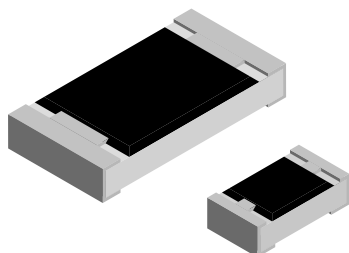


## Lead (Pb)-free Thick Film, Rectangular, Low Value Resistors ( $R \leq 1 \Omega$ )



### FEATURES

- 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
- Compatible with "Restriction of the use of Hazardous Substances" (RoHS) directive 2002/95/EC (issue 2004)
- Extremely low resistance values ( $R \leq 1 \Omega$ )
- Suitable for current sensors and shunts



### STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING $P_{70^\circ\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX $V_{\equiv}$	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE $\Omega$	E-SERIES
	INCH	METRIC	CECC 40401-802/EIA-575					
D10/CRCW0402-LR	0402	1005	0.063	$\sqrt{P \times R}$	$\pm 400$ $\pm 600$	$\pm 5$ $\pm 5$	R47 - R91 R22 - R43	24 24
D11/CRCW0603-LR	0603	1608	0.1	$\sqrt{P \times R}$	$\pm 200$ $\pm 400$	$\pm 5$ $\pm 5$	R47 - R91 R10 - R43	24 24
D12/CRCW0805-LR	0805	2012	0.125	$\sqrt{P \times R}$	$\pm 200$ $\pm 300$	$\pm 5$ $\pm 5$	R47 - R91 R10 - R43	24 24
D25/CRCW1206-LR	1206	3216	0.25	$\sqrt{P \times R}$	$\pm 300$ $\pm 200$	$\pm 5$ $\pm 5$	R10 - R43 R47 - R91	24 24
CRCW1210-LR	1210	3225	0.33	$\sqrt{P \times R}$	$\pm 200$	$\pm 5$	R10 - R91	24
CRCW1218-LR	1218	3246	1.0	$\sqrt{P \times R}$	$\pm 200$	$\pm 5$	R10 - R91	24
CRCW2010-LR	2010	5025	0.5	$\sqrt{P \times R}$	$\pm 200$	$\pm 5$	R10 - R91	24
CRCW2512-LR	2512	6332	1.0	$\sqrt{P \times R}$	$\pm 200$	$\pm 5$	R10 - R91	24

- Ask about further value ranges
- 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
- 1 % tolerance on request

### TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	0402	0603	0805	1206	1210	1218	2010	2512
Rated Dissipation at 70 °C	W	0.063	0.1	0.125	0.25	0.33	1.0	0.5	1.0
Limiting Element Voltage	$V_{\equiv}$	$\sqrt{P \times R}$							
Insulation Voltage (1 min)	$V_{\text{peak}}$	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300
Thermal Resistance	K/W	$\leq 870^1$	$\leq 550^1$	$\leq 440^1$	$\leq 220^1$	$\leq 140^2$	$\leq 140^2$	$\leq 88^2$	$\leq 45^2$
Insulation Resistance	$\Omega$	$> 10^9$							
Category Temperature Range	°C	- 55 to + 125 (+ 155)							
Weight/1000 pcs	g	0.65	2	5.5	10	16	29.5	25.5	40.5

<sup>1)</sup> Measuring conditions in acc. to CECC 40401 - 802

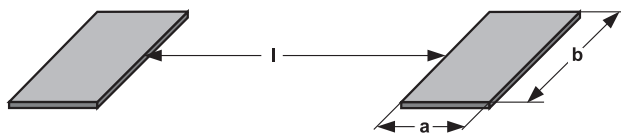
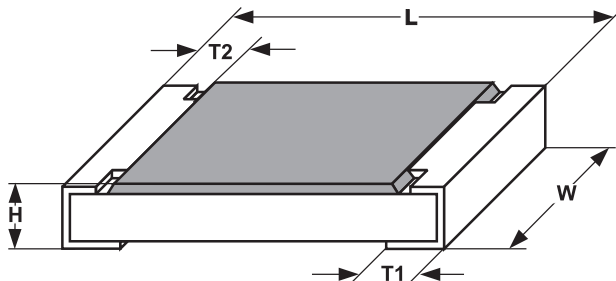
<sup>2)</sup> Dependent on solder pad dimensions



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## DIMENSIONS



SIZE		DIMENSIONS [in millimeters]				
INCH	METRIC	L	W	H	T1	T2
0402	1005	$1.0 \pm 0.05$	$0.5 \pm 0.05$	$0.35 \pm 0.05$	$0.25^{+0.05}_{-0.10}$	$0.2 \pm 0.1$
0603	1608	$1.55^{+0.10}_{-0.05}$	$0.85 \pm 0.1$	$0.45 \pm 0.05$	$0.3 \pm 0.2$	$0.3 \pm 0.2$
0805	2012	$2.0^{+0.20}_{-0.10}$	$1.25 \pm 0.15$	$0.45 \pm 0.05$	$0.3^{+0.20}_{-0.10}$	$0.3 \pm 0.2$
1206	3216	$3.2^{+0.10}_{-0.20}$	$1.6 \pm 0.15$	$0.55 \pm 0.05$	$0.45 \pm 0.2$	$0.4 \pm 0.2$
1210	3225	$3.2 \pm 0.2$	$2.5 \pm 0.2$	$0.55 \pm 0.05$	$0.45 \pm 0.2$	$0.4 \pm 0.2$
1218	3246	$3.2^{+0.10}_{-0.20}$	$4.6 \pm 0.15$	$0.55 \pm 0.05$	$0.45 \pm 0.2$	$0.4 \pm 0.2$
2010	5025	$5.0 \pm 0.15$	$2.5 \pm 0.15$	$0.6 \pm 0.1$	$0.6 \pm 0.2$	$0.6 \pm 0.2$
2512	6332	$6.3 \pm 0.2$	$3.15 \pm 0.15$	$0.6 \pm 0.1$	$0.6 \pm 0.2$	$0.6 \pm 0.2$

SIZE		SOLDER PAD DIMENSIONS [in millimeters]					
		REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	a	b	l	a	b	l
0402	1005	0.4	0.6	0.5			
0603	1608	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	0.9	1.7	2.0	1.1	1.7	2.3
1210	3225	0.9	2.5	2.0	1.1	2.5	2.2
1218	3246	1.05	4.9	1.9	1.25	4.8	1.9
2010	5025	1.0	2.5	3.9	1.2	2.5	3.9
2512	6332	1.0	3.2	5.2	1.2	3.2	5.2

## PART NUMBER AND PRODUCT DESCRIPTION D../CRCW....-LR e3 SERIES

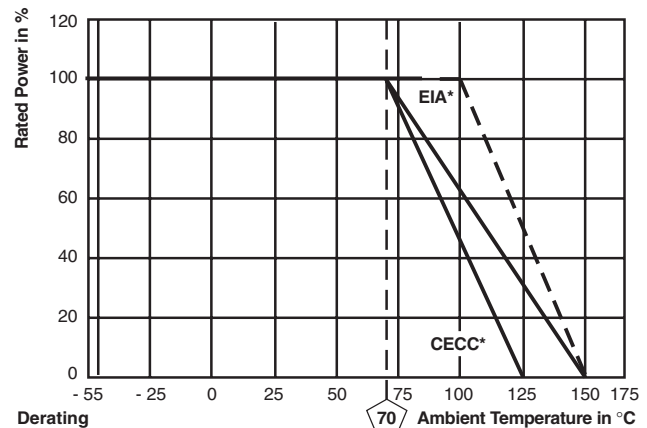
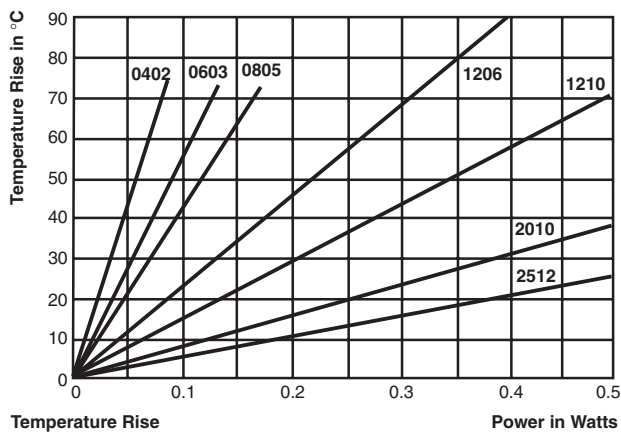
PART NUMBERING: CRCW0402R470JNEALR

C	R	C	W	0	4	0	2	R	4	7	0	J	N	E	A	L	R
MODEL/SIZE				VALUE				TOLERANCE				TC		PACKING		SPECIAL	
CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512				R = Decimal				J = $\pm 5\%$				N = $\pm 200$ ppm/K M = $\pm 300$ ppm/K Q = $\pm 400$ ppm/K T = $\pm 600$ ppm/K		ED = ET7 EE = EF4 EA = ET1 EB = ET5 EC = ET6 EI = EG1 EL = E20 EK = ET9 EF = E02 EG = E67 EH = E82		up to 2 digits LR = Low Value	

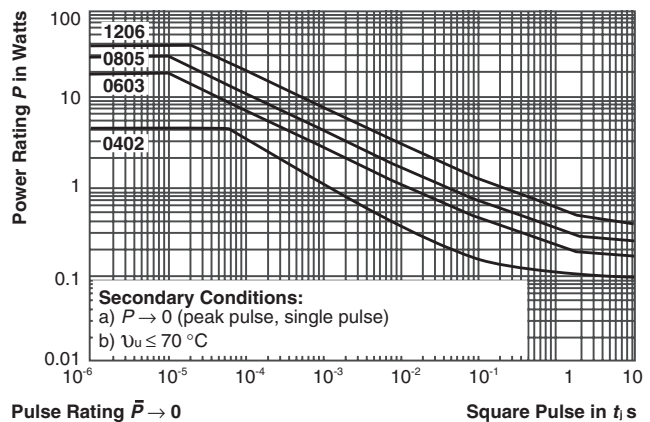
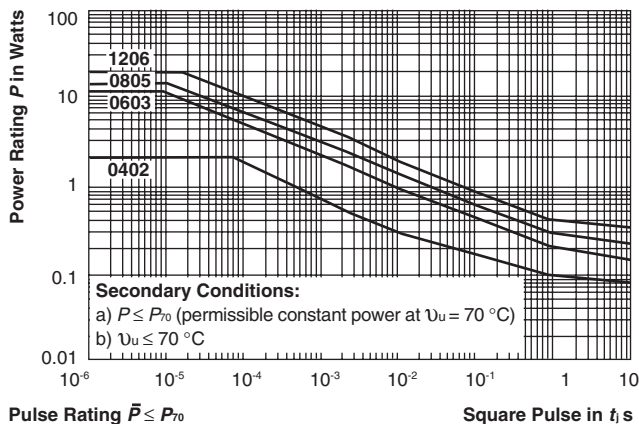
PRODUCT DESCRIPTION: D10/CRCW0402-LR 200 0R47 5 % ET1 e3

D10/CRCW0402-LR	200	0R47	5 %	ET1	e3
MODEL	TC	RESISTANCE VALUE	TOLERANCE	PACKING	LEAD (Pb)-FREE
D10/CRCW0402-LR D11/CRCW0603-LR D12/CRCW0805-LR D25/CRCW1206-LR CRCW1210-LR CRCW1218-LR CRCW2010-LR CRCW2512-LR	$\pm 200$ ppm/K $\pm 300$ ppm/K $\pm 400$ ppm/K $\pm 600$ ppm/K	0R10 = $0.1 \Omega$ 0R91 = $0.91 \Omega$	$\pm 5\%$	ET7 EF4 ET1 ET5 ET6 EG1 E20 ET9 E02 E67 E82	e3 = Pure Tin Termination Finish

PACKING						
MODEL	REEL					
	TAPE WIDTH	DIAMETER	PIECES/REEL	PITCH	PACKING CODE	
					PAPER	BLISTER
D10/CRCW0402-LR	8 mm	180 mm/7"	10 000	2 mm	ET7	
		330 mm/13"	50 000	2 mm	EF4	
D11/CRCW0603-LR	8 mm	180 mm/7"	5000	4 mm	ET1	EG1
		255 mm/10"	10 000	4 mm	ET5	
		330 mm/13"	20 000	4 mm	ET6	E20
D12/CRCW0805-LR	8 mm	180 mm/7"	5000	4 mm	ET1	EG1
		255 mm/10"	10 000	4 mm	ET5	
		330 mm/13"	20 000	4 mm	ET6	E20
D25/CRCW1206-LR	8 mm	180 mm/7"	5000	4 mm	ET1	EG1
		255 mm/10"	10 000	4 mm	ET5	
		330 mm/13"	20 000	4 mm	ET6	E20
CRCW1210-LR	8 mm	180 mm/7"	5000	4 mm	ET1	EG1
		330 mm/13"	20 000	4 mm	ET6	E20
CRCW1218-LR	12 mm	180 mm/7"	4000	4 mm		ET9
CRCW2010-LR	12 mm	180 mm/7"	4000	4 mm		E02
CRCW2512-LR	12 mm	180 mm/7"	2000	8 mm		E67
			4000	4 mm		E82



\* There are differences in board layout and measurements between CECC and EIA.



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<b>PERFORMANCE</b>		
<b>TEST</b>	<b>CONDITIONS OF TEST</b>	<b>REQUIREMENTS<sup>1)</sup></b>
Endurance Test at 70 °C IEC 60115-1 4.25.1	1000 hours at 70 °C, 1.5 hours "ON", 0.5 hours "OFF"	$\leq \pm 2 \%$
Endurance at UCT IEC 60115-1 4.25.3	1000 hours at 125 °C without load	$\leq \pm 0.5 \%$
Overload Test IEC 60115-1 4.13	Short time overload for 2 seconds	$\leq \pm 1 \%$
Thermal Shock IEC 60115-1 4.19; IEC 60068-2-14	Rapid change between upper and lower category temperature	$\leq \pm 1 \%$
Damp Heat Steady State IEC 60115-1 4.24; IEC 60068-2-3	56 days at 40 °C and 93 % relative humidity	$\leq \pm 2 \%$
Resistance to Soldering Heat IEC 60115-1 4.18; IEC 60068-2-20	10 seconds at 260 °C solder bath temperature	$\leq \pm 1 \%$

<sup>1)</sup> Limits for change of resistance at test

<b>APPLICABLE SPECIFICATIONS</b>
<ul style="list-style-type: none"><li>• CECC40000/40400/40401-802</li><li>• IEC 60115-1</li><li>• EIA 575</li></ul>



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