

Solid Tantalum Chip Capacitors, MICROTANTM Leadframeless Molded





FEATURES

- Small sizes include 0603 and 0402 footprint
- Lead (Pb)-free L-shaped terminations
- 8 mm tape and reel packaging available per EIA-481-1 and reeling per IEC 286-3 7" [178 mm] standard



Compliant to RoHS Directive 2002/95/EC



ROHS COMPLIANT GREEN

PERFORMANCE CHARACTERISTICS

Operating Temperature: - 55 °C to + 85 °C

(to + 125 °C voltage derating)

Capacitance Range: 1 µF to 220 µF

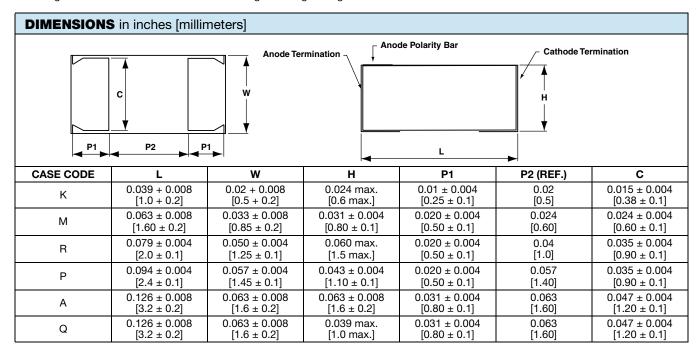
Capacitance Tolerance: ± 20 % standard

Voltage Range: 2.5 V_{DC} to 50 V_{DC}

ORDE	RING INFORMA	ATION				
298D	106	Х0	010	M	2	Т
TYPE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C 	CASE CODE	TERMINATION	REEL SIZE AND PACKAGING
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	X0 = ± 20 % X9 = ± 10 %	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V).	See Ratings and Case Codes table	2 = 100 % tin 4 = Gold plated	T = Tape and reel 7" [178 mm] reel

Note

Preferred tolerance and reel sizes are in bold.
 We reserve the right to supply higher voltage ratings and tighter capacitance tolerance capacitors in the same case size.
 Voltage substitutions will be marked with the higher voltage rating.



^{**} Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902



Vishay Sprague

RATINGS AND CASE CODES									
μF	2.5 V	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V
1.0			K	K	K/M		M/R		Р
1.5				М					
2.2			K/M	K/M	М				
3.3			М	М					
4.7		K	K*/M	М	М	Р	Р		
6.8									
10		K/M	K*/M	М	R				
15		K	М	М					
22		М	М	М					
33		М	М	Р					
47	М	М	Р	Р					
100		Р	P/A/Q*						
220	Р	Р							

Note

^{*} Preliminary values, contact factory for availability.

	VOLTAC	E CODE	CAPACITA	NCE CODE	
	V	CODE	CAP, μF	CODE	P, R-Case
M-Case	2.5	е	0.68	w	Voltage Capacitance Polarity Bar Code Code
Polarity Bar Voltage Code	4	G	1	Α	
	6.3	J	2.2	J	
	10	Α	3.3	N	$G\overline{J}$
A	16	С	4.7	S	I GJ
	20	D	6.8	W	
	25	Е	10	α	
K 0	35	V	15	е	Voltage EIA Capacitanc Polarity Bar Code Code (pF)
K-Case	50	Т	22	j	Polarity Bar Code Code (pF)
			33	n	
			47	S	
			68	W	J107
			100	Ā	0107
			150	Ē	
			220	J	

STANDARD RATINGS								
CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (μA)	MAX. DF AT + 25 °C (%)	MAX. ESR AT + 25 °C 100 kHz (Ω)	MAX. RIPPLE 100 kHz I _{RMS} (A)	ΔC/C ⁽¹⁾ (%)	
		2.5 V _I	_C AT + 85 °C; 1.	6 V _{DC} AT + 125	°C			
47	М	298D476X02R5M2T	2.4	20	4.0	0.080	± 30	
220	Р	298D227X02R5P2T	11.0	30	3.0	0.122	± 30	
		4 V _D	C AT + 85 °C; 2.7	V _{DC} AT + 125	°C			
4.7	K	298D475X0004K2T	0.5	15.0	20.0	0.027	± 30	
10	K	298D106X0004K2T	4.0	50.0	20.0	0.027	± 30	
10	М	298D106X0004M2T	0.5	8.0	5.0	0.071	± 10	
15	K	298D156X0004K2T	10.0	50.0	20.0	0.027	± 30	
22	М	298D226X0004M2T	0.9	15.0	4.0	0.080	± 15	
33	М	298D336X0004M2T	2.6	30.0	4.0	0.080	± 20	
47	М	298D476X0004M2T	3.8	40.0	7.5	0.080	± 30	
100	Р	298D107X0004P2T	4.0	30.0	2.0	0.100	± 30	
220	Р	298D227X0004P2T (3)	17.6	30.0	3.0	0.122	± 30	

Notes

- (1) See Performance Characteristics tables
 (2) In development
- $^{(3)}$ ± 10 % capacitance tolerance available

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(LF) CODE NUMBER AT + 25 °C AT + 25 °C C AT + 125 °C C AT +	STANDARD	RATIN	GS							
1.0 K 298D105X06R3K2T 0.5 6.0 20.0 0.027 a 2.2 K 298D225X06R3K2T 0.5 8.0 20.0 0.027 a 3.3 M 298D335X06R3M2T 0.5 8.0 6.0 0.000 0.007 a 3.3 M 298D335X06R3M2T 0.5 8.0 6.0 0.000 0.027 a 4.7 K 298D475X06R3K2T 0.5 8.0 6.0 0.000 0.027 a 4.7 K 298D475X06R3K2T 0.5 8.0 6.0 0.000 0.027 a 4.7 M 298D106X06R3K2T 0.5 8.0 0.0 0.0 0.027 a 10 K 298D106X06R3K2T 0.5 0.5 8.0 0.0 0.0 0.027 a 110 K 298D106X06R3K2T 0.0 0.5 8.0 0.0 0.0 0.027 a 12 M 298D106X06R3M2T 0.0 0.5 8.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0				LEAKAGE AT + 25 °C	AT + 25 °C	AT + 25 °C 100 kHz	100 kHz I _{RMS}	ΔC/C ⁽¹⁾ (%)		
2.2 K 298D225X06R3K2T 0.5 8.0 20.0 0.027 3 2.2 M 298D225X06R3K2T 0.5 10.0 5.0 0.070 3 3.3 M 298D335X06R3K2T 0.5 8.0 6.0 0.090 3 4.7 K 298D475X06R3K2T 0.5 8.0 3.0 0.090 3 4.7 K 298D475X06R3K2T 0.5 8.0 3.0 0.090 3 4.7 M 298D106X06R3K2T 0.5 8.0 3.0 0.090 3 10 K 298D106X06R3K2T 0.0 5.0 20.0 0.027 3 11 M 298D106X06R3K2T 0.0 5.0 20.0 0.027 3 12 M 298D35X06R3M2T 0.0 6 8.0 5.0 0.071 3 15 M 298D106X06R3K2T 0.0 6.6 8.0 5.0 0.071 3 15 M 298D106X06R3M2T 0.0 5.0 8.0 5.0 0.071 3 22 M 298D26X06R3M2T 2.8 20.0 5.5 0.067 3 33 M 298D336X06R3M2T 2.8 20.0 5.5 0.067 3 33 M 298D336X06R3M2T 4.2 30.0 7.5 0.068 3 47 P 298D107X06R3A2T 6.3 20.0 1.0 0.270 3 100 A 298D107X06R3A2T 6.3 20.0 1.0 0.270 3 100 P 298D107X06R3A2T 6.3 20.0 1.0 0.270 3 100 P 298D107X06R3A2T 6.3 20.0 1.0 0.270 3 100 P 298D107X06R3A2T 6.3 0.0 0.0 1.1 0.220 3 100 P 298D107X06R3A2T 6.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	W 1									
2.2 M 298D225X06R3M2T (5) 0.5 10.0 5.0 0.070 3 3.3 M 298D335X06R3M2T (6) 0.5 8.0 6.0 0.090 3 4.7 K 298D475X06R3M2T (7) 0.5 8.0 3.0 0.002 3 4.7 M 298D475X06R3M2T (7) 0.5 8.0 3.0 0.090 3 10 K 298D16X06R3M2T (7) 0.5 8.0 3.0 0.090 3 110 K 298D16X06R3M2T (7) 0.6 8.0 5.0 0.071 3 115 M 298D16X06R3M2T (7) 1.0 20.0 7.0 0.060 3 115 M 298D16X06R3M2T (7) 1.0 20.0 7.0 0.060 3 122 M 298D226X06R3M2T 4.2 30.0 7.5 0.058 3 133 M 298D36X06R3M2T 4.2 30.0 7.5 0.058 3 147 P 298D476X06R3P2T 3.0 22.0 3.0 0.122 3 100 A 298D107X06R3A2T 6.3 20.0 1.0 0.270 3 100 Q 298D107X06R3A2T 6.3 20.0 1.0 0.270 3 100 P 298D107X06R3P2T 6.3 30.0 2.0 0.150 3 100 P 298D107X06R3P2T 6.3 30.0 2.0 0.150 3 100 P 298D105X001X2T 0.5 6.0 20.0 0.50 3 1.5 M 298D155X0010M2T (8) 0.5 6.0 14.0 0.040 3 1.5 M 298D255X0010M2T 0.5 6.0 14.0 0.000 3 1.7 M 298D25X0010M2T 0.5 6.0 10.0 10.0 0.050 3 1.7 M 298D16X0010M2T (8) 0.5 6.0 10.0 0.090 3 1.7 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (8) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (9) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (9) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (9) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (9) 0.5 6.0 5.0 0.071 3 1.0 M 298D16X0010M2T (9) 0.5 6.0 5.0 0.002 3 3.3 P 298D336X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 6.0 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 0.000 0.000 0.000 3 3.3 P 298D36X0010M2T (9) 0.5 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.	1.0	K	298D105X06R3K2T	0.5	6.0	20.0	0.027	± 30		
3.3 M 298D33SX06R3M2T (3) 0.5 8.0 6.0 0.090 34 4.7 K 298D47SX06R3K2T (2) 4.0 50.0 20.0 0.027 4.7 M 298D47SX06R3K2T (2) 10.0 50.0 20.0 0.027 10 K 298D106X06R3K2T (2) 10.0 50.0 20.0 0.027 110 M 298D106X06R3K2T (3) 1.0 20.0 7.0 0.060 115 M 298D156X06R3M2T (3) 1.0 20.0 7.0 0.060 116 M 298D156X06R3M2T (3) 1.0 20.0 7.0 0.060 117 M 298D156X06R3M2T (3) 1.0 20.0 7.0 0.060 118 M 298D36X06R3M2T 4.2 30.0 7.5 0.058 119 M 298D36X06R3M2T 4.2 30.0 7.5 0.058 110 M 298D17X06R3P2T 3.0 22.0 3.0 0.122 110 M 298D17X06R3P2T 6.3 20.0 1.0 0.770 110 M 298D107X06R3P2T 6.3 20.0 1.1 0.220 110 P 298D107X06R3P2T 6.3 30.0 2.0 0.150 110 P 298D107X06R3P2T 6.3 30.0 2.0 0.150 110 K 298D107X06R3P2T 6.3 30.0 2.0 0.150 110 K 298D107X06R3P2T 6.3 10.0 30.0 1.1 0.220 110 P 298D107X06R3P2T 6.3 10.0 30.0 1.1 0.20 110 K 298D105X0010K2T 0.5 6.0 14.0 0.040 12.2 K 298D25X0010M2T 0.5 6.0 14.0 0.040 12.2 K 298D25X0010M2T 0.5 8.0 15.0 0.027 13.3 M 298D35X0010M2T 0.5 10.0 10.0 0.050 13.3 M 298D35X0010M2T 0.5 10.0 10.0 0.050 14.7 M 298D475X0010M2T 0.5 6.0 5.0 0.071 15 M 298D16X0010M2T 0.5 10.0 10.0 0.050 15 M 298D16X0010M2T 0.5 10.0 10.0 0.050 16 M 298D16X0010M2T 0.5 0.5 6.0 5.0 0.071 17 M 298D475X0010M2T 0.5 6.0 5.0 0.071 18 M 298D16X0010M2T 0.5 6.0 5.0 0.071 19 M 298D16X0010M2T 0.5 6.0 5.0 0.071 10 M 298D16X0010M2T 0.5 6.0 5.0 0.007 11 M 298D16X0010M2T 0.5 6.0 5.0 0.007 12 M 298D16X0010M2T 0.5 6.0 5.0 0.007 13 M 298D16X0010M2T 0.5 6.0 0.0 0.007 14 M 298D16X0010M2T 0.5 6.0 0.0 0.007 15 M 298D16X0010M2T 0.5 6.0 0.0 0.007 16 M 298D16X0016M2T 0.5 6.0 0.0 0.007 17 M 298D475X0010M2T 0.5 6.0 0.0 0.007 18 M 298D16X0010M2T 0.5 6.0 0.0 0.007 19 M 298D16X0016M2T 0.5 6.0 0.0 0.007 10 M 298D16X0016M2T 0.6 6.0 0.0 0.006 11 M 298D16X0026M2T 0.6 6.0 0.0 0.006 12 M 298D16X0026M2T 0.6 6.0 0.0 0.006 13 M 298D16X0026M2T 0.5 6.0 0.0 0.0 0.005 14 M 298D16X0026M2T 0.5 6.0 0.0 0.0 0.005 15 M 298D16X0026M2T 0.5 6.0 0.0 0.0 0.005 16 M 298D16X0026M2T 0	2.2	K	298D225X06R3K2T	0.5	8.0	20.0	0.027	± 30		
4.7 K 298D475X06R3K2T (?) 4.0 50.0 20.0 0.027 3 4.7 M 298D475X06R3K2T (?) 0.5 8.0 3.0 0.090 3 10 K 298D106X06R3KZT (?) 10.0 50.0 20.0 0.027 3 11 M 298D16SX06R3MZT (8) 0.6 8.0 5.0 0.071 3 11 M 298D16SX06R3MZT (8) 1.0 20.0 7.0 0.060 3 11 M 298D16SX06R3MZT (8) 1.0 20.0 7.0 0.060 3 12 M 298D26X06R3MZT 2.8 20.0 5.5 0.067 3 33 M 298D36X08R3MZT 4.2 30.0 7.5 0.068 3 47 P 298D476X06R3PZT 3.0 22.0 3.0 0.122 3 100 A 298D107X06R3AZT 6.3 20.0 1.0 0.270 3 100 Q 298D107X06R3AZT 6.3 20.0 1.0 0.270 3 100 P 298D107X06R3AZT 6.3 30.0 2.0 1.0 0.270 3 100 P 298D107X06R3PZT 6.3 30.0 2.0 0.150 3 11.0 K 298D105X0010XZT 0.5 6.0 20.0 0.027 3 1.5 M 298D25X0010MZT 0.5 6.0 20.0 0.027 3 1.5 M 298D25X0010MZT 0.5 8.0 15.0 0.027 3 1.3 M 298D35X0010MZT 0.5 8.0 15.0 0.027 3 1.3 M 298D35X0010MZT 0.5 6.0 0.0 0.000 3 1.1 0.00	2.2	М	298D225X06R3M2T (3)	0.5	10.0	5.0	0.070	± 10		
4.7 M 298D475X06R3M2T (2) 0.5 8.0 3.0 0.090 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3.3	М	298D335X06R3M2T (3)	0.5	8.0	6.0	0.090	± 10		
10 K 298D106X06R3K2T (2) 10.0 50.0 20.0 0.027 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4.7	K	298D475X06R3K2T (2)	4.0	50.0	20.0	0.027	± 30		
10 M 298D106X06R3M2T (3) 0.6 8.0 5.0 0.071 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4.7	M	298D475X06R3M2T (2)	0.5	8.0	3.0	0.090	± 10		
15 M 298D156X06R3M2T (3) 1.0 20.0 7.0 0.060 2 22 M 298D226X06R3M2T 2.8 20.0 5.5 0.067 2 33 M 298D336X06R3M2T 4.2 30.0 7.5 0.058 3 47 P 298D476X06R3P2T 3.0 22.0 3.0 0.122 3 100 A 298D107X06R3A2T 6.3 20.0 1.0 0.270 3 100 P 298D107X06R3A2T 6.3 30.0 1.1 0.220 3 100 P 298D107X06R3A2T 6.3 30.0 1.1 0.220 3 100 P 298D107X06R3A2T 6.3 30.0 2.0 0.150 3 ***TOV_bc AT + 85 °C; 7 V_bc AT + 125 °C*** 1.0 K 298D105X0010K2T 0.5 6.0 20.0 0.027 3 1.5 M 298D155X0010M2T 0.5 6.0 14.0 0.040 3 2.2 K 298D25X0010M2T 0.5 8.0 15.0 0.027 3 3.3 M 298D25X0010M2T 0.5 10.0 10.0 0.050 3 3.3 M 298D35X0010M2T 0.5 10.0 10.0 0.050 3 4.7 M 298D475X0010M2T 1.0 20.0 7.5 0.058 3 15 M 298D165X0010M2T 1.0 20.0 7.5 0.058 3 16 M 298D165X0010M2T 2.2 0 40.0 10.0 0.050 3 33 P 298D36X0010M2T 3.1 5 30.0 7.5 0.058 3 15 M 298D165X0010M2T 2.0 40.0 10.0 0.050 3 37 P 298D36X0010P2T 3.3 20.0 4.0 0.150 3 38 P 298D36X0010P2T 3.0 10.0 20.0 0.071 3 39 P 298D36X0010P2T 3.0 0.5 6.0 10.0 0.050 3 47 P 298D476X0016P2T 3.0 10.0 20.0 0.077 3 1.0 K 298D165X0016M2T 3.0 10.0 20.0 0.077 3 1.0 K 298D165X0016M2T 3.0 10.0 20.0 0.077 3 1.0 K 298D165X0016M2T 3.0 10.0 20.0 0.077 3 1.0 M 298D165X0016M2T 3.0 10.0 20.0 0.077 3 1.0 M 298D165X0016M2T 3.0 10.0 20.0 0.075 3 1.0 R 298D165X0016M2T 3.0 6.0 4.0 0.060 3 1.0 R 298D105X0016M2T 3.0 6.0 4.0 0.060 3 1.0 R 298D105X0016M2T 3.0 6.0 4.0 0.060 3 1.0 R 298D105X0016M2T 3.0 6.0 4.0 0.006 3 1.0 R 298D105X0025M2T 0.5 6.0 10.0 0.005 3 1.0 R 298D105X0025M2T 0.5 6.0 10.0 0.005 3 1.0 R 298D106X0025A2T (2) 1.2 6.0 4	10	K	298D106X06R3K2T (2)	10.0	50.0	20.0	0.027	± 30		
22 M 298D226X06R3MZT 2.8 20.0 5.5 0.067 2 33 M 298D336X06R3MZT 4.2 30.0 7.5 0.058 3 47 P 298D476X06R3PZT 3.0 22.0 3.0 0.122 2 100 A 298D107X06R3AZT 6.3 20.0 1.0 0.270 3 100 Q 298D107X06R3AZT 6.3 30.0 1.1 0.220 3 100 P 298D107X06R3PZT 6.3 30.0 2.0 0.150 3 ***TOV_bc AT +85 °C; 7 V_bc AT + 125 °C*** 1.0 K 298D105X0010KZT 0.5 6.0 14.0 0.040 3 2.2 K 298D25X0010MZT 0.5 6.0 14.0 0.040 3 2.2 K 298D25X0010KZT 0.5 8.0 15.0 0.027 3 2.2 M 298D25X0010MZT 0.5 8.0 15.0 0.027 3 4.7 M 298D155X0010MZT 0.5 6.0 5.0 0.000 3 3.3 M 298D335X0010MZT 0.5 6.0 5.0 0.000 3 4.7 M 298D16X0010MZT 1.0 20.0 7.5 0.058 3 15 M 298D35X0010MZT 0.5 6.0 5.0 0.071 3 16 M 298D16X0010MZT 1.0 20.0 7.5 0.058 3 17 M 298D36X0010MZT 0.5 0.0 0.0 0.000 3 18 M 298D36X0010MZT 0.5 0.0 0.0 0.000 3 18 M 298D36X0010MZT 0.5 0.0 0.0 0.0 0.000 3 18 M 298D36X0010MZT 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	10	М	298D106X06R3M2T (3)	0.6	8.0	5.0	0.071	± 10		
33 M 298D336X06R3M2T 4.2 30.0 7.5 0.058 ± 47 P 298D476X06R3P2T 3.0 22.0 3.0 0.122 ± 2 100 A 298D107X06R3A2T 6.3 20.0 1.0 0.270 ± 2 100 Q 298D107X06R3A2T 6.3 20.0 1.0 0.270 ± 2 100 P 298D107X06R3A2T 6.3 30.0 1.1 0.220 ± 2 100 P 298D107X06R3A2T 6.3 30.0 2.0 0.150 ± 2 100 P 298D107X06R3P2T 6.3 30.0 2.0 0.150 ± 2 100 P 298D107X06R3P2T 0.5 6.0 20.0 0.027 ± 2 1.5 M 298D155X0010M2T 0.5 6.0 14.0 0.040 ± 2.2 K 298D225X0010M2T 0.5 8.0 15.0 0.027 ± 2 2 2 M 298D225X0010M2T 0.5 8.0 15.0 0.027 ± 2 3 3 3 3 M 298D35X0010M2T 0.5 8.0 6.0 0.090 ± 2 3 3 3 M 298D35X0010M2T 0.5 8.0 6.0 0.090 ± 2 4 7 M 298D475X0010M2T 0.5 6.0 5.0 0.071 ± 1 0 M 298D106X0010M2T 0.5 6.0 5.0 0.071 ± 1 0 M 298D166X0010M2T 0.5 6.0 5.0 0.071 ± 1 0 M 298D166X0010M2T 0.5 6.0 5.0 0.071 ± 1 0 0 M 298D166X0010M2T 0.5 6.0 5.0 0.071 ± 1 0 0 0.050 ± 2 0 0.050 ± 2 0 0.	15	M	298D156X06R3M2T (3)	1.0	20.0	7.0	0.060	± 20		
47 P 298D476X06R3P2T 3.0 22.0 3.0 0.122 = 100 A 298D107X06R3A2T 6.3 20.0 1.0 0.270 = 1100 Q 298D107X06R3A2T 6.3 30.0 1.1 0.220 = 1100 P 298D107X06R3Q2T (2) 10.0 30.0 1.1 0.220 = 1100 P 298D107X06R3Q2T (2) 10.0 30.0 1.1 0.220 = 1100 P 298D107X06R3Q2T (3) 10.0 2.0 0.150 = 1100 V C AT + 85 °C; 7 V C AT + 125 °C	22	M	298D226X06R3M2T	2.8	20.0	5.5	0.067	± 15		
100	33	M	298D336X06R3M2T	4.2	30.0	7.5	0.058	± 30		
100	47	Р	298D476X06R3P2T	3.0	22.0	3.0	0.122	± 20		
100	100	Α	298D107X06R3A2T	6.3	20.0	1.0	0.270	± 10		
10 V _{DC} AT + 85 °C; 7 V _{DC} AT + 125 °C	100	Q	298D107X06R3Q2T (2)	10.0	30.0	1.1	0.220	± 20		
1.0 K 298D105X0010K2T 0.5 6.0 20.0 0.027 ± 1.5 M 298D155X0010M2T (3) 0.5 6.0 14.0 0.040 ± 2.2 K 298D225X0010K2T 0.5 8.0 15.0 0.027 ± 2.2 M 298D225X0010M2T 0.5 10.0 10.0 0.050 ± 3.3 M 298D335X0010M2T (3) 0.5 8.0 6.0 0.090 ± 4.7 M 298D475X0010M2T 1.0 20.0 7.5 0.058 ± 15 M 298D166X0010M2T 1.0 20.0 7.5 0.058 ± 15 M 298D156X0010M2T 22.0 40.0 10.0 0.050 ± 33 P 298D36X0010M2T 22.0 40.0 10.0 0.050 ± 47 P 298D476X0010P2T 4.7 22.0 3.0 0.122 ± 16 V _{DC} AT + 85 °C; 10 V _{DC} AT + 125 °C 1.0 K 298D105X0016M2T (3) 0.5 10.0 12.0 0.045 ± 2.2 M 298D25X0016M2T 3.0 10.0 20.0 0.027 ± 1.0 K 298D15X0016M2T (3) 0.5 6.0 12.0 0.045 ± 2.2 M 298D25X0016M2T (3) 0.5 6.0 12.0 0.045 ± 4.7 M 298D475X0016M2T (3) 0.5 10.0 12.0 0.045 ± 4.7 M 298D475X0016M2T (3) 0.5 10.0 12.0 0.045 ± 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 ± 4.7 M 298D105X0016M2T 0.8 8.0 6.0 0.060 ± 4.7 M 298D105X0016M2T 0.8 8.0 6.0 0.075 ± 20 V _{DC} AT + 85 °C; 11 V _{DC} AT + 125 °C 1.0 M 298D105X0016M2T 0.8 8.0 6.0 0.060 ± 10 R 298D105X0016M2T 0.8 8.0 6.0 0.060 ± 10 R 298D105X0016M2T 0.8 8.0 6.0 0.060 ± 10 R 298D105X002P2T 0.5 6.0 10.0 0.050 ± 10 M 298D105X002P2T 0.5 6.0 10.0 0.050 ± 10 M 298D105X0025P2T 0.5 6.0 10.0 0.050 ± 10 R 298D105X0025P2T 0.5 6.0 10.	100	Р	298D107X06R3P2T	6.3	30.0	2.0	0.150	± 20		
1.5 M 298D155X0010M2T (3) 0.5 6.0 14.0 0.040 2 2.2 K 298D225X0010K2T 0.5 8.0 15.0 0.027 2 2.2 M 298D225X0010M2T 0.5 10.0 10.0 0.050 2 3.3 M 298D335X0010M2T (3) 0.5 8.0 6.0 0.090 2 4.7 M 298D475X0010M2T (3) 0.5 6.0 5.0 0.071 2 10 M 298D106X0010M2T 1.0 20.0 7.5 0.058 2 15 M 298D16X0010M2T (3) 1.5 30.0 7.5 0.058 2 22 M 298D226X0010M2T 22.0 40.0 10.0 0.050 2 33 P 298D336X0010P2T (3) 3.3 20.0 4.0 0.150 2 33 P 298D336X0010P2T (3) 3.3 20.0 4.0 0.150 2 47 P 298D476X0010P2T 4.7 22.0 3.0 0.122 2 10 M 298D105X0016K2T 3.0 10.0 20.0 0.027 2 11.0 K 298D105X0016M2T (3) 0.5 6.0 12.0 0.045 2 2.2 M 298D25X0016M2T (3) 0.5 6.0 12.0 0.045 2 2.2 M 298D25X0016M2T (4) 0.5 10.0 12.0 0.045 2 4.7 M 298D125X0016M2T (4) 0.5 10.0 12.0 0.045 2 4.7 M 298D475X0016M2T (4) 0.5 10.0 12.0 0.045 2 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 2 4.7 M 298D105X0016M2T 1.0 8.0 8.0 0.075 2 10 R 298D106X0016P2T 1.0 8.0 8.0 0.075 2 10 R 298D475X0020P2T 1.0 6.0 4.0 0.106 2 10 R 298D475X0020P2T 1.0 6.0 4.0 0.106 2 10 R 298D475X0025M2T 0.5 6.0 10.0 0.050 2 11.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 2 11.0 R 298D105X0025M2T 0.5 6.0 10.0 0.050 2 11.0 A 298D105			10 V _I	_{OC} AT + 85 °C; 7	' V _{DC} AT + 125 °	°C				
2.2 K 298D225X0010K2T 0.5 8.0 15.0 0.027 2 2.2 M 298D225X0010M2T 0.5 10.0 10.0 0.050 2 3.3 M 298D335X0010M2T 0.5 8.0 6.0 0.090 2 4.7 M 298D475X0010M2T 0.5 6.0 5.0 0.071 2 10 M 298D105X0010M2T 1.0 20.0 7.5 0.058 2 15 M 298D156X0010M2T 22.0 40.0 10.0 0.050 2 33 P 298D336X0010P2T 3.3 20.0 4.0 0.150 2 33 P 298D336X0010P2T 4.7 22.0 3.0 0.122 2 34 P 298D476X0010P2T 4.7 22.0 3.0 0.122 2 35 P 298D476X0010P2T 4.7 22.0 3.0 0.122 2 36 P 298D476X0010P2T 3.0 10.0 20.0 0.027 2 36 P 298D476X0016M2T 3.0 10.0 20.0 0.027 2 36 P 298D476X0016M2T 3.0 10.0 20.0 0.045 2 36 P 298D476X0016M2T 3.0 10.0 12.0 0.045 2 37 M 298D105X0016M2T 0.8 8.0 6.0 0.060 2 38 P 298D475X0016M2T 0.8 8.0 6.0 0.060 2 39 P 298D475X0016M2T 1.0 8.0 8.0 0.075 2 30 P 298D475X0026P2T 1.6 8.0 8.0 0.075 2 30 P 298D475X0026P2T 1.0 6.0 4.0 0.106 2 30 P 298D475X0025P2T 1.0 6.0 10.0 0.050 2 30 P 298D475X0025P2T 1.0 6.0 10.0 0.050 2 30 P 298D475X0025P2T 1.2 6.0 10.0 0.050 2 30 P 298D475X0025P2T 1.2 6.0 4.0 0.106 2 30 P 298D47	1.0	K	298D105X0010K2T	0.5	6.0	20.0	0.027	± 30		
2.2 M 298D225X0010M2T 0.5 10.0 10.0 0.050 2 3.3 M 298D335X0010M2T (3) 0.5 8.0 6.0 0.090 2 4.7 M 298D475X0010M2T (3) 0.5 6.0 5.0 0.071 2 10 M 298D106X0010M2T 1.0 20.0 7.5 0.058 2 15 M 298D156X0010M2T 22.0 40.0 10.0 0.050 2 33 P 298D336X0010P2T 3.3 20.0 4.0 0.150 2 33 P 298D336X0010P2T 4.7 22.0 3.0 0.122 2 47 P 298D476X0010P2T 4.7 22.0 3.0 0.122 2 10 K 298D105X0016K2T 3.0 10.0 20.0 0.027 2 1.0 K 298D105X0016K2T 3.0 10.0 20.0 0.027 2 1.0 M 298D225X0016M2T 3.0 10.0 20.0 0.045 2 2.2 M 298D225X0016M2T 3.0 10.0 20.0 0.045 2 2.2 M 298D475X0016M2T 3.0 10.0 20.0 0.045 2 4.7 M 298D475X0016M2T 3.0 8.8 8.0 6.0 0.060 2 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 2 4.7 M 298D475X0016M2T 1.6 8.0 8.0 0.075 2 4.7 P 298D475X002P2T 3 1.0 6.0 4.0 0.106 2 4.7 P 298D475X002P2T 3 1.0 6.0 4.0 0.106 2 4.7 P 298D475X002P2T 3 1.0 6.0 4.0 0.050 2 4.7 P 298D475X002P2T 3 1.0 6.0 4.0 0.050 2 4.7 P 298D475X002P2T 3 1.0 6.0 4.0 0.050 2 4.7 P 298D475X002P2T 3 1.0 6.0 4.0 0.050 2 4.7 P 298D475X002P2T 3 1.0 6.0 4.0 0.050 2 4.7 P 298D475X002P2T 3 1.2 6.0 4.0 0.050 2 4.7 P 298D475X002P2T 3 1.2 6.0 4.0 0.106 2 4.7 P 298D475X002P2T 3 1.2 6.0 4.0 0.106 2 4.7 P 298D475X002P2T 3 1.2 6.0 4.0 0.106 2 4.7 P 298D475X002P2T 3 1.2 6.0 4.0 0.106 2		M	298D155X0010M2T (3)	0.5	6.0	14.0	0.040	± 10		
3.3 M 298D335X0010M2T (3) 0.5 8.0 6.0 0.090 4 4.7 M 298D475X0010M2T (3) 0.5 6.0 5.0 0.071 4 10 M 298D106X0010M2T 1.0 20.0 7.5 0.058 4 15 M 298D156X0010M2T 2.0 40.0 10.0 0.050 4 22 M 298D226X0010M2T 22.0 40.0 10.0 0.050 4 33 P 298D36X0010P2T (3) 3.3 20.0 4.0 0.150 4 47 P 298D476X0010P2T 4.7 22.0 3.0 0.122 4 1.0 K 298D105X0016K2T 3.0 10.0 20.0 0.027 4 1.0 M 298D105X0016M2T (3) 0.5 6.0 12.0 0.045 4 2.2 M 298D25X0016M2T (3) 0.5 6.0 12.0 0.045 4 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 4 4.7 M 298D475X0016M2T 1.6 8.0 8.0 0.075 4 4.7 M 298D475X0016R2T 1.6 8.0 8.0 0.075 4 4.7 P 298D475X0020P2T 1.0 6.0 4.0 0.106 4 4.7 P 298D475X0020P2T 1.0 6.0 4.0 0.106 4 4.7 P 298D475X0020P2T 0.5 6.0 10.0 0.050 4 4.7 P 298D475X0020P2T 0.5 6.0 10.0 0.050 4 4.7 P 298D475X0025P2T 0.5 6.0 10.0 0.050 6 4.7 P 298D475X		K	298D225X0010K2T	0.5	8.0	15.0	0.027	± 30		
4.7 M 298D475X0010M2T (3) 0.5 6.0 5.0 0.071 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		М						± 10		
10 M 298D106X0010M2T 1.0 20.0 7.5 0.058 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		М						± 10		
15 M 298D156X0010M2T 3 1.5 30.0 7.5 0.058 22 M 298D226X0010M2T 22.0 40.0 10.0 0.050 23 33 P 298D336X0010P2T 3 3.3 20.0 4.0 0.150 24 47 P 298D476X0010P2T 4.7 22.0 3.0 0.122 24 16 V _{DC} AT + 85 °C; 10 V _{DC} AT + 125 °C 10.0 M 298D105X0016K2T 3.0 10.0 20.0 0.027 2 1.0 M 298D105X0016M2T 3 0.5 6.0 12.0 0.045 22 M 298D225X0016M2T 3 0.5 10.0 12.0 0.045 24 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 24 4.7 M 298D105X0016M2T 1.6 8.0 8.0 0.075 24 1.0 R 298D105X0016M2T 1.6 8.0 8.0 0.075 24 1.0 R 298D105X0016M2T 1.6 8.0 8.0 0.075 24 1.0 R 298D475X0016M2T 1.6 8.0 8.0 8.0 0.075 24 1.0 R 298D475X0020P2T 1.6 8.0 8.0 8.0 0.075 24 1.0 1.0 6.0 4.0 0.106 24 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0								± 15		
22 M 298D226X0010M2T 22.0 40.0 10.0 0.050 ± 4.0 0.150 ± 4.7 P 298D476X0010P2T 4.7 22.0 3.0 0.122 ± 4.7 1.0 K 298D105X0016M2T 3.0 10.0 20.0 0.027 ± 1.0 M 298D105X0016M2T 3.0 0.5 6.0 12.0 0.045 ± 4.7 M 298D475X0016M2T 3.0 0.5 10.0 12.0 0.045 ± 4.7 M 298D105X0016M2T 3.0 0.5 10.0 12.0 0.045 ± 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 ± 4.7 M 298D475X0016M2T 1.6 8.0 8.0 0.075 ± 20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C								± 15		
33 P 298D336X0010P2T (3) 3.3 20.0 4.0 0.150 ± 4.7 P 298D476X0010P2T 4.7 22.0 3.0 0.122 ± 4.7 1.0								± 20		
47 P 298D476X0010P2T 4.7 22.0 3.0 0.122 ± 16 V _{DC} AT + 85 °C; 10 V _{DC} AT + 125 °C 1.0 K 298D105X0016K2T 3.0 10.0 20.0 0.027 ± 1.0 M 298D105X0016M2T (³) 0.5 6.0 12.0 0.045 ± 2.2 M 298D475X0016M2T (³) 0.5 10.0 12.0 0.045 ± 4.7 M 298D475X0016M2T (³) 0.8 8.0 6.0 0.060 ± 20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C 4.7 P 298D475X0020P2T (³) 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T (³) 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T (³) 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (³) 1.2 6.0 4.0 0.106								± 30		
16 V _{DC} AT + 85 °C; 10 V _{DC} AT + 125 °C 1.0 K 298D105X0016K2T 3.0 10.0 20.0 0.027 ± 1.0 M 298D105X0016M2T (³) 0.5 6.0 12.0 0.045 ± 2.2 M 298D225X0016M2T (³) 0.5 10.0 12.0 0.045 ± 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 ± 10 R 298D106X0016R2T 1.6 8.0 8.0 0.075 ± 20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C 4.7 P 298D475X0020P2T (³) 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (³) 1.2 6.0 4.0 0.106 ± 4.7 P 298D475X0025P2T (³) 1.2 6.0								± 10		
1.0 K 298D105X0016K2T 3.0 10.0 20.0 0.027 ± 1.0 M 298D105X0016M2T (3) 0.5 6.0 12.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.045 ± 1.0 0.060 ± 1.0 0.060 ± 1.0 0.060 ± 1.0 0.060 ± 1.0 0.075 ± 1.0 0.075 ± 1.0 0.075 ± 1.0 0.075 ± 1.0 0.0060 ± 1.0 0.060	47	P					0.122	± 20		
1.0 M 298D105X0016M2T (3) 0.5 6.0 12.0 0.045 ± 2.2 M 298D225X0016M2T (3) 0.5 10.0 12.0 0.045 ± 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 ± 4.7 M 298D106X0016R2T 1.6 8.0 8.0 0.075 ± 20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C 4.7 P 298D475X0020P2T (3) 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ±	1.0	I/					0.007	. 00		
2.2 M 298D225X0016M2T (3) 0.5 10.0 12.0 0.045 ± 4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 ± 10 R 298D106X0016R2T 1.6 8.0 8.0 0.075 ± 20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C 4.7 P 298D475X0020P2T (3) 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 1.0 A 298D106X0025A2T (2)(3) 2.5 10.0 3.5 0.146 ± 1.0 A 298D106X0025A2T (2)(3) 2.5 10.0 3.5 0.146								± 30		
4.7 M 298D475X0016M2T 0.8 8.0 6.0 0.060 ± 20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C 4.7 P 298D475X0020P2T ⁽³⁾ 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T ⁽³⁾ 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T ⁽²⁾⁽³⁾ 2.5 10.0 3.5 0.146 ±								± 15		
10 R 298D106X0016R2T 1.6 8.0 8.0 0.075 ± 20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C 4.7 P 298D475X0020P2T (³) 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (³) 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T (²)(³) 2.5 10.0 3.5 0.146 ±								± 15		
20 V _{DC} AT + 85 °C; 13 V _{DC} AT + 125 °C 4.7 P 298D475X0020P2T ⁽³⁾ 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T ⁽³⁾ 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T ⁽²⁾⁽³⁾ 2.5 10.0 3.5 0.146 ±								± 15		
4.7 P 298D475X0020P2T (3) 1.0 6.0 4.0 0.106 ± 25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T (2)(3) 2.5 10.0 3.5 0.146 ±	10	п					0.075	± 10		
25 V _{DC} AT + 85 °C; 17 V _{DC} AT + 125 °C 1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T (2)(3) 2.5 10.0 3.5 0.146 ±	4.7	P					0.106	± 10		
1.0 M 298D105X0025M2T 0.5 6.0 10.0 0.050 ± 1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T (2)(3) 2.5 10.0 3.5 0.146 ±		•					0.100	± 10		
1.0 R 298D105X0025R2T 0.5 6.0 10.0 0.050 ± 4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T (2)(3) 2.5 10.0 3.5 0.146 ±	1.0	М					0.050	± 10		
4.7 P 298D475X0025P2T (3) 1.2 6.0 4.0 0.106 ± 10 A 298D106X0025A2T (2)(3) 2.5 10.0 3.5 0.146 ±								± 10		
10 A 298D106X0025A2T ⁽²⁾⁽³⁾ 2.5 10.0 3.5 0.146 ±								± 10		
								± 10		
30 FDC AL T 00 O, 00 FDC AL T 120 O				_C AT + 85 °C; 3		°C				
	1.0	Р					0.075	± 10		

Notes

⁽¹⁾ See Performance Characteristics tables

⁽²⁾ In development

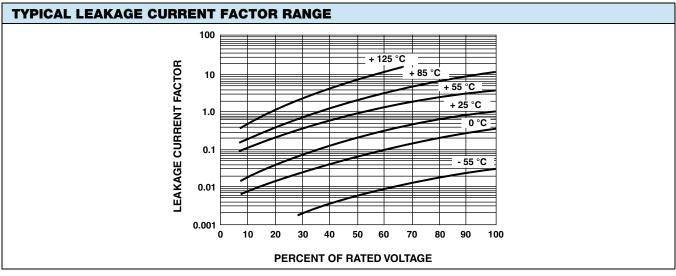
 $^{^{(3)}}$ ± 10 % capacitance tolerance available



Vishay Sprague

CAPACITORS PERFORMANCE CHARACTERISTICS

ITEM	PERFORMANCE CHARACTERISTICS					
Category Temperature Range	- 55 °C to + 85 °C (to + 12	25 °C with voltage deratir	ng)			
Capacitance Tolerance	± 20 %, ± 10 % (at 120 H	z) 2 V _{RMS} at + 25 °C usin	g a capacitance bridge			
Dissipation Factor (at 120 Hz)	Limits per Standard Ratin	gs Table. Tested via brid	ge method, at 25 °C, 120 H	Z.		
ESR (100 kHz)	Limits per Standard Ratin	gs Table. Tested via brid	ge method, at 25 °C, 100 kl	Hz.		
Leakage Current	1 kΩ resistor in series we described in Standard R	After application of rated voltage applied to capacitors for 5 min using a steady source of power with 1 k Ω resistor in series with the capacitor under test, leakage current at 25 °C is not more than described in Standard Ratings Table. Note that the leakage current varies with temperature and applied voltage. See graph below for the appropriate adjustment factor.				
Reverse Voltage	DC rating at + 25 °C 5 % of the DC rating at +	Capacitors are capable of withstanding peak voltages in the reverse direction equal to: 10 % of the DC rating at + 25 °C 5 % of the DC rating at + 85 °C Vishay does not recommend intentional or repetitive application of reverse voltage				
Temperature Derating	If capacitors are to be us voltage shall be calculate 1.0 at + 25 °C 0.9 at + 85 °C 0.4 at + 125 °C		ve + 25 °C, the permissible ors:	RMS ripple current or		
	+ 85 °C R	ATING	+ 125 °C RATING			
	WORKING VOLTAGE (V)	SURGE VOLTAGE (V)	WORKING VOLTAGE (V)	SURGE VOLTAGE (V)		
	4	5.2	2.7	3.4		
	6.3	8	4	5		
Operating Temperature	10	13	7	8		
Operating Temperature	16	20	10	12		
	20	26	13	16		
	25	32	17	20		
	35	46	23	28		



- At + 25 °C, the leakage current shall not exceed the value listed in the Standard Ratings table
- At + 85 °C, the leakage current shall not exceed 10 times the value listed in the Standard Ratings table
- At + 125 °C, the leakage current shall not exceed 12 times the value listed in the Standard Ratings table





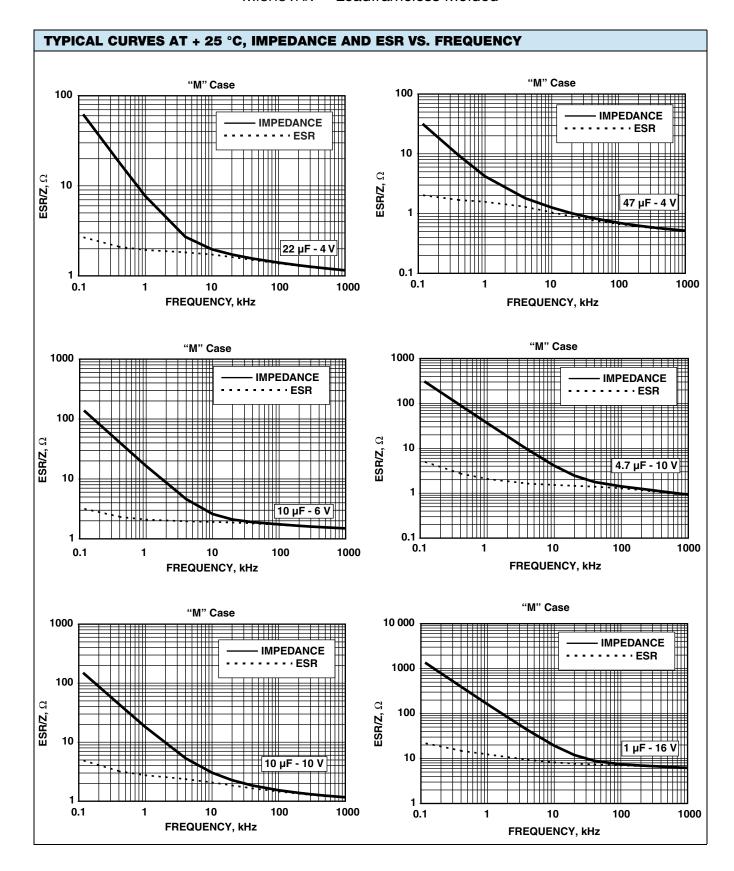
ENVIRONMENTAL PERFORMANCE CHARACTERISTICS					
ITEM	CONDITION	POST TEST PERFORM	IANCE		
Life Test at + 85 °C	1000 h application of rated voltage at 85 °C with a 3 Ω series resistance, MIL-STD-202G method 108A	Capacitance change Dissipation factor Leakage current	Refer to Standard Ratings table Not to exceed 150 % of initial Not to exceed 200 % of initial		
Humidity Tests	At 40 °C/90 % RH 500 h, no voltage applied. MIL-STD-202G method 103B	Capacitance change Dissipation factor Leakage current	Refer to Standard Ratings table Not to exceed 150 % of initial Not to exceed 200 % of initial		
Thermal Shock	At - 55 °C/+ 125 °C, 30 min each, for 5 cycles. MIL-STD-202G method 107G	Capacitance change Dissipation factor Leakage current	Refer to Standard Ratings table Not to exceed 150 % of initial Not to exceed 200 % of initial		

ITEM	CONDITION	POST TEST PERFORM	MANCE	
Terminal Strength	Apply a pressure load of 5 N for 10 s ± 1 s horizontally to the center of capacitor side body. AEC Q-200 rev. C method 006	Capacitance change Dissipation factor Leakage current	Refer to Standard Ratings table Initial specified value or less Initial specified value or less	
	AEC Q-200 rev. C method 006	There shall be no mech post-conditioning.	anical or visual damage to capacitors	
Substrate Bending (Board flex)	With parts soldered onto substrate test board, apply force to the test board for a deflection of 1 mm. AEC-Q200 rev. C method 005	Capacitance change Dissipation factor Leakage current	Refer to Standard Ratings table Initial specified value or less Initial specified value or less	
Vibration	MIL-STD-202G, method 204D, 10 Hz to 2000 Hz, 20 <i>g</i> peak	Capacitance change Dissipation factor Leakage current There shall be no mech	Refer to Standard Ratings table Initial specified value or less Initial specified value or less anical or visual damage to capacitors	
		post-conditioning.		
Shock	MIL-STD-202G, method 213B, Condition I, 100 g peak	Capacitance change Dissipation factor Leakage current	Refer to Standard Ratings table Initial specified value or less Initial specified value or less	
	3 7	There shall be no mechanical or visual damage to capacitors post-conditioning.		
Resistance to Solder Heat	At 260 °C, for 10 s, reflow	Capacitance change Dissipation factor Leakage current	Refer to Standard Ratings table Not to exceed 150 % of initial Not to exceed 200 % of initial	
Tiout		There shall be no mechanical or visual damage to capacitors post-conditioning.		
Solderability	MIL-STD-202G, method 208H, ANSI/J-STD-002, Test B. Applies only to solder and tin plated terminations. Does not apply to gold terminations.	There shall be no mech post-conditioning.	anical or visual damage to capacitors	
Resistance to Solvents	MIL-STD-202, method 215D	There shall be no mech post-conditioning.	anical or visual damage to capacitors	
Flammability	Encapsulation materials meet UL 94 V-0 with an oxygen index of 32 %			



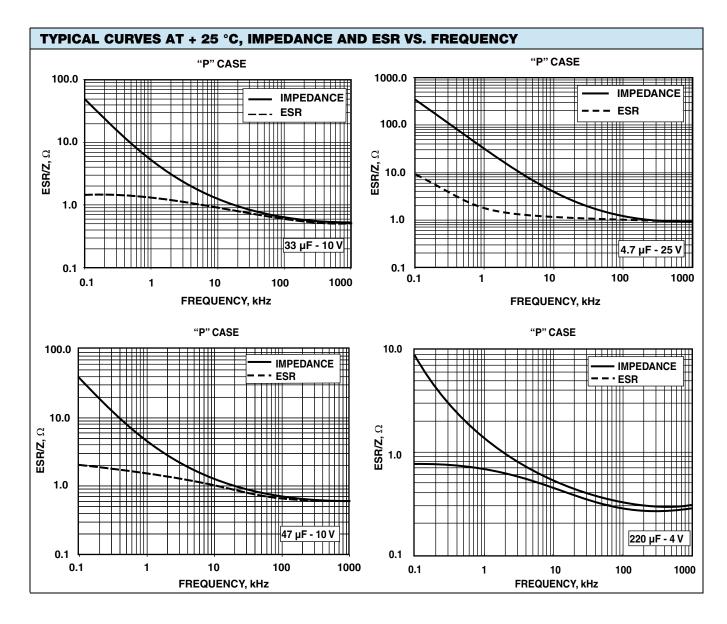


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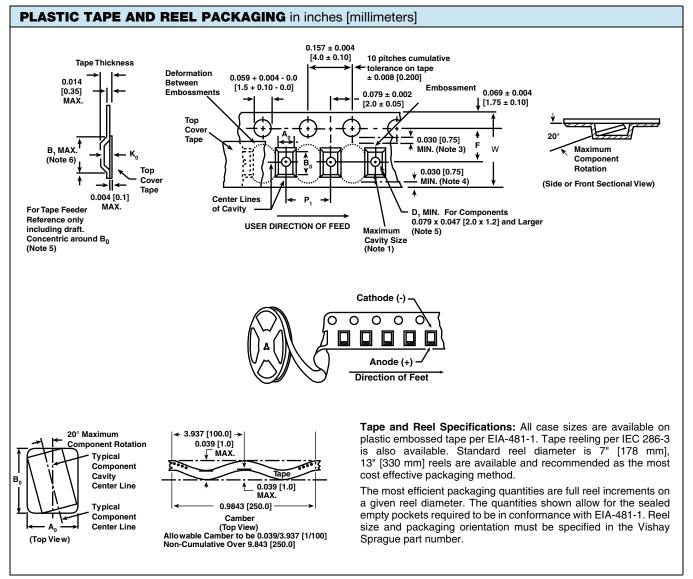
Solid Tantalum Chip Capacitors, MICROTANTM Leadframeless Molded







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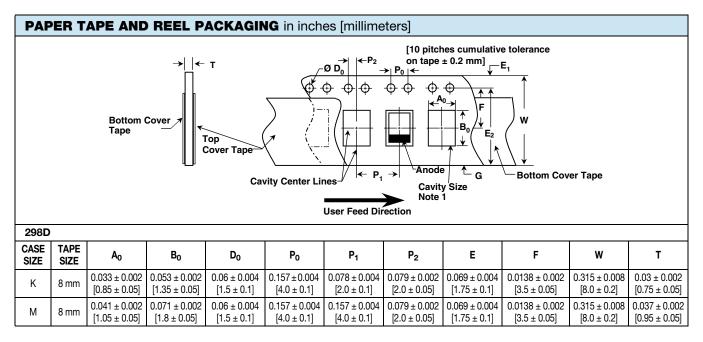
Note

• Metric dimensions will govern. Dimensions in inches are rounded and for reference only.

CASE CODE	TAPE SIZE	B ₁ (MAX.)	D ₁ (MIN.)	F	K ₀ (MAX.)	P ₁	w
298D							
P, R	8 mm	0.108 [2.75]	0.039 [1.0]	0.138 ± 0.002 [3.5 ± 0.05]	0.054 [1.37]	0.157 ± 0.004 [4.0 ± 1.0]	0.315 + 0.0118/- 0.0039 [8.0 + 0.30/- 0.10]
А	8 mm	0.165 [4.2]	0.039 [1.0]	0.138 ± 0.002 [3.5 ± 0.05]	0.094 [2.4]	0.157 ± 0.004 [4.0 ± 1.0]	0.315 ± 0.012 [8.0 ± 0.30]

Solid Tantalum Chip Capacitors, MICROTANTM Leadframeless Molded





STANDARD PACKAGING QUANTITY						
CEDIFC	CASE CODE	QUANTITY (pcs/reel)				
SERIES	CASE CODE	7" REEL				
	К	5000				
	M	4000				
298D	Р	3000				
	R	2500				
	A	2000				

RECOMMENDED VOLTAGE DERATING GUIDELINI	RECOMMENDED VOLTAGE DERATING GUIDELINES					
STANDARD CONDITIONS: FOR EXAMPLE: OUTPUT FILTERS						
Capacitor Voltage Rating	Operating Voltage					
4.0	2.5					
6.3	3.6					
10	6.0					
16	10					
20	12					
25	15					
35	24					
50	28					
SEVERE CONDITIONS: FOR EXAMPLE: INPUT FILTERS						
Capacitor Voltage Rating	Operating Voltage					
4.0	2.5					
6.3	3.3					
10	5.0					
16	8.0					
20	10					
25	12					
35	15					
50	24					

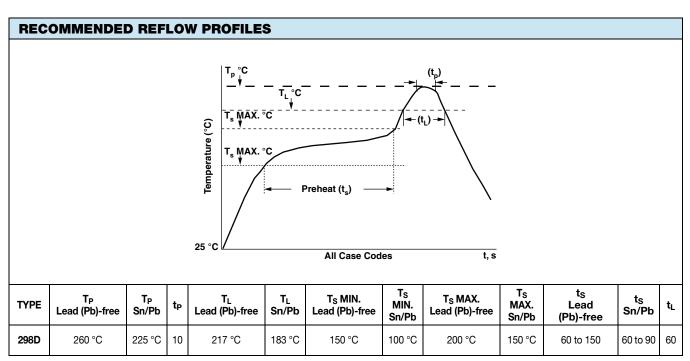
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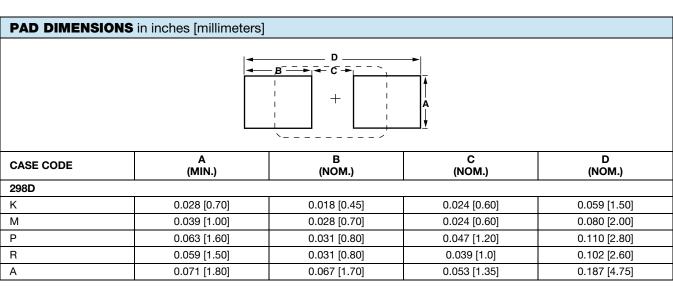
For technical questions, contact: tantalum@vishay.com



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POWER DISSIPATION					
CASE CODE		MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR			
	К	0.015			
	M	0.025			
298D	P	0.045			
	R	0.045			
	Α	0.075			





Solid Tantalum Chip Capacitors, MICROTANTM Leadframeless Molded



GUIDE TO APPLICATION

 AC Ripple Current: The maximum allowable ripple current shall be determined from the formula:

$$I_{RMS} = \sqrt{\frac{P}{R_{ESR}}}$$

where.

P = Power dissipation in W at + 25 °C as given in the table in paragraph number 5 (power dissipation)

R_{ESR} = The capacitor equivalent series resistance at the specified frequency

2. **AC Ripple Voltage:** The maximum allowable ripple voltage shall be determined from the formula:

$$V_{RMS} \, = \, Z \sqrt{\frac{P}{R_{ESR}}}$$

or, from the formula:

$$V_{RMS} = I_{RMS} \times Z$$

where,

P = Power dissipation in W at + 25 °C as given in the table in paragraph number 5 (power dissipation).

R_{ESR} = The capacitor equivalent series resistance at the specified frequency.

Z = The capacitor impedance at the specified frequency.

2.1 The sum of the peak AC voltage plus the applied DC voltage shall not exceed the DC voltage rating of the capacitor.

2.2 The sum of the negative peak AC voltage plus the applied DC voltage shall not allow a voltage reversal exceeding 10 % of the DC working voltage at + 25 °C.

3. **Reverse Voltage:** These capacitors are capable of withstanding peak voltages in the reverse direction equal to 10 % of the DC rating at + 25 °C, 5 % of the DC rating at + 25 °C; 5 % of the DC rating at + 85 °C and 1 % of the DC rating at + 125 °C.

4. **Temperature Derating:** If these capacitors are to be operated at temperatures above + 25 °C, the permissible RMS ripple current or voltage shall be calculated using the derating factors as shown:

TEMPERATURE	DERATING FACTOR
+ 25 °C	1.0
+ 85 °C	0.9
+ 125 °C	0.4

5. **Power Dissipation:** Power dissipation will be affected by the heat sinking capability of the mounting surface. Non-sinusoidal ripple current may produce heating effects which differ from those shown. It is important that the equivalent I_{RMS} value be established when calculating permissable operating levels. (Power dissipation calculated using + 25 °C temperature rise.)

6. **Printed Circuit Board Materials:** Molded capacitors are compatible with commonly used printed circuit board materials (alumina substrates, FR4, FR5, G10, PTFE-fluorocarbon and porcelanized steel).

7. Attachment:

7.1 **Solder Paste:** The recommended thickness of the solder paste after application is 0.007" ± 0.001" [0.178 mm ± 0.025 mm]. Care should be exercised in selecting the solder paste. The metal purity should be as high as practical. The flux (in the paste) must be active enough to remove the oxides formed on the metallization prior to the exposure to soldering heat. In practice this can be aided by extending the solder preheat time at temperatures below the liquidous state of the solder.

7.2 **Soldering:** Capacitors can be attached by conventional soldering techniques; vapor phase, convection reflow, infrared reflow, wave soldering and hot plate methods. The Soldering Profile charts show recommended time/temperature conditions for soldering. Preheating is recommended. The recommended maximum ramp rate is 2 °C per s. Attachment with a soldering iron is not recommended due to the difficulty of controlling temperature and time at temperature. The soldering iron must never come in contact with the capacitor.

7.2.1 Backward and Forward Compatibility: Capacitors with SnPb or 100 % tin termination finishes can be soldered using SnPb or lead (Pb)-free soldering processes.

8. Cleaning (Flux Removal) After Soldering: Molded capacitors are compatible with all commonly used solvents such as TES, TMS, Prelete, Chlorethane, Terpene and aqueous cleaning media. However, CFC/ODS products are not used in the production of these devices and are not recommended. Solvents containing methylene chloride or other epoxy solvents should be avoided since these will attack the epoxy encapsulation material.

8.1 When using ultrasonic cleaning, the board may resonate if the output power is too high. This vibration can cause cracking or a decrease in the adherence of the termination. DO NOT EXCEED 9W/I at 40 kHz for 2 min.

9. Recommended Mounting Pad Geometries: Proper mounting pad geometries are essential for successful solder connections. These dimensions are highly process sensitive and should be designed to minimize component rework due to unacceptable solder joints. The dimensional configurations shown are the recommended pad geometries for both wave and reflow soldering techniques. These dimensions are intended to be a starting point for circuit board designers and may be fine tuned if necessary based upon the peculiarities of the soldering process and/or circuit board design.





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CWR29HC106KCDC CWR29FC336KDGC CWR09NC225KDB CWR29FC475KDDC CWR29HC225KCAC CWR11KC106KBB

CWR09JH105KC 293D476X9035E2TE3 CWR29JC335KDDC CWR29KC226JCGC CWR29FC105KDAC CWR29DC337KCHC NTC
T686K6.3TRBF 595D686X9010B2T 595D106X0025C8T TAZH685K035LBSB0824 TAZG107K010LBSB0800 TAZH475K050LBSB0H23

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