

Solid Tantalum Surface Mount Chip Capacitors, Molded Case, 0805 Size



PERFORMANCE / ELECTRICAL CHARACTERISTICS

Operating Temperature: -55 °C to +125 °C
(above +85 °C, voltage derating is required)

Capacitance Range: 0.1 µF to 47 µF

Capacitance Tolerance: ± 10 %, ± 20 %

Voltage Rating: 2.5 V_{DC} to 25 V_{DC}

FEATURES

- Small size, suitable for high-density packaging
- Terminations: 100 % matte tin
- Compatible with “high volume” automatic pick and place equipment
- Moisture sensitivity level 1
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Industrial
- Audio and visual equipment
- General purpose

ORDERING INFORMATION

| TMC | P | 0J | 107 | M | TR | (2) | F |
|------|-----------------------------------|--|--|--------------------------|--|------------------------------|---------------------------------|
| TYPE | CASE CODE | DC VOLTAGE RATING AT +85 °C | CAPACITANCE (µF) | CAPACITANCE TOLERANCE | PACKAGING POLARITY | OPTIONAL | TERMINAL CODE |
| | See Ratings and Case Codes table. | 0E = 2.5 V 0G = 4.0 V 0J = 6.3 V 1A = 10 V 1C = 16 V 1D = 20 V 1E = 25 V | This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow. | K = ± 10 % M = ± 20 % | TR = 7" reel, cathodes close to perforation side | Halogen-free (special order) | F = lead (Pb)-free terminations |

DIMENSIONS in inches [millimeters]

| CASE CODE | EIA SIZE | L | W | H | l | a |
|-----------|----------|------------------------------|-------------------------------|--------------------------|------------------------------|------------------------------|
| P | 2012-12 | 0.080 ± 0.008 [2.0 ± 0.2] | 0.049 ± 0.008 [1.25 ± 0.2] | 0.047 max. [1.2 max.] | 0.020 ± 0.008 [0.5 ± 0.2] | 0.035 ± 0.004 [0.9 ± 0.1] |



| RATINGS AND CASE CODES | | | | | | | |
|------------------------|-------|-------|-------|------|------|------|------|
| μF | 2.5 V | 4.0 V | 6.3 V | 10 V | 16 V | 20 V | 25 V |
| 0.10 | | | | | | P | P |
| 0.15 | | | | | | P | |
| 0.22 | | | | | | P | |
| 0.33 | | | | | | P | |
| 0.47 | | | | | | P | P |
| 0.68 | | | | | | P | |
| 1.0 | | | | | P | P | P |
| 1.5 | | | | P | P | P | |
| 2.2 | | | | P | P | P | |
| 3.3 | | | | P | P | | |
| 4.7 | | | P | P | P | | |
| 6.8 | | | P | P | | | |
| 10 | | | P | P | | | |
| 15 | P | P | P | | | | |
| 22 | P | P | P | | | | |
| 33 | P | P | | | | | |
| 47 | P | P | | | | | |

MARKING

| SIMPLIFIED VOLTAGE AND CAP CODES | | | | | | | |
|----------------------------------|-----|-----|-----|----|----|----|----|
| μF | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 | 25 |
| 0.10 | | | | | | DA | EA |
| 0.15 | | | | | | DE | |
| 0.22 | | | | | | DJ | |
| 0.33 | | | | | | DN | |
| 0.47 | | | | | | DS | ES |
| 0.68 | | | | | | DW | |
| 1.0 | | | | | CA | DA | EA |
| 1.5 | | | | AE | CE | DE | |
| 2.2 | | | | AJ | CJ | DJ | |
| 3.3 | | | | AN | CN | | |
| 4.7 | | | JS | AS | CS | | |
| 6.8 | | | JW | AW | | | |
| 10 | | | JA | aA | | | |
| 15 | eE | GE | jE | | | | |
| 22 | eJ | gJ | jJ | | | | |
| 33 | eN | gN | | | | | |
| 47 | eS | gS | | | | | |



| STANDARD RATINGS | | | | | | |
|--|-----------|-----------------|------------------------------------|------------------------------------|--|---|
| CAPACITANCE (μ F) | CASE CODE | PART NUMBER | MAX. DCL AT 25 °C (μ A) | MAX. DF AT 25 °C, 120 Hz (%) | MAX. ESR AT +25 °C, 100 kHz (Ω) | MAX. RIPPLE, 100 kHz I _{RMS} (A) |
| 2.5 V_{DC} AT +85 °C; 1.6 V_{DC} AT +125 °C | | | | | | |
| 15 | P | TMCP0E156(1)TRF | 0.5 | 8 | 4.0 | 0.126 |
| 22 | P | TMCP0E226(1)TRF | 0.6 | 10 | 4.0 | 0.126 |
| 33 | P | TMCP0E336(1)TRF | 0.8 | 20 | 4.0 | 0.126 |
| 47 | P | TMCP0E476MTRF | 11.8 | 30 | 6.0 | 0.103 |
| 4 V_{DC} AT +85 °C; 2.5 V_{DC} AT +125 °C | | | | | | |
| 15 | P | TMCP0G156(1)TRF | 0.6 | 8 | 4.0 | 0.126 |
| 22 | P | TMCP0G226(1)TRF | 0.9 | 10 | 4.0 | 0.126 |
| 33 | P | TMCP0G336(1)TRF | 13.2 | 30 | 5.9 | 0.104 |
| 47 | P | TMCP0G476MTRF | 18.8 | 30 | 6.0 | 0.103 |
| 6.3 V_{DC} AT +85 °C; 4 V_{DC} AT +125 °C | | | | | | |
| 4.7 | P | TMCP0J475(1)TRF | 0.5 | 8 | 4.0 | 0.126 |
| 6.8 | P | TMCP0J685(1)TRF | 0.5 | 8 | 4.0 | 0.126 |
| 10 | P | TMCP0J106(1)TRF | 0.7 | 8 | 5.3 | 0.110 |
| 15 | P | TMCP0J156(1)TRF | 1.0 | 12 | 5.9 | 0.104 |
| 22 | P | TMCP0J226MTRF | 13.9 | 30 | 5.9 | 0.104 |
| 10 V_{DC} AT +85 °C; 6.3 V_{DC} AT +125 °C | | | | | | |
| 1.5 | P | TMCP1A155(1)TRF | 0.5 | 8 | 11.0 | 0.076 |
| 2.2 | P | TMCP1A225(1)TRF | 0.5 | 8 | 8.8 | 0.085 |
| 3.3 | P | TMCP1A335(1)TRF | 0.5 | 8 | 7.7 | 0.091 |
| 4.7 | P | TMCP1A475(1)TRF | 0.5 | 8 | 4.0 | 0.126 |
| 6.8 | P | TMCP1A685(1)TRF | 0.7 | 20 | 4.0 | 0.126 |
| 10 | P | TMCP1A106(1)TRF | 10.0 | 20 | 5.9 | 0.104 |
| 16 V_{DC} AT +85 °C; 10 V_{DC} AT +125 °C | | | | | | |
| 1.0 | P | TMCP1C105(1)TRF | 0.5 | 6 | 9.9 | 0.080 |
| 1.5 | P | TMCP1C155(1)TRF | 0.5 | 8 | 11.0 | 0.076 |
| 2.2 | P | TMCP1C225(1)TRF | 0.5 | 8 | 8.8 | 0.085 |
| 3.3 | P | TMCP1C335(1)TRF | 0.6 | 8 | 8.8 | 0.085 |
| 4.7 | P | TMCP1C475MTRF | 0.8 | 8 | 8.8 | 0.085 |
| 20 V_{DC} AT +85 °C; 13 V_{DC} AT +125 °C | | | | | | |
| 0.10 | P | TMCP1D104(1)TRF | 0.5 | 6 | 33.0 | 0.044 |
| 0.15 | P | TMCP1D154(1)TRF | 0.5 | 6 | 27.5 | 0.048 |
| 0.22 | P | TMCP1D224(1)TRF | 0.5 | 6 | 27.5 | 0.048 |
| 0.33 | P | TMCP1D334(1)TRF | 0.5 | 6 | 22.0 | 0.054 |
| 0.47 | P | TMCP1D474(1)TRF | 0.5 | 6 | 22.0 | 0.054 |
| 0.68 | P | TMCP1D684(1)TRF | 0.5 | 6 | 16.5 | 0.062 |
| 1.0 | P | TMCP1D105(1)TRF | 0.5 | 6 | 11.0 | 0.076 |
| 1.5 | P | TMCP1D155(1)TRF | 0.5 | 8 | 11.0 | 0.076 |
| 2.2 | P | TMCP1D225MTRF | 0.5 | 8 | 8.8 | 0.085 |
| 25 V_{DC} AT +85 °C; 16 V_{DC} AT +125 °C | | | | | | |
| 0.10 | P | TMCP1E104(1)TRF | 0.5 | 6 | 33.0 | 0.044 |
| 0.47 | P | TMCP1E474(1)TRF | 0.5 | 6 | 22.0 | 0.054 |
| 1.0 | P | TMCP1E105(1)TRF | 0.5 | 6 | 11.0 | 0.076 |

Note

- Part number definition:
 - (1) Tolerance: For 10 % tolerance, specify "K"; for 20 % tolerance, change to "M"

| RECOMMENDED VOLTAGE DERATING GUIDELINES (for temperature below +85 °C) | |
|--|-------------------|
| CAPACITOR VOLTAGE RATING | OPERATING VOLTAGE |
| 2.5 | 1.2 |
| 4.0 | 2.0 |
| 6.3 | 3.1 |
| 10 | 5.0 |
| 16 | 8.0 |
| 20 | 10.0 |
| 25 | 12.5 |



| POWER DISSIPATION | |
|-------------------|---|
| CASE CODE | MAXIMUM PERMISSIBLE POWER DISSIPATION AT +25 °C (W) IN FREE AIR |
| P | 0.064 |

| STANDARD PACKAGING QUANTITY | |
|-----------------------------|-------------------|
| CASE CODE | UNITS PER 7" REEL |
| P | 3000 |

| PERFORMANCE CHARACTERISTICS | | | | | | |
|-----------------------------|---|------------------------|---|--|--------------|--------------|
| ITEM | CONDITION | POST TEST PERFORMANCE | | | | |
| | | | Specified initial value | -55 °C | +85 °C | +125 °C |
| Temperature characteristics | Measure the specified characteristics in each stage | Capacitance change | - | -20 % to 0 % | 0 % to +20 % | 0 % to +20 % |
| | | Dissipation factor (%) | 6 | 10 | 8 | 10 |
| | | | 8 | 12 | 10 | 12 |
| | | | 10 | 14 | 12 | 14 |
| | | | 12 | 16 | 14 | 16 |
| | | | 20 | 24 | 22 | 24 |
| | | 30 | 60 | 30 | 40 | |
| Leakage current | Refer to Standard Ratings table | - | 1000 % specified initial value or less | 1250 % specified initial value or less | | |
| Solder heat resistance | Solder dip: 260 °C ± 5 °C 10 s ± 1 s Reflow: 260 °C 10 s ± 1 s | Capacitance change | Within ± 20 % of initial value | | | |
| | | Dissipation factor | Initial specified value or less | | | |
| | | Leakage current | Initial specified value or less | | | |
| Moisture resistance no load | Leave at 40 °C and 90 % to 95 % RH for 500 h | Capacitance change | Within ± 20 % of initial value | | | |
| | | Dissipation factor | Shall not exceed 150 % of initial specified value | | | |
| | | Leakage current | Initial specified value or less | | | |
| High temperature load | 85 °C. The rated voltage is applied for 2000 h | Capacitance change | Within ± 20 % of initial value | | | |
| | | Dissipation factor | Initial specified value or less | | | |
| | | Leakage current | Shall not exceed 200 % of initial specified value | | | |
| Thermal shock | Leave at -55 °C, normal temperature, 125 °C, and normal temperature for 30 min, 3 min, 30 min, and 3 min. Repeat this operation 5 times running | Capacitance change | Within ± 20 % of initial value | | | |
| | | Dissipation factor | Initial specified value or less | | | |
| | | Leakage current | Initial specified value or less | | | |
| Moisture resistance load | Leave at 40 °C and 90 % to 95 % RH. The rated voltage is applied for 500 h | Capacitance change | Within ± 20 % of initial value or less | | | |
| | | Dissipation factor | Shall not exceed 150 % of initial specified value | | | |
| | | Leakage current | Shall not exceed 200 % of initial specified value | | | |
| Failure rate | 85 °C. The rated voltage is applied through a protective resistor of 1 Ω/V. | 1 % / 1000 h | | | | |

Note

- Test conditions per JIS C5101-1



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