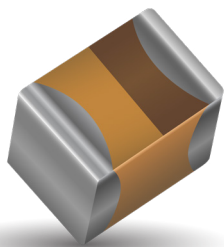


# TBC SERIES

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



KYOCERA 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 TACmicrochip® technology offers designers significant opportunity to downsize circuits for military and aerospace applications.

The product is manufactured in the 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.

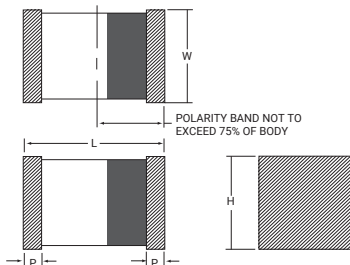
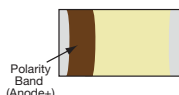
### CASE DIMENSIONS:

millimeters (inches)

Case Code	Length (L)	Width (W)	Height (H)	Term. Width (W <sub>1</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			

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Белгород (4722)40-23-64  
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Хабаровск (4212)92-98-04  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
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# 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>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>ESR</b> C = Std ESR	<b>Packaging</b> B = Bulk R = 7" 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

LEAD-FREE LEAD-FREE COMPATIBLE COMPONENT  
 RoHS COMPLIANT  
 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>Type</b>	<b>Voltage Code</b> C = 4Vdc D = 6Vdc F = 10Vdc J = 20Vdc	<b>Termination Finish</b> B = Gold Plated K = Solder Fused	<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

LEAD-FREE LEAD-FREE COMPATIBLE COMPONENT  
 RoHS COMPLIANT  
 For RoHS compliant products, please select correct termination style.

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

<b>TBC</b>	<b>L</b>	<b>685</b>	<b>*</b>	<b>004</b>	<b>C</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 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 GC = Group C Testing and Data OR = TOR compliant testing and data

LEAD-FREE LEAD-FREE COMPATIBLE COMPONENT  
 RoHS COMPLIANT  
 For RoHS compliant products, please select correct termination style.

\*Contact factory for 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:					

# 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	DC Rated Voltage	ESR @ 100kHz	DCL max			DF Max			Power Dissipation	25°C Ripple	85°C Ripple	125°C Ripple	25°C Ripple	85°C Ripple	125°C Ripple
							+25°C	+85°C	+125°C	+25°C	+(85/125)°C	-55°C							
CWR15 P/N	MIL & COTS-Plus P/N	SRC9000 P/N	Case	µF @ 25°C	V @ +85°C	Ohms @ +25°C	(µA)	(µA)	(µA)	(%)	(%)	(%)	W	A (100kHz)	A (100kHz)	A (100kHz)	V (100kHz)	V (100kHz)	V (100kHz)
CWR15CK685**L+	TBCL 685*004 C □ # @ 0^+	TBCL 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+	TBCR 106*004 C □ # @ 0^++	TBCR 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+	TBCR 156*004 C □ # @ 0^++	TBCR 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+	TBCR 226*004 C □ # @ 0^+	TBCR 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+	TBCR 336*004 C □ # @ 0^+	TBCR 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+	TBCA 686*004 C □ # @ 0^+	TBCA 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+	TBCL 335*006 C □ # @ 0^+	TBCL 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+	TBCL 475*006 C □ # @ 0^+	TBCL 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+	TBCR 685*006 C □ # @ 0^++	TBCR 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+	TBCR 106*006 C □ # @ 0^++	TBCR 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+	TBCR 156*006 C □ # @ 0^+	TBCR 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+	TBCA 226*006 C □ # @ 0^+	TBCA 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+	TBCA 336*006 C □ # @ 0^+	TBCA 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+	TBCA 476*006 C □ # @ 0^+	TBCA 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+	TBCL 474*010 C □ # @ 0^+	TBCL 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+	TBCL 684*010 C □ # @ 0^+	TBCL 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+	TBCL 105*010 C □ # @ 0^+	TBCL 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+	TBCL 155*010 C □ # @ 0^+	TBCL 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+	TBCL 225*010 C □ # @ 0^+	TBCL 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+	TBCR 335*010 C □ # @ 0^+	TBCR 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+	TBCR 475*010 C □ # @ 0^+	TBCR 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+	TBCR 685*010 C □ # @ 0^+	TBCR 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+	TBCR 106*010 C □ # @ 0^+	TBCR 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**A+	TBCA 156*010 C □ # @ 0^+	TBCA 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**L+	TBCL 474*020 C □ # @ 0^+	TBCL 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: KYOCERA AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.**

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