 226  | 6.3x11            | 2.5        | B11       | 9                       | 115                  | TYRV1J226B11ML |
| 63                 | 33          | 336  | 6.3x11            | 2.5        | B11       | 9                       | 140                  | TYRV1J336B11ML |
| 63                 | 47          | 476  | 6.3x11            | 2.5        | B11       | 9                       | 170                  | TYRV1J476B11ML |
| 63                 | 100         | 107  | 10x12.5           | 5.0        | D12       | 9                       | 320                  | TYRV1J107D12ML |
| 63                 | 220         | 227  | 10x16             | 5.0        | D16       | 9                       | 490                  | TYRV1J227D16ML |

\* DF measured at 120Hz, 20°C

\* RC measured at 120Hz, 85°C

### Standard Product Table (continued)

| Rated Voltage V.DC | Capacitance |      | Case Size Dia x L | Lead Pitch | Case Code | Dissipation Factor (%)* | Ripple Current (mA)* | Part Number    |
|--------------------|-------------|------|-------------------|------------|-----------|-------------------------|----------------------|----------------|
|                    | µF          | Code |                   |            |           |                         |                      |                |
| 63                 | 330         | 337  | 10x20             | 5.0        | D20       | 9                       | 710                  | TYRV1J337D20ML |
| 63                 | 470         | 477  | 12.5x20           | 5.0        | E20       | 9                       | 900                  | TYRV1J477E20ML |
| 63                 | 1000        | 108  | 16x25             | 7.5        | F25       | 9                       | 1560                 | TYRV1J108F25ML |
| 63                 | 2200        | 228  | 18x40             | 7.5        | G40       | 9                       | 2385                 | TYRV1J228G40ML |
| 63                 | 3300        | 338  | 22x40             | 10         | H40       | 9                       | 3000                 | TYRV1J338H40ML |
| 63                 | 4700        | 478  | 25x40             | 12.5       | J40       | 9                       | 3560                 | TYRV1J478J40ML |
| 100                | 0.1         | 104  | 5x11              | 2.0        | A11       | 8                       | 3.0                  | TYRV2A104A11ML |
| 100                | 0.22        | 224  | 5x11              | 2.0        | A11       | 8                       | 5.8                  | TYRV2A224A11ML |
| 100                | 0.33        | 334  | 5x11              | 2.0        | A11       | 8                       | 8.8                  | TYRV2A334A11ML |
| 100                | 0.47        | 474  | 5x11              | 2.0        | A11       | 8                       | 12                   | TYRV2A474A11ML |
| 100                | 1.0         | 105  | 5x11              | 2.0        | A11       | 8                       | 22                   | TYRV2A105A11ML |
| 100                | 2.2         | 225  | 5x11              | 2.0        | A11       | 8                       | 33                   | TYRV2A225A11ML |
| 100                | 3.3         | 335  | 5x11              | 2.0        | A11       | 8                       | 40                   | TYRV2A335A11ML |
| 100                | 4.7         | 475  | 5x11              | 2.0        | A11       | 8                       | 48                   | TYRV2A475A11ML |
| 100                | 10          | 106  | 6.3x11            | 2.5        | B11       | 8                       | 80                   | TYRV2A106B11ML |
| 100                | 22          | 226  | 6.3x11            | 2.5        | B11       | 8                       | 115                  | TYRV2A226B11ML |
| 100                | 33          | 336  | 8x11.5            | 3.5        | C11       | 8                       | 145                  | TYRV2A336C11ML |
| 100                | 47          | 476  | 10x12.5           | 5.0        | D12       | 8                       | 235                  | TYRV2A476D12ML |
| 100                | 100         | 107  | 10x20             | 5.0        | D20       | 8                       | 370                  | TYRV2A107D20ML |
| 100                | 220         | 227  | 12.5x20           | 5.0        | E20       | 8                       | 640                  | TYRV2A227E20ML |
| 100                | 330         | 337  | 16x25             | 7.5        | F25       | 8                       | 825                  | TYRV2A337F25ML |
| 100                | 470         | 477  | 16x31.5           | 7.5        | F31       | 8                       | 1070                 | TYRV2A477F31ML |
| 100                | 1000        | 108  | 18x40             | 7.5        | G40       | 8                       | 2410                 | TYRV2A108G40ML |
| 160                | 0.47        | 474  | 6.3x11            | 2.5        | B11       | 12                      | 15                   | TYRV2C474B11ML |
| 160                | 1.0         | 105  | 6.3x11            | 2.5        | B11       | 12                      | 24                   | TYRV2C105B11ML |
| 160                | 2.2         | 225  | 6.3x11            | 2.5        | B11       | 12                      | 34                   | TYRV2C225B11ML |
| 160                | 3.3         | 335  | 6.3x11            | 2.5        | B11       | 12                      | 43                   | TYRV2C335B11ML |
| 160                | 4.7         | 475  | 6.3x11            | 2.5        | B11       | 12                      | 51                   | TYRV2C475B11ML |
| 160                | 10          | 106  | 10x12.5           | 5.0        | D12       | 12                      | 104                  | TYRV2C106D12ML |
| 160                | 22          | 226  | 10x20             | 5.0        | D20       | 12                      | 189                  | TYRV2C226D20ML |
| 160                | 33          | 336  | 10x20             | 5.0        | D20       | 12                      | 228                  | TYRV2C336D20ML |
| 160                | 47          | 476  | 12.5x20           | 5.0        | E20       | 12                      | 318                  | TYRV2C476E20ML |
| 160                | 100         | 107  | 12.5x25           | 5.0        | E25       | 12                      | 510                  | TYRV2C107E25ML |
| 160                | 220         | 227  | 16x31.5           | 7.5        | F31       | 12                      | 792                  | TYRV2C227F31ML |
| 160                | 330         | 337  | 18x35.5           | 7.5        | G35       | 12                      | 984                  | TYRV2C337G35ML |
| 200                | 0.47        | 474  | 6.3x11            | 2.5        | B11       | 14                      | 16                   | TYRV2D474B11ML |
| 200                | 1.0         | 105  | 6.3x11            | 2.5        | B11       | 14                      | 25                   | TYRV2D105B11ML |
| 200                | 2.2         | 225  | 6.3x11            | 2.5        | B11       | 14                      | 37                   | TYRV2D225B11ML |
| 200                | 3.3         | 335  | 6.3x11            | 2.5        | B11       | 14                      | 46                   | TYRV2D335B11ML |
| 200                | 4.7         | 475  | 8x11.5            | 3.5        | C11       | 14                      | 64                   | TYRV2D475C11ML |
| 200                | 10          | 106  | 10x12.5           | 5.0        | D12       | 14                      | 112                  | TYRV2D106D12ML |
| 200                | 22          | 226  | 10x20             | 5.0        | D20       | 14                      | 204                  | TYRV2D226D20ML |
| 200                | 33          | 336  | 12.5x20           | 5.0        | E20       | 14                      | 288                  | TYRV2D336E20ML |
| 200                | 47          | 476  | 12.5x25           | 5.0        | E25       | 14                      | 378                  | TYRV2D476E25ML |
| 200                | 100         | 107  | 16x25             | 7.5        | F25       | 14                      | 582                  | TYRV2D107F25ML |
| 200                | 220         | 227  | 18x35.5           | 7.5        | G35       | 14                      | 1002                 | TYRV2D227G35ML |
| 250                | 2.2         | 225  | 6.3x11            | 2.5        | B11       | 17                      | 42                   | TYRV2E225B11ML |
| 250                | 3.3         | 335  | 8x11.5            | 3.5        | C11       | 17                      | 60                   | TYRV2E335C11ML |
| 250                | 4.7         | 475  | 8x11.5            | 3.5        | C11       | 17                      | 72                   | TYRV2E475C11ML |
| 250                | 10          | 106  | 10x16             | 5.0        | D16       | 17                      | 138                  | TYRV2E106D16ML |

\* DF measured at 120Hz, 20°C

\* RC measured at 120Hz, 85°C

#### Standard Product Table (continued)

| Rated Voltage<br>V.DC | Capacitance |      | Case Size<br>Dia x L | Lead Pitch | Case Code | Dissipation Factor (%)* | Ripple Current (mA)* | Part Number    |
|-----------------------|-------------|------|----------------------|------------|-----------|-------------------------|----------------------|----------------|
|                       | µF          | Code |                      |            |           |                         |                      |                |
| 250                   | 22          | 226  | 10 x 20              | 5.0        | D20       | 17                      | 220                  | TYRV2E226D20ML |
| 250                   | 33          | 336  | 12.5 x 20            | 5.0        | E20       | 17                      | 310                  | TYRV2E336E20ML |
| 250                   | 47          | 476  | 12.5 x 25            | 5.0        | E25       | 17                      | 420                  | TYRV2E476E25ML |
| 250                   | 100         | 107  | 16 x 35.5            | 7.5        | F35       | 17                      | 732                  | TYRV2E107F35ML |
| 250                   | 220         | 227  | 22 x 40              | 10         | H40       | 17                      | 1134                 | TYRV2E227H40ML |
| 350                   | 1.0         | 105  | 6.3 x 11             | 2.5        | B11       | 20                      | 27                   | TYRV2V105B11ML |
| 350                   | 2.2         | 225  | 8 x 11.5             | 3.5        | C11       | 20                      | 49                   | TYRV2V225C11ML |
| 350                   | 3.3         | 335  | 10 x 12.5            | 5.0        | D12       | 20                      | 70                   | TYRV2V335D12ML |
| 350                   | 4.7         | 475  | 10 x 16              | 5.0        | D16       | 20                      | 93                   | TYRV2V475D16ML |
| 350                   | 10          | 106  | 10 x 20              | 5.0        | D20       | 20                      | 150                  | TYRV2V106D20ML |
| 350                   | 22          | 226  | 12.5 x 20            | 5.0        | E20       | 20                      | 255                  | TYRV2V226E20ML |
| 350                   | 33          | 336  | 16 x 25              | 7.5        | F25       | 20                      | 390                  | TYRV2V336F25ML |
| 350                   | 47          | 476  | 16 x 31.5            | 7.5        | F31       | 20                      | 474                  | TYRV2V476F31ML |
| 350                   | 100         | 107  | 18 x 40              | 7.5        | G40       | 20                      | 685                  | TYRV2V107G40ML |
| 400                   | 1.0         | 105  | 8 x 11.5             | 3.5        | C11       | 25                      | 32                   | TYRV2G105C11ML |
| 400                   | 2.2         | 225  | 10 x 12.5            | 5.0        | D12       | 25                      | 57                   | TYRV2G225D12ML |
| 400                   | 3.3         | 335  | 10 x 16              | 5.0        | D16       | 25                      | 78                   | TYRV2G335D16ML |
| 400                   | 4.7         | 475  | 10 x 20              | 5.0        | D20       | 25                      | 103                  | TYRV2G475D20ML |
| 400                   | 10          | 106  | 12.5 x 20            | 5.0        | E20       | 25                      | 174                  | TYRV2G106E20ML |
| 400                   | 22          | 226  | 12.5 x 25            | 5.0        | E25       | 25                      | 280                  | TYRV2G226E25ML |
| 400                   | 22          | 226  | 16 x 25              | 7.5        | F25       | 25                      | 318                  | TYRV2G226F25ML |
| 400                   | 33          | 336  | 16 x 25              | 7.5        | F25       | 25                      | 390                  | TYRV2G336F25ML |
| 400                   | 47          | 476  | 16 x 31.5            | 7.5        | F31       | 25                      | 474                  | TYRV2G476F31ML |
| 400                   | 100         | 107  | 22 x 40              | 10         | H40       | 25                      | 710                  | TYRV2G107H40ML |
| 450                   | 1.0         | 105  | 8 x 11.5             | 3.5        | C11       | 25                      | 32                   | TYRV2W105C11ML |
| 450                   | 2.2         | 225  | 10 x 12.5            | 5.0        | D12       | 25                      | 57                   | TYRV2W225D12ML |
| 450                   | 3.3         | 335  | 10 x 16              | 5.0        | D16       | 25                      | 78                   | TYRV2W335D16ML |
| 450                   | 4.7         | 475  | 10 x 20              | 5.0        | D20       | 25                      | 103                  | TYRV2W475D20ML |
| 450                   | 10          | 106  | 12.5 x 20            | 5.0        | E20       | 25                      | 174                  | TYRV2W106E20ML |
| 450                   | 22          | 226  | 16 x 25              | 7.5        | F25       | 25                      | 354                  | TYRV2W226F25ML |
| 450                   | 33          | 336  | 16 x 31.5            | 7.5        | F31       | 25                      | 435                  | TYRV2W336F31ML |
| 450                   | 47          | 476  | 18 x 40              | 7.5        | G40       | 25                      | 600                  | TYRV2W476G40ML |
| 450                   | 100         | 107  | 22 x 45              | 10         | H45       | 25                      | 750                  | TYRV2W107H45ML |

\* DF measured at 120Hz, 20°C

\* RC measured at 120Hz, 85°C

### Product Availability Chart

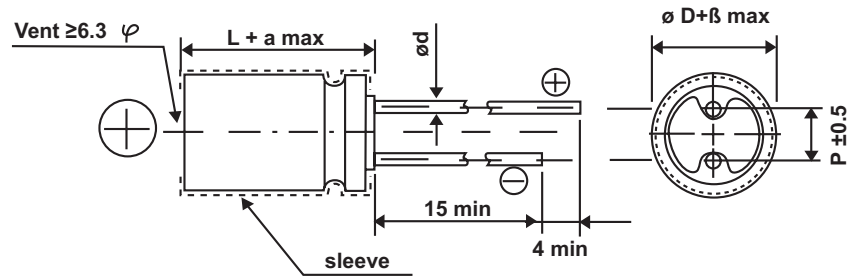
| Capacitance |      | Rated Voltage (V.DC) |     |         |     |         |     |         |     |         |     |         |      |         |      |
|-------------|------|----------------------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|------|---------|------|
|             |      | 6.3                  |     | 10      |     | 16      |     | 25      |     | 35      |     | 50      |      | 63      |      |
| µF          | Code | Dia x L              | P   | Dia x L | P   | Dia x L | P   | Dia x L | P   | Dia x L | P   | Dia x L | P    | Dia x L | P    |
| 0.1         | 104  |                      |     |         |     |         |     |         |     |         |     | 5x11    | 2.0  |         |      |
| 0.22        | 224  |                      |     |         |     |         |     |         |     |         |     | 5x11    | 2.0  |         |      |
| 0.33        | 334  |                      |     |         |     |         |     |         |     |         |     | 5x11    | 2.0  |         |      |
| 0.47        | 474  |                      |     |         |     |         |     |         |     |         |     | 5x11    | 2.0  |         |      |
| 1.0         | 105  |                      |     |         |     |         |     |         |     |         |     | 5x11    | 2.0  |         |      |
| 2.2         | 225  |                      |     |         |     |         |     |         |     |         |     | 5x11    | 2.0  |         |      |
| 3.3         | 335  |                      |     |         |     |         |     |         |     |         |     | 5x11    | 2.0  |         |      |
| 4.7         | 475  |                      |     |         |     |         |     | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0  |         |      |
| 10          | 106  |                      |     |         |     | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0  | 5x11    | 2.0  |
| 22          | 226  |                      |     | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0  | 6.3x11  | 2.5  |
| 33          | 336  | 5x11                 | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0  | 6.3x11  | 2.5  |
| 47          | 476  | 5x11                 | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 6.3x11  | 2.5  | 6.3x11  | 2.5  |
| 100         | 107  | 5x11                 | 2.0 | 5x11    | 2.0 | 5x11    | 2.0 | 6.3x11  | 2.5 | 6.3x11  | 2.5 | 8x11.5  | 3.5  | 10x12.5 | 5.0  |
| 220         | 227  | 5x11                 | 2.0 | 6.3x11  | 2.5 | 6.3x11  | 2.5 | 8x11.5  | 3.5 | 8x11.5  | 3.5 | 10x12.5 | 5.0  | 10x16   | 5.0  |
| 330         | 337  | 6.3x11               | 2.5 | 6.3x11  | 2.5 | 8x11.5  | 3.5 | 8x11.5  | 3.5 | 10x12.5 | 5.0 | 10x16   | 5.0  | 10x20   | 5.0  |
| 470         | 477  | 6.3x11               | 2.5 | 6.3x11  | 2.5 | 8x11.5  | 3.5 | 10x12.5 | 5.0 | 10x16   | 5.0 | 10x20   | 5.0  | 12.5x20 | 5.0  |
| 1000        | 108  | 8x11.5               | 3.5 | 10x12.5 | 5.0 | 10x16   | 5.0 | 10x20   | 5.0 | 12.5x20 | 5.0 | 12.5x25 | 5.0  | 16x25   | 7.5  |
| 2200        | 228  | 10x20                | 5.0 | 10x20   | 5.0 | 12.5x20 | 5.0 | 12.5x25 | 5.0 | 16x25   | 7.5 | 16x35.5 | 7.5  | 18x40   | 7.5  |
| 3300        | 338  | 10x20                | 5.0 | 12.5x20 | 5.0 | 12.5x25 | 5.0 | 16x25   | 7.5 | 16x35.5 | 7.5 | 22x40   | 10   | 22x40   | 10   |
| 4700        | 478  | 12.5x20              | 5.0 | 12.5x25 | 5.0 | 16x25   | 7.5 | 16x31.5 | 7.5 | 18x35.5 | 7.5 | 22x40   | 10   | 25x40   | 12.5 |
| 6800        | 688  | 12.5x25              | 5.0 | 16x25   | 7.5 | 16x31.5 | 7.5 | 18x35.5 | 7.5 |         |     | 25x40   | 12.5 |         |      |
| 10000       | 109  | 16x25                | 7.5 | 16x35.5 | 7.5 | 18x35.5 | 7.5 | 22x40   | 10  |         |     |         |      |         |      |
| 22000       | 229  | 18x40                | 7.5 | 22x40   | 10  | 22x40   | 10  |         |     |         |     |         |      |         |      |
|             |      | 22x40                | 10  |         |     |         |     |         |     |         |     |         |      |         |      |

| Capacitance |      | Rated Voltage (V.DC) |     |         |     |         |     |         |     |         |     |         |     |         |     |
|-------------|------|----------------------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
|             |      | 100                  |     | 160     |     | 200     |     | 250     |     | 350     |     | 400     |     | 450     |     |
| µF          | Code | Dia x L              | P   | Dia x L | P   | Dia x L | P   | Dia x L | P   | Dia x L | P   | Dia x L | P   | Dia x L | P   |
| 0.1         | 104  | 5x11                 | 2.0 |         |     |         |     |         |     |         |     |         |     |         |     |
| 0.22        | 224  | 5x11                 | 2.0 |         |     |         |     |         |     |         |     |         |     |         |     |
| 0.33        | 334  | 5x11                 | 2.0 |         |     |         |     |         |     |         |     |         |     |         |     |
| 0.47        | 474  | 5x11                 | 2.0 | 6.3x11  | 2.5 | 6.3x11  | 2.5 |         |     |         |     |         |     |         |     |
| 1.0         | 105  | 5x11                 | 2.0 | 6.3x11  | 2.5 | 6.3x11  | 2.5 |         |     | 6.3x11  | 2.5 | 8x11.5  | 3.5 | 8x11.5  | 3.5 |
| 2.2         | 225  | 5x11                 | 2.0 | 6.3x11  | 2.5 | 6.3x11  | 2.5 | 6.3x11  | 2.5 | 8x11.5  | 3.5 | 10x12.5 | 5.0 | 10x12.5 | 5.0 |
| 3.3         | 335  | 5x11                 | 2.0 | 6.3x11  | 2.5 | 6.3x11  | 2.5 | 8x11.5  | 3.5 | 10x12.5 | 5.0 | 10x16   | 5.0 | 10x16   | 5.0 |
| 4.7         | 475  | 5x11                 | 2.0 | 6.3x11  | 2.5 | 8x11.5  | 3.5 | 8x11.5  | 3.5 | 10x16   | 5.0 | 10x20   | 5.0 | 10x20   | 5.0 |
| 10          | 106  | 6.3x11               | 2.5 | 10x12.5 | 5.0 | 10x12.5 | 5.0 | 10x16   | 5.0 | 10x20   | 5.0 | 12.5x20 | 5.0 | 12.5x20 | 5.0 |
| 22          | 226  | 6.3x11               | 2.5 | 10x20   | 5.0 | 10x20   | 5.0 | 10x20   | 5.0 | 12.5x20 | 5.0 | 12.5x25 | 5.0 | 16x25   | 7.5 |
| 33          | 336  | 8x11.5               | 3.5 | 10x20   | 5.0 | 12.5x20 | 5.0 | 12.5x20 | 5.0 | 16x25   | 7.5 | 16x25   | 7.5 | 16x31.5 | 7.5 |
| 47          | 476  | 10x12.5              | 5.0 | 12.5x20 | 5.0 | 12.5x25 | 5.0 | 12.5x25 | 5.0 | 16x31.5 | 7.5 | 16x31.5 | 7.5 | 18x40   | 7.5 |
| 100         | 107  | 10x20                | 5.0 | 12.5x25 | 5.0 | 16x25   | 7.5 | 16x35.5 | 7.5 | 18x40   | 7.5 | 22x40   | 10  | 22x45   | 10  |
| 220         | 227  | 12.5x20              | 5.0 | 16x31.5 | 7.5 | 18x35.5 | 7.5 | 22x40   | 10  |         |     |         |     |         |     |
| 330         | 337  | 16x25                | 7.5 | 18x35.5 | 7.5 |         |     |         |     |         |     |         |     |         |     |
| 470         | 477  | 16x31.5              | 7.5 |         |     |         |     |         |     |         |     |         |     |         |     |
| 1000        | 108  | 18x40                | 7.5 |         |     |         |     |         |     |         |     |         |     |         |     |
| 2200        | 228  |                      |     |         |     |         |     |         |     |         |     |         |     |         |     |
| 3300        | 338  |                      |     |         |     |         |     |         |     |         |     |         |     |         |     |
| 4700        | 478  |                      |     |         |     |         |     |         |     |         |     |         |     |         |     |
| 6800        | 688  |                      |     |         |     |         |     |         |     |         |     |         |     |         |     |
| 10000       | 109  |                      |     |         |     |         |     |         |     |         |     |         |     |         |     |
| 22000       | 229  |                      |     |         |     |         |     |         |     |         |     |         |     |         |     |

### Characteristics - Electrical

|   |                    |   |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             | Test Cond. JIS C5101-4,<br>Characteristic W   |    |    |
|---|--------------------|---|------|------|------|------|------|------|-------------------------------------|------|------|-------------------------------------|------|---------------|-------------|---|----|----|
| Operating Temp. Range                     | -40°C ~ +85°C      |   |      |      |      |      |      |      |                                     |      |      |                                     |      |               | —           |   |    |    |
| Rated Voltage                             | DC 6.3 ~ 450V      |   |      |      |      |      |      |      |                                     |      |      |                                     |      |               | 85°C        |   |    |    |
| Capacitance                               | 0.1 ~ 22000μF      |   |      |      |      |      |      |      |                                     |      |      |                                     |      |               | 85°C        |   |    |    |
| Capacitance Tolerance                     | ±20%               |   |      |      |      |      |      |      |                                     |      |      |                                     |      |               | 120Hz, 20°C |   |    |    |
| Leakage Current                           | Rated Voltage      | ≤100V   |      |      |      |      |      |      | >100V                               |      |      |                                     |      |               |             | C = rated capacitance (μF)<br>V = rated DC working voltage (V)<br>Temperature = 20°C  |    |    |
|   | Time               | after 2 minutes                                 |      |      |      |      |      |      | after 5 minutes                     |      |      |                                     |      |               |             |   |    |    |
|   | Leakage Current    | I = 0.02CV or<br>3 (μA) whichever<br>is greater |      |      |      |      |      |      | CV ≤1000<br>I = 0.03CV<br>+ 15 (μA) |      |      | CV >1000<br>I = 0.02CV<br>+ 25 (μA) |      |               |             |   |    |    |
| Dissipation Factor<br>(Tanδ)              | Rated Voltage      | 6.3   | 10   | 16   | 25   | 35   | 50   | 63   | 100                                 | 160  | 200  | 250                                 | 350  | 400           | 450         | 120Hz, 20°C   |    |    |
|   | Tanδ max           | 0.23  | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08                                | 0.12 | 0.14 | 0.17                                | 0.20 | 0.25          | 0.25        |   |    |    |
| Low Temperature<br>Characteristics        | Rated Voltage      | 6.3   | 10   | 16   | 25   | 35   | 50   | 63   | 100                                 | 160  | 200  | 250                                 | 350  | 400           | 450         | 120Hz   |    |    |
|   | Impedance Ratio    |   |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             |   |    |    |
|   | Z(-25°C)/<br>∅D<16 | 6   | 4    | 3    | 3    | 2    | 2    | 2    | 2                                   | 3    |      |                                     | 6    | 8             | 12          |   | 14 | 16 |
|   | Z(+20°C)/<br>∅D≥16 | 8   | 6    | 4    | 4    | 3    | 3    | 3    | 3                                   | 4    |      |                                     | 8    | 10            | 16          |   | 18 | 20 |
|   | Z(-40°C)/<br>∅D<16 | 10  | 8    | 6    | 6    | 4    | 3    | 3    | 3                                   | 4    |      |                                     | 8    | 10            | 16          |   | 18 | 20 |
| Z(+20°C)/<br>∅D≥16                        | 18                 | 16  | 12   | 10   | 8    | 8    | 6    | 6    | 4                                   |      |      | 8                                   | 10   | 16            | 18          | 20  |    |    |
| Load Life Test                            | Test Time          | 2000 Hrs (3000 Hrs for dia ≥10mm)               |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             | Specification satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2000 / 3000 hrs at 85°C  |    |    |
|   | Capacitance Change | Within ±20% of initial value                    |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             |   |    |    |
|   | Dissipation Factor | Less than 200% of specified value               |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             |   |    |    |
|   | Leakage Current    | Within specified value                          |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             |   |    |    |
| Shelf Life Test                           | Test Time          | 1000 hrs  |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             | Specifications satisfied when the capacitors are restored to 20°C after exposing them for 1000 hrs at 85°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5102) |    |    |
|   | Capacitance Change | Within ±20% of initial value                    |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             |   |    |    |
|   | Dissipation Factor | Less than 200% of specified value               |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             |   |    |    |
|   | Leakage Current    | Within specified value                          |      |      |      |      |      |      |                                     |      |      |                                     |      |               |             |   |    |    |
| Ripple Current &<br>Multipliers Frequency | Frequency (Hz)     | 60(50)  |      |      | 120  |      |      | 500  |                                     |      | 1k   |                                     |      | 10k and above |             |   | —  |    |
|   | C (μF) < 100       | 0.70  |      |      | 1.00 |      |      | 1.30 |                                     |      | 1.40 |                                     |      | 1.50          |             |   |    |    |
|   | C (μF) 100~1000    | 0.75  |      |      | 1.00 |      |      | 1.20 |                                     |      | 1.30 |                                     |      | 1.35          |             |   |    |    |
|   | C (μF) > 1000      | 0.80  |      |      | 1.00 |      |      | 1.10 |                                     |      | 1.12 |                                     |      | 1.15          |             |   |    |    |

### Dimensions



| Case Code | Dimensions (mm) |           |       |          |
|-----------|-----------------|-----------|-------|----------|
|           | Dia + β 0.5 max | L + a max | P±0.5 | Lead dia |
| A11       | 5.0             | 11+1.0    | 2.0   | 0.5      |
| B11       | 6.3             | 11+1.0    | 2.5   | 0.5      |
| C11       | 8.0             | 11.5 +1.0 | 3.5   | 0.6      |
| D12       | 10              | 12.5 +1.5 | 5.0   | 0.6      |
| D16       | 10              | 16 +1.5   | 5.0   | 0.6      |
| D20       | 10              | 20 +1.5   | 5.0   | 0.6      |
| E20       | 12.5            | 20 +1.5   | 5.0   | 0.6      |
| E25       | 12.5            | 25 +1.5   | 5.0   | 0.6      |
| F25       | 16              | 25 +1.5   | 7.5   | 0.8      |
| F31       | 16              | 31.5 +1.5 | 7.5   | 0.8      |
| F35       | 16              | 35.5 +1.5 | 7.5   | 0.8      |
| G35       | 18              | 35.5 +1.5 | 7.5   | 0.8      |
| G40       | 18              | 40 +1.5   | 7.5   | 0.8      |
| H40       | 22              | 40 +2.0   | 10    | 1.0      |
| H45       | 22              | 45 +2.0   | 10    | 1.0      |
| J40       | 25              | 40 +2.0   | 12.5  | 1.0      |

### How to Order

| TYRV        | 0J   | 336         | A11       | M         | L                |
|-------------|--|-------------|-----------|-----------|------------------|
| Common Part | Voltage Code   | Capacitance | Case Code | Tolerance | Packaging        |
| TYRV        | 0J (6.3V)<br>1A (10V)<br>1C (16V)<br>1E (25V)<br>1V (35V)<br>1H (50V)<br>1J (63V)<br>2A (100V)<br>2C (160V)<br>2D (200V)<br>2E (250V)<br>2V (350V)<br>2G (400V)<br>2W (450V) | e.g. 336    | e.g. A11  | M (20%)   | L = Loose (bulk) |