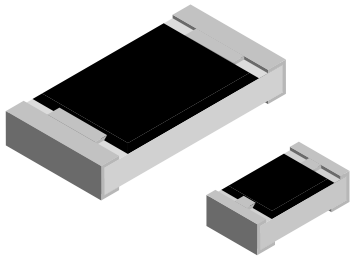
CRCW....-EL e3

Vishay

Thick Film, Low Ohmic Chip Resistors



The RCWE is a direct replacement to the CRCW….-EL e3 type resistor with no change in performance or quality. For RCWE datasheet please visit our website at www.vishay.com/doc?20019

FEATURES

- Extremely low resistance values (down to 0.01 Ω)
- Suitable for current sensors and shunts
- Special metal glaze on high quality ceramic
- Protective overglaze
- Lead (Pb)-free solder contacts on Ni barrier layer
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compliant with "Restriction of the use of Hazardous Substances" (RoHS) directive 2002/95/EC (issue 2004)
- AEC-Q200, rev. C compliant

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING P_{70} W	RATED VOLTAGE V	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES
	INCH	METRIC						
CRCW0603-EL e3	0603	1608	0.2	$\sqrt{P \times R}$	± 700 ± 400 ± 200 ± 100	± 5 ± 1, ± 5 ± 1, ± 5 ± 1, ± 5	0.010 to 0.018 0.020 to 0.030 0.033 to 0.047 0.051 to 0.976	E24
CRCW0805-EL e3	0805	2012	0.25	$\sqrt{P \times R}$	± 400 ± 300 ± 200 ± 100	± 5 ± 1, ± 5 ± 1, ± 5 ± 1, ± 5	0.010 to 0.018 0.020 to 0.030 0.033 to 0.047 0.051 to 0.976	E24
CRCW1206-EL e3	1206	3216	0.5	$\sqrt{P \times R}$	± 600 ± 300 ± 200 ± 100	± 5 ± 1, ± 5 ± 1, ± 5 ± 1, ± 5	0.010 to 0.018 0.020 to 0.030 0.033 to 0.047 0.051 to 0.976	E24
CRCW2512-EL e3	2512	6332	2.0	$\sqrt{P \times R}$	± 600 ± 300 ± 200 ± 100	± 5 ± 1, ± 5 ± 1, ± 5 ± 1, ± 5	0.010 to 0.018 0.020 to 0.030 0.033 to 0.047 0.051 to 0.976	E24

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.
- Marking and packaging: see appropriate catalog or web page
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CRCW0603-EL	CRCW0805-EL	CRCW1206-EL	CRCW2512-EL
Rated Dissipation P_{70} (2)	W	0.2	0.25	0.5	2.0
Rated Voltage $U_{max.}$ AC/DC	V	$\sqrt{P \times R}$			
Insulation Voltage U_{ins} (1 min)	V	> 100	> 200	> 300	> 300
Thermal Resistance (1)	K/W	≤ 425	≤ 340	≤ 170	≤ 43
Insulation Resistance	Ω	$> 10^9$			
Category Temperature Range	°C	- 55 to + 155			
Weight	mg	3	5.5	10.5	40.5

Notes

(1) The measuring conditions are in acc. to EN 140401-802

(2) The power dissipation on the resistors 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.

For technical questions, contact: filmresistors.thickfilmchip@vishay.com

Document Number: 20042
Revision: 30-Apr-09

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: CRCW0603R051FKEAEL (1)

C	R	C	W	0	6	0	3	R	0	5	1	F	K	E	A	E	L

MODEL/SIZE	VALUE	TOLERANCE	TCR	PACKAGING (2)	SPECIAL
CRCW0603 **CRCW0805** **CRCW1206** **CRCW2512**	**R** = Decimal	**F** = ± 1 % **J** = ± 5 %	**K** = ± 100 ppm/K **N** = ± 200 ppm/K **M** = ± 300 ppm/K **Q** = ± 400 ppm/K **T** = ± 600 ppm/K **Y** = ± 700 ppm/K	**EA** **EB** **EC** **EI** **EL** **EG** **EH**	Up to 2 digits **EL** = Low Ohmic

PRODUCT DESCRIPTION: CRCW0603-EL 100 R051 1 % ET1 e3

CRCW0603-EL	100	R051	1 %	ET1	e3
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING (2)	LEAD (Pb)-FREE
CRCW0603-EL CRCW0805-EL CRCW1206-EL CRCW2512-EL	± 100 ppm/K ± 200 ppm/K ± 300 ppm/K ± 400 ppm/K ± 600 ppm/K ± 700 ppm/K	R010 = 0.01 Ω R10 = 0.1 Ω	± 1 % ± 5 %	ET1 ET5 ET6 EG1 E20 E67 E82	e3 = Pure tin Termination finish

Notes

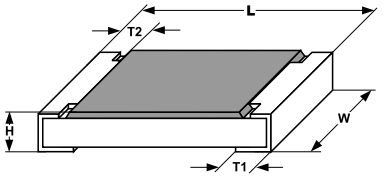
(1) Preferred way for ordering products is by use of the PART NUMBER

(2) Please refer to table PACKAGING, see below

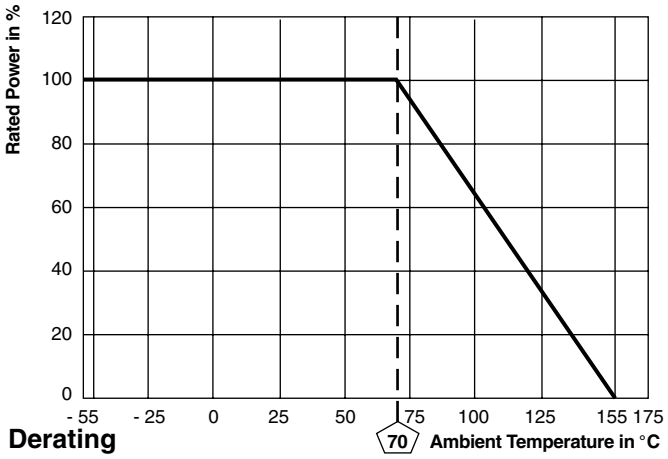
PACKAGING

MODEL	REEL							
	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PACKAGING CODE			
					PART NUMBER		PRODUCT DESC.	
					PAPER	BLISTER	PAPER	BLISTER
CRCW0603-EL	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20
CRCW0805-EL	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20
CRCW1206-EL	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20
CRCW2512-EL	12 mm	180 mm/7"	8 mm 4 mm	2000 4000		EG EH		E67 E82

DIMENSIONS in millimeters



SIZE		RESISTANCE RANGE Ω	DIMENSIONS				
INCH	METRIC		L	W	H	T1	T2
0603	1608	0.010 to 0.030	1.6 ± 0.1	0.85 ± 0.1	0.5 ± 0.1	0.5 ± 0.2	0.3 ± 0.2
		0.033 to 0.976				0.3 ± 0.2	
0805	2012	0.010 to 0.030	2.0 ± 0.15	1.3 ± 0.1	0.55 ± 0.1	0.6 ± 0.2	0.35 ± 0.2
		0.033 to 0.976				0.4 ± 0.2	
1206	3216	0.010 to 0.030	3.1 ± 0.15	1.6 ± 0.15	0.6 ± 0.1	0.9 ± 0.2	0.45 ± 0.2
		0.033 to 0.047				0.8 ± 0.2	
		0.051 to 0.976				0.45 ± 0.2	
2512	6332	0.010 to 0.030	6.3 ± 0.2	3.15 ± 0.15	0.6 ± 0.1	2.0 ± 0.3	0.6 ± 0.2
		0.033 to 0.047				0.8 ± 0.3	
		0.051 to 0.976				0.8 ± 0.3	



TEST PROCEDURES AND REQUIREMENTS

EN 60115-1

TEST (clause)	CONDITIONS OF TEST	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
		STABILITY CLASS 2 OR BETTER
	Stability for product types:	10 mΩ to 976 mΩ
	CRCW....-EL e3	
Resistance (4.5)	-	± 1 %, ± 5 %
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	± 700 ppm/K, ± 600 ppm/K, ± 400 ppm/K, ± 300 ppm/K, ± 200 ppm/K, ± 100 ppm/K
Overload (4.13)	$U = 2.5 \times \sqrt{P_{70} \times R}$ $\leq 2 \times U_{max.}$; Duration: According the style	± (0.5 % R + 0.5 mΩ)
Solderability (4.17.5)	Aging 4 h at 155 °C, dryheat solder bath method; 235 °C; 2 s visual examination	Good tinning (≥ 95 % covered) no visible damage
Resistance to soldering heat (4.18.2)	Solder bath method; (260 ± 5) °C; (10 ± 1) s	± (0.5 % R + 0.5 mΩ)
Rapid change of temperature (4.19)	30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles	± (0.5 % R + 0.5 mΩ)
Damp heat, steady state (4.24)	(40 ± 2) °C; 56 days; (93 ± 3) % RH	± (2 % R + 0.5 mΩ)
Climatic sequence (4.23)	16 h at UCT = 125 °C; 1 cycle at 55 °C; 2 h at LCT = - 55 °C; 1 h/1 kPa at 15 °C to 35 °C; 5 cycles at 55 °C $U = \sqrt{P_{70} \times R}$	± (2 % R + 0.5 mΩ)
Endurance at 70 °C (4.25.1)	$U = \sqrt{P_{70} \times R}$ 1.5 h ON; 0.5 h OFF; 70 °C; 1000 h	± (2 % R + 0.5 mΩ)
Extended endurance (4.25.1.8)	Duration extended to 8000 h	± (4 % R + 0.5 mΩ)
Endurance at upper category temperature (4.25.3)	UCT = 155 °C; 1000 h	± (2 % R + 0.5 mΩ)

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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