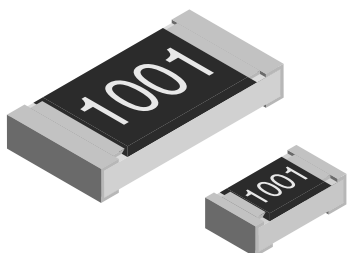


# Lead (Pb)-Free Thick Film, Rectangular, Precision Resistors



## 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)
- Excellent stability in different environmental conditions
- Low temperature coefficient and tight tolerances



## STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING P <sub>70°C</sub> W	LIMITING ELEMENT VOLTAGE MAX V <sub>≡</sub>	TEMPERATURE COEFFICIENT  ppm/K	TOLERANCE  %	RESISTANCE RANGE  Ω	E-SERIES
	INCH	METRIC	CECC 40401-802/EIA-575					
D10/CRCW0402-P	0402	1005	0.063	50	± 100 ± 50 ± 25	± 0.5 ± 0.25; ± 0.5; ± 1 ± 0.25; ± 0.5; ± 1	10R - 1M0 100R - 1M0 100R - 10K	96 96 96
D11/CRCW0603-P	0603	1608	0.1	75	± 100 ± 50 ± 50 ± 25	± 0.5 ± 0.25 ± 0.5; ± 1 ± 0.25; ± 0.5; ± 1	10R - 10M 100R - 1M0 100R - 10M 100R - 10K	96 96 96 96
D12/CRCW0805-P	0805	2012	0.125	150	± 100 ± 50 ± 50 ± 25	± 0.5 ± 0.25 ± 0.5; ± 1 ± 0.25; ± 0.5; ± 1	10R - 10M 100R - 1M0 100R - 10M 100R - 10K	96 96 96 96
D25/CRCW1206-P	1206	3216	0.25	200	± 100 ± 50 ± 50 ± 25	± 0.5 ± 0.25 ± 0.5; ± 1 ± 0.25; ± 0.5; ± 1	10R - 10M 100R - 1M0 100R - 10M 100R - 10K	96 96 96 96
CRCW1210-P	1210	3225	0.33	200	± 100 ± 50	± 0.5 ± 0.5	100R - 1M0 100R - 1M0	96 96
CRCW1218-P	1218	3246	1.0	200	± 100 ± 50	± 0.5 ± 0.5; ± 1	100R - 1M0 100R - 2M2	96 96
CRCW2010-P	2010	5025	0.5	400	± 100 ± 50	± 0.5 ± 0.5; ± 1	10R - 10M 100R - 10M	96 96
CRCW2512-P	2512	6332	1.0	500	± 100 ± 50	± 0.5 ± 0.5; ± 1	10R - 10M 100R - 10M	96 96

- Ask about further value ranges
- Special terminations for conductive adhesive attachment on request
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material
- Marking and packaging: see appropriate catalog or web pages

## TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	D10/ CRCW0402-P	D11/ CRCW0603-P	D12/ CRCW0805-P	D25/ CRCW1206-P	CRCW1210-P	CRCW1218-P	CRCW2010-P	CRCW2512-P
Rated Dissipation at 70°C (CECC 40401   EIA 575)	W	0.063	0.1	0.125	0.25	0.33	1.0	0.5	1.0
Limiting Element Voltage <sup>2)</sup>	V <sub>≡</sub>	50	75	150	200	200	200	400	500
Insulation Voltage (1 min)	V <sub>peak</sub>	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300
Thermal Resistance	K/W	≤ 870 <sup>1)</sup>	≤ 550 <sup>1)</sup>	≤ 440 <sup>1)</sup>	≤ 220 <sup>1)</sup>	≤ 140 <sup>3)</sup>	<sup>3)</sup>	≤ 88 <sup>3)</sup>	≤ 65 <sup>3)</sup>
Insulation Resistance	Ω	> 10 <sup>9</sup>							
Category Temperature Range	°C	- 55 to + 125							
Failure Rate	h <sup>-1</sup>	0.3 • 10 <sup>-9</sup>							
Weight / 1000pcs	g	0.65	2	5.5	10	16	29.5	25.5	40.5

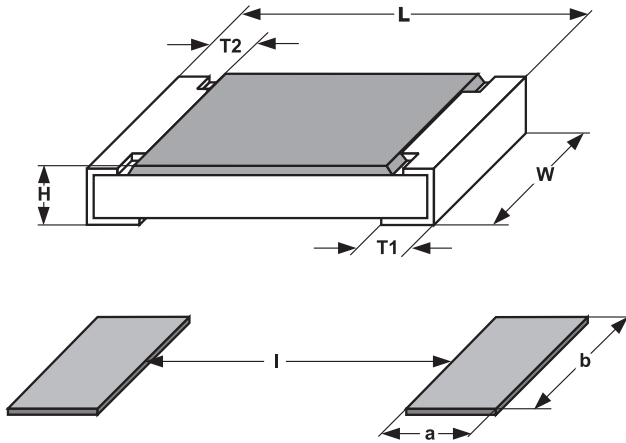
<sup>1)</sup> Measuring conditions in acc. to CECC 40401 - 802

<sup>2)</sup> Rated voltage:  $\sqrt{P \times R}$

<sup>3)</sup> Depending on solder pad dimensions



## DIMENSIONS



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

Dimensions 1210 to 2512 and solder-pad dimensions: see standard chip resistors D../CRCW

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

Part Numbering: CRCW040225R0DKEDP

C	R	C	W	0	4	0	2	2	5	R	0	D	K	E	D	P	
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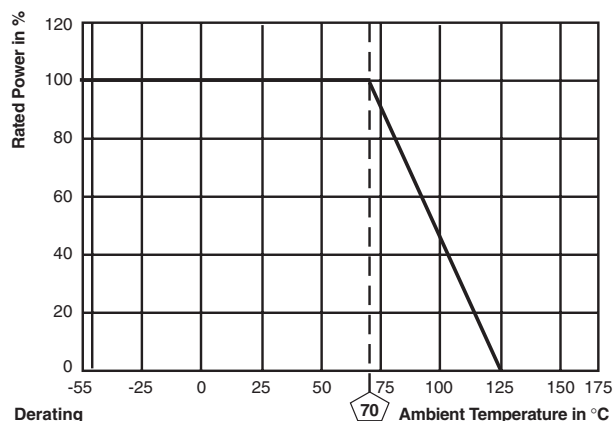
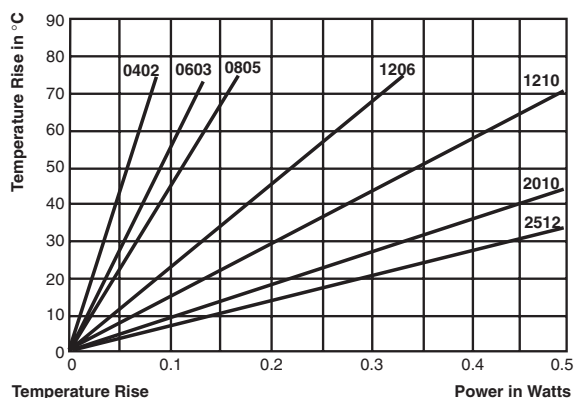
MODEL/SIZE	VALUE	TOLERANCE	TC	PACKING	SPECIAL
CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512	R = Decimal K = Thousand M = Million	C = ± 0.25 % D = ± 0.5 % F = ± 1 %	E = ± 25 ppm/K H = ± 50 ppm/K K = ± 100 ppm/K	EA = ET1 EB = ET5 EC = ET6 ED = ET7 EE = EF4 EI = EG1 EL = E20 EK = ET9 EF = E02 EG = E67 EH = E82 EY = E27	up to 2 digits P = Precision

Product Description: D10/CRCW0402-P 100 25R 0.5% ET7 e3

D10/CRCW0402-P	100	25R	0.5 %	ET7	E3
MODEL	TC	RESISTANCE	TOLERANCE	PACKING <sup>1)</sup>	LEAD (Pb)-FREE
D10/CRCW0402-P D11/CRCW0603-P D12/CRCW0805-P D25/CRCW1206-P CRCW1210-P CRCW1218-P CRCW2010-P CRCW2512-P	± 25 ppm/K ± 50 ppm/K ± 100 ppm/K	49K9 = 49.9 KΩ 5R1 = 5.1 Ω	± 0.25 % ± 0.5 % ± 1 %	ET1 ET5 ET6 ET7 EF4 EG1 E20 ET9 E02 E67 E82 E27	E3 = Pure Tin Termination Finish

<sup>1)</sup> Please refer to table PACKING, page 3.

PACKING								
MODEL	REEL					BULK		
	TAPE WIDTH	DIAMETER	PIECES/REEL	PITCH	PACKING CODE		BULK FEEDING MAGAZINE PIECES/MAGAZINE	
					PAPER	BLISTER	PIECES	CODE
D10/CRCW0402-P	8mm	180mm/7" 330mm/13"	10 000 50 000	2 mm 2 mm	ET7 EF4		50 000	E27
D11/CRCW0603-P	8mm	180mm/7" 255mm/10" 330mm/13"	5 000 10 000 20 000	4 mm 4 mm 4 mm	ET1 ET5 ET6	EG1 E20	25 000	E27
D12/CRCW0805-P	8mm	180mm/7" 255mm/10" 330mm/13"	5 000 10 000 20 000	4 mm 4 mm 4 mm	ET1 ET5 ET6	EG1 E20	10 000	E27
D25/CRCW1206-P	8mm	180mm/7" 255mm/10" 330mm/13"	5 000 10 000 20 000	4 mm 4 mm 4 mm	ET1 ET5 ET6	EG1 E20		
CRCW1210-P	8mm	180mm/7" 330mm/13"	5 000 20 000	4 mm 4 mm	ET1 ET6	EG1 E20		
CRCW1218-P	12mm	180mm/7"	4 000	4 mm		ET9		
CRCW2010-P	12mm	180mm/7"	4 000	4 mm		E02		
CRCW2512-P	12mm	180mm/7"	2 000 4 000	8 mm 4 mm		E67 E82		





PERFORMANCE				
TEST	CONDITIONS OF TEST	TEST RESULTS %		
		0402 0603	0805 1206 1210	1218 2010 2512
Endurance Test at 70°C IEC 60115-1 4.25.1	1000 hours at 70°C, 1.5 hours "ON", 0.5 hours "OFF"	≤ ± 1.0	≤ ± 1.5	≤ ± 1.0
Endurance at UCT IEC 60115-1 4.25.3	1000 hours at 125°C without load	≤ ± 1.0	≤ ± 0.5	≤ ± 1.0
Overload Test IEC 60115-1 4.13	Short time overload 2.5 x rated voltage or ≤ 2 x limiting element voltage.	≤ ± 0.25	≤ ± 0.25	≤ ± 0.5
Thermal Shock IEC 60115-1 4.19; IEC 60068-2-14;	Rapid change between upper and lower category temperature	≤ ± 0.25	≤ ± 0.25	≤ ± 0.5
Damp Heat Steady State IEC 60115-1 4.24; IEC 60068-2-3	56 days at 40°C and 93% relative humidity	≤ ± 1.0	≤ ± 0.5	≤ ± 1.0
Resistance to Soldering Heat IEC 60115-1 4.18; IEC 60068-2-20	10 seconds at 260°C solder bath temperature	≤ ± 0.25	≤ ± 0.25	≤ ± 0.5

**CURRENT NOISE / NON-LINEARITY:**

See standard Chip series D...CRCW...

APPLICABLE SPECIFICATIONS
<ul style="list-style-type: none"><li>• CECC40000 / 40400 / 40401 - 802</li><li>• EN140400 / IEC 60115 – 1</li><li>• EIA 575</li><li>• MIL-PRF-55342</li></ul>



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