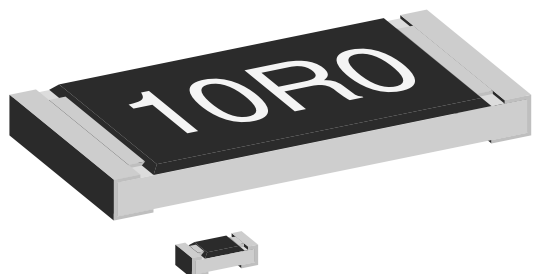


## Lead Free Thick Film, Rectangular Chip Resistors Series D/CRCW



### 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
- High volume product suitable for commercial and special applications

### STANDARD ELECTRICAL SPECIFICATIONS

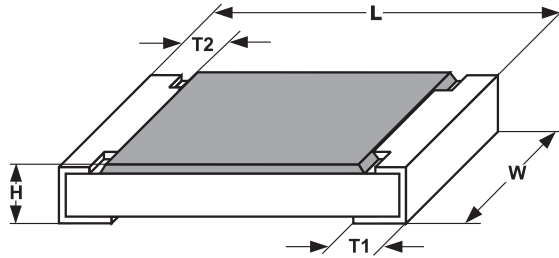
MODEL	SIZE		POWER RATING $P_{70^{\circ}\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX $V_{\leq}$	TEMPERATURE COEFFICIENT	TOLERANCE	RESISTANCE RANGE	E-SERIES
	INCH	METRIC						
CRCW0201	0201	0525	0.05	30	200	1	10R – 1M	24 + 96
			0.05	30	200	5	10R – 1M0	24
Zero-Ohm-Resistor: $R_{\text{max}} = 50\text{m}\Omega$ , $I_{\text{max}} = 1\text{A}$								
D10/CRCW0402	0402	1005	0.063	50	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 1\text{A}$								
D11/CRCW0603	0603	1608	0.10	75	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 1.5\text{A}$								
D12/CRCW0805	0805	2012	0.125	150	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 2\text{A}$								
D25/CRCW1206	1206	3216	0.25	200	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 2.5\text{A}$								
CRCW1210	1210	3225	0.33	200	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 1M0	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 2.5\text{A}$								
CRCW1218	1218	3246	1.0	200	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 2M2	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 4\text{A}$								
CRCW2010	2010	5025	0.5	400	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 3\text{A}$								
CRCW2512	2512	6332	1.0	500	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
Zero-Ohm-Resistor: $R_{\text{max}} = 20\text{m}\Omega$ , $I_{\text{max}} = 4\text{A}$								

1) 100ppm/K on request

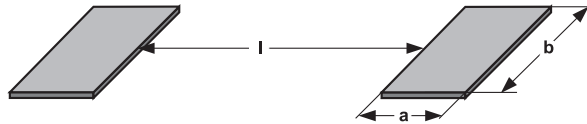
- Ask about further value ranges
- For low values see Thick Film rectangular low value resistors
- For high values see Thick Film rectangular high values.
- For precision Thick Film CRCW see Thick Film rectangular Precision Resistors
- Marking and packaging: see appropriate catalog or web pages
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material
- AgPd or Pd terminations for conductive adhesive attachment on request

### ORDERING INFORMATION

D11/CRCW0603 MODEL	100 TC ppm / K	562R RESISTANCE VALUE $\Omega$	1% TOLERANCE $\pm$ %	ET6 PACKAGING Papertape 20000 pcs	E3 LEAD FREE
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**DIMENSIONS**


SIZE		DIMENSIONS [in millimeters]				
INCH	METRIC	L	W	H	T1	T2
0201	0525	0.6 ± 0.05	0.3 ± 0.05	0.23 ± 0.05	0.15 ± 0.05	0.6 ± 0.05
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 <sup>+0.10</sup> <sub>-0.05</sub>	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2
0805	2012	2.0 <sup>+0.20</sup> <sub>-0.10</sub>	1.25 ± 0.15	0.45 ± 0.05	0.3 <sup>+0.20</sup> <sub>-0.10</sub>	0.3 ± 0.2
1206	3216	3.2 <sup>+0.10</sup> <sub>-0.20</sub>	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 <sup>+0.10</sup> <sub>-0.20</sub>	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



SIZE		SOLDER PAD DIMENSIONS [in millimeters]					
INCH	METRIC	REFLOW SOLDERING			WAVE SOLDERING		
		a	b	l	a	b	l
0201	0525	0.28	0.43	0.23			
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

**TECHNICAL SPECIFICATIONS**

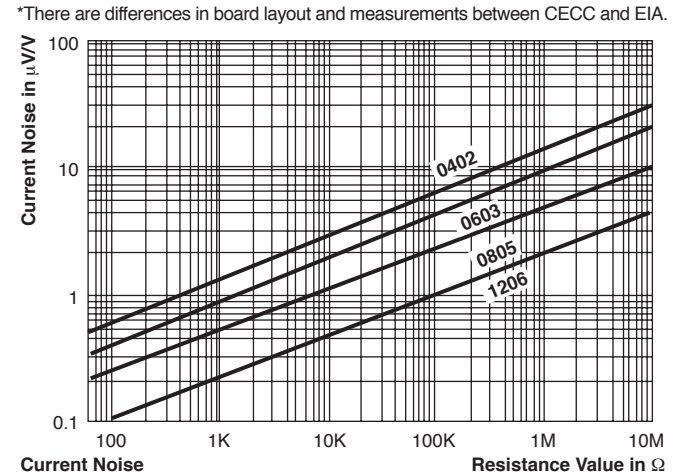
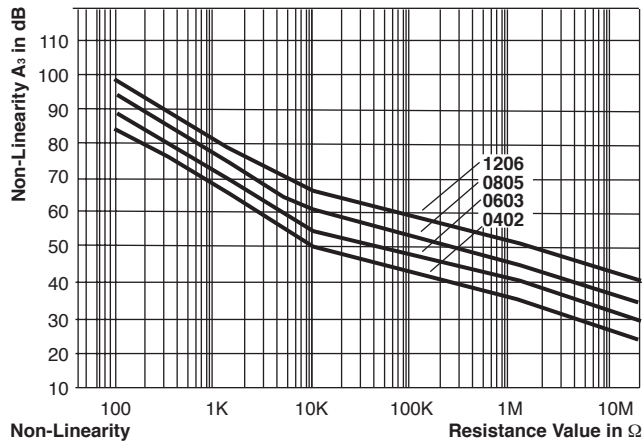
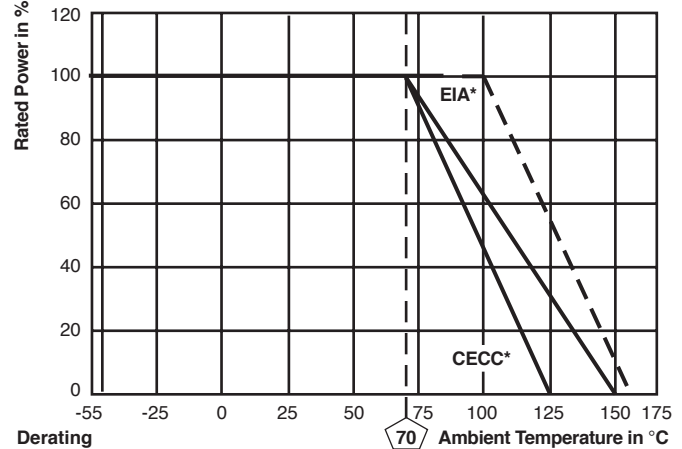
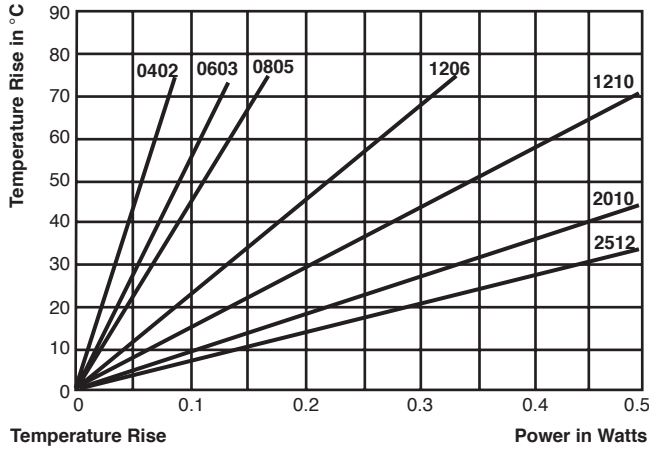
PARAMETER	UNIT	CRCW0201	D10/ CRCW0402	D11/ CRCW0603	D12/ CRCW0805	D25/ CRCW1206	CRCW1210	CRCW1218	CRCW2010	CRCW2512
Rated Dissipation at 70°C (CECC 40401 I EIA 575)	W	0.05	0.063	0.10	0.125	0.25	0.33	1.0	0.5	1.0
Limiting Element Voltage <sup>2)</sup>	V <sub>≅</sub>	30	50	75	150	200	200	200	400	500
Insulation Voltage (1 min)	V <sub>peak</sub>	50	> 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 / + 125 (+ 155)								
Failure Rate	h <sup>-1</sup>	1.10 <sup>-9</sup>	0.3 · 10 <sup>-9</sup>							
Weight / 1000pcs	g	0.17	0.65	2	5.5	10	16	29.5	25.5	40.5

<sup>1)</sup> Measuring conditions in acc. to CECC 4040

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

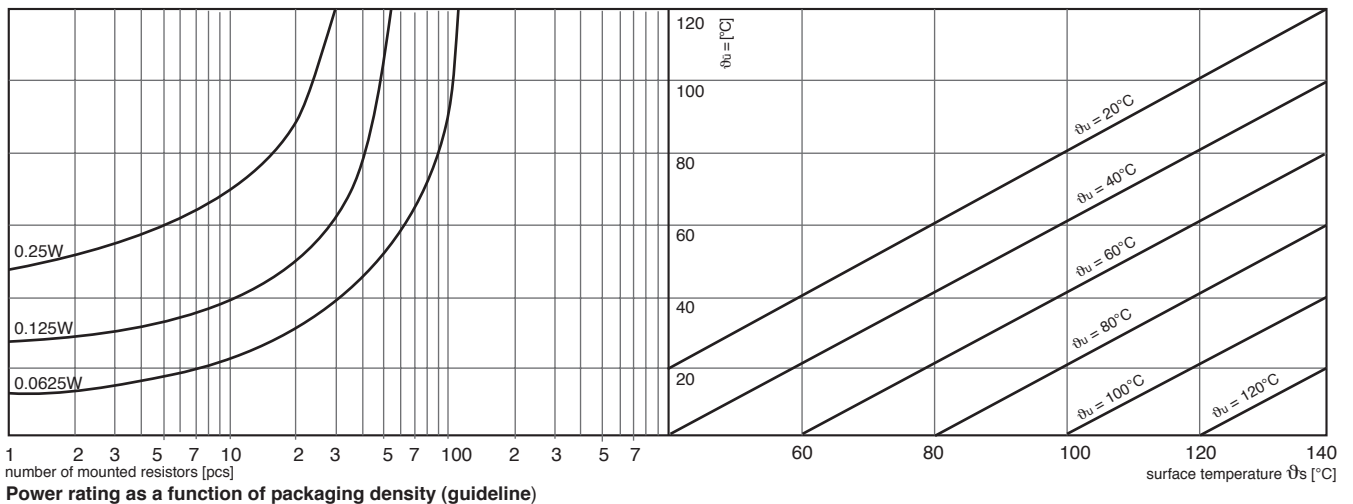
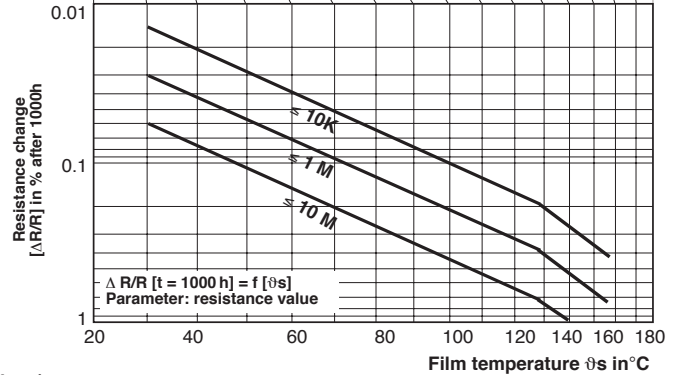
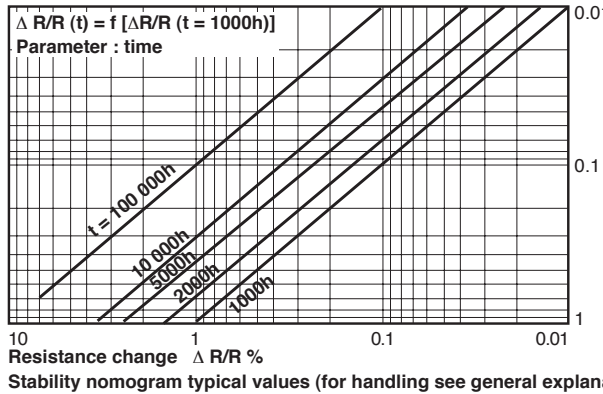
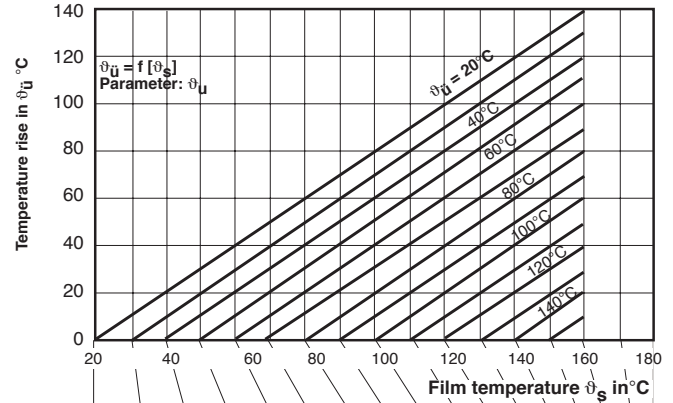
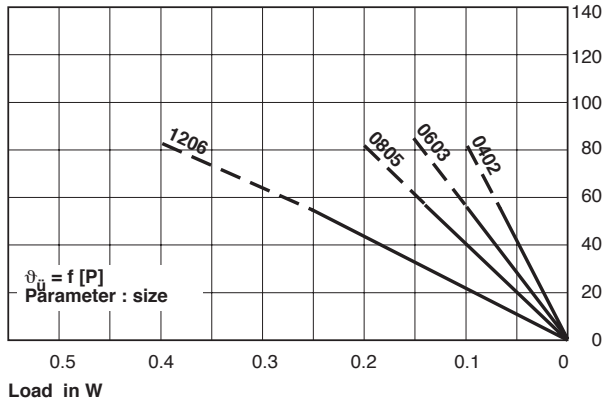
<sup>2)</sup> Rated voltage:  $\sqrt{P \times R}$ 
**PART NUMBER INFORMATION**

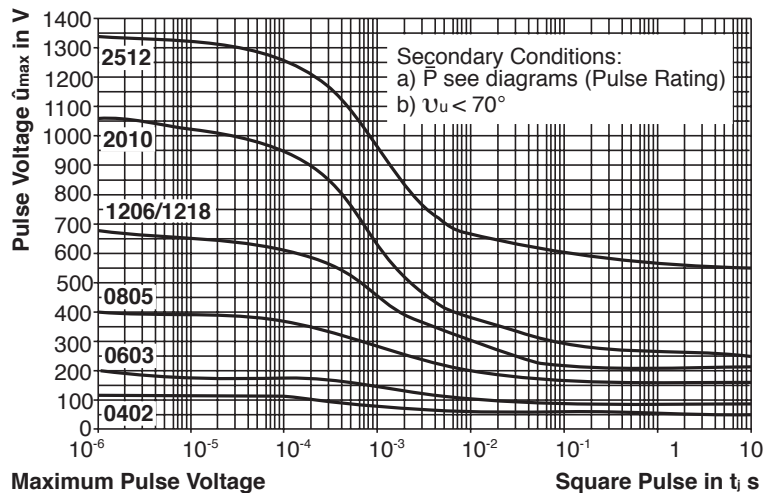
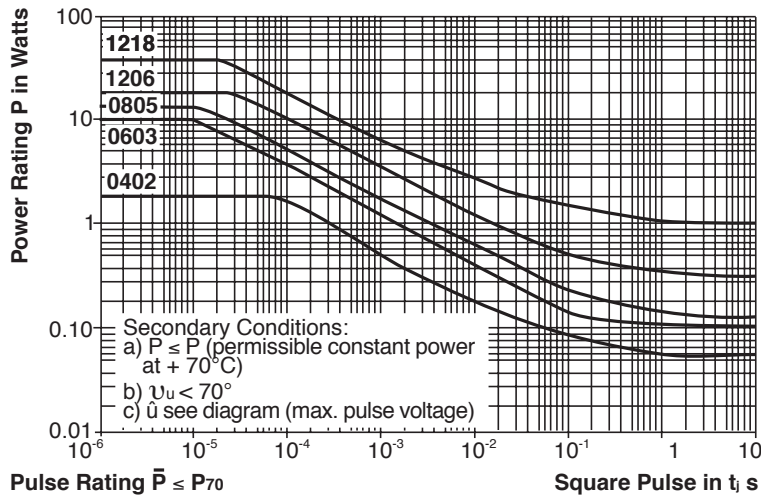
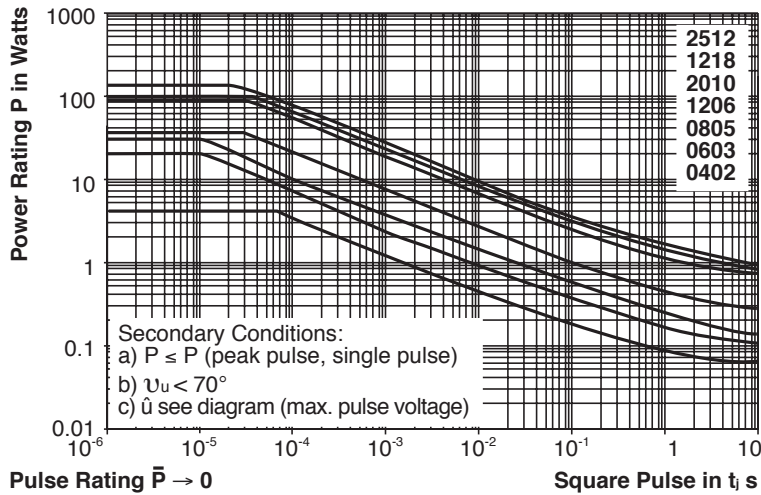
MODEL	VALUE	TOLERANCE	T.C.	PACKAGING	SPECIAL
CRCW0201 D10/CRCW0402 D11/CRCW0603 D12/CRCW0805 D25/CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512	R = Decimal K = Thousand M = Million	F = ± 1.0% J = ± 5.0%	K = 100 ppm/K N = 200 ppm/K	EA = ET1 5000 paper tape EB = ET5 10000 paper tape EC = ET6 20000 paper tape ED = ET7 10000 paper tape EE = EF4 50000 paper tape EF = E02 4000 paper tape EG = E67 2000 paper tape EH = E82 4000 paper tape EI = EG1 5000 paper tape EK = ET9 4000 paper tape EL = E20 20000 paper tape EY = E27 bulk	up to 2 digits
<b>Part Numbering: CRCW0603562RFKEC</b>					



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

PACKAGING								
MODEL	REEL				BULK			
	TAPE WIDTH	DIAMETER	PIECES/REEL	PITCH	PACKAGING CODE		BULK FEEDING MAGAZINE PIECES/MAGAZINE	
					PAPER	BLISTER	PIECES	CODE
CRCW0201	8mm Papertape	180mm/7" 330mm/13"	10000 50000	2mm 2mm	P0/RT7 PZ/RF4			
D10/CRCW0402	8mm Papertape	180mm/7" 330mm/13"	10000 50000	2mm 2mm	ET7 EF4		50000	E27
D11/CRCW0603	8mm Paper-/ Blister-tape	180mm/7" 255mm/10" 330mm/13"	5000 10000 20000	4mm 4mm 4mm	ET1 ET5 ET6	EG1 E20	25000	E27
D12/CRCW0805	8mm Paper-/ Blister-tape	180mm/7" 255mm/10" 330mm/13"	5000 10000 20000	4mm 4mm 4mm	ET1 ET5 ET6	EG1 E20	10000	E27
D25/CRCW1206	8mm Paper-/ Blister-tape	180mm/7" 255mm/10" 330mm/13"	5000 10000 20000	4mm 4mm 4mm	ET1 ET5 ET6	EG1 E20		
CRCW1210	8mm Paper-/Blister-tape	180mm/7" 330mm/13"	5000 20000	4mm 4mm	ET1 ET6	EG1 E20		
CRCW1218	12mm Blister-tape	180mm/7"	4000	4mm		ET9		
CRCW2010	12mm Blister-tape	180mm/7"	4000	4mm		E02		
CRCW2512	12mm Blister-tape	180mm/7"	2000 4000	8mm 4mm		E67 E82		







PERFORMANCE					
TEST	CONDITIONS OF TEST	REQUIREMENTS IN % <sup>1)</sup>			
		0402 0603	0805 1206 1210	1218 2010 2512	0201
Endurance Test at 70°C IEC 60115-1 4.25.1; EIA-575	1000 hours at 70°C, 1.5 hours "ON", 0.5 hours "OFF"	≤ ± 1.0	≤ ± 0.5	≤ ± 1.0	≤ ± 3.0
Endurance at UCT IEC 60115-1 4.25.3	1000 hours at 125°C without load	≤ ± 1.0	≤ ± 0.5	≤ ± 1.0	≤ ± 2.0
Overload Test IEC 60115-1 4.13; EIA-575	Short time overload, 2.5 x rated voltage or 2 x limiting element voltage.	≤ ± 0.25	≤ ± 0.25	≤ ± 0.5	≤ ± 1.0
Thermal Shock IEC 60115-1 4.19; IEC 60068-2-14; EIA-575	Rapid change between upper and lower category temperature	≤ ± 0.25	≤ ± 0.25	≤ ± 0.5	≤ ± 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	≤ ± 2.0
Resistance to Soldering Heat IEC 60115-1 4.18; IEC 60068-2-20; EIA-575	10 seconds at 260°C solder bath temperature	≤ ± 0.25	≤ ± 0.25	≤ ± 0.5	≤ ± 1.0

<sup>1)</sup> Limits for change of resistance at test acc. to CECC

#### APPLICABLE SPECIFICATIONS

- CECC40000/40400/40401-004,-006,-007,-802
- EN140400/IEC 60115-1
- EIA-575