TCH LOW ESR HERMETIC SERIES

SMD Low ESR Conductive Polymer Capacitors in Hermetic package, COTS-Plus



FEATURES

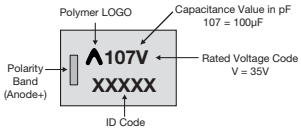
- Aerospace & Hi-Rel applications
- Low ESR conductive polymer electrode
- 100% surge current tested
- Ceramic case hermetic packaging
- Stability under humidity and ambient atmosphere exposure
- Large case sizes including CTC-21D provide high capacitance values
- Specific codes meet NASA EEE-INST-002, Level 2 requirements



Elektra Award 2015

MARKING

9 CASE



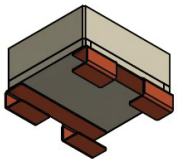
APPLICATIONS

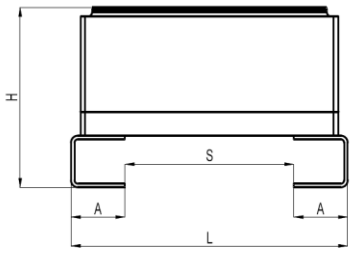
- Aerospace
- Defence
- Power supplies
- Pulse power

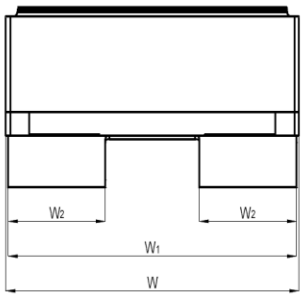
CASE DIMENSIONS: millimeters (inches)

Code	Type	L	W	H Max.	W_1	W_2	A	S Min.
9 (CTC-21D)	J-lead (C-shape)	12.00 ± 0.50 (0.472 ± 0.020)	12.50 ± 0.50 (0.492 ± 0.020)	8.45 (0.333)	12.30 ± 0.50 (0.484 ± 0.020)	4.15 ± 0.10 (0.163 ± 0.004)	2.30 ± 0.50 (0.091 ± 0.020)	6.50 (0.256)
9 (CTC-21D)	J-lead (L-shape)	11.50 ± 0.50 (0.453 ± 0.020)	12.50 ± 0.50 (0.492 ± 0.020)	6.15 (0.242)	12.50 ± 0.50 (0.492 ± 0.020)	-	1.90 ± 0.50 (0.075 ± 0.020)	7.00 (0.276)
9 (CTC-21D)	Undertab	11.00 ± 0.20 (0.433 ± 0.008)	12.50± 0.20 (0.492 ± 0.008)	5.95 (0.234)	10.50± 0.20 (0.413 ± 0.008)	-	1.50± 0.20 (0.059 ± 0.008)	7.80 (0.307)

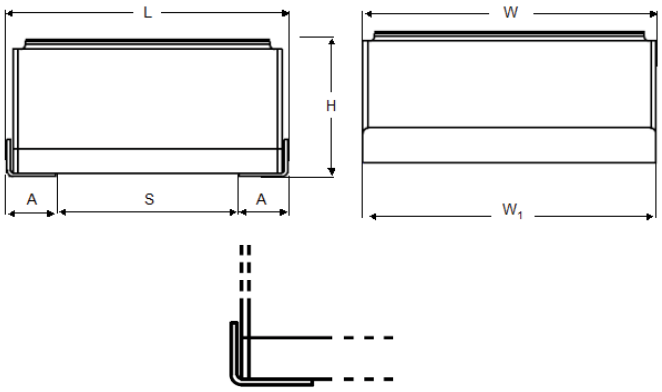
'J' Lead Termination (C-shape)



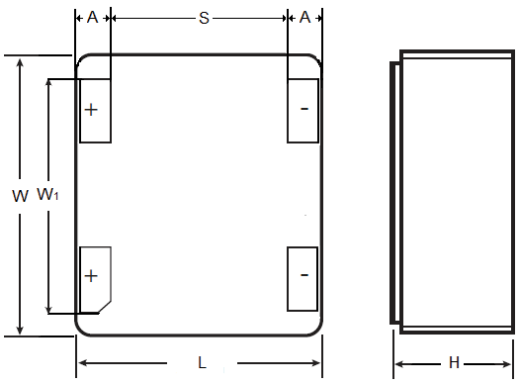




'J' Lead Termination (L-shape)



Undertab Termination



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TCH LOW ESR HERMETIC SERIES

SMD Low ESR Conductive Polymer Capacitors in Hermetic package, COTS-Plus

TECHNICAL SPECIFICATIONS

Technical Data:		All technical data relate to an ambient temperature of +25°C							
Capacitance Range:		22 µF to 330 µF (for extended range under development, contact manufacturer)							
Capacitance Tolerance:		±20%							
Leakage Current DCL:		0.1CV							
Rated Voltage (VR)	≤ +85°C:	10	16	20	25	35	50	75	100
Category Voltage (VC)	≤ +125°C:	7	11	13	17	23	33	50	66
Temperature Range:		-55°C to +125°C							
Termination Finish:		Gold Plating (Undertab), Gold Plating (J-lead/L-shape), Sn/Pb Plating (J-lead/ C-shape, L-shape)							

HOW TO ORDER

PART NUMBER

TCH	9	227	M	016	W	0	040	#
Type	**Case Size**	**Capacitance Code**	**Tolerance**	**Rated DC Voltage**	**Packaging**		**ESR in mΩ**	**Termination**
	See table above	pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	M = ±20%	010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc 075 = 75Vdc 100 = 100Vdc	W = Waffle	0 = Standard (contact manufacturer) S = Space (according to NASA EEE-INST-002, Level 2 requirements)		C = 'J' lead C-shape (Sn/Pb) J = 'J' lead L-shape (Gold) L = 'J' lead L-shape (Sn/Pb) U = Undertab C, L = Non RoHS

LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

For RoHS compliant products, please select correct termination style.

CAPACITANCE AND VOLTAGE RANGE (CASE CODE BEFORE THE BRACKETS)

Capacitance		Rated Voltage DC (VR) at 85°C							
µF	Code	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)	75V (P)	100V (A)
22	226								9(150)
33	336							9(120)	
47	476						9(70)		
68	686								
100	107					9(55)			
150	157				9(50)	9(55)			
220	227		9(40)	9(50)					
330	337	9(40)							

Released ratings, (ESR ratings in mOhms in parentheses)

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RATINGS & PART NUMBER REFERENCE

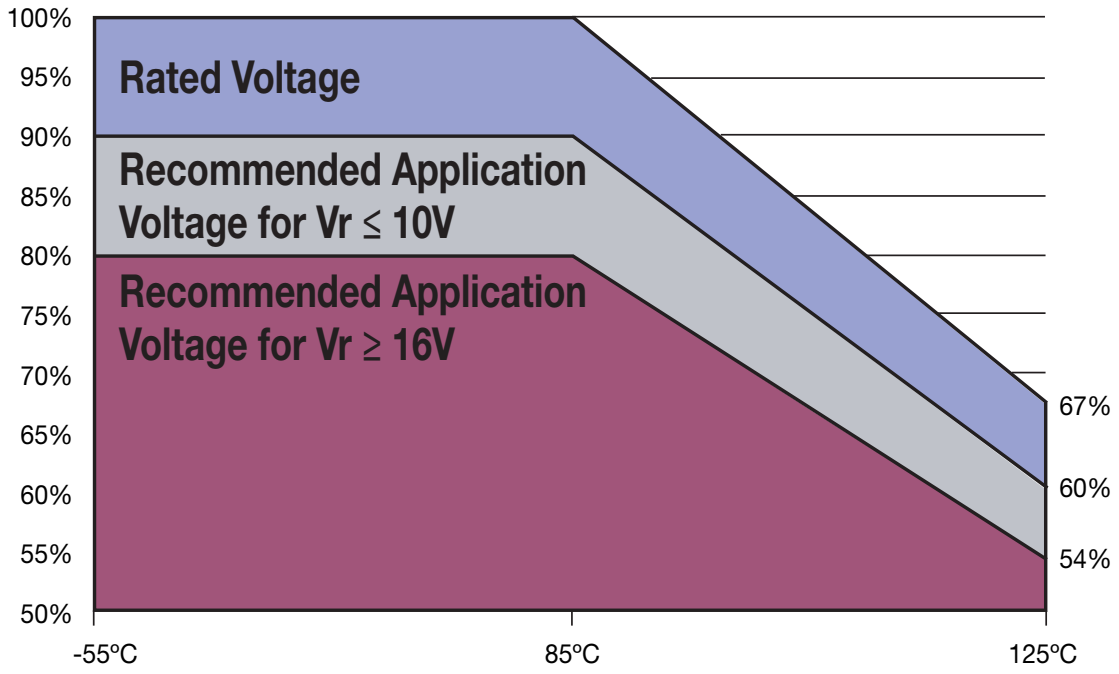
Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (A)			Endurance at 85°C (hrs)
										25°C	85°C	125°C	
10 Volt @ 85°C													
TCH9337M010W0040#	9	330	10	85	7	125	330	8	40	3.16	2.84	1.26	2000
TCH9337M010WS040C	9	330	10	85	7	125	330	8	40	3.16	2.84	1.26	2000
16 Volt @ 85°C													
TCH9227M016W0040#	9	220	16	85	10	125	352	8	40	3.16	2.84	1.26	10000
TCH9227M016WS040C	9	220	16	85	10	125	352	8	40	3.16	2.84	1.26	10000
20 Volt @ 85°C													
TCH9227M020W0050#	9	220	20	85	13	125	440	8	50	2.83	2.55	1.13	10000
25 Volt @ 85°C													
TCH9157M025W0050#	9	150	25	85	17	125	375	8	50	2.83	2.55	1.13	10000
35 Volt @ 85°C													
TCH9107M035W0055#	9	100	35	85	23	125	350	8	55	2.69	2.42	1.08	10000
TCH9157M035W0055#	9	150	35	85	23	125	525	8	55	2.69	2.42	1.08	2000
TCH9157M035WS055C	9	150	35	85	23	125	525	8	55	2.69	2.42	1.08	2000
50 Volt @ 85°C													
TCH9476M050W0070#	9	47	50	85	33	125	235	8	70	2.39	2.15	0.96	10000
TCH9476M050WS070C	9	47	50	85	33	125	235	8	70	2.39	2.15	0.96	10000
75 Volt @ 85°C													
TCH9336M075W0120#	9	33	75	85	50	125	248	8	120	1.82	1.64	0.73	2000
TCH9336M075WS120C	9	33	75	85	50	125	248	8	120	1.82	1.64	0.73	2000
100 Volt @ 85°C													
TCH9226M100W0150#	9	22	100	85	66	125	220	8	150	1.63	1.47	0.65	10000
TCH9226M100WS150C	9	22	100	85	66	125	220	8	150	1.63	1.47	0.65	10000

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with a maximum DC bias of 2.2V.
DCL is measured at rated voltage after 5 minutes.

Moisture Sensitivity Level (MSL) is defined according to J-STD-020. All TCH products are MSL1.

RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr



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QUALIFICATION TABLE

<table>
<tr><th rowspan="2">TEST</th><th colspan="9">TCH low ESR hermetic series (Temperature range -55°C to +125°C)</th></tr>
<tr><th colspan="3">Condition</th><th colspan="6">Characteristics</th></tr>
<tr><td>Endurance</td><td colspan="3" rowspan="5">Determine after application of rated voltage for 2000 (10 000) +48/0 hours at 85±2°C and then leaving min. 2 hours at room temperature. Also determine of 125°C temperature, category voltage for 2000 +48/-0 hours. Power supply impedance to be < 3Ω.</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">1.25 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±20% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">1.5 x initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">2 x initial limit</td></tr>
<tr><td>Storage Life</td><td colspan="3" rowspan="5">125°C, 0V, 2000h</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">2 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±20% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">1.5 x initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">2 x initial limit</td></tr>
<tr><td>Humidity</td><td colspan="3" rowspan="5">Determine after storage without applied voltage at 40±2°C and 90±2% relative humidity for 56 days.</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">1.25 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±10% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">1.25 x initial limit</td></tr>
<tr><td rowspan="8">Temperature Stability</td><td>Step</td><td>Temperature°C</td><td>Duration (min)</td><td></td><td>+20°C</td><td>-55°C</td><td>+20°C</td><td>+85°C</td><td>+125°C</td><td>+20°C</td></tr>
<tr><td>1</td><td>+20</td><td>15</td><td>DCL</td><td>IL*</td><td>n/a</td><td>IL*</td><td>10 x IL*</td><td>12.5 x IL*</td><td>IL*</td></tr>
<tr><td>2</td><td>-55</td><td>15</td><td>ΔC/C</td><td>n/a</td><td>+0/-20%</td><td>±5%</td><td>+20/-0%</td><td>+30/-0%</td><td>±5%</td></tr>
<tr><td>3</td><td>+20</td><td>15</td><td>DF</td><td>IL*</td><td>1.5 x IL*</td><td>IL*</td><td>1.5 x IL*</td><td>2 x IL*</td><td>IL*</td></tr>
<tr><td>4</td><td>+85</td><td>15</td><td>ESR</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.5 x IL*</td><td>1.5 x IL*</td><td>1.25 x IL*</td></tr>
<tr><td>5</td><td>+125</td><td>15</td><td colspan="7"></td></tr>
<tr><td>6</td><td>+20</td><td>15</td><td colspan="7"></td></tr>
<tr><td>Surge Voltage</td><td colspan="3" rowspan="5"><u>Test temperature: 85°C+3/0°C</u>
Surge voltage: 1.3 x rated voltage (for Ur ≤ 50V),
1.15 x rated voltage (for Ur > 50V)
Series protection resistance: 33Ω (for Ur ≤ 50V),
1000Ω (for Ur > 50V)
Discharge resistance: 33Ω
Number of cycles: 1000x
Cycle duration: 6 min; 30 sec charge,
5 min 30 sec discharge</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±20% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">1.25 x initial limit</td></tr>
<tr><td>Mechanical Shock/Vibration</td><td colspan="3" rowspan="5">MIL-STD-202, Method 213, Condition C, 100 G peak
MIL-STD-202, Method 204, Condition D,
10 Hz to 2,000 Hz, 20 G peak</td><td>Visual examination</td><td colspan="5">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="5">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="5">within ±10% of initial value</td></tr>
<tr><td>DF</td><td colspan="5">initial limit</td></tr>
<tr><td>ESR</td><td colspan="5">1.25 x initial limit</td></tr>
</table>

*Initial Limit

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