TCH LOW ESR HERMETIC SERIES

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

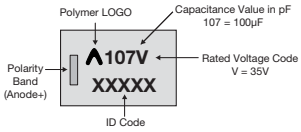
FEATURES

- Aerospace & Hi-Rel applications
- Low ESR conductive polymer electrode
- Endurance up to 10 000 hrs. on selected codes
- 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
- Ongoing ESA qualification

Elektra Award 2015

MARKING

9 CASE



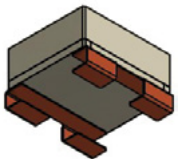
APPLICATIONS

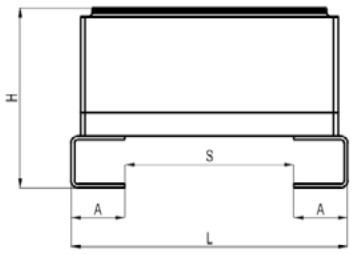
- Aerospace
- Defence
- Power supplies
- Pulse power

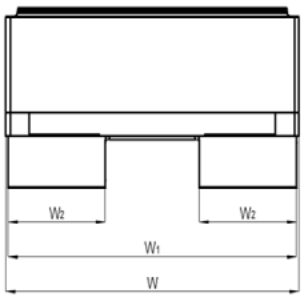
CASE DIMENSIONS: millimeters (inches)

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)

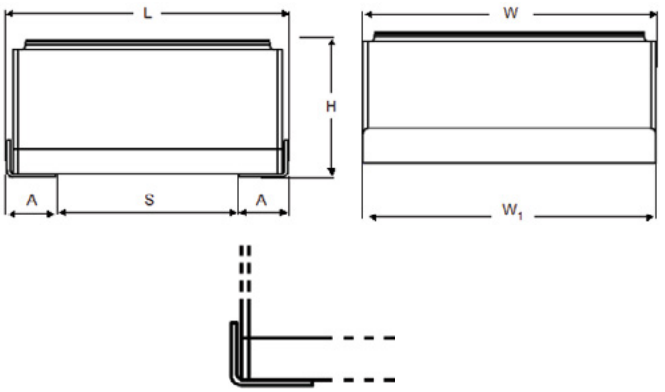
'J' Lead Termination (C-shape)



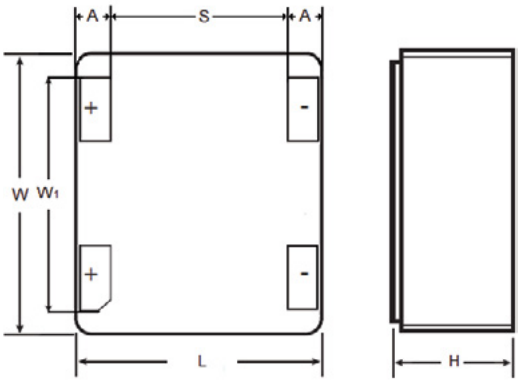




'J' Lead Termination (L-shape)



Undertab Termination



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	25	35	50	75	100	
Category Voltage (VC)	≤ +125°C:	7	11	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**	**Customer Specifications**	**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 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
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)	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)					
330	337	9(40)						

Released ratings, (ESR ratings in mOhms in parentheses)

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
16 Volt @ 85°C													
TCH9227M016W0040#	9	220	16	85	10	125	352	8	40	3.16	2.84	1.26	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
50 Volt @ 85°C													
TCH9476M050W0070#*	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
100 Volt @ 85°C													
TCH9226M100W0150#*	9	22	100	85	66	125	220	8	150	1.63	1.47	0.65	10000

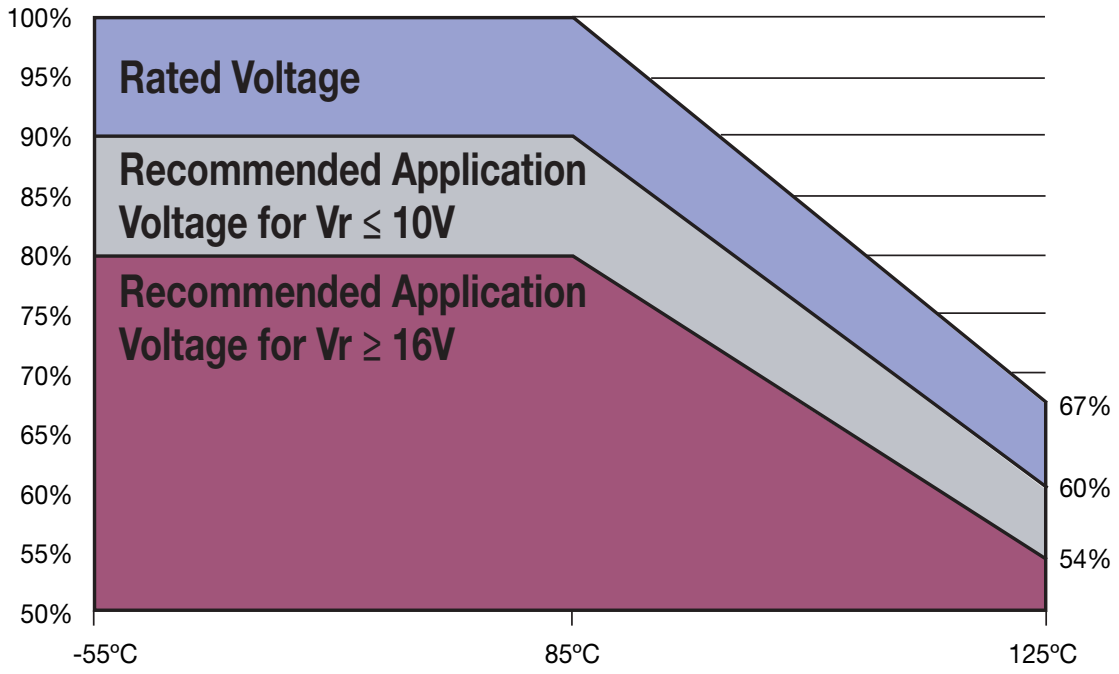
*These part numbers are approved for Space applications (see How to order)

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



QUALIFICATION TABLE

<table>
<tr><th rowspan="2">TEST</th><th colspan="8">TCH low ESR hermetic series (Temperature range -55°C to +125°C)</th></tr>
<tr><th colspan="3">Condition</th><th colspan="5">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 and then leaving min. 2 hours at room temperature. Power supply impedance to be < 3Ω.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±20% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">1.5 x initial limit</td></tr>
<tr><td></td><td>ESR</td><td colspan="4">2 x initial limit</td></tr>
<tr><td>Storage Life</td><td colspan="3" rowspan="5">Store at 125°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">2 x initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±20% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">1.5 x initial limit</td></tr>
<tr><td></td><td>ESR</td><td colspan="4">2 x initial limit</td></tr>
<tr><td>Humidity</td><td colspan="3" rowspan="5">Store at 40°C and 90% relative humidity for 56 days, with no applied voltage. Stabilize at room temperature and humidity for min. 2 hours before measuring.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±10% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">initial limit</td></tr>
<tr><td></td><td>ESR</td><td colspan="4">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="6"></td></tr>
<tr><td>6</td><td>+20</td><td>15</td><td colspan="6"></td></tr>
<tr><td>Surge Voltage</td><td colspan="3"><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="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±20% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">initial limit</td></tr>
<tr><td></td><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td>Mechanical Shock/Vibration</td><td colspan="3">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="4">no visible damage</td></tr>
<tr><td></td><td>DCL</td><td colspan="4">initial limit</td></tr>
<tr><td></td><td>ΔC/C</td><td colspan="4">within ±10% of initial value</td></tr>
<tr><td></td><td>DF</td><td colspan="4">initial limit</td></tr>
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</table>