

## 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<sub>DC</sub> to 25 V<sub>DC</sub>

### 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](http://www.vishay.com/doc?99912)



**RoHS COMPLIANT**  
**HALOGEN FREE**  
Available  
**GREEN**  
(5-2008)  
Available

### APPLICATIONS

- Industrial
- Audio and visual equipment
- General purpose

### ORDERING INFORMATION

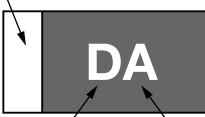
| TMC  | P                                 | 0J   | 107  | M                        | TR   | (2)                          | F                               |
|------|-----------------------------------|--|--|--------------------------|--|------------------------------|---------------------------------|
| 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<br>0G = 4.0 V<br>0J = 6.3 V<br>1A = 10 V<br>1C = 16 V<br>1D = 20 V<br>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 %<br>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<br>[2.0 ± 0.2] | 0.049 ± 0.008<br>[1.25 ± 0.2] | 0.047 max.<br>[1.2 max.] | 0.020 ± 0.008<br>[0.5 ± 0.2] | 0.035 ± 0.004<br>[0.9 ± 0.1] |

| <b>RATINGS AND CASE CODES</b> |       |       |       |      |      |      |      |
|-------------------------------|-------|-------|-------|------|------|------|------|
| $\mu\text{F}$                 | 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**



Anode indication belt mark

Simplified code of rated voltage (D: 20 V)

Simplified code of nominal capacitance (A: 0.1  $\mu\text{F}$ )

| <b>SIMPLIFIED VOLTAGE AND CAP CODES</b> |     |     |     |    |    |    |    |
|---|-----|-----|-----|----|----|----|----|
| $\mu\text{F}$                           | 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<br>( $\mu$ F)  | CASE CODE | PART NUMBER     | MAX. DCL<br>AT 25 °C<br>( $\mu$ A) | MAX. DF<br>AT 25 °C, 120 Hz<br>(%) | MAX. ESR<br>AT +25 °C, 100 kHz<br>( $\Omega$ ) | MAX. RIPPLE,<br>100 kHz I <sub>RMS</sub><br>(A) |
| <b>2.5 V<sub>DC</sub> AT +85 °C; 1.6 V<sub>DC</sub> AT +125 °C</b> |           |                 |                                    |                                    |  |   |
| 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   |
| <b>4 V<sub>DC</sub> AT +85 °C; 2.5 V<sub>DC</sub> AT +125 °C</b>   |           |                 |                                    |                                    |  |   |
| 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   |
| <b>6.3 V<sub>DC</sub> AT +85 °C; 4 V<sub>DC</sub> AT +125 °C</b>   |           |                 |                                    |                                    |  |   |
| 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   |
| <b>10 V<sub>DC</sub> AT +85 °C; 6.3 V<sub>DC</sub> AT +125 °C</b>  |           |                 |                                    |                                    |  |   |
| 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   |
| <b>16 V<sub>DC</sub> AT +85 °C; 10 V<sub>DC</sub> AT +125 °C</b>   |           |                 |                                    |                                    |  |   |
| 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   |
| <b>20 V<sub>DC</sub> AT +85 °C; 13 V<sub>DC</sub> AT +125 °C</b>   |           |                 |                                    |                                    |  |   |
| 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   |
| <b>25 V<sub>DC</sub> AT +85 °C; 16 V<sub>DC</sub> AT +125 °C</b>   |           |                 |                                    |                                    |  |   |
| 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:<br>260 °C ± 5 °C 10 s ± 1 s<br>Reflow:<br>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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- Поставка более 17-ти миллионов наименований электронных компонентов;
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#### Как с нами связаться

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