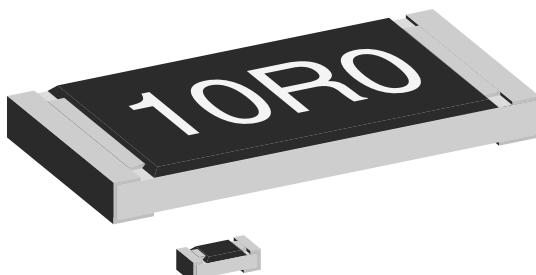


## Lead (Pb)-free Thick Film, Rectangular Commodity Chip Resistors



### FEATURES

- High volume product suitable for commercial applications
- Stability ( $\Delta R/R \leq 1\%$  for 1000 h at  $70^\circ\text{C}$ )
- Lead (Pb)-free solder contacts on Ni barrier layer
- Metal glaze on ceramic
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



STANDARD ELECTRICAL SPECIFICATIONS								
MODEL	CASE SIZE INCH	CASE SIZE METRIC	POWER RATING $P_{70^\circ\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX. V $\geq$	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE $\Omega$	E-SERIES
CRCW0402...C	0402	RR 1005M	0.063	50	$\pm 100$	$\pm 1$	1R0 to 10M	E24; E96
					$\pm 200$	$\pm 5$	1R0 to 10M	E24
Zero-Ohm-Resistor: $R_{\max.} = 20 \text{ m}\Omega$ , $I_{\max.}$ at $70^\circ\text{C} = 1.5 \text{ A}$								
CRCW0603...C	0603	RR 1608M	0.10	75	$\pm 100$	$\pm 1$	1R0 to 10M	E24; E96
					$\pm 200$	$\pm 5$	1R0 to 10M	E24
Zero-Ohm-Resistor: $R_{\max.} = 20 \text{ m}\Omega$ , $I_{\max.}$ at $70^\circ\text{C} = 2.0 \text{ A}$								
CRCW0805...C	0805	RR 2012M	0.125	150	$\pm 100$	$\pm 1$	1R0 to 10M	E24; E96
					$\pm 200$	$\pm 5$	1R0 to 10M	E24
Zero-Ohm-Resistor: $R_{\max.} = 20 \text{ m}\Omega$ , $I_{\max.}$ at $70^\circ\text{C} = 2.5 \text{ A}$								
CRCW1206...C	1206	RR 3216M	0.25	200	$\pm 100$	$\pm 1$	1R0 to 10M	E24; E96
					$\pm 200$	$\pm 5$	1R0 to 10M	E24
Zero-Ohm-Resistor: $R_{\max.} = 20 \text{ m}\Omega$ , $I_{\max.}$ at $70^\circ\text{C} = 3.5 \text{ A}$								

#### 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	CRCW0402...C	CRCW0603...C	CRCW0805...C	CRCW1206...C
Rated dissipation at $70^\circ\text{C}$ <sup>(1)</sup>	W	0.063	0.10	0.125	0.25
Limiting element voltage $U_{\max.}$ AC/DC	V	50	75	150	200
Insulation voltage $U_{\text{ins.}}$ (1 min)	V	> 75	> 100	> 200	> 300
Insulation resistance	$\Omega$	$> 10^9$			
Category temperature range	$^\circ\text{C}$	- 55 to + 155			
Failure rate	$\text{h}^{-1}$	$0.1 \times 10^{-9}$			
Weight/1000 pieces	g	0.65	2	5.5	10

#### Note

- <sup>(1)</sup> 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  $155^\circ\text{C}$  is not exceeded

<b>PART NUMBER AND PRODUCT DESCRIPTION</b>															
<b>PART NUMBER: CRCW0603562RFKECC</b>															
<b>C</b>	<b>R</b>	<b>C</b>	<b>W</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>3</b>	<b>5</b>	<b>6</b>	<b>2</b>	<b>R</b>	<b>F</b>	<b>K</b>		
MODEL/SIZE			VALUE			TOLERANCE			TCR		PACKAGING		SPECIAL		
<b>CRCW0402</b>			<b>R = decimal</b>			<b>F = ± 1.0 %</b>			<b>K = ± 100 ppm/K</b>		<b>EA, EB,</b>		Up to 2 digits		
<b>CRCW0603</b>			<b>K = thousand</b>			<b>J = ± 5.0 %</b>			<b>N = ± 200 ppm/K</b>		<b>EC, ED,</b>		<b>C = commodity</b>		
<b>CRCW0805</b>			<b>M = million</b>			<b>Z = jumper</b>			<b>O = jumper</b>						
<b>CRCW1206</b>															
<b>PRODUCT DESCRIPTION: CRCW0603-C 100 562R 1 % ET6 E3</b>															
<b>CRCW0603-C</b>	<b>100</b>		<b>562R</b>			<b>1 %</b>		<b>ET6</b>		<b>e3</b>					
MODEL	TCR		RESISTANCE VALUE			TOLERANCE		PACKAGING		LEAD (Pb)-FREE					
<b>CRCW0402-C</b>	<b>± 200 ppm/K</b>		<b>10R = 10 Ω</b>			<b>± 5 %</b>		<b>ET1, ET5,</b>		<b>e3 = pure tin termination finish</b>					
<b>CRCW0603-C</b>	<b>± 100 ppm/K</b>		<b>562R = 562 Ω</b>			<b>± 1 %</b>		<b>ET6, ET7,</b>							
<b>CRCW0805-C</b>			<b>10K = 10.0 kΩ</b>					<b>EF4</b>							
<b>CRCW1206-C</b>			<b>1M = 1 MΩ</b>												
			<b>OR0 = jumper</b>												

<b>PACKAGING</b>						
TYPE / SIZE	CODE	QUANTITY	PACKAGING STYLE	WIDTH	PITCH	PACKAGING DIMENSIONS
<b>CRCW0402...C</b>	ED = ET7	10 000	Paper tape acc. to IEC 60286-3, Type 1a	8 mm	2 mm	Ø 180 mm/7"
	EE = EF4	50 000				Ø 330 mm/13"
<b>CRCW0603...C</b>	EA = ET1	5000	Paper tape acc. to IEC 60286-3, Type 1a	8 mm	4 mm	Ø 180 mm/7"
	EB = ET5	10 000				Ø 254 mm/10"
<b>CRCW0805...C</b>	EC = ET6	20 000	Paper tape acc. to IEC 60286-3, Type 1a	8 mm	4 mm	Ø 330 mm/13"
	EA = ET1	5000				Ø 180 mm/7"
<b>CRCW1206...C</b>	EB = ET5	10 000	Paper tape acc. to IEC 60286-3, Type 1a	8 mm	4 mm	Ø 254 mm/10"
	EC = ET6	20 000				Ø 330 mm/13"

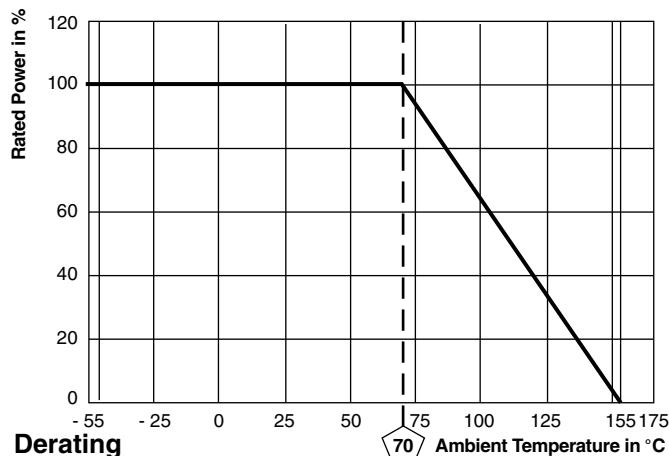
### DIMENSIONS



SIZE	DIMENSIONS (in millimeters)					SOLDER PAD DIMENSIONS <sup>(1)</sup> (in millimeters)						
						REFLOW SOLDERING		WAVE SOLDERING				
INCH	METRIC	L	W	H	T1	T2	a	b	I	a	b	I
0402	1005	1.0 ± 0.10	0.5 ± 0.05	0.30 ± 0.05	0.25 ± 0.10	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1.60 ± 0.10	0.80 ± 0.10	0.45 ± 0.10	0.3 ± 0.2	0.3 ± 0.2	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	2.0 ± 0.10	1.25 ± 0.15	0.50 ± 0.10	0.35 ± 0.15	0.35 ± 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 <sup>+0.10</sup> <sub>-0.05</sub>	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.

**FUNCTIONAL PERFORMANCE**


<b>TEST PROCEDURES AND REQUIREMENTS</b>							
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE ( $\Delta R$ )			
				STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER		
Stability for product types:			<b>CRCW...C e3</b>	1 Ω to 10 MΩ	1 Ω to 10 MΩ		
4.5	-	Resistance	(20/- 55/20) °C and (20/125/20) °C	± 1 %	± 5 %		
4.8.4.2	-	Temperature coefficient					
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}; 5 \text{ s}$	± (2 % $R + 0.1 \Omega$ )			
4.17.5	58 (Td)	Solderability	Pre-aging 4 h at 155 °C, dryheat	Solder bath method; Sn60Pb40 non activated flux; (235 ± 5) °C (2 ± 0.2) s	Good tinning (≥ 95 % covered) no visible damage		
				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	Solder bath method (260 ± 5) °C; (10 ± 1) s		± (1% $R + 0.05 \Omega$ )		
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 °C; 30 min. at 125 °C; 5 cycles		± (0.25 % $R + 0.05 \Omega$ )    ± (0.5 % $R + 0.05 \Omega$ )		
4.24	78 (Cab)	Damp heat, steady state	(40 ± 2) °C; 56 days; (93 ± 3) % RH		± (1 % $R + 0.05 \Omega$ )    ± (2 % $R + 0.1 \Omega$ )		
4.36	-	Operation at low temperature	-55 °C, 1 h		± (1 % $R + 0.05 \Omega$ )		
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	± (1 % $R + 0.05 \Omega$ )  ± (2 % $R + 0.1 \Omega$ )	± (2 % $R + 0.1 \Omega$ )  ± (4 % $R + 0.1 \Omega$ )		
4.25.3	-	Endurance at upper category temperature	155 °C, 1000 h		± (1 % $R + 0.05 \Omega$ )    ± (2 % $R + 0.1 \Omega$ )		

**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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