

## 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)



### 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]

<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**

<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 ( $\mu$ 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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