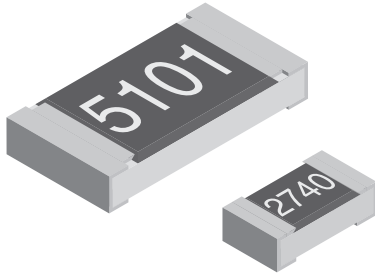


## Thin Film, Rectangular, Resistor Chips



### FEATURES

- Metal film layer on high quality ceramic
- Protective top coat
- Pure tin on nickel barrier layer
- Excellent stability at different environmental conditions
- Low TC and tight tolerances
- Resistant to extreme degrees of humidity (HAST - Test)

STANDARD ELECTRICAL SPECIFICATIONS									
MODEL	SIZE		POWER RATING $W_{70^{\circ}C}$		LIMITING ELEMENT VOLTAGE MAX $V_{\cong}$	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE $\Omega$	E-SERIES
	INCH	METRIC	CECC 40401-801	EIA 575					
M10	0402	1005	0.063	0.063	25	$\pm 25, \pm 50$	$\pm 0.5, \pm 1$	10R – 20K <sup>*</sup>	24 - 96
M11	0603	1608	0.1	0.063	75	$\pm 25$	$\pm 0.1, \pm 0.25, \pm 0.5, \pm 1$	10R – 56K <sup>*</sup>	24 - 96
						$\pm 50$	$\pm 0.1, \pm 0.25, \pm 0.5, \pm 1$	10R – 56K <sup>*</sup> 1R0 – 100K <sup>*</sup>	
M12	0805	2012	0.125	0.1	150	$\pm 25$	$\pm 0.1, \pm 0.25, \pm 0.5, \pm 1$	10R – 100K <sup>*</sup>	24 - 96
						$\pm 50$	$\pm 0.1, \pm 0.25, \pm 0.5, \pm 1$	10R – 100K <sup>*</sup> 1R0 – 220K <sup>*</sup>	
M25	1206	3216	0.25	0.125	200	$\pm 25$	$\pm 0.1, \pm 0.25, \pm 0.5, \pm 1$	10R – 220K <sup>*</sup>	24 - 96
						$\pm 50$	$\pm 0.1, \pm 0.25, \pm 0.5, \pm 1$	10R – 220K <sup>*</sup> 1R0 – 330K <sup>*</sup>	

\*Higher values on request, ask about extended value ranges

- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material
- Marking: 4 digits, M10 - no marking

TECHNICAL SPECIFICATIONS									
PARAMETER	UNIT	M10		M11		M12		M25	
Rated Dissipation at 70°C (CECC 40401   EIA 575)	W	0.063		0.1	0.063	0.125	0.1	0.25	0.125
Limiting Element Voltage <sup>2)</sup>	$V_{\cong}$	25		75		150		200	
Insulation Voltage (1 min)	$V_{dc/ac\ peak}$	> 50		> 100		> 200		> 300	
Thermal Resistance <sup>1)</sup>	K/W	$\leq 870^1)$	-	$\leq 550^1)$	-	$\leq 440^1)$	-	$\leq 220^1)$	-
Insulation Resistance	$\Omega$	> $10^9$							
Category Temperature Range	°C	- 55 / + 125 (+ 155)							
Failure Rate	$h^{-1}$	$0.3 \cdot 10^{-9}$							
Weight / 1000pcs	g	0.65		2		5.5		10	

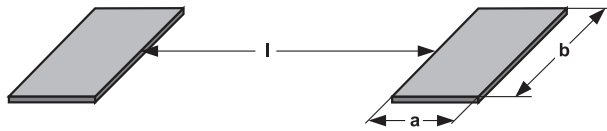
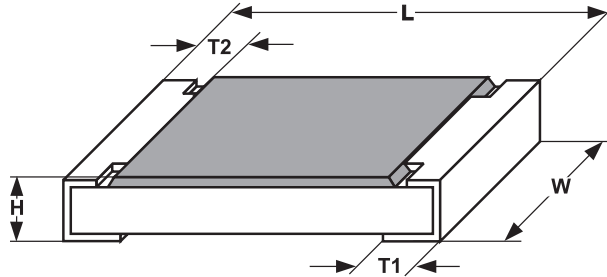
<sup>1)</sup> Measuring conditions in acc. with CECC 40401

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

ORDERING INFORMATION				
M12	25	562R	.5%	P5
MODEL	TC ppm / K	RESISTANCE VALUE $\Omega$	TOLERANCE $\pm$ %	PACKAGING P5-Papertape 5000 pcs

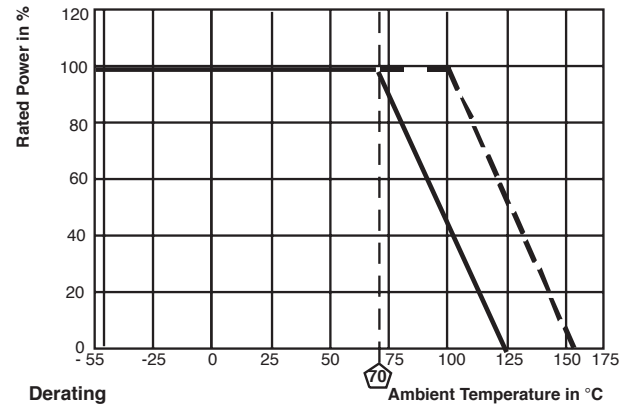
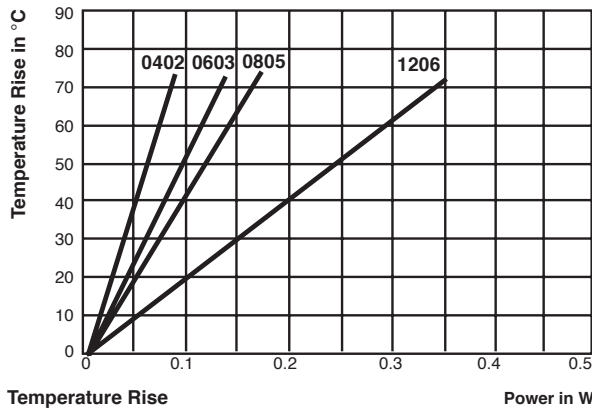


**DIMENSIONS**



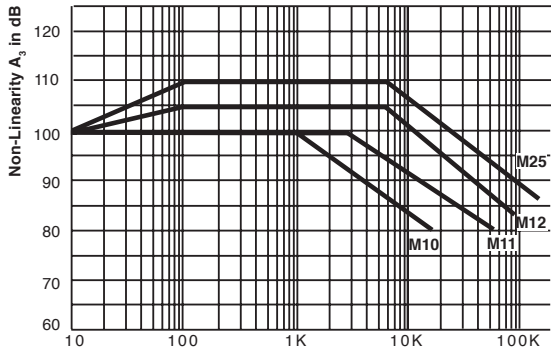
SIZE		DIMENSIONS [in millimeters]				
INCH	METRIC	L	W	H	T1	T2
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.1	0.2 ± 0.1
0603	1608	1.55 <sup>+0.10</sup> <sub>-0.05</sub>	0.85 ± 0.1	0.45 ± 0.05	0.30 ± 0.2	0.3 ± 0.2
0805	2012	2.0 <sup>+0.20</sup> <sub>-0.10</sub>	1.25 ± 0.15	0.45 ± 0.05	0.30 <sup>+0.20</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

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	1.4	1.2	0.9	1.3	1.3
1206	3216	0.9	1.7	2.0	1.1	1.7	2.3

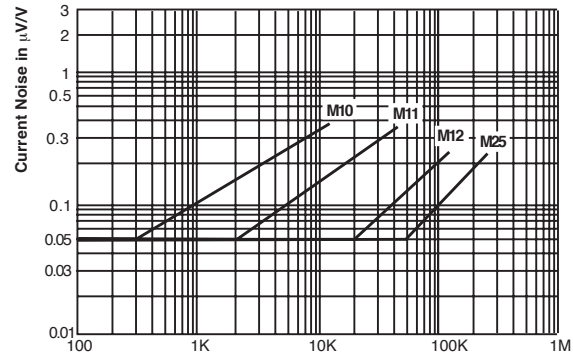


PACKAGING					
MODEL	REEL				
	TAPE WIDTH	DIAMETER	PIECES / REEL	PACKAGING CODE	
				PAPER	BLISTER
M10	8mm Papertape	180mm / 7" 330mm / 13" <sup>2)</sup>	10000 50000	P0 PZ	
M11 to M25	8mm Paper-/Blister tape <sup>1)</sup>	180mm / 7" 180mm / 7" 255mm / 10" 330mm / 13"	1000* 5000 10000 20000	P1 P5 P0 PN	B1 B5  BN

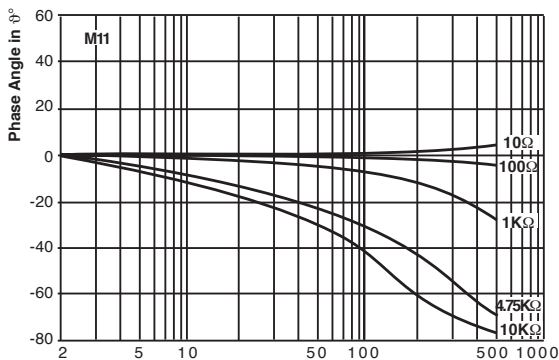
<sup>1)</sup> only in combination with 180mm/7" and 330mm/13" plastic reel  
<sup>2)</sup> plastic reel  
 • further information about packaging: see appropriate catalog or web page  
 \* For  $\leq$  TC25 and Tol  $\leq$  0.1% only



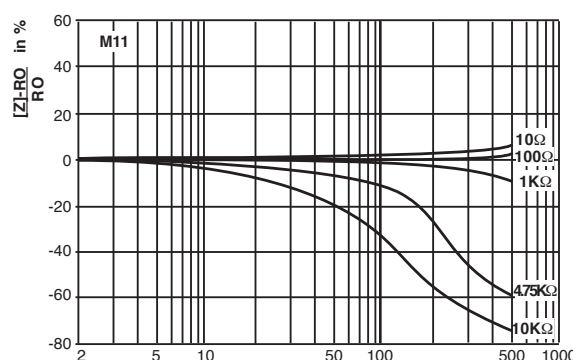
Non-Linearity Resistance Value in  $\Omega$



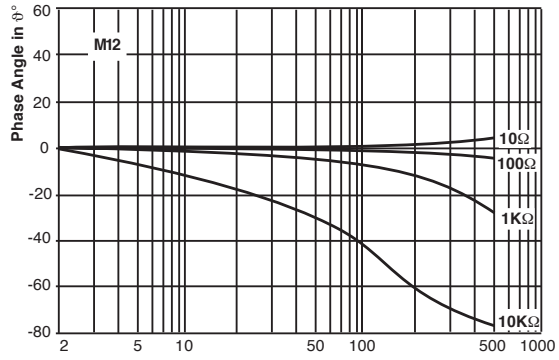
Current Noise Resistance Value in  $\Omega$



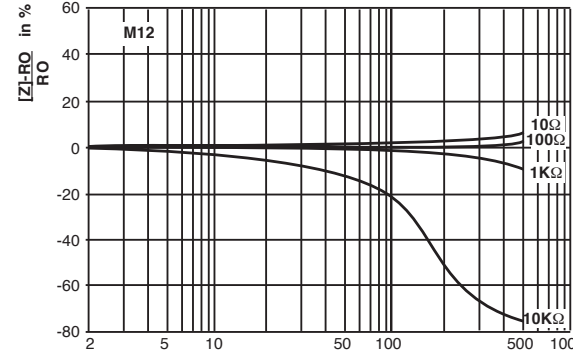
HF Performance Frequency f in MHz



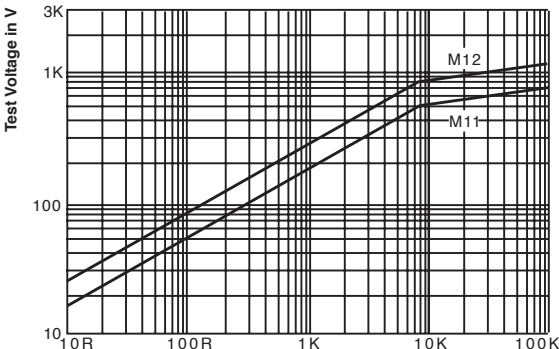
HF Performance Frequency f in MHz



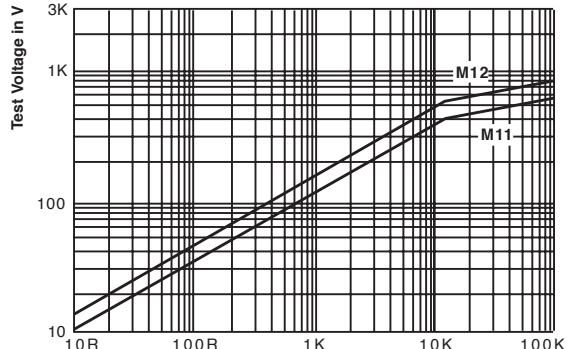
HF Performance Frequency f in MHz



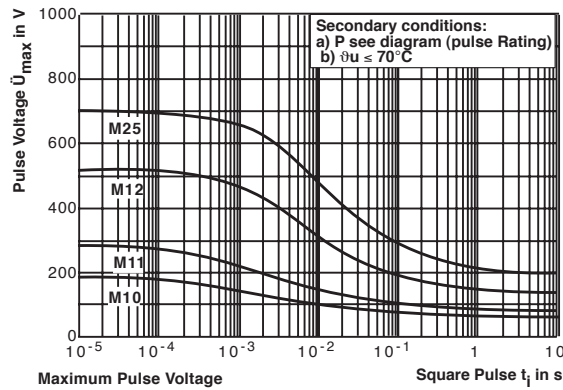
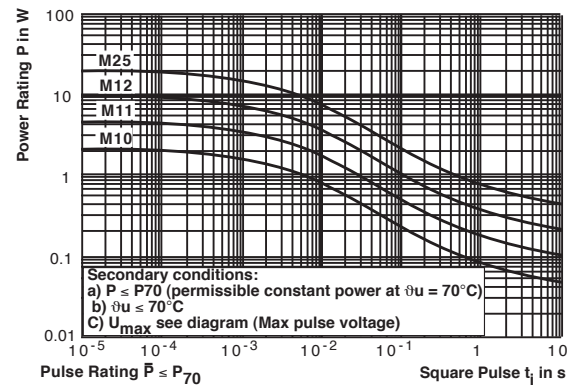
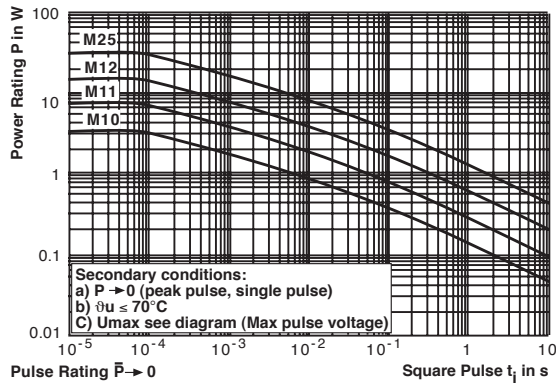
HF Performance Frequency f in MHz



Single-Pulse High Voltage Overload Test 1.2 / 50 $\mu$ s EN140000 4.27 Resistance Value in  $\Omega$



Single-Pulse High Voltage Overload Test 10 / 700 $\mu$ s EN140000 4.27 Resistance Value in  $\Omega$



PERFORMANCE			
TEST	CONDITIONS OF TEST	TEST RESULTS	
		TOLERANCES	
		± 0.1% / ± 0.25%	± 0.5% / ± 1.0%
Endurance Test at 70°C IEC 60115-1 4.25.1	1000 hours at 70°C, 1.5 hours "ON", 0.5 hours "OFF"	≤ ± 0.2%	≤ ± 0.5%
Endurance at UCT IEC 60115-1 4.25.3	1000 hours at 125 °C without load	≤ ± 0.2%	≤ ± 0.5%
Overload Test IEC 60115-1 4.13	Short time overload for 2 seconds 2.5 x rated voltage or ≤ 2 x limiting element voltage	≤ ± 0.05%	≤ ± 0.1%
Thermal Shock IEC 60115-1 4.19, IEC 60068-2-14	Rapid change between upper and lower category temperature	≤ ± 0.05%	≤ ± 0.1%
Damp Heat Steady State IEC 60115-1 4.24, IEC 60068-2-3	56 days at 40°C and 93% relative humidity	≤ ± 0.2%	≤ ± 0.5
Resistance to Soldering Heat IEC 60115-1 4.18, IEC 60068-2-20	10 seconds at 260°C solder bath temperature	≤ ± 0.05%	≤ ± 0.2

APPLICABLE SPECIFICATIONS
<ul style="list-style-type: none"> <li>• CECC40000 / 40400 / 40401-801</li> <li>• EN140400 / IEC 60115 – 1</li> </ul>