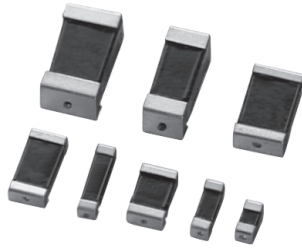


## Solid Tantalum Chip Capacitors Conformal Coated



### FEATURES

- Eight standard case codes, "pad compatible" with MIL-C-55365/4 (CWR06).
- High volumetric efficiency (Up to 200,000 CV per cubic inch).
- Low profile, conformally-coated construction.
- 100% low impedance power burn-in at + 85°C.
- Low ESR in high frequency applications.
- Packaging in 50 unit 'Blister-Pack' trays or 8mm or 12mm tape and reel.
- Gold plated or solder dipped terminations.

### PERFORMANCE CHARACTERISTICS

**Operating Temperature:** - 55°C to + 85°C. (To + 125°C with voltage derating.)

**Capacitance Range:** 0.1µF to 220µF.

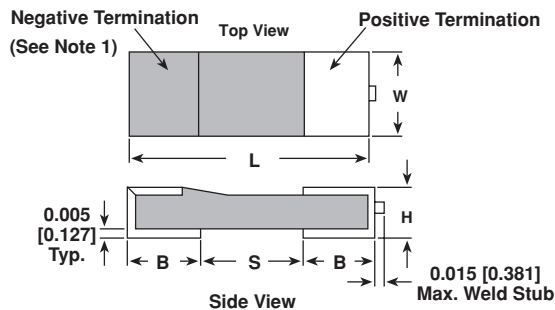
**Capacitance Tolerance:** ± 20%, ± 10% standard.  
± 5% available as special

**Voltage Rating:** 4 WVDC to 50 WVDC.

**Conformally Coated:** Fluoroelastomer coating.

**Automatic Screening:** Capacitance, DF and DCL.

### DIMENSIONS in inches [millimeters]



CASE CODE	LENGTH L	WIDTH W	HEIGHT H	SPACING TYPICAL S	PAD WIDTH B	TYPICAL WEIGHT (Grams)
B	0.100 ± 0.015 [2.54 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.040 [1.02]	0.030 ± 0.005 [0.76 ± 0.127]	0.02
L	0.150 ± 0.015 [3.81 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.090 [2.29]	0.030 ± 0.005 [0.76 ± 0.127]	0.03
U	0.200 ± 0.015 [5.08 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.140 [3.55]	0.030 ± 0.005 [0.76 ± 0.127]	0.04
E	0.150 ± 0.015 [3.81 ± 0.381]	0.100 ± 0.015 [2.54 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.090 [2.29]	0.030 ± 0.005 [0.76 ± 0.127]	0.07
C	0.200 ± 0.015 [5.08 ± 0.381]	0.100 ± 0.015 [2.54 ± 0.381]	0.050 ± 0.015 [1.27 ± 0.381]	0.140 [3.55]	0.030 ± 0.005 [0.76 ± 0.127]	0.09
H	0.220 ± 0.015 [5.59 ± 0.381]	0.135 ± 0.015 [3.43 ± 0.381]	0.070 ± 0.015 [1.78 ± 0.381]	0.160 [4.06]	0.030 ± 0.005 [0.76 ± 0.127]	0.21
I	0.265 ± 0.015 [6.73 ± 0.381]	0.110 ± 0.015 [2.79 ± 0.381]	0.110 ± 0.015 [2.79 ± 0.381]	0.165 [4.19]	0.050 ± 0.005 [1.27 ± 0.127]	0.33
P	0.285 ± 0.015 [7.25 ± 0.381]	0.150 ± 0.015 [3.81 ± 0.381]	0.110 ± 0.015 [2.79 ± 0.381]	0.185 [4.70]	0.050 ± 0.005 [1.27 ± 0.127]	0.50

### Notes:

1. For polarity identification, when chip is in mounting position, bare metal clip and weld stub are positive. The top surface of the negative terminal is blue.
2. Anode Riser (weld stub) may extend case size length dimension by 0.015" [0.381] maximum.
3. Dimensions given are for gold plated terminations. For solder dipped terminations, add 0.015" [0.381] to dimension tolerances.
4. Spacing dimension is average distance between chip mounting terminations and therefore maximum distance between mounting pads on substrate.



RATINGS AND CASE CODES																	
μF	Picofarad Code	4 V		6 V		10 V		15 V		20 V		25 V		35 V		50 V	
		Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.
0.10	104	B	—	B	—	B	—	B	—	B	—	B	—	B	—	B	—
0.15	154	B	—	B	—	B	—	B	—	B	—	B	—	B	—	B	—
0.22	224	B	—	B	—	B	—	B	—	B	—	B	—	B	—	L	—
0.33	334	B	—	B	—	B	—	B	—	B	—	B	—	L	—	L	—
0.47	474	B	—	B	—	B	—	B	—	B	—	L	B	L	B	U	—
0.68	684	B	—	B	—	B	—	B	—	L	—	L	—	U	—	E	—
1.0	105	B	—	B	—	B	—	L	B	L	B	U	B	E	L	C	—
1.5	155	B	—	B	—	L	B	L	B	U	B	E	L	C	U	H	—
2.2	225	B	—	L	B	L	B	U	B	E	L	C	U	H	E	H	—
3.3	335	L	B	L	B	U	B	E	L	C	U	H	E	H	C	I	—
4.7	475	L	B	U	B	E	L	C	U	H	E	H	C	I	H	P	—
6.8	685	U	B	E	L	C	U	H	E	H	C	I	H	P	H	—	—
10	106	E	L	C	U	H	E	H	C	I	H	I	H	—	I	—	—
15	156	C	U	H	E	H	C	I	H	I	H	P	H	—	P	—	—
22	226	H	E	H	C	I	H	I	H	P	H	—	I	—	—	—	—
33	336	H	C	I	H	I	H	P	H	—	I	—	P	—	—	—	—
47	476	I	H	I	H	P	H	—	I	—	P	—	—	—	—	—	—
68	686	I	H	P	H	—	I	—	P	—	—	—	—	—	—	—	—
100	107	P	H	—	I	—	P	—	—	—	—	—	—	—	—	—	—
120	127	—	I	—	I	—	—	—	—	—	—	—	—	—	—	—	—
150	157	—	I	—	P	—	—	—	—	—	—	—	—	—	—	—	—
220	227	—	P	—	—	—	—	—	—	—	—	—	—	—	—	—	—

STANDARD RATINGS - TYPE 49BC							
NOMINAL CAPACITANCE (μF)	CASE CODE	Max. DCL (μA) @			Max. DF 120 Hz (%)	Max. ESR 100kHz (Ohms)	
		+ 25°C	+ 85°C	+ 125°C			
<b>4 WVDC @ - 55°C to + 85°C, SURGE = 5 V . . . 2.7 WVDC @ + 125°C, SURGE = 3.4 V</b>							
2.2	B	0.5	5.0	7.0	6.0	8.0	
4.7	L	0.5	5.0	7.0	6.0	5.5	
6.8	U	0.5	5.0	7.0	6.0	3.5	
10	E	0.5	5.0	7.0	8.0	2.0	
15	C	0.6	6.0	8.0	8.0	1.5	
33	H	1.4	14.0	18.0	8.0	1.0	
68	I	2.8	28.0	35.0	10.0	0.8	
100	P	4.0	40.0	48.0	10.0	0.5	
<b>6 WVDC @ - 55°C to + 85°C, SURGE = 8 V . . . 4 WVDC @ + 125°C, SURGE = 5 V</b>							
1.5	B	0.5	5.0	7.0	6.0	8.0	
3.3	L	0.5	5.0	7.0	6.0	5.5	
4.7	U	0.5	5.0	7.0	6.0	3.5	
6.8	E	0.5	5.0	7.0	6.0	2.0	
10	C	0.6	6.0	8.0	8.0	1.5	
22	H	1.4	14.0	18.0	8.0	1.0	
47	I	2.9	29.0	36.0	10.0	0.8	
68	P	4.0	40.0	48.0	10.0	0.7	
<b>10 WVDC @ - 55°C to + 85°C, SURGE = 13 V . . . 7 WVDC @ + 125°C, SURGE = 9 V</b>							
1.0	B	0.5	5.0	7.0	6.0	9.0	
2.2	L	0.5	5.0	7.0	6.0	5.5	
3.3	U	0.5	5.0	7.0	6.0	3.5	
4.7	E	0.5	5.0	7.0	6.0	2.0	
6.8	C	0.7	7.0	9.0	6.0	2.0	
15	H	1.5	15.0	19.0	8.0	1.0	
33	I	3.0	30.0	36.0	10.0	0.8	
47	P	4.7	47.0	59.0	10.0	0.7	



<b>STANDARD RATINGS - TYPE 49BC</b>						
NOMINAL CAPACITANCE (μF)	CASE CODE	Max. DCL (μA) @			Max. DF 120 Hz (%)	Max. ESR 100kHz (Ohms)
		+ 25°C	+ 85°C	+ 125°C		
<b>15 WVDC @ - 55°C to + 85°C, SURGE = 20 V . . . 10 WVDC @ + 125°C, SURGE = 12 V</b>						
.68	B	0.5	5.0	7.0	6.0	10.0
1.5	L	0.5	5.0	7.0	6.0	6.0
2.2	U	0.5	5.0	7.0	6.0	4.0
3.3	E	0.5	5.0	7.0	6.0	2.5
4.7	C	0.8	8.0	10.0	6.0	2.5
10	H	1.5	15.0	19.0	6.0	1.5
22	I	3.3	33.0	42.0	8.0	1.0
33	P	5.0	50.0	60.0	8.0	0.8
<b>20 WVDC @ - 55°C to + 85°C, SURGE = 26 V . . . 13 WVDC @ + 125°C, SURGE = 16 V</b>						
.47	B	0.5	5.0	7.0	6.0	12.0
.68	L	0.5	5.0	7.0	6.0	8.0
1.0	L	0.5	5.0	7.0	6.0	8.0
1.5	U	0.5	5.0	7.0	6.0	6.0
2.2	E	0.5	5.0	7.0	6.0	3.5
3.3	C	0.7	7.0	9.0	6.0	3.0
6.8	H	1.4	14.0	18.0	6.0	2.5
15	I	3.0	30.0	36.0	6.0	1.0
22	P	4.0	40.0	48.0	6.0	1.0
<b>25 WVDC @ - 55°C to + 85°C, SURGE = 32 V . . . 17 WVDC @ + 125°C, SURGE = 22 V</b>						
.33	B	0.5	5.0	7.0	6.0	15.0
.68	L	0.5	5.0	7.0	6.0	10.0
1.0	U	0.5	5.0	7.0	6.0	6.5
1.5	E	0.5	5.0	7.0	6.0	5.0
2.2	C	0.6	6.0	8.0	6.0	3.5
4.7	H	1.2	12.0	15.0	6.0	2.5
6.8	I	1.7	17.0	22.0	6.0	1.2
10	I	2.5	25.0	32.0	6.0	1.4
15	P	3.8	38.0	48.0	6.0	1.0
<b>35 WVDC @ - 55°C to + 85°C, SURGE = 46 V . . . 23 WVDC @ + 125°C, SURGE = 28 V</b>						
.22	B	0.5	5.0	7.0	6.0	18.0
.47	L	0.5	5.0	7.0	6.0	12.0
.68	U	0.5	5.0	7.0	6.0	9.0
1.0	E	0.5	5.0	7.0	6.0	6.0
1.5	C	0.6	6.0	8.0	6.0	4.5
3.3	H	1.0	10.0	12.0	6.0	2.5
4.7	I	1.7	17.0	22.0	6.0	1.5
6.8	P	2.4	24.0	30.0	6.0	1.3
<b>50 WVDC @ - 55°C to + 85°C, SURGE = 65 V . . . 33 WVDC @ + 125°C, SURGE = 40 V</b>						
.10	B	0.5	5.0	7.0	6.0	20.0
.15	B	0.5	5.0	7.0	6.0	20.0
.22	L	0.5	5.0	7.0	6.0	15.0
.33	L	0.5	5.0	7.0	6.0	12.0
.47	U	0.5	5.0	7.0	6.0	8.0
.68	E	0.5	5.0	7.0	6.0	7.0
1.0	C	0.5	5.0	7.0	6.0	6.0
1.5	H	0.8	8.0	10.0	6.0	4.0
2.2	H	1.1	11.0	14.0	6.0	2.5
3.3	I	1.7	17.0	22.0	6.0	2.0
4.7	P	2.4	24.0	30.0	6.0	2.0



<b>EXTENDED RATINGS - TYPE 49EC</b>						
NOMINAL CAPACITANCE (μF)	CASE CODE	Max. DCL (μA) @			Max. DF 120 Hz (%)	Max. ESR 100kHz (Ohms)
		+ 25°C	+ 85°C	+ 125°C		
<b>4 WVDC @ - 55°C to + 85°C, SURGE = 5 V . . . 2.7 WVDC @ + 125°C, SURGE = 3.4 V</b>						
6.8	B	0.5	5.0	6.0	6.0	3.5
10	L	0.5	5.0	6.0	8.0	2.0
15	U	0.6	6.0	8.0	8.0	1.5
22	E	0.9	9.0	11.0	8.0	1.0
33	C	1.4	14.0	17.0	8.0	1.0
100	H	4.0	40.0	48.0	10.0	0.5
150	I	6.0	60.0	72.0	10.0	0.5
220	P	9.0	90.0	108.0	10.0	0.5
<b>6 WVDC @ - 55°C to + 85°C, SURGE = 8 V . . . 4 WVDC @ + 125°C, SURGE = 5 V</b>						
4.7	B	0.5	5.0	6.0	6.0	3.5
6.8	L	0.5	5.0	6.0	6.0	2.0
10	U	0.6	6.0	8.0	8.0	1.5
15	E	0.9	9.0	11.0	8.0	1.0
22	C	1.4	14.0	17.0	8.0	1.0
68	H	4.0	40.0	48.0	10.0	0.7
120	I	8.0	80.0	96.0	10.0	0.5
150	P	9.0	90.0	108.0	10.0	0.5
<b>10 WVDC @ - 55°C to + 85°C, SURGE = 13 V . . . 7 WVDC @ + 125°C, SURGE = 9 V</b>						
3.3	B	0.5	5.0	6.0	6.0	3.5
4.7	L	0.5	5.0	6.0	6.0	2.0
6.8	U	0.7	7.0	9.0	6.0	2.0
10	E	1.0	10.0	12.0	8.0	1.5
15	C	1.5	15.0	18.0	8.0	1.0
47	H	4.7	47.0	57.0	10.0	0.7
68	I	7.0	70.0	84.0	10.0	0.7
100	P	10.0	100.0	120.0	10.0	0.5
<b>15 WVDC @ - 55°C to + 85°C, SURGE = 20 V . . . 10 WVDC @ + 125°C, SURGE = 12 V</b>						
2.2	B	0.5	5.0	6.0	6.0	4.0
3.3	L	0.5	5.0	6.0	6.0	2.5
4.7	U	0.8	8.0	10.0	6.0	2.5
6.8	E	1.0	10.0	12.0	6.0	2.0
10	C	1.5	15.0	18.0	6.0	1.5
33	H	5.0	50.0	60.0	8.0	0.8
47	I	8.0	80.0	96.0	8.0	0.8
68	P	11.0	110.0	132.0	8.0	0.8

**EXTENDED RATINGS - TYPE 49EC**

NOMINAL CAPACITANCE (μF)	CASE CODE	Max. DCL (μA) @			Max. DF 120 Hz (%)	Max. ESR 100kHz (Ohms)
		+ 25°C	+ 85°C	+ 125°C		
<b>20 WVDC @ - 55°C to + 85°C, SURGE = 26 V . . . 13 WVDC @ + 125°C, SURGE = 16 V</b>						
1.5	B	0.5	5.0	6.0	6.0	6.0
2.2	L	0.5	5.0	6.0	6.0	3.5
3.3	U	0.7	7.0	9.0	6.0	3.0
4.7	E	1.0	10.0	12.0	6.0	2.5
6.8	C	1.4	14.0	17.0	6.0	2.0
22	H	4.0	40.0	48.0	6.0	1.0
33	I	7.0	70.0	84.0	6.0	1.0
47	P	10.0	100.0	120.0	6.0	1.0
<b>25 WVDC @ - 55°C to + 85°C, SURGE = 32 V . . . 17 WVDC @ + 125°C, SURGE = 22 V</b>						
1.0	B	0.5	5.0	6.0	6.0	8.0
1.5	L	0.5	5.0	6.0	6.0	5.0
2.2	U	0.6	6.0	8.0	6.0	3.5
3.3	E	0.9	9.0	11.0	6.0	3.5
4.7	C	1.2	12.0	15.0	6.0	2.5
10	H	2.5	25.0	30.0	6.0	2.0
15	H	3.8	38.0	46.0	6.0	1.0
22	I	6.0	60.0	72.0	6.0	1.0
33	P	9.0	90.0	108.0	6.0	1.0
<b>35 WVDC @ - 55°C to + 85°C, SURGE = 46 V . . . 23 WVDC @ + 125°C, SURGE = 28 V</b>						
0.47	B	0.5	5.0	6.0	6.0	12.0
1.0	L	0.5	5.0	6.0	6.0	6.0
1.5	U	0.6	6.0	8.0	6.0	5.0
2.2	E	0.8	8.0	10.0	6.0	3.5
3.3	C	1.0	10.0	12.0	6.0	2.5
4.7	H	1.7	17.0	20.0	6.0	2.5
6.8	H	2.4	24.0	29.0	6.0	2.0
10	I	4.0	40.0	48.0	6.0	2.0
15	P	6.0	60.0	72.0	6.0	2.0

### ORDERING INFORMATION

<b>49</b> LEADLESS TANTALUM CAPACITOR	<b>EC</b> SERIES	<b>225</b> CAPACITANCE	<b>E</b> CASE CODE	<b>035</b> DC VOLTAGE RATING	<b>M</b> CAPACITANCE TOLERANCE	<b>0</b> UNSLEEVED	<b>A</b> GRADE	<b>G</b> TERMINATION FINISH
	BC = Standard Range. EC = Extended Range.	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.		See Ratings and Case Codes Table.	J = ± 5% K = ± 10% M = ± 20%		A = Industrial grade. X = Requires internal spec.	G = Gold plated. D = Solder dipped.

### PACKAGING in inches [millimeters]

**Top View**

**Side View (Cross-Section)**

**Blister-Pack Trays:** Type 49BC/EC capacitors are shipped in 'Blister-Pack' trays containing 50 pieces each in a 5 x 10 matrix configuration. The 'Blister-Pack' provides a separate pocket for each unit to prevent damage to the capacitors during shipping, handling and storage.

Orientation of the capacitors within the tray pockets is random with respect to polarity and mounting surface. This packaging is ideal for hand placement of the capacitors as it takes up very little room at the work station. It is recommended that operators remove and handle these capacitors using a blunt, coated tweezer to prevent damage to the Blue Seal coating.

**Tape and Reel Specifications:** Type 49BC/EC capacitors are available in tape and reel packaging to facilitate the use of automatic placement equipment. Tape and Reel is per EIA (Electronic Industries Association) specification RS-481-1. Capacitor orientation within the tape pockets is negative terminal toward sprocket holes and mounting side down. Quantities less than minimum reel will be shipped in 'Blister-Pack' trays.

Case Code	Tape Width W	Unit Pitch Ctr/Ctr P	Quantity per Full 7" [178] Reel	Minimum Quantity per Reel
B	8mm	4mm	2500	1250
L	12mm	4mm	2500	1250
U	12mm	4mm	2500	1250
E	12mm	4mm	2500	1250
C	12mm	4mm	2500	1250
H	12mm	8mm	1000	500
I	12mm	8mm	600	300
P	12mm	8mm	600	300