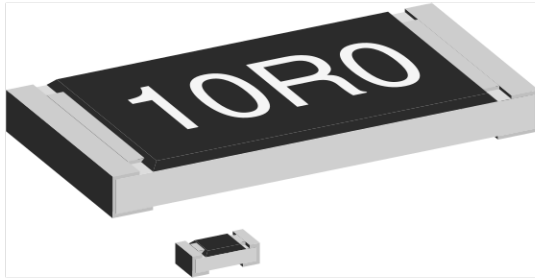


Lead (Pb)-free Thick Film, Rectangular Commodity Chip Resistors



FEATURES

- High volume product suitable for commercial applications
- Excellent stability ($\Delta R/R \leq 1\%$ for 1000 h at 70 °C)
- Lead (Pb)-free solder contacts on Ni barrier layer
- Metal glaze on high quality ceramic
- Protective overglaze
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS								
MODEL	CASE SIZE INCH	CASE SIZE METRIC	POWER RATING $P_{70\text{ }^\circ\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX. V \cong	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES
CRCW0402...BC	0402	RR 1005M	0.063	50	± 100 ± 200	± 1 ± 5	1R0 to 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20\text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 1.5 A					
CRCW0603...BC	0603	RR 1608M	0.10	75	± 100 ± 200	± 1 ± 5	1R0 to 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20\text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 2.0 A					
CRCW0805...BC	0805	RR 2012M	0.125	150	± 100 ± 200	± 1 ± 5	1R0 to 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20\text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 2.5 A					
CRCW1206...BC	1206	RR 3216M	0.25	200	± 100 ± 200	± 1 ± 5	1R0 to 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20\text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 3.5 A					
CRCW1210...BC	1210	RR 3225M	0.50	200	± 100 ± 200	± 1 ± 5	1R0 to 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20\text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 4.0 A					
CRCW2010...BC	2010	RR 5025M	0.75	400	± 100 ± 200	± 1 ± 5	1R0 to 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20\text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 5.0 A					
CRCW2512...BC	2512	RR 6332M	1.0	500	± 100 ± 200	± 1 ± 5	1R0 to 10M	24 + 96 24
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20\text{ m}\Omega$, $I_{\text{max.}}$ at 70 °C = 7.0 A					

Notes

- These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.
- Power rating depends on the maximum temperature at the solder point, the component placement density and the substrate material



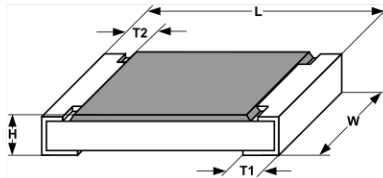
TECHNICAL SPECIFICATIONS								
PARAMETER	UNIT	CRCW0402...BC	CRCW0603...BC	CRCW0805...BC	CRCW1206...BC	CRCW1210...BC	CRCW2010...BC	CRCW2512...BC
Rated Dissipation at 70 °C (1)	W	0.063	0.10	0.125	0.25	0.50	0.75	1.0
Limiting Element Voltage U_{max} AC/DC	V	50	75	150	200	200	400	500
Insulation Voltage U_{ins} (1 min)	V	> 75	> 100	> 200	> 300	> 300	> 300	> 300
Insulation Resistance	Ω	> 10 ⁹						
Category Temperature Range	°C	- 55 to + 155						
Failure Rate	h ⁻¹	0.3 x 10 ⁻⁹						
Weight/1000 Pieces	g	0.65	2	5.5	10	16	25.5	40.5

Note

(1) The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

PART NUMBER AND PRODUCT DESCRIPTION					
PART NUMBER: CRCW0603562RFKTBC					
C	R	C	W	0	6
0	3	5	6	2	R
F	K	T	C	B	C
MODEL	VALUE	TOLERANCE	TCR	PACKAGING	Special
CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW2010 CRCW2512	R = Decimal K = Thousand M = Million 0000 = Jumper	F = ± 1.0 % J = ± 5.0 % Z = Jumper	K = ± 100 ppm/K N = ± 200 ppm/K 0 = Jumper	TA, TB TC, TD TE, TF TH, TI	Up to 2 digits BC = Commodity
PRODUCT DESCRIPTION: CRCW0603-BC 100 562R 1 % RT6 e3					
CRCW0603-BC	100	562R	1 %	RT6	e3
MODEL	TCR	RESISTANCE VALUE	TOLERANCE VALUE	PACKAGING	LEAD (Pb)-FREE
CRCW0402-BC CRCW0603-BC CRCW0805-BC CRCW1206-BC CRCW1210-BC CRCW2010-BC CRCW2512-BC	± 200 ppm/K ± 100 ppm/K	10R = 10 Ω 562R = 562 Ω 10K = 10.0 k Ω 1M = 1 M Ω 0R0 = Jumper	± 5 % ± 1 %	RT1, RT2 RT5, RT6 RT7, RF4 R02, R82	e3 = Pure tin termination finish

PACKAGING								
MODEL	REEL							
	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PACKAGING CODE			
					PART NUMBER		PRODUCT DESC.	
					PAPER	BLISTER	PAPER	BLISTER
CRCW0402...BC	8 mm	180 mm/7"	2 mm	10 000	TD		RT7	
		254 mm/10"		20 000	TI		RT2	
		330 mm/13"		50 000	TE		RF4	
CRCW0603...BC	8 mm	180 mm/7"	4 mm	5000	TA		RT1	
		254 mm/10"		10 000	TB		RT5	
		330 mm/13"		20 000	TC		RT6	
CRCW0805...BC	8 mm	180 mm/7"	4 mm	5000	TA		RT1	
		254 mm/10"		10 000	TB		RT5	
		330 mm/13"		20 000	TC		RT6	
CRCW1206...BC	8 mm	180 mm/7"	4 mm	5000	TA		RT1	
		254 mm/10"		10 000	TB		RT5	
		330 mm/13"		20 000	TC		RT6	
CRCW1210...BC	8 mm	180 mm/7"	4 mm	5000	TA		RT1	
		254 mm/10"		10 000	TB		RT5	
		330 mm/13"		20 000	TC		RT6	
CRCW2010...BC	12 mm	180 mm/7"	4 mm	4000		TF		R02
CRCW2512...BC	12 mm	180 mm/7"	4 mm	4000		TH		R82

DIMENSIONS in millimeters


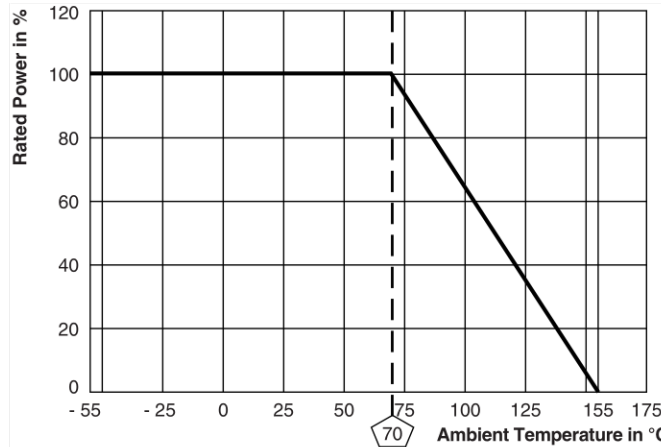
SIZE		DIMENSIONS					SOLDER PAD DIMENSIONS ⁽¹⁾					
							REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1.55 ^{+0.10} / _{-0.05}	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	2.0 ^{+0.20} / _{-0.10}	1.25 ± 0.15	0.45 ± 0.05	0.3 ^{+0.20} / _{-0.10}	0.3 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	3.2 ^{+0.10} / _{-0.20}	1.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	1.7	2.0	1.1	1.7	2.3
1210	3225	3.2 ± 0.2	2.5 ± 0.2	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	2.5	2.0	1.1	2.5	2.2
2010	5025	5.0 ± 0.15	2.5 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	2.5	3.9	1.2	2.5	3.9
2512	6332	6.3 ± 0.2	3.15 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	3.2	5.2	1.2	3.2	5.2

Note

⁽¹⁾ The rated dissipation applies only if the permitted film temperature is not exceeded. Furthermore, a high level of ambient temperature or of power dissipation may raise the temperature of the solder joint, hence special solder alloys or board materials may be required to maintain the reliability of the assembly. Specified power rating above 125 °C requires dedicated heat-sink pads, which depend on board materials. The given solder pad dimensions reflect the considerations for board design and assembly as outlined e.g. in standards IEC 61188-5-x, or in publication IPC-7351. They do not guarantee any supposed thermal properties, particularly as these are also strongly influenced by many other parameters. Still the given solder pad dimensions will be found adequate for most general applications.



DERATING



TEST PROCEDURES AND REQUIREMENTS					
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)	
				STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER
			Stability for product types:		
			CRCW...BC e3	1 Ω to 10 M Ω	1 Ω to 10 M Ω
4.5	-	Resistance	-	$\pm 1 \%$	$\pm 5 \%$
4.8.4.2	-	Temperature coefficient	(20/- 55/20) °C and (20/125/20) °C	± 100 ppm/K	± 200 ppm/K
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$; duration: Acc. to the style	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$
4.17.5	58 (Td)	Solderability	Pre-aging 4 h at 155 °C, dryheat	Solder bath method; Sn60Pb40 non activated flux; (235 \pm 5) °C (2 \pm 0.2) s	Good tinning ($\geq 95 \%$ covered) no visible damage
				Solder bath method; Sn96.5Ag3Cu0.5 non activated flux; (245 \pm 5) °C (3 \pm 0.3) s	Good tinning ($\geq 95 \%$ covered) no visible damage
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 \pm 5) °C; (10 \pm 1) s	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 °C; 30 min. at 125 °C; 5 cycles	$\pm (0.25 \% R + 0.05 \Omega)$	$\pm (0.5 \% R + 0.05 \Omega)$
4.24	78 (Cab)	Damp heat, steady state	(40 \pm 2) °C; 56 days; (93 \pm 3) % RH	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$



TEST PROCEDURES AND REQUIREMENTS					
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)	
				STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER
			Stability for product types:		
			CRCW...BC e3	1 Ω to 10 M Ω	1 Ω to 10 M Ω
4.23	-	Climatic sequence:	-		
4.23.2	2 (Ba)	Dry heat	125 °C; 16 h		
4.23.3	30 (Db)	Damp heat, cyclic	55 °C; ≥ 90 % RH; 24 h; 1 cycle		
4.23.4	1 (Aa)	Cold	- 55 °C; 2 h	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$
4.23.5	13 (M)	Low air pressure	1 kPa; (25 \pm 10) °C; 1 h		
4.23.6	30 (Db)	Damp heat, cyclic	55 °C; ≥ 90 % RH; 24 h; 5 cycles		
4.23.7	-	DC load	$U = \sqrt{P_{70}} \times R \leq U_{max.}$		
4.25.1	-	Endurance at 70 °C	$U = \sqrt{P_{70}} \times R \leq U_{max.};$ 1.5 h on; 0.5 h off; 70 °C; 1000 h 70 °C; 8000 h	$\pm (1 \% R + 0.05 \Omega)$ $\pm (2 \% R + 0.1 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$ $\pm (4 \% R + 0.1 \Omega)$
4.25.3	-	Endurance at 125 °C	125 °C, 1000 h	$\pm (1 \% R + 0.05 \Omega)$	$\pm (2 \% R + 0.1 \Omega)$

APPLICABLE SPECIFICATIONS	
<ul style="list-style-type: none"> • EN60115-1Generic specification • EN140400Sectional specification • EN140401-802Detail specification 	<ul style="list-style-type: none"> • IEC 60068-2-XVariety of environmental test procedures • IEC 60286-3Packaging of SMD components