

TR Series

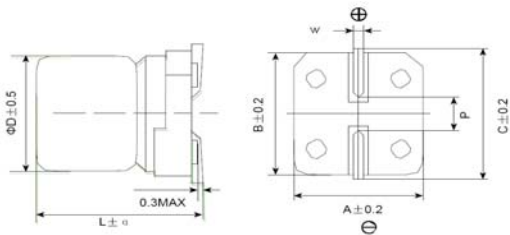
- Suitable for high density mounting
- Endurance: 130°C 1000~5000 hours
- RoHS Compliant



● SPECIFICATIONS

| Items | Characteristics | | | | | | | | | | | | |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------|------|------|--------------------------------|-----------|-----------------------------------|------|------------|------------|------------------|------------|
| Category Temperature | -40 to +130°C | | | | | | | | | | | | |
| Rated Voltage Range | 10 to 450Vdc | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (M) (at 20°C, 120Hz) | | | | | | | | | | | | |
| Leakage Current | 10 to 100 Vdc | | | | | 160 to 450 Vdc | | | | | (at 20°C) | | |
| | I ≤ 0.03CV or 4uA Whichever is greater (at 2 minutes) | | | | | I ≤ 0.04CV+100uA (at 1 minute) | | | | | | | |
| | Where, I: Max .leakage current (uA);C: Nominal capacitance (uF);V: Rated voltage (V). | | | | | | | | | | | | |
| Dissipation (tan δ) | Rate voltage (Vdc) | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | 160 to 250 | 400 to 450 | (at 20°C, 120Hz) | |
| | Tan δ (Max) | 0.24 | 0.20 | 0.16 | 0.14 | 0.14 | 0.12 | 0.12 | 0.10 | 0.24 | 0.30 | | |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rate voltage (Vdc) | 0607-1014 | Z(-25°C)/Z(+20°C) | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 6 | (at 120Hz) |
| | | | Z(-40°C)/Z(+20°C) | 6 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 10 | |
| | 1214-1821 | Z(-25°C)/Z(+20°C) | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 6 | |
| | | Z(-40°C)/Z(+20°C) | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 3 | 10 | 18 | |
| Endurance | The following specification shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1000 to 5000 hours at 130°C. | | | | | | | | | | | | |
| | Rate voltage (Vdc) | 10 to 450V | | | | | Life Time | 0608 (10~100Vdc): 1000 hours | | | | | |
| | Capacitance Change | ≤ ±30% of the initial value | | | | | | 0811~1014(10~100Vdc): 2000 hours | | | | | |
| | D.F. (tan δ) | ≤ 300% of the initial specified value | | | | | | 1214~1821(10~100Vdc): 5000 hours | | | | | |
| | Leakage Current | ≤ the initial specified value | | | | | | 1010~1821(160~450Vdc): 3000 hours | | | | | |
| Shelf Life | The following specification shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000 hours (400~450Vdc:500 hours) at 130°C, without voltage applied. | | | | | | | | | | | | |
| | Rate voltage (Vdc) | 10 to 450V | | | | | | | | | | | |
| | Capacitance Change | ≤ ±30% of the initial value | | | | | | | | | | | |
| | D.F. (tan δ) | ≤ 300% of the initial specified value | | | | | | | | | | | |
| | Leakage Current | ≤ 500% of the initial specified value | | | | | | | | | | | |

◆ DIMENSIONS (mm)



| Size code | D | L | A | B | C | W | P |
|-----------|------|------|------|------|------|---------|-----|
| 0608 | 6.3 | 7.7 | 6.6 | 6.6 | 7.2 | 0.5~0.8 | 1.9 |
| 0811 | 8 | 10.5 | 8.3 | 8.3 | 9.0 | 0.7~1.1 | 3.1 |
| 0812 | 8 | 12.5 | 8.3 | 8.3 | 9.0 | 0.7~1.1 | 3.1 |
| 1010 | 10 | 10.5 | 10.3 | 10.3 | 11.0 | 0.7~1.1 | 4.5 |
| 1012 | 10 | 12.5 | 10.3 | 10.3 | 11.0 | 0.7~1.1 | 4.5 |
| 1014 | 10 | 13.5 | 10.3 | 10.3 | 11.0 | 0.7~1.1 | 4.5 |
| 1214 | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0~1.3 | 4.2 |
| 1216 | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0~1.3 | 4.2 |
| 1616 | 16 | 16.5 | 17.0 | 17.0 | 18.0 | 1.0~1.3 | 6.5 |
| 1621 | 16 | 21.5 | 17.0 | 17.0 | 18.0 | 1.0~1.3 | 6.5 |
| 1816 | 18 | 16.5 | 19.0 | 19.0 | 20.0 | 1.0~1.3 | 6.5 |
| 1821 | 18 | 21.5 | 19.0 | 19.0 | 20.0 | 1.0~1.3 | 6.5 |

◆ RATED RIPPLE CURRENT MULTIPLIERS

| Vdc | Freq. (Hz) | | | | |
|---------|-------------------|------|------|------|------|
| | CAP (uF) | 120 | 1K | 10K | 100K |
| 10~100 | CAP < 220 | 0.40 | 0.75 | 0.90 | 1.00 |
| | 220 ≤ CAP < 680 | 0.50 | 0.85 | 0.94 | 1.00 |
| | 680 ≤ CAP < 2200 | 0.60 | 0.87 | 0.95 | 1.00 |
| | 2200 ≤ CAP < 3300 | 0.75 | 0.90 | 0.95 | 1.00 |
| | CAP ≥ 3300 | 0.85 | 0.95 | 0.98 | 1.00 |
| 160~450 | CAP ≤ 33 | 0.55 | 0.83 | 0.97 | 1.00 |
| | CAP > 33 | 0.66 | 0.86 | 0.93 | 1.00 |

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◆ STANDARD RATINGS

| WV (Vdc) | Cap (uF) | Size code | tan δ | Ripple current (mArms/130°C, 100KHz) |
|----------|----------|-----------|-------|--------------------------------------|
| 10 (1A) | 100 | 0608 | 0.24 | 110 |
| | 220 | 0608 | 0.24 | 110 |
| | 220 | 0811 | 0.24 | 220 |
| | 330 | 0811 | 0.24 | 220 |
| | 330 | 1010 | 0.24 | 296 |
| | 470 | 1010 | 0.24 | 296 |
| | 1000 | 1214 | 0.24 | 750 |
| | 2200 | 1616 | 0.26 | 1000 |
| | 3300 | 1816 | 0.28 | 1200 |
| 4700 | 1821 | 0.30 | 1550 | |
| 16 (1C) | 100 | 0608 | 0.20 | 110 |
| | 100 | 0811 | 0.20 | 220 |
| | 220 | 0811 | 0.20 | 220 |
| | 330 | 1010 | 0.20 | 296 |
| | 470 | 1012 | 0.20 | 340 |
| | 680 | 1214 | 0.20 | 750 |
| | 1000 | 1216 | 0.20 | 800 |
| | 1500 | 1616 | 0.20 | 1000 |
| 25 (1E) | 47 | 0608 | 0.16 | 110 |
| | 100 | 0608 | 0.16 | 110 |
| | 100 | 0811 | 0.16 | 220 |
| | 220 | 0811 | 0.16 | 220 |
| | 220 | 1010 | 0.16 | 296 |
| | 330 | 1010 | 0.16 | 296 |
| | 470 | 1214 | 0.16 | 750 |
| | 680 | 1216 | 0.16 | 800 |
| | 1000 | 1616 | 0.16 | 1000 |
| 35 (1V) | 33 | 0608 | 0.14 | 110 |
| | 47 | 0608 | 0.14 | 110 |
| | 100 | 0811 | 0.14 | 220 |
| | 220 | 1010 | 0.14 | 296 |
| | 330 | 1214 | 0.14 | 750 |
| | 470 | 1216 | 0.14 | 900 |
| | 680 | 1616 | 0.14 | 1000 |
| | 1000 | 1816 | 0.14 | 1200 |
| 50 (1H) | 10 | 0608 | 0.14 | 83 |
| | 22 | 0608 | 0.14 | 83 |
| | 33 | 0608 | 0.14 | 83 |
| | 47 | 0811 | 0.14 | 160 |
| | 47 | 1010 | 0.14 | 247 |
| | 100 | 1010 | 0.14 | 247 |
| | 100 | 1214 | 0.14 | 550 |
| | 220 | 1214 | 0.14 | 550 |
| | 330 | 1216 | 0.14 | 700 |
| | 470 | 1616 | 0.14 | 850 |
| 560 | 1816 | 0.14 | 920 | |
| 63 (1J) | 22 | 0608 | 0.12 | 65 |
| | 33 | 0811 | 0.12 | 100 |
| | 47 | 0811 | 0.12 | 125 |
| | 100 | 1012 | 0.12 | 270 |
| | 220 | 1216 | 0.12 | 600 |
| | 330 | 1616 | 0.12 | 820 |
| | 470 | 1621 | 0.12 | 1100 |
| 80 (1K) | 10 | 0811 | 0.12 | 95 |
| | 22 | 0811 | 0.12 | 110 |
| | 22 | 1010 | 0.12 | 215 |
| | 33 | 0811 | 0.12 | 130 |
| | 47 | 1010 | 0.12 | 245 |
| | 100 | 1214 | 0.12 | 475 |

| WV (Vdc) | Cap (uF) | Size code | tan δ | Ripple current (mArms/130°C, 100KHz) |
|----------|----------|-----------|-------|--------------------------------------|
| 100 (2A) | 10 | 0811 | 0.10 | 90 |
| | 22 | 0811 | 0.10 | 105 |
| | 33 | 1010 | 0.10 | 200 |
| | 47 | 1010 | 0.10 | 230 |
| | 68 | 1012 | 0.10 | 275 |
| | 100 | 1214 | 0.10 | 405 |
| | 220 | 1616 | 0.10 | 650 |
| 160 (2C) | 10 | 1014 | 0.24 | 90 |
| | 15 | 1214 | 0.24 | 120 |
| | 22 | 1216 | 0.24 | 180 |
| | 33 | 1616 | 0.24 | 220 |
| | 47 | 1621 | 0.24 | 260 |
| | 68 | 1621 | 0.24 | 310 |
| 200 (2D) | 100 | 1821 | 0.24 | 400 |
| | 10 | 1216 | 0.24 | 110 |
| | 15 | 1216 | 0.24 | 150 |
| | 22 | 1616 | 0.24 | 200 |
| | 33 | 1621 | 0.24 | 250 |
| 250 (2E) | 47 | 1821 | 0.24 | 320 |
| | 10 | 1216 | 0.24 | 110 |
| | 15 | 1216 | 0.24 | 150 |
| | 22 | 1621 | 0.24 | 210 |
| 400 (2G) | 33 | 1621 | 0.24 | 250 |
| | 47 | 1821 | 0.24 | 320 |
| | 1 | 1010 | 0.30 | 22 |
| | 2.2 | 1014 | 0.30 | 38 |
| | 3.3 | 1214 | 0.30 | 50 |
| | 4.7 | 1216 | 0.30 | 70 |
| | 6.8 | 1616 | 0.30 | 100 |
| | 10 | 1621 | 0.30 | 130 |
| 450 (2W) | 15 | 1621 | 0.30 | 160 |
| | 22 | 1821 | 0.30 | 240 |
| | 2.2 | 1214 | 0.30 | 35 |
| | 3.3 | 1216 | 0.30 | 45 |
| | 4.7 | 1616 | 0.30 | 60 |
| | 10 | 1621 | 0.30 | 110 |
| 15 | 1821 | 0.30 | 150 | |
| 22 | 1821 | 0.30 | 230 | |