

## Thick Film, Rectangular Chip Resistors



### FEATURES

- Metal glaze on high quality ceramic
- Protective overglaze
- Solder contacts on Ni barrier layer
- 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 $V_{\cong}$	TEMPERATURE COEFFICIENT	TOLERANCE	RESISTANCE RANGE	E-SERIES
	INCH	METRIC	CECC 40401-802/EIA-575		ppm/K	%	$\Omega$	
CRCW0201	0201	0525	0.05	30	200	5	10R– 1M0	24
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 1\text{A}$					
D10	0402	1005	0.063	50	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
CRCW0402					100	1	10R – 10M	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 1\text{A}$		200	5	1R0 – 10M	24
D11	0603	1608	0.10	75	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
CRCW0603					100	1	10R – 10M	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 1.5\text{A}$		200	5	1R0 – 10M	24
D12	0805	2012	0.125	150	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
CRCW0805					100	1	10R - 10M	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 2\text{A}$		200	5	1R0 – 10M	24
D25	1206	3216	0.25	200	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
CRCW1206					100	1	10R – 10M	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 2.5\text{A}$		200	5	1R0 – 10M	24
CRCW1210	1210	3225	0.33	200	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 1M0	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 2.5\text{A}$		200	5	1R0 – 10M	24
CRCW1218	1218	3246	1.0	200	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 2M2	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 4\text{A}$		200	5	1R0 – 2M2	24
CRCW2010	2010	5025	0.5	400	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 3\text{A}$		200	5	1R0 – 10M	24
CRCW2512	2512	6332	1.0	500	200 <sup>1)</sup>	1	1R0 – 9R76	24 + 96
					100	1	10R – 10M	24 + 96
			Zero-Ohm-Resistor : $R_{\text{max}} = 20\text{m}\Omega$ $I_{\text{max}} = 4\text{A}$		200	5	1R0 – 10M	24

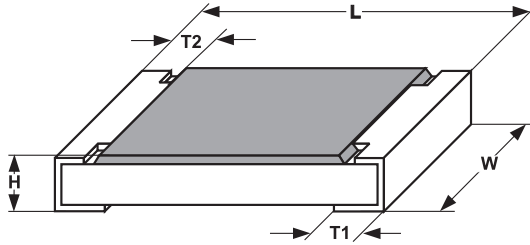
<sup>1)</sup> 100ppm/K on request

- Ask about further value ranges
- For low values see Thick Film rectangular low value resistors
- For high values see Thick Film rectangular high values.

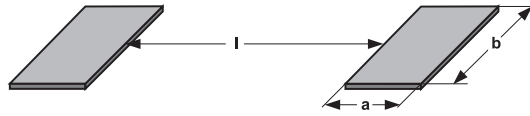
- Marking and packaging: see appropriate catalog or web pages
- For precision Thick Film CRCW see Thick Film rectangular Precision Resistors
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material
- AgPd or Pd terminations for conductive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



**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	0.15 ± 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   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

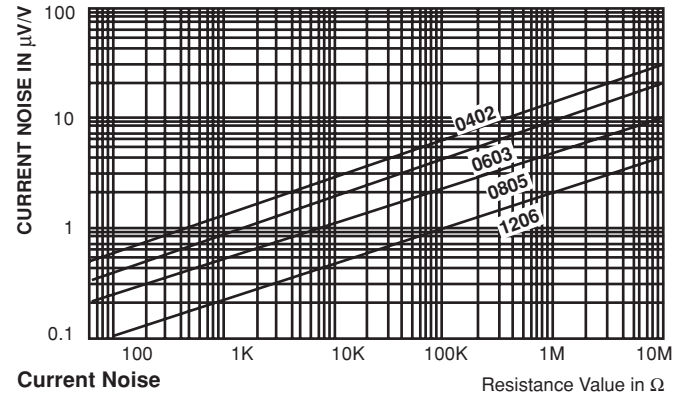
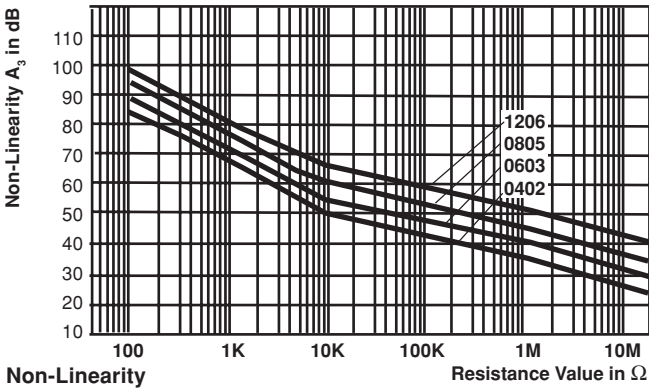
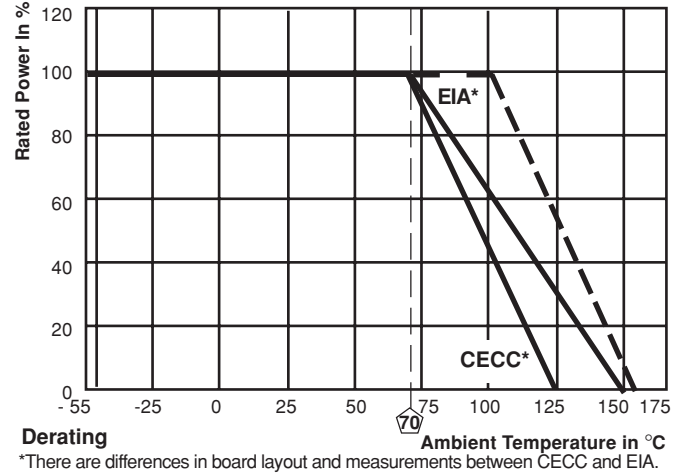
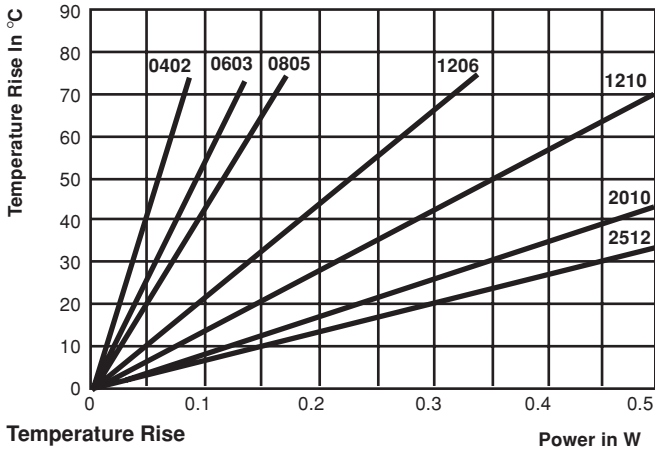
<sup>1)</sup> Measuring conditions in acc. to CECC 40401

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

<sup>2)</sup> Rated voltage: √PxR

**ORDERING INFORMATION**

<b>D-SERIES</b>					
<b>D11</b> MODEL	<b>100</b> TC ppm / K	<b>562R</b> RESISTANCE VALUE Ω	<b>1%</b> TOLERANCE ± % F = ± 1%, J = ± 5%	<b>PN</b> PACKAGING Papertape 20000 pcs	
<b>CRCW-SERIES</b> <b>CRCW</b> MODEL	<b>0603</b> SIZE	<b>5620</b> RESISTANCE VALUE Ω ± 1% = 3 sig. digits, plus multiplier ± 5% = 2 sig. digits, plus multiplier <b>Example:</b> 49R9F = 49.9Ω, ± 1% 5R1J = 5.1Ω, ± 5% 3011F = 3.01KΩ, ± 1% 000Z = 0Ω Jumper	<b>F</b> TOLERANCE ± % D = ± 0.5% F = ± 1% J = ± 5%, Z = 0Ω Jumper	<b>100</b> TC* 50ppm 100ppm 200ppm <b>*NOTE:</b> Entering a TC value in this field is optional. If no TC is specified by the Customer, the default TC will be highest listed for Tolerance specified.	<b>RT6</b> PACKAGING Papertape 20000 pcs

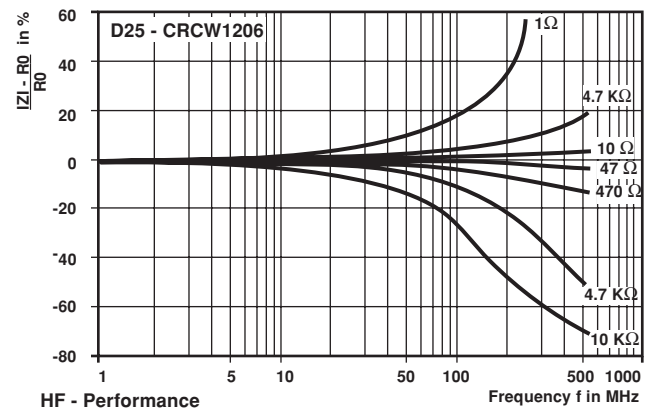
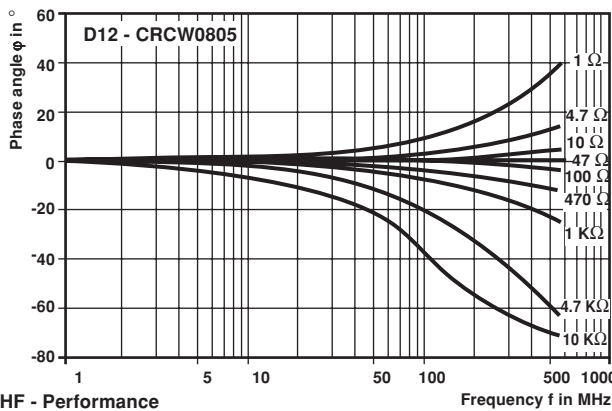
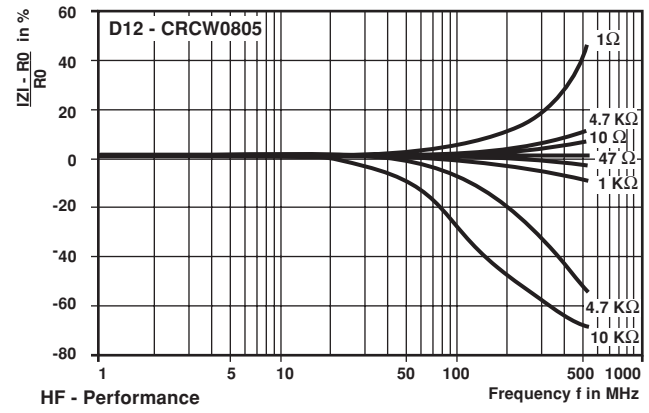
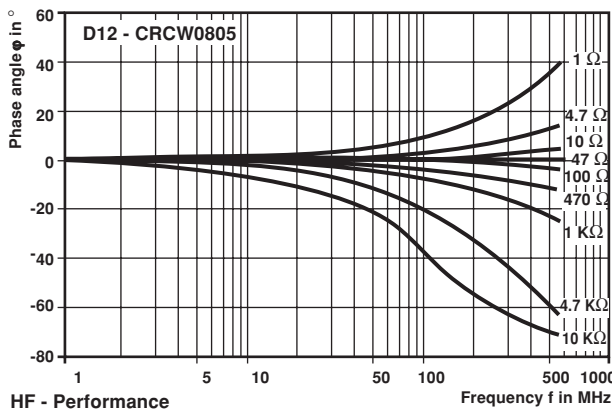
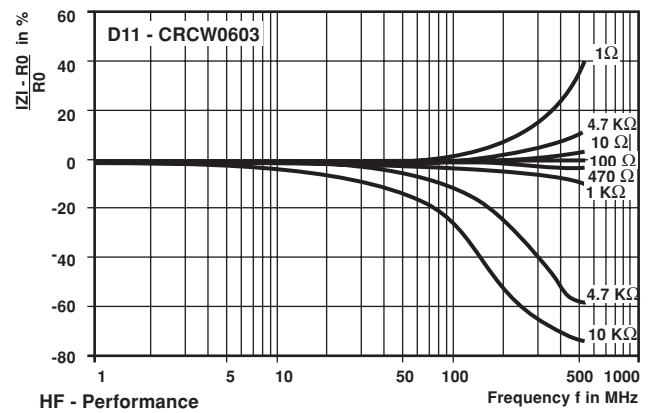
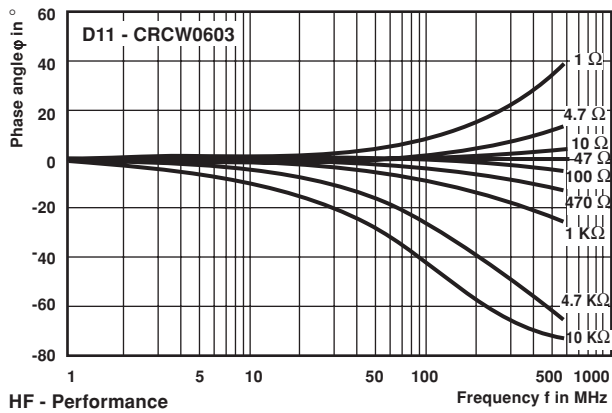
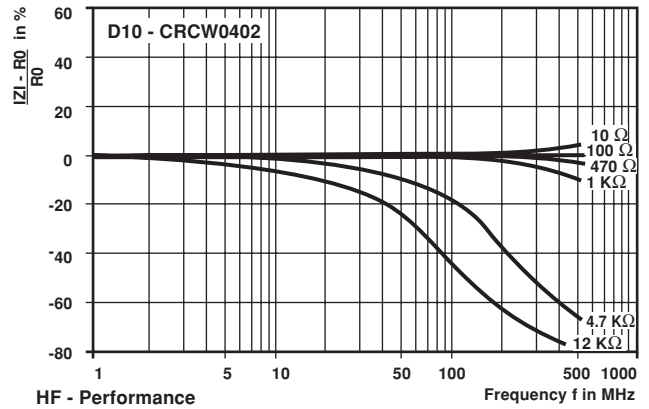
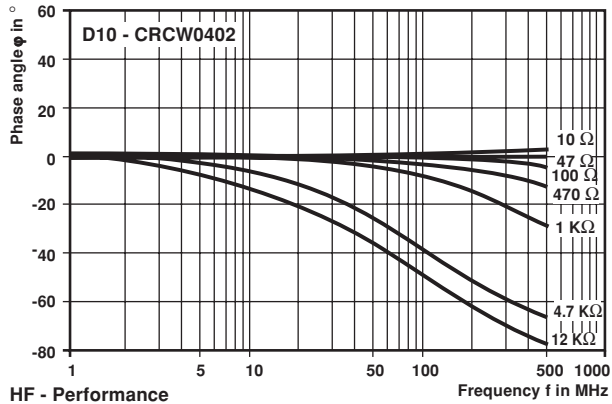


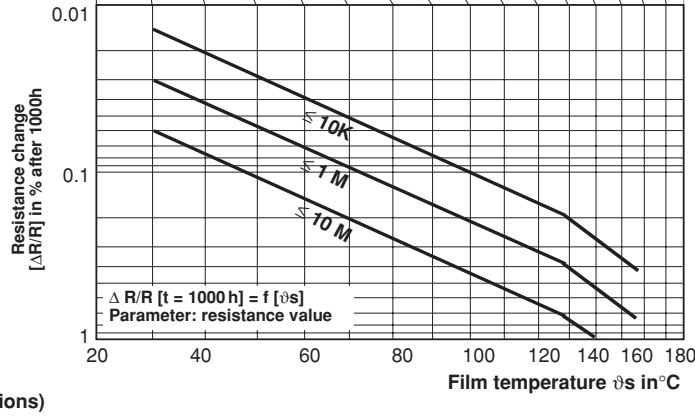
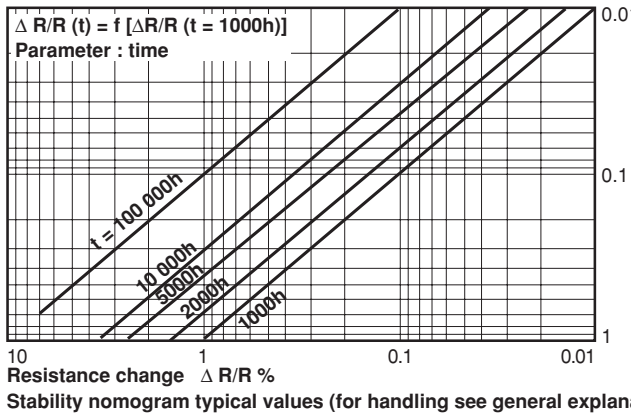
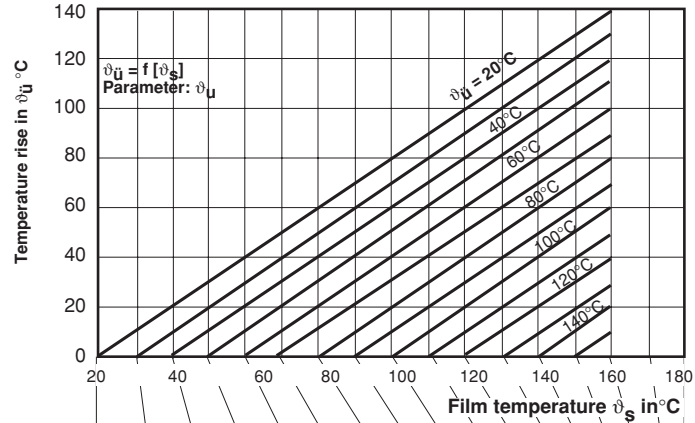
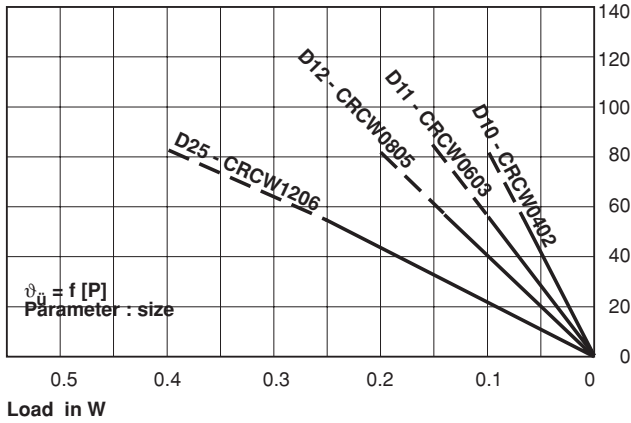
**PACKAGING**

MODEL	REEL				BULK			
	TAPE WIDTH	DIAMETER	PIECES / REEL	PITCH	PACKAGING CODE		BULK FEEDING MAGAZINE PIECES/MAGAZINE	
					PAPER <sup>2)</sup>	BLISTER <sup>2)</sup>	PIECES <sup>1)</sup>	CODE <sup>2)</sup>
D10	8mm	180mm / 7"	10000	2mm	P0 / RT7			
CRCW0402	Papertape	330mm / 13"	50000	2mm	PZ / RF4		50000	MZ / B27
D11	8mm	180mm / 7"	5000	4mm	P5 / RT1	B5/na		
CRCW0603	Paper-/ Blisertape	255mm / 10" 330mm / 13"	10000 20000	4mm 4mm	P0 / RT5 PN / RT6	BN/na	25000	MU / B27
D12	8mm	180mm / 7"	5000	4mm	P5 / RT1	B5/na		
CRCW0805	Paper-/ Blisertape	255mm / 10" 330mm / 13"	10000 20000	4mm 4mm	P0 / RT5 PN / RT6	BN/na	10000	MO / B27
D25	8mm	180mm / 7"	5000	4mm	P5 / RT1	B5/na		
CRCW1206	Paper-/ Blisertape	255mm / 10" 330mm / 13"	10000 20000	4mm 4mm	P0 / RT5 PN / RT6	BN/na		
CRCW1210	8mm	180mm / 7"	5000	4mm	P5 / RT1	B5/na		
	Paper-/Blisertape	330mm / 13"	20000	4mm	PN / RT6	BN/na		
CRCW1218	12mm	180mm / 7"	4000	4mm		B4 / RT9		
CRCW2010	12mm	180mm / 7"	4000	4mm		B4 / R02		
CRCW2512	12mm	180mm / 7"	2000	8mm		B2 / R67		
	Blisertape		4000	4mm		B4 / R82		

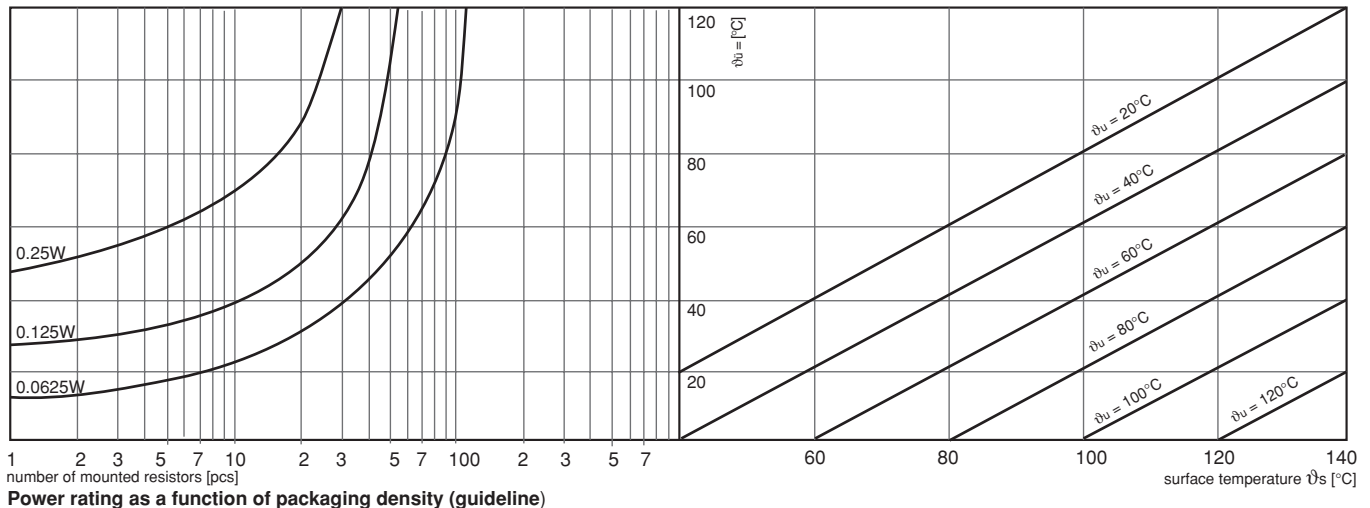
1) On request,

2) European / N.American packaging codes na = NOT AVAILABLE • Further information about packaging: see appropriate catalog or web page.

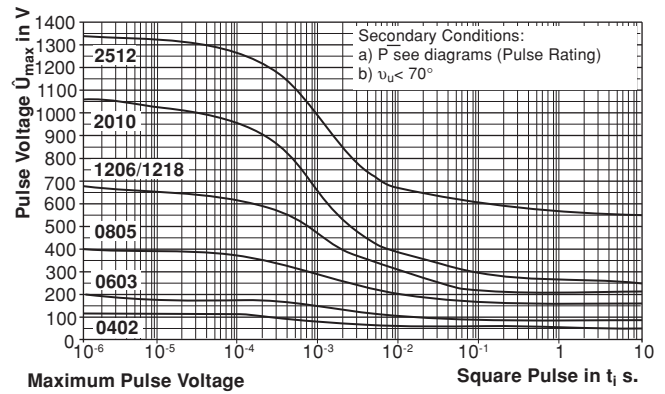
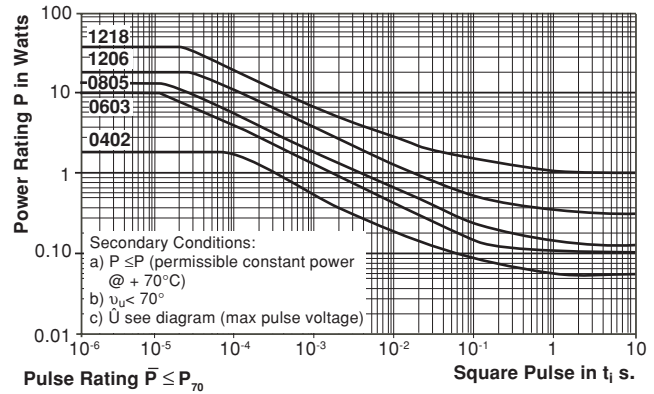
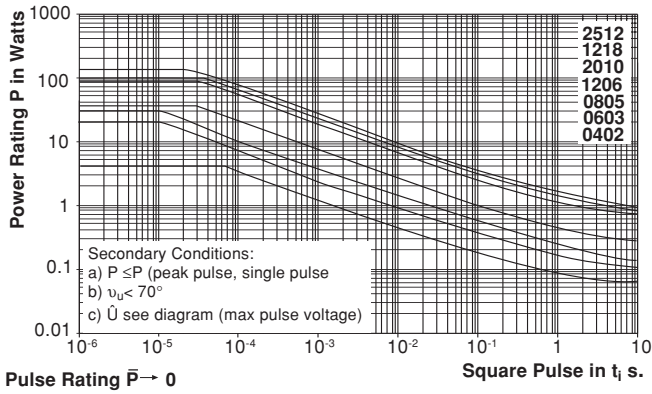




Stability nomogram typical values (for handling see general explanations)



Power rating as a function of packaging density (guideline)



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 600 68-2-20; 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
<ul style="list-style-type: none"> <li>CECC40000 / 40400 / 40401-004,-006,-007,-802</li> <li>EN140400 / IEC 60115 – 1</li> <li>EIA-575</li> </ul>