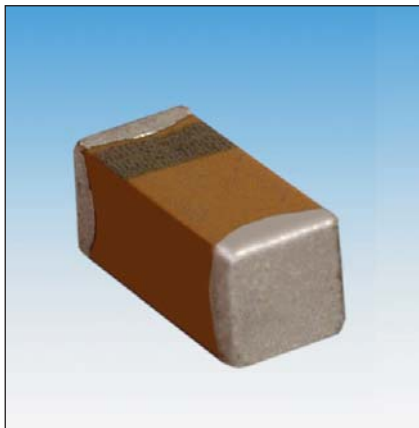


# TBC Series



## CWR15 MIL-PRF-55365/12 Established Reliability, COTS-Plus & Space Level



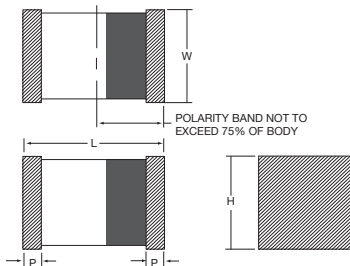
AVX announces the world's smallest military approved tantalum chip capacitors. The CWR15 offers 0603, 0805 and 1206 case sizes in capacitance/voltage combinations previously only available in much larger packages. The revolutionary AVX TACmicrochip® technology offers designers significant opportunity to downsize circuits for military and aerospace applications.

The product is manufactured in the AVX Tantalum high reliability facility in Biddeford, Maine which is also home to the CWR09, CWR11, CWR19 and CWR29 product lines.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

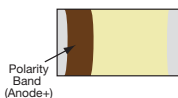
### CASE DIMENSIONS: millimeters (inches)

Case Code	Length (L)	Width (W)	Height (H)	Term. Width (W <sub>t</sub> )
A	3.20±0.20 (0.126±0.008)	1.60±0.20 (0.063±0.008)	1.60±0.20 (0.063±0.008)	0.15+0.35/-0.00 (0.006+0.014/-0.000)
L	1.60+0.25/-0.15 (0.063+0.010/-0.006)	0.84+0.20/-0.10 (0.033+0.008/-0.004)	0.84+0.20/-0.10 (0.033+0.008/-0.004)	0.15+0.35/-0.00 (0.006+0.014/-0.000)
R	2.00+0.25/-0.15 (0.079+0.010/-0.006)	1.35+0.20/-0.10 (0.053+0.008/-0.004)	1.35+0.20/-0.10 (0.053+0.008/-0.004)	0.15+0.35/-0.00 (0.006+0.014/-0.000)



### MARKING

#### A, L, R CASE



### CAPACITANCE AND RATED VOLTAGE, V<sub>R</sub> (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Voltage Rating DC (V <sub>R</sub> ) at 85°C			
µF	Code	4V (C)	6V (D)	10V (F)	20V (J)
0.47	474			L	L
0.68	684			L	
1.0	105			L	
1.5	155			L	
2.2	225			L	
3.3	335		L	R	
4.7	475		L	R	
6.8	685	L	R	R	
10	106	R	R	R	
15	156	R	R	A	
22	226	R	A		
33	336	R	A		
47	476		A		
68	686	A			

Further extensions of the CWR15 product are planned for later in 2009. A new case size will be added, and the voltage range will be extended to 20 volts. Ratings of 100 µF at 4 volts to 10 µF at 20 volts will be included in this extension of the product line.

# TBC Series





## CWR15 MIL-PRF-55365/12 Established Reliability, COTS-Plus & Space Level



### HOW TO ORDER

#### COTS-PLUS & MIL QPL (CWR15):

<b>TBC</b>	<b>L</b>	<b>685</b>	<b>*</b>	<b>004</b>	<b>C</b>	<b>□</b>	<b>#</b>	<b>@</b>	<b>0</b>	<b>^</b>	<b>++</b>
<b>Type</b>	<b>Case Size</b>	<b>Capacitance Code</b> pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	<b>Capacitance Tolerance</b> M = ±20% K = ±10% J = ±5%	<b>Voltage Code</b> 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 020 = 20Vdc	<b>Standard or Low ESR Range</b> C = Std ESR	<b>Packaging</b> B = Bulk R = 7" T&R S = 13" T&R W = Waffle  See page 8 for additional packaging options.	<b>Inspection Level</b> S = Std. Conformance L = Group A  M = MIL (JAN) CWR15	<b>Reliability Grade</b> Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. Z = Non-ER	<b>Qualification Level</b> 0 = N/A T = T Level 9 = SRC9000	<b>Termination Finish</b> 0 = Fused Solder Plated 9 = Gold Plated 7 = Matte Sn (COTS-Plus only)	<b>Surge Test Option</b> 00 = None 23 = 10 Cycles, +25°C 24 = 10 Cycles, -55°C & +85°C 45 = 10 cycles, -55°C & +85°C before Weibull





  
 For RoHS compliant products, please select correct termination style.

#### CWR15 P/N CROSS REFERENCE:

<b>CWR15</b>	<b>F</b>	<b>C</b>	<b>685</b>	<b>*</b>	<b>-</b>	<b>L</b>	<b>+</b>
<b>Style</b>	<b>Voltage Code</b> C = 4Vdc D = 6Vdc F = 10Vdc J = 20Vdc	<b>Termination Finish</b> B = Gold Plated K = Solder Fused    For RoHS compliant products, please select correct termination style.	<b>Capacitance Code</b> pF code: 1st two digits represent significant figures 3rd digit represents number of zeros to follow	<b>Capacitance Tolerance</b> J = ±5% K = ±10% M = ±20%  See page 8 for additional packaging options.	<b>Product Level Designator</b> Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. T = T Level A = Non-ER	<b>Case Size</b>	<b>Surge Test Option</b> A = +25°C after Weibull B = -55°C & +85°C after Weibull C = -55°C & +85°C before Weibull Z = None Required

#### SPACE LEVEL OPTIONS TO SRC9000\*:

<b>TBC</b>	<b>L</b>	<b>685</b>	<b>*</b>	<b>004</b>	<b>C</b>	<b>□</b>	<b>L</b>	<b>@</b>	<b>9</b>	<b>^</b>	<b>++</b>
<b>Type</b>	<b>Case Size</b>	<b>Capacitance Code</b> pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	<b>Capacitance Tolerance</b> M = ±20% K = ±10% J = ±5%	<b>Voltage Code</b> 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 020 = 20Vdc	<b>Standard or Low ESR Range</b> C = Std ESR L = Low ESR	<b>Packaging</b> B = Bulk R = 7" T&R S = 13" T&R W = Waffle  See page 8 for additional packaging options.	<b>Inspection Level</b> L = Group A	<b>Reliability Grade</b> Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf.	<b>Qualification Level</b> 9 = SRC9000	<b>Termination Finish</b> 0 = Fused Solder Plated 9 = Gold Plated	<b>Surge Test Option</b> 45 = 10 cycles, -55°C & +85°C before Weibull



  
 For RoHS compliant products, please select correct termination style.

\*Contact factory for AVX SRC9000 Space Level SCD details.

### TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C				
Capacitance Range:	0.47 µF to 68 µF				
Capacitance Tolerance:	±5%; ±10%; ±20%				
Rated Voltage (V <sub>R</sub> )	≤ 85°C:	4	6	10	20
Category Voltage (V <sub>C</sub> )	≤ 125°C:	2.7	4	6.7	13.3
Surge Voltage (V <sub>S</sub> )	≤ 85°C:	5.3	8	13.3	26.7
Surge Voltage (V <sub>S</sub> )	≤ 125°C:	3.5	5.3	8.7	17.8
Temperature Range:	-55°C to +125°C				



# TBC Series



## CWR15 MIL-PRF-55365/12 Established Reliability, COTS-Plus & Space Level

RATING & PART NUMBER REFERENCE				Parametric Specifications by Rating per MIL-PRF-55365/12							Typical RMS Ripple Data by Rating								
				Cap @ 120Hz μF @ 25°C	DC Rated Voltage V @ +85°C	ESR @ 100kHz Ohms @ +25°C	DCL max			DF Max			Power Dissipation W	25°C Ripple A (100kHz)	85°C Ripple A (100kHz)	125°C Ripple A (100kHz)	25°C Ripple V (100kHz)	85°C Ripple V (100kHz)	125°C Ripple V (100kHz)
CWR15 P/N	AVX MIL & COTS-Plus P/N	AVX SRC9000 P/N	Case	+25°C	+85°C	+125°C	+25°C	+85°C	+125°C	+25°C	+85°C	+125°C							
CWR15CK685^L+	TBC L 685 * 004 C □ # @ 0 ^ +	TBC L 685 * 004 C □ L @ 9 ^ +	L	6.8	4	10	0.5	5	6	8	16	12	0.025	0.05	0.05	0.02	0.50	0.45	0.20
CWR15CK106^R+	TBC R 106 * 004 C □ # @ 0 ^ ++	TBC R 106 * 004 C □ L @ 9 ^ ++	R	10	4	6	0.5	5	6	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15CK156^R+	TBC R 156 * 004 C □ # @ 0 ^ ++	TBC R 156 * 004 C □ L @ 9 ^ ++	R	15	4	6	0.6	6	7	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15CK226^R+	TBC R 226 * 004 C □ # @ 0 ^ ++	TBC R 226 * 004 C □ L @ 9 ^ ++	R	22	4	6	0.9	9	11	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15CK336^R+	TBC R 336 * 004 C □ # @ 0 ^ ++	TBC R 336 * 004 C □ L @ 9 ^ ++	R	33	4	6	1.3	13	16	10	20	15	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15CK686^A+	TBC A 686 * 004 C □ # @ 0 ^ +	TBC A 686 * 004 C □ L @ 9 ^ +	A	68	4	1	2.7	27	33	15	30	23	0.040	0.20	0.18	0.08	0.20	0.18	0.08
CWR15DK335^L+	TBC L 335 * 006 C □ # @ 0 ^ +	TBC L 335 * 006 C □ L @ 9 ^ +	L	3.3	6	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.20
CWR15DK475^L+	TBC L 475 * 006 C □ # @ 0 ^ +	TBC L 475 * 006 C □ L @ 9 ^ +	L	4.7	6	10	0.5	5	6	8	16	12	0.025	0.05	0.05	0.02	0.50	0.45	0.20
CWR15DK685^R+	TBC R 685 * 006 C □ # @ 0 ^ ++	TBC R 685 * 006 C □ L @ 9 ^ ++	R	6.8	6	6	0.5	5	6	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15DK106^R+	TBC R 106 * 006 C □ # @ 0 ^ ++	TBC R 106 * 006 C □ L @ 9 ^ ++	R	10	6	6	0.6	6	7	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15DK156^R+	TBC R 156 * 006 C □ # @ 0 ^ ++	TBC R 156 * 006 C □ L @ 9 ^ ++	R	15	6	6	0.9	9	11	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15DK226^A+	TBC A 226 * 006 C □ # @ 0 ^ +	TBC A 226 * 006 C □ L @ 9 ^ +	A	22	6	6	1.4	14	17	10	20	15	0.040	0.08	0.07	0.03	0.49	0.44	0.20
CWR15DK336^A+	TBC A 336 * 006 C □ # @ 0 ^ +	TBC A 336 * 006 C □ L @ 9 ^ +	A	33	6	6	2	20	24	10	20	15	0.040	0.08	0.07	0.03	0.49	0.44	0.20
CWR15DK476^A+	TBC A 476 * 006 C □ # @ 0 ^ +	TBC A 476 * 006 C □ L @ 9 ^ +	A	47	6	4	2.8	28	34	15	30	23	0.040	0.10	0.09	0.04	0.40	0.36	0.16
CWR15FK474^L+	TBC L 474 * 010 C □ # @ 0 ^ +	TBC L 474 * 010 C □ L @ 9 ^ +	L	0.47	10	12	0.5	5	6	6	12	9	0.025	0.05	0.04	0.02	0.55	0.49	0.22
CWR15FK684^L+	TBC L 684 * 010 C □ # @ 0 ^ +	TBC L 684 * 010 C □ L @ 9 ^ +	L	0.68	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.20
CWR15FK105^L+	TBC L 105 * 010 C □ # @ 0 ^ +	TBC L 105 * 010 C □ L @ 9 ^ +	L	1	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.20
CWR15FK155^L+	TBC L 155 * 010 C □ # @ 0 ^ +	TBC L 155 * 010 C □ L @ 9 ^ +	L	1.5	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.20
CWR15FK225^L+	TBC L 225 * 010 C □ # @ 0 ^ +	TBC L 225 * 010 C □ L @ 9 ^ +	L	2.2	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.20
CWR15FK335^R+	TBC R 335 * 010 C □ # @ 0 ^ +	TBC R 335 * 010 C □ L @ 9 ^ +	R	3.3	10	6	0.5	5	6	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15FK475^R+	TBC R 475 * 010 C □ # @ 0 ^ +	TBC R 475 * 010 C □ L @ 9 ^ +	R	4.7	10	6	0.5	5	6	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15FK685^R+	TBC R 685 * 010 C □ # @ 0 ^ +	TBC R 685 * 010 C □ L @ 9 ^ +	R	6.8	10	6	0.7	7	8.5	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15FK106^R+	TBC R 106 * 010 C □ # @ 0 ^ +	TBC R 106 * 010 C □ L @ 9 ^ +	R	10	10	6	1	10	12	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.21
CWR15FK156^R+	TBC A 156 * 010 C □ # @ 0 ^ +	TBC A 156 * 010 C □ L @ 9 ^ +	A	15	10	6	1.5	15	18	10	20	15	0.040	0.08	0.07	0.03	0.49	0.44	0.20
CWR15JK474^R+	TBC L 474 * 020 C □ # @ 0 ^ +	TBC L 474 * 020 C □ L @ 9 ^ +	L	0.47	20	24	0.5	5	6	6	12	9	0.025	0.03	0.03	0.01	0.77	0.70	0.31

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

**NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.**