

# TCH LOW ESR HERMETIC SERIES

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



### FEATURES

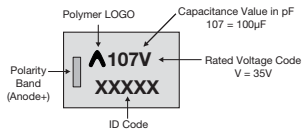
- Aerospace & Hi-Rel applications
- Low ESR conductive polymer electrode
- 100% surge current tested
- Ceramic case hermetic packaging
- Stability under humidity and ambient atmosphere exposure
- Large case sizes including CTC-21D provide high capacitance values
- Specific codes meet NASA EEE-INST-002,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



Elekra Award 2015

### MARKING

#### 9 CASE



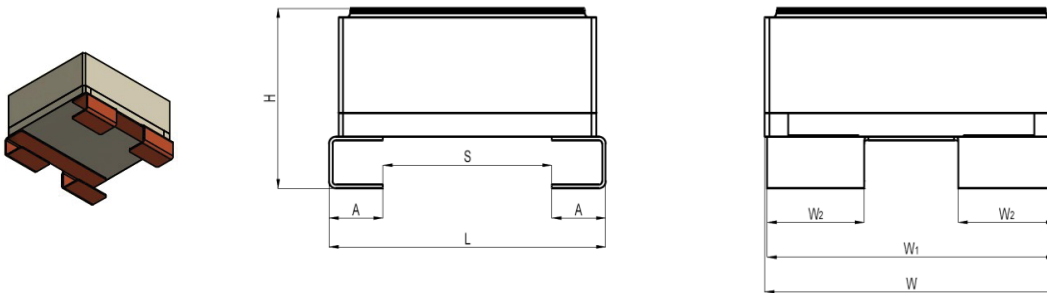
### APPLICATIONS

- Aerospace
- Defence
- Power supplies
- Pulse power

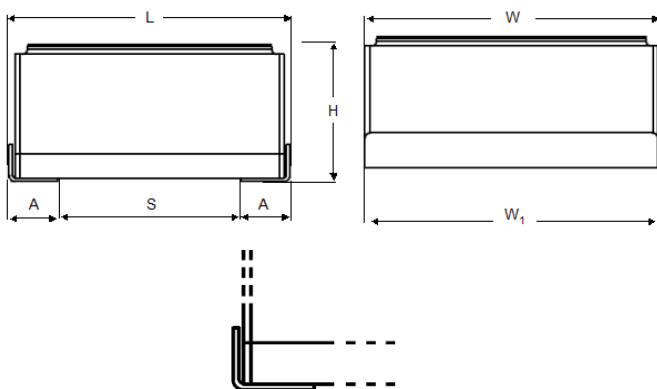
### CASE DIMENSIONS: millimeters (inches)

Code	Type	L	W	H Max.	W <sub>1</sub>	W <sub>2</sub>	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)

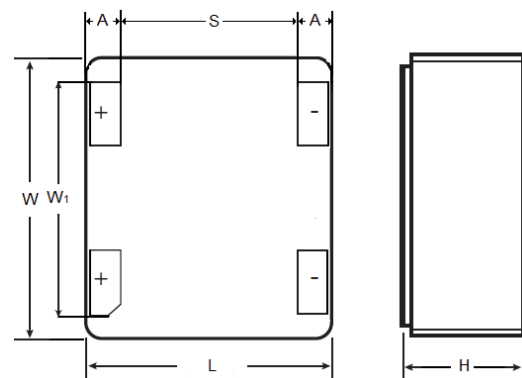
#### 'J' Lead Termination (C-shape)



#### 'J' Lead Termination (L-shape)



#### Undertab Termination



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### 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

<b>TCH</b>	<b>9</b>	<b>227</b>	<b>M</b>	<b>016</b>	<b>W</b>	<b>0</b>	<b>040</b>	<b>#</b>
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	



### 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

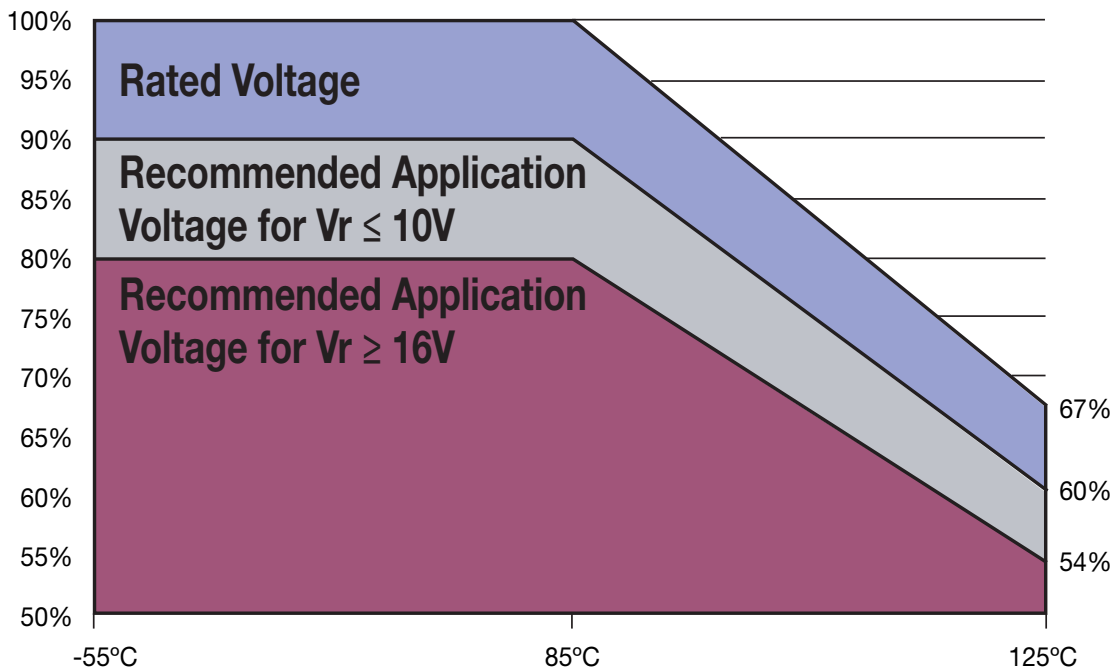
Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (μA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (A)			Endurance at 85°C (hrs)
										25°C	85°C	125°C	
<b>10 Volt @ 85°C</b>													
TCH9337M010W0040#	9	330	10	85	7	125	330	8	40	3.16	2.84	1.26	2000
<b>16 Volt @ 85°C</b>													
TCH9227M016W0040#	9	220	16	85	10	125	352	8	40	3.16	2.84	1.26	10000
<b>20 Volt @ 85°C</b>													
TCH9227M020W0050#	9	220	20	85	13	125	440	8	50	2.83	2.55	1.13	10000
<b>25 Volt @ 85°C</b>													
TCH9157M025W0050#	9	150	25	85	17	125	375	8	50	2.83	2.55	1.13	10000
<b>35 Volt @ 85°C</b>													
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
<b>50 Volt @ 85°C</b>													
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
<b>75 Volt @ 85°C</b>													
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
<b>100 Volt @ 85°C</b>													
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

TEST	TCH low ESR hermetic series (Temperature range -55°C to +125°C)										
	Condition			Characteristics							
<b>Endurance</b>	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.			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within ±20% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
<b>Storage Life</b>	Store at 125°C, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within ±20% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
<b>Humidity</b>	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.			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
<b>Temperature Stability</b>	Step	Temperature°C	Duration (min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20	15								
	2	-55	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	3	+20	15	ΔC/C	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%	
	4	+85	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*	
	5	+125	15	ESR	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.5 x IL*	1.5 x IL*	1.25 x IL*	
	6	+20	15								
<b>Surge Voltage</b>	Test temperature: 85°C+3/0°C 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			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within ±20% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
<b>Mechanical Shock/Vibration</b>	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			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						