

## 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 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 ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DCL AT 25 °C ( $\mu$ A)	MAX. DF AT 25 °C, 120 Hz (%)	MAX. ESR AT +25 °C, 100 kHz ( $\Omega$ )	MAX. RIPPLE, 100 kHz I <sub>RMS</sub> (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: 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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