# CRCW...C e3

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



### FEATURES

- High volume product suitable for commercial applications
- Stability ( $\Delta R/R \le 1$  % for 1000 h at 70 °C)
- Lead (Pb)-free solder contacts on Ni barrier
   HALOGEN
   FREE
- Metal glaze on ceramic
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

STANDARD E	STANDARD ELECTRICAL SPECIFICATIONS									
MODEL	CASE SIZE INCH	CASE SIZE METRIC	POWER RATING P <sub>70 °C</sub> W	LIMITING ELEMENT VOLTAGE MAX. V ≅	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES		
			0.063	50	± 100	± 1	1R0 to 10M	E24; E96		
CRCW0402C	0402	RR 1005M	0.005	50	± 200	± 5	1R0 to 10M	E24		
			Zero-Ohm-Resisto	or: <i>R</i> <sub>max.</sub> = 20	mΩ, <i>I<sub>max.</sub></i> at 70 °C =	= 1.5 A				
			0.10	75	± 100	± 1	1R0 to 10M	E24; E96		
CRCW0603C	0603	RR 1608M			± 200	± 5	1R0 to 10M	E24		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$ , $I_{\text{max.}}$ at 70 °C = 2.0 A							
		0805 RR 2012M	0.125	150	± 100	± 1	1R0 to 10M	E24; E96		
CRCW0805C	0805		0.125	150	± 200	± 5	1R0 to 10M	E24		
			Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$ , $I_{\text{max.}}$ at 70 °C = 2.5 A							
		6 RR 3216M	0.25	200	± 100	± 1	1R0 to 10M	E24; E96		
CRCW1206C	1206			200	± 200	± 5	1R0 to 10M	E24		
			Zero-Ohm-Resisto	Zero-Ohm-Resistor: $R_{\text{max.}} = 20 \text{ m}\Omega$ , $I_{\text{max.}}$ at 70 °C = 3.5 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 max. temperature at the solder point, the component placement density and the substrate material

TECHNICAL SPECIFICATIONS							
PARAMETER	UNIT	CRCW0402C	CRCW0603C	CRCW0805C	CRCW1206C		
Rated dissipation at 70°C <sup>(1)</sup>	W 0.063 0.10 0.125 0.25						
Limiting element voltage U <sub>max.</sub> AC/DC	V	50	75	150	200		
Insulation voltage U <sub>ins.</sub> (1 min)	on voltage <i>U</i> <sub>ins.</sub> (1 min) V > 75 > 100 > 200 >				> 300		
Insulation resistance	Ω	> 10 <sup>9</sup>					
Category temperature range	°C	- 55 to + 155					
Failure rate	h <sup>-1</sup>	0.1 x 10 <sup>-9</sup>					
Weight/1000 pieces	g	0.65	2	5.5	10		

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



RoHS

COMPLIANT

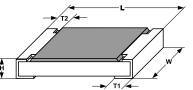
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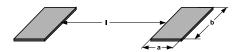
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PART NUMBER	PART NUMBER AND PRODUCT DESCRIPTION						
PART NUMBER: CRCW0603562RFKECC C R C W 0 6 0 3 5 6 2 R F K E C C							
MODEL/SIZE CRCW0402 CRCW0603 CRCW0805 CRCW1206	VALUE <b>R</b> = decimal <b>K</b> = thousand <b>M</b> = million	TOLERANCE $F = \pm 1.0 \%$ $J = \pm 5.0 \%$ $Z = jumper$	TCR <b>K</b> = ± 100 ppm/K <b>N</b> = ± 200 ppm/K <b>0</b> = jumper	PACKAGING EA, EB, EC, ED, EE	SPECIAL Up to 2 digits <b>C</b> = commodity		
	0000 = jumper TION: CRCW0603-C 1 100	00 562R 1 % ET6 E	3	ET6	e3		
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE		
CRCW0402-C CRCW0603-C CRCW0805-C CRCW1206-C	± 200 ppm/K ± 100 ppm/K	<b>10R</b> = 10 Ω <b>562R</b> = 562 Ω <b>10K</b> = 10.0 kΩ <b>1M</b> = 1 MΩ <b>0R0</b> = jumper	± 5 % ± 1 %	ET1, ET5, ET6, ET7, EF4	<b>e3</b> = pure tin termination finish		

PACKAGING								
TYPE / SIZE	CODE	QUANTITY	PACKAGING STYLE	WIDTH	PITCH	PACKAGING DIMENSIONS		
CRCW0402C	ED = ET7	10 000			2 mm	Ø 180 mm/7"		
ChCW0402C	EE = EF4	50 000		8 mm	2 11111	Ø 330 mm/13"		
	EA = ET1	5000			4 mm	Ø 180 mm/7"		
CRCW0603C	EB = ET5	10 000	Paper tape acc. to IEC 60286-3, Type 1a			Ø 254 mm/10"		
	EC = ET6	20 000				Ø 330 mm/13"		
	EA = ET1	5000			4 mm	Ø 180 mm/7"		
CRCW0805C	EB = ET5	10 000				Ø 254 mm/10"		
	EC = ET6	20 000				Ø 330 mm/13"		
	EA = ET1	5000				Ø 180 mm/7"		
CRCW1206C	EB = ET5	10 000			4 mm	Ø 254 mm/10"		
	EC = ET6	20 000				Ø 330 mm/13"		

#### DIMENSIONS





	SIZE DIMENSIONS (in millimeters)					SOLDER PAD DIMENSIONS <sup>(1)</sup> (in millimeters					ieters)	
			DIVIEN		iiineters)		REFLO	W SOLD	ERING	WAVE	SOLDE	ERING
INCH	METRIC	L	w	н	T1	T2	а	b	I	а	b	I
0402	1005	$1.0 \pm 0.10$	$0.5 \pm 0.05$	$0.30 \pm 0.05$	$0.25\pm0.10$	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1.60 ± 0.10	$0.80 \pm 0.10$	$0.45 \pm 0.10$	$0.3 \pm 0.2$	$0.3 \pm 0.2$	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	$2.0 \pm 0.10$	$1.25 \pm 0.15$	$0.50 \pm 0.10$	$0.35\pm0.15$	$0.35 \pm 0.2$	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	3.05 ± 0.10	1.55 ± 0.10	0.55 + 0.10 - 0.05	0.35 ± 0.15	0.45 ± 0.2	0.9	1.7	2.0	1.1	1.7	2.3

#### 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 maybe 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

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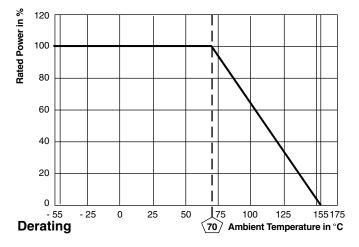
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### FUNCTIONAL PERFORMANCE



TEST PR	OCEDURES	S AND REQUIP	REMENTS					
	EN 60115-1 CLAUSE METHOD TEST PROCEDURE				REQUIREMENTS PERMISSIBLE CHANGE (\(\triangle R))			
CLAUSE			STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER				
			Stability for proc	luct types:				
				CRCWC e3	1 $\Omega$ to 10 $M\Omega$	1 $\Omega$ to 10 $M\Omega$		
4.5	-	Resistance		-	±1%	± 5 %		
4.8.4.2	-	Temperature coefficient		5/20) °C and 125/20) °C	± 100 ppm/K	± 200 ppm/K		
4.13	-	Short time overload	$U = 2.5 \text{ x } \sqrt{P_{70}}$	$x R \leq 2 x U_{max.;} 5 s$	± (2 % R	+ 0.1 Ω)		
4 17 E	58 (Td)	Solderability	Pre-aging 4 h at 155 °C,	Solder bath method; Sn60Pb40 non activated flux; (235 ± 5) °C (2 ± 0.2) s	Good tinning (≥ no visible	,		
4.17.5		Solderability	dryheat	Solder bath method; Sn96.5Ag3Cu0.5 non activated flux; (245 ± 5) °C (3 ± 0.3) s	Good tinning (≥ 95 % covered) no visible damage			
4.18.2	58 (Td)	Resistance to soldering heat		bath method ) °C; (10 ± 1) s	± (1% <i>R</i> + 0.05 Ω)			
4.19	14 (Na)	Rapid change of temperature	30 mir	n. at - 55 °C; n. at 125 °C; cycles	± (0.25 % <i>R</i> + 0.05 Ω)	$\pm$ (0.5 % R + 0.05 Ω)		
4.24	78 (Cab)	Damp heat, steady state	5	(40 ± 2) °C; 56 days; (93 ± 3) % RH		± (2 % <i>R</i> + 0.1 Ω)		
4.36	-	Operation at low temperature	-55 °C, 1 h		± (1 % <i>R</i> + 0.05 Ω)			
1.05.4	Endurance		$U = \sqrt{P_{70} \times R} \le U_{\text{max.};}$ 1.5 h on; 0.5 h off;					
4.25.1	-	at 70 °C	70 °C; 1000 h		$\pm$ (1 % R + 0.05 Ω)	$\pm$ (2 % R + 0.1 Ω)		
			70 °	C; 8000 h	± (2 % <i>R</i> + 0.1 Ω)	± (4 % <i>R</i> + 0.1 Ω)		
4.25.3	-	Endurance at upper category temperature	155	°C, 1000 h	± (1 % <i>R</i> + 0.05 Ω)	± (2 % <i>R</i> + 0.1 Ω)		

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APPLICABLE SPECIFICATIONS				
• EN 60115-1	Generic specification			
• EN 140400	Sectional specification			
• EN 140401-802	Detail specification			
• IEC 60068-2-X	Variety of environmental test procedures			
• IEC 60286-3	Packaging of SMD components			



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