

FEATURES

- LONG LIFE (105°C, 2000 HOURS)
- LOW PROFILE AND HIGH DENSITY DESIGN OPTIONS
- EXPANDED CV VALUE RANGE
- HIGH RIPPLE CURRENT
- CAN-TOP SAFETY VENT
- DESIGNED AS INPUT FILTER OF SMPS
- STANDARD 10mm (.400") SNAP-IN SPACING

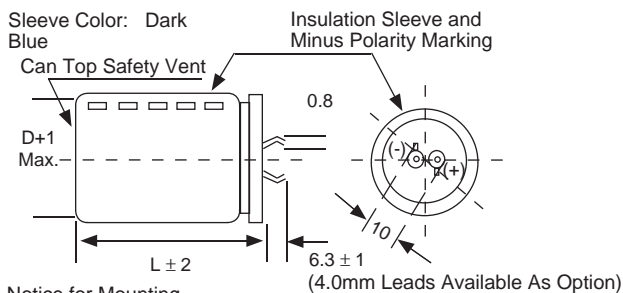
**RoHS
Compliant**
includes all homogeneous materials

*See Part Number System for Details



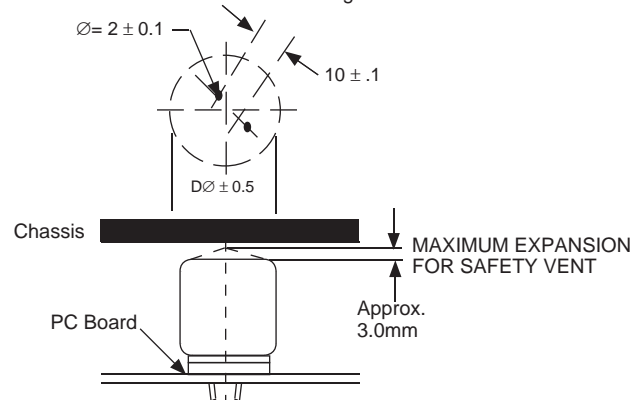
SPECIFICATIONS

| | | | | | | | | | | | |
|---|------------------------------|---|------|------|------|------|------|------|-----------|-----------|------|
| Operating Temperature Range | -40 ~ +105°C | -25 ~ +105°C | | | | | | | | | |
| Rated Voltage Range | 10 ~ 250Vdc | 400 ~ 450Vdc | | | | | | | | | |
| Rated Capacitance Range | 180 ~ 68,000µF | 56 ~ 470µF | | | | | | | | | |
| Capacitance Tolerance | ±20% (M) at 120Hz, +20°C | | | | | | | | | | |
| Max. Leakage Current (µA) After 5 minutes (20°C) | $3 \times C \sqrt{(\mu F)V}$ | | | | | | | | | | |
| Max. Tan δ at 120Hz/20°C | W.V. (Vdc) | | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 ~ 400 | 450 |
| | Tan δ max. | | 0.55 | 0.45 | 0.35 | 0.30 | 0.25 | 0.20 | 0.17 | 0.15 | 0.20 |
| Surge Voltage | W.V. (Vdc) | | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 |
| | S.V. (Vdc) | | 13 | 20 | 32 | 44 | 63 | 79 | 100 | 125 | 200 |
| | W.V. (Vdc) | | 180 | 200 | 250 | 400 | 450 | - | - | - | - |
| | S.V. (Vdc) | | 220 | 250 | 300 | 450 | 500 | - | - | - | - |
| Ripple Current Correction Factors | Frequency (Hz) | | 50 | 60 | 100 | 120 | 500 | 1K | 10K ~ 50K | - | - |
| | Multiplier at 85°C | 16 ~ 100Vdc | 0.93 | 0.95 | 0.99 | 1.0 | 1.05 | 1.08 | 1.15 | - | - |
| | | 160 ~ 450Vdc | 0.75 | 0.80 | 0.95 | 1.0 | 1.20 | 1.25 | 1.40 | - | - |
| Low Temperature Stability (10 to 250Vdc) | Temperature (°C) | | 0 | -25 | -40 | - | - | - | - | - | - |
| | Capacitance Change | | -5% | -10 | -30% | - | - | - | - | - | - |
| | Impedance Ratio | | 1.5 | 3 | 9 | - | - | - | - | - | - |
| Load Life Test 2,000 hours at +105°C | Capacitance Change | Within ±20% of initial measured value | | | | | | | | | |
| | Tan δ | Less than 200% of specified maximum value | | | | | | | | | |
| | Leakage Current | Less than specified maximum value | | | | | | | | | |
| Shelf Life Test 1,000 hours at +105°C (no load) | Capacitance Change | Within ±20% of initial measured value | | | | | | | | | |
| | Tan δ | Less than 200% of specified maximum value | | | | | | | | | |
| | Leakage Current | Less than specified maximum value | | | | | | | | | |
| Surge Voltage Test Per JIS-C-5141 (table #6, #4) Surge voltage applied: 30 seconds "On" and 5.5 minutes no voltage "Off" | Capacitance Change | Within ±20% of initial measured value | | | | | | | | | |
| | Tan δ | Less than 200% of specified maximum value | | | | | | | | | |
| | Leakage Current | Less than specified maximum value | | | | | | | | | |
| Soldering Effect Refer to MIL-STD-202F Method 210A | Capacitance Change | Within ±10% of initial measured value | | | | | | | | | |
| | Tan δ | Less than specified maximum value | | | | | | | | | |
| | Leakage Current | Less than specified maximum value | | | | | | | | | |



Notice for Mounting
The space from the top of the can shall be more than (3mm) from chassis or other construction materials so that safety vent has room to expand in case of emergency.

Recommended PC Board Mounting Holes:



PRECAUTIONS

Please review the notes on correct use, safety and precautions found on pages T10 & T11 of NIC's Electrolytic Capacitor catalog.
Also found at www.niccomp.com/precautions
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com



STANDARD PRODUCT LIST, CASE SIZE AND SPECIFICATIONS

| Part Number | Cap (µF) | W.V. | Case Size | ESR (Ω @ 20°C) | | Max. Ripple Current (Arms@105°C) | |
|--------------------|----------|-------|-----------|----------------|-------|----------------------------------|-------------|
| | | | | 120Hz | 20KHz | 120Hz | 10K ~ 50KHz |
| NRLMW682M10V20X25F | 6,800 | 10 | 20x25 | 0.110 | 0.093 | 1.30 | 1.50 |
| NRLMW822M10V20X30F | 8,200 | | 20x30 | 0.091 | 0.077 | 1.60 | 1.84 |
| NRLMW103M10V22X25F | 10,000 | | 22x25 | 0.075 | 0.063 | 1.80 | 2.07 |
| NRLMW153M10V25X25F | 15,000 | | 25x25 | 0.053 | 0.045 | 2.30 | 2.65 |
| NRLMW223M10V25X35F | 22,000 | | 25x35 | 0.038 | 0.032 | 2.60 | 2.99 |
| NRLMW223M10V30X25F | | | 30x25 | | | | |
| NRLMW333M10V25X45F | 33,000 | | 25x45 | 0.027 | 0.023 | 3.40 | 3.91 |
| NRLMW333M10V30X35F | | | 30x35 | | | | |
| NRLMW333M10V35X30F | | | 35x30 | | | | |
| NRLMW473M10V30X45F | 47,000 | | 30x45 | 0.023 | 0.020 | 4.20 | 4.83 |
| NRLMW473M10V35X35F | | 35x35 | | | | | |
| NRLMW683M10V35X50F | 68,000 | 35x50 | 0.021 | 0.020 | 5.50 | 6.33 | |
| NRLMW682M16V22X25F | 6,800 | 16 | 22x25 | 0.085 | 0.068 | 2.20 | 2.53 |
| NRLMW822M16V22X30F | 8,200 | | 22x30 | 0.071 | 0.057 | 2.40 | 2.76 |
| NRLMW103M16V25X25F | 10,000 | | 25x25 | 0.066 | 0.053 | 2.60 | 2.99 |
| NRLMW153M16V25X35F | 15,000 | | 25x35 | 0.046 | 0.037 | 3.20 | 3.68 |
| NRLMW153M16V30X30F | | | 30x30 | | | | |
| NRLMW223M16V25X45F | 22,000 | | 25x45 | 0.033 | 0.028 | 3.80 | 4.37 |
| NRLMW223M16V30X35F | | | 30x35 | | | | |
| NRLMW223M16V35X30F | | | 35x30 | | | | |
| NRLMW333M16V30X45F | 33,000 | | 30x45 | 0.023 | 0.020 | 4.70 | 5.41 |
| NRLMW333M16V35X35F | | | 35x35 | | | | |
| NRLMW473M16V35X45F | 47,000 | 35x45 | 0.020 | 0.018 | 5.50 | 6.33 | |
| NRLMW683M16V35X50F | 56,000 | 35x50 | 0.019 | 0.017 | 6.00 | 6.90 | |
| NRLMW472M25V22X25F | 4,700 | 25 | 22x25 | 0.106 | 0.079 | 2.00 | 2.30 |
| NRLMW682M25V25X25F | 6,800 | | 25x25 | 0.073 | 0.055 | 2.40 | 2.76 |
| NRLMW822M25V25X30F | 8,200 | | 25x30 | 0.061 | 0.045 | 2.70 | 3.11 |
| NRLMW822M25V30X25F | | | 30x25 | | | | |
| NRLMW103M25V25X35F | 10,000 | | 25x35 | 0.051 | 0.039 | 3.00 | 3.45 |
| NRLMW103M25V30X30F | | | 30x30 | | | | |
| NRLMW153M25V25X45F | 15,000 | | 25x45 | 0.036 | 0.031 | 3.60 | 4.14 |
| NRLMW153M25V30X35F | | | 30x35 | | | | |
| NRLMW153M25V35X30F | | | 35x30 | | | | |
| NRLMW223M25V30X45F | 22,000 | | 30x45 | 0.025 | 0.022 | 4.30 | 4.95 |
| NRLMW223M25V35X35F | | 35x35 | | | | | |
| NRLMW333M25V35X50F | 33,000 | 35x50 | 0.018 | 0.016 | 5.50 | 6.33 | |
| NRLMW332M35V22X25F | 3,300 | 35 | 22x25 | 0.121 | 0.090 | 1.90 | 2.19 |
| NRLMW472M35V25X25F | 4,700 | | 25x25 | 0.088 | 0.066 | 2.20 | 2.53 |
| NRLMW682M35V25X35F | 6,800 | | 25x35 | 0.061 | 0.046 | 2.60 | 2.99 |
| NRLMW682M35V30X30F | | | 30x30 | | | | |
| NRLMW822M35V25X40F | 8,200 | | 25x40 | 0.051 | 0.038 | 2.90 | 3.34 |
| NRLMW822M35V30X30F | | | 30x30 | | | | |
| NRLMW822M35V35X25F | | | 35x25 | | | | |
| NRLMW103M35V25X45F | 10,000 | | 25x45 | 0.041 | 0.031 | 3.20 | 3.68 |
| NRLMW103M35V30X35F | | | 30x35 | | | | |
| NRLMW103M35V35X30F | | | 35x30 | | | | |
| NRLMW153M35V30X45F | 15,000 | 30x45 | 0.030 | 0.022 | 3.90 | 4.49 | |
| NRLMW153M35V35X35F | | 35x35 | | | | | |
| NRLMW223M35V35X50F | 22,000 | 35x50 | 0.023 | 0.017 | 5.00 | 5.75 | |

STANDARD PRODUCT LIST, CASE SIZE AND SPECIFICATIONS

| Part Number | Cap (μF) | W.V. | Case Size | ESR (Ω @ 20°C) | | Max. Ripple Current (Arms@105°C) | | |
|---------------------|----------|-------|-----------|----------------|-------|----------------------------------|-------------|------|
| | | | | 120Hz | 20KHz | 120Hz | 10K ~ 50KHz | |
| NRLMW222M50V22X30F | 2,200 | 50 | 22x30 | 0.105 | 0.079 | 1.70 | 1.96 | |
| NRLMW332M50V25X30F | 3,300 | | 25x30 | 0.070 | 0.053 | 2.00 | 2.30 | |
| NRLMW472M50V25X40F | 4,700 | | 25x40 | 0.053 | 0.040 | 2.50 | 2.88 | |
| NRLMW472M50V30X30F | | | 30x30 | | | | | |
| NRLMW472M50V35X25F | | | 35x25 | | | | | |
| NRLMW562M50V25X50F | 6,800 | | 25x50 | 0.046 | 0.035 | 3.30 | 3.80 | |
| NRLMW562M50V30X40F | | | 30x40 | | | | | |
| NRLMW562M50V35X30F | | | 35x30 | | | | | |
| NRLMW822M50V30X45F | 8,200 | | 30x45 | 0.038 | 0.029 | 3.60 | 4.14 | |
| NRLMW822M50V35X35F | | | 35x35 | | | | | |
| NRLMW103M50V30X50F | 10,000 | | 30x50 | 0.033 | 0.025 | 4.00 | 4.60 | |
| NRLMW103M50V35X40F | | | 35x40 | | | | | |
| NRLMW153M50V35X50F | 15,000 | | 35x50 | 0.022 | 0.018 | 4.80 | 5.52 | |
| NRLMW152M63V22X30F | 1,500 | | 63 | 22x30 | 0.188 | 0.141 | 1.50 | 1.73 |
| NRLMW222M63V25X30F | 2,200 | | | 25x30 | 0.128 | 0.096 | 2.00 | 2.30 |
| NRLMW332M63V25X40F | 3,300 | 25x40 | | 0.090 | 0.068 | 2.50 | 2.88 | |
| NRLMW332M63V30X30F | | 30x30 | | | | | | |
| NRLMW332M63V35X25F | | 35x25 | | | | | | |
| NRLMW472M63V25X50F | 4,700 | 25x50 | | 0.063 | 0.048 | 3.00 | 3.45 | |
| NRLMW472M63V30X30F | | 30x40 | | | | | | |
| NRLMW472M63V35X30F | | 35x30 | | | | | | |
| NRLMW682M63V30X50F | 6,800 | 30x50 | | 0.049 | 0.037 | 3.60 | 4.14 | |
| NRLMW682M63V35X40F | | 35x40 | | | | | | |
| NRLMW822M63V35X45F | 8,200 | 35x45 | | 0.040 | 0.030 | 3.90 | 4.49 | |
| NRLMW103M63V35X50F | 10,000 | 35x50 | | 0.033 | 0.028 | 4.40 | 5.06 | |
| NRLMW102M80V25X25F | 1,000 | 80 | | 25x25 | 0.182 | 0.119 | 1.30 | 1.50 |
| NRLMW152M80V25X30F | 1,500 | | | 25x30 | 0.133 | 0.093 | 1.70 | 1.96 |
| NRLMW222M80V25X35F | 2,200 | | | 25x35 | 0.090 | 0.063 | 2.10 | 2.42 |
| NRLMW222M80V30X30F | | | 30x30 | | | | | |
| NRLMW222M80V35X25F | | | 35x25 | | | | | |
| NRLMW332M80V25X50F | 3,300 | | 25x50 | 0.065 | 0.049 | 2.60 | 2.99 | |
| NRLMW332M80V30X40F | | | 30x40 | | | | | |
| NRLMW332M80V35X30F | | | 35x30 | | | | | |
| NRLMW472M80V30X50F | 4,700 | | 30x50 | 0.049 | 0.037 | 2.60 | 2.99 | |
| NRLMW472M80V35X40F | | | 35x40 | | | | | |
| NRLMW682M80V35X50F | 6,800 | | 35x50 | 0.041 | 0.031 | 3.90 | 4.49 | |
| NRLMW821M100V25X25F | 820 | | 25x25 | 0.202 | 0.121 | 1.40 | 2.10 | |
| NRLMW102M100V25X30F | 1,000 | | 25x30 | 0.182 | 0.109 | 1.70 | 2.55 | |
| NRLMW152M100V25X40F | 1,500 | | 25x40 | 0.122 | 0.079 | 2.10 | 3.15 | |
| NRLMW152M100V30X30F | | | 30x30 | | | | | |
| NRLMW152M100V35X25F | | 35x25 | | | | | | |
| NRLMW222M100V25X50F | 2,200 | 25x50 | 0.090 | 0.059 | 2.60 | 3.90 | | |
| NRLMW222M100V30X40F | | 30x40 | | | | | | |
| NRLMW222M100V35X30F | | 35x30 | | | | | | |
| NRLMW332M100V30X30F | 3,300 | 30x50 | 0.075 | 0.053 | 3.20 | 4.80 | | |
| NRLMW332M100V35X40F | | 35x40 | | | | | | |
| NRLMW472M100V35X50F | 4,700 | 35x50 | 0.053 | 0.040 | 3.80 | 5.70 | | |



STANDARD PRODUCT LIST, CASE SIZE AND SPECIFICATIONS

| Part Number | Cap (µF) | W.V. | Case Size | ESR (Ω @ 20°C) | | Max. Ripple Current (Arms@105°C) | |
|---------------------|----------|-------|-----------|----------------|-------|----------------------------------|-------------|
| | | | | 120Hz | 20KHz | 120Hz | 10K ~ 50KHz |
| NRLMW221M160V20X25F | 220 | 160 | 20x25 | 0.829 | 0.373 | 1.00 | 1.40 |
| NRLMW331M160V22X30F | 330 | | 22x30 | 0.553 | 0.249 | 1.20 | 1.68 |
| NRLMW471M160V25X30F | 470 | | 25x30 | 0.459 | 0.208 | 1.40 | 1.96 |
| NRLMW681M160V25X35F | 680 | | 25x35 | 0.317 | 0.143 | 1.70 | 2.38 |
| NRLMW681M160V30X30F | | | 30x30 | | | | |
| NRLMW821M160V25X40F | 820 | | 25x40 | 0.263 | 0.118 | 2.00 | 2.80 |
| NRLMW821M160V30X30F | | | 30x30 | | | | |
| NRLMW102M160V25X45F | 1,000 | | 25x45 | 0.216 | 0.108 | 2.20 | 3.08 |
| NRLMW102M160V30X35F | | | 30x35 | | | | |
| NRLMW152M160V30X45F | 1,500 | | 30x45 | 0.166 | 0.083 | 2.50 | 3.50 |
| NRLMW152M160V35X35F | | | 35x35 | | | | |
| NRLMW182M160V30X45F | 1,800 | | 30x45 | 0.129 | 0.064 | 2.70 | 3.78 |
| NRLMW222M160V35X50F | 2,200 | | 35x50 | 0.113 | 0.057 | 2.90 | 4.06 |
| NRLMW221M200V22X25F | 220 | | 200 | 22x25 | 0.754 | 0.339 | 1.00 |
| NRLMW331M200V25X25F | 330 | 25x25 | | 0.502 | 0.226 | 1.20 | 1.68 |
| NRLMW471M200V22X40F | 470 | 22x40 | | 0.353 | 0.159 | 1.40 | 1.96 |
| NRLMW471M200V25X35F | | 25x35 | | | | | |
| NRLMW471M200V30X25F | | 30x25 | | | | | |
| NRLMW681M200V25X40F | 680 | 25x40 | | 0.244 | 0.110 | 1.70 | 2.38 |
| NRLMW681M200V30X30F | | 30x30 | | | | | |
| NRLMW821M200V25X50F | 820 | 25x50 | | 0.222 | 0.111 | 2.00 | 2.80 |
| NRLMW821M200V30X35F | | 30x35 | | | | | |
| NRLMW821M200V35X30F | | 35x30 | | | | | |
| NRLMW102M200V30X45F | 1,000 | 30x45 | | 0.199 | 0.099 | 2.20 | 3.08 |
| NRLMW102M200V35X35F | | 35x35 | | | | | |
| NRLMW152M200V35X50F | 1,500 | 35x50 | | 0.144 | 0.072 | 2.50 | 3.50 |
| NRLMW221M250V25X25F | 220 | 250 | | 25x25 | 0.754 | 0.377 | 1.00 |
| NRLMW331M250V25X35F | 330 | | 25x35 | 0.502 | 0.251 | 1.20 | 1.68 |
| NRLMW331M250V30X25F | | | 30x25 | | | | |
| NRLMW471M250V25X45F | 470 | | 25x45 | 0.353 | 0.176 | 1.40 | 1.96 |
| NRLMW471M250V30X35F | | | 30x35 | | | | |
| NRLMW471M250V35X30F | | | 35x30 | | | | |
| NRLMW681M250V30X45F | 680 | | 30x45 | 0.244 | 0.122 | 1.70 | 2.38 |
| NRLMW681M250V35X35F | | | 35x35 | | | | |
| NRLMW821M250V30X50F | 820 | | 30x50 | 0.202 | 0.101 | 2.00 | 2.80 |
| NRLMW821M250V35X40F | | | 35x40 | | | | |
| NRLMW102M250V35X45F | | | 1,000 | | | | |

STANDARD PRODUCT LIST, CASE SIZE AND SPECIFICATIONS

| Part Number | Cap (μF) | W.V. | Case Size | ESR (Ω @ 20°C) | | Max. Ripple Current (Arms@105°C) | |
|---------------------|----------|-------|-----------|----------------|-------|----------------------------------|-------------|
| | | | | 120Hz | 20KHz | 120Hz | 10K ~ 50KHz |
| NRLMW680M400V25X25F | 68 | 400 | 25x25 | 1.950 | 0.683 | 0.56 | 0.78 |
| NRLMW820M400V25X25F | 82 | | 25x25 | 1.617 | 0.566 | 0.64 | 0.90 |
| NRLMW101M400V25X30F | 100 | | 25x30 | 1.325 | 0.464 | 0.69 | 0.97 |
| NRLMW151M400V25X40F | 150 | | 25x40 | 0.884 | 0.309 | 0.82 | 1.15 |
| NRLMW151M400V30X30F | | | 30x30 | | | | |
| NRLMW221M400V25X50F | 220 | | 25x50 | 0.603 | 0.211 | 1.10 | 1.54 |
| NRLMW221M400V30X40F | | | 30x40 | | | | |
| NRLMW221M400V35X30F | | | 35x30 | | | | |
| NRLMW331M400V30X50F | 330 | | 30x50 | 0.402 | 0.161 | 1.35 | 1.89 |
| NRLMW331M400V35X40F | | | 35x40 | | | | |
| NRLMW471M400V35X50F | 470 | 35x50 | 0.282 | 0.127 | 1.75 | 2.45 | |
| NRLMW560M450V22X25F | 56 | 450 | 22x25 | 2.368 | 0.947 | 0.40 | 0.56 |
| NRLMW680M450V25X25F | 68 | | 25x25 | 1.950 | 0.683 | 0.50 | 0.70 |
| NRLMW820M450V22X35F | 82 | | 22x35 | 1.617 | 0.647 | 0.56 | 0.78 |
| NRLMW101M450V25X30F | 100 | | 25x30 | 1.326 | 0.531 | 0.64 | 0.90 |
| NRLMW101M450V30X25F | | | 30x25 | | | | |
| NRLMW151M450V25X40F | 150 | | 25x40 | 0.884 | 0.354 | 0.79 | 1.11 |
| NRLMW151M450V30X30F | | | 30x30 | | | | |
| NRLMW221M450V30X40F | 220 | | 30x40 | 0.678 | 0.271 | 1.00 | 1.40 |
| NRLMW221M450V35X30F | | | 35x30 | | | | |
| NRLMW331M450V30X50F | 330 | | 30x50 | 0.502 | 0.201 | 1.38 | 1.93 |
| NRLMW331M450V35X40F | | 35x40 | | | | | |
| NRLMW471M450V35X50F | 470 | 35x50 | 0.353 | 0.123 | 1.74 | 2.44 | |

PART NUMBER SYSTEM

