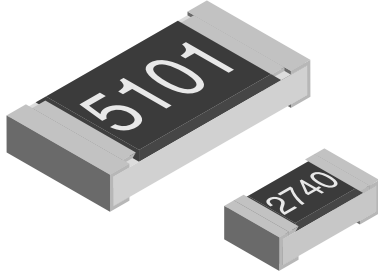


Thin Film, Rectangular, Resistor Chips



FEATURES

- Metal film layer on high quality ceramic
- Protective top coat
- Pure tin on nickel barrier layer
- Low temperature coefficient and tight tolerances ($\pm 0.1\%$; ± 10 ppm/K)
- 56 days at 40 °C and 93 % relative humidity down to $\leq \pm 0.2\%$



STANDARD ELECTRICAL SPECIFICATIONS									
MODEL	SIZE		POWER RATING P _{70 °C}		LIMITING ELEMENT VOLTAGE MAX V _≡	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES
	INCH	METRIC	EN 140 401-801	EIA 575					
M10	0402	1005	0.063	0.063	25	$\pm 25; \pm 50$	$\pm 0.5; \pm 1$	10R - 20K [*]	24 - 96
M11	0603	1608	0.1	0.063	75	± 25	$\pm 0.1; \pm 0.25;$ $\pm 0.5; \pm 1$	10R - 56K [*]	24 - 96
						± 50	$\pm 0.1; \pm 0.25; \pm 0.5;$ ± 1	10R - 56K [*] 1R0 - 100K [*]	
M12	0805	2012	0.125	0.1	150	± 25	$\pm 0.1; \pm 0.25;$ $\pm 0.5; \pm 1$	10R - 100K [*]	24 - 96
						± 50	$\pm 0.1; \pm 0.25; \pm 0.5;$ ± 1	10R - 100K [*] 1R0 - 220K [*]	
M25	1206	3216	0.25	0.125	200	± 25	$\pm 0.1; \pm 0.25;$ $\pm 0.5; \pm 1$	10R - 220K [*]	24 - 96
						± 50	$\pm 0.1; \pm 0.25; \pm 0.5;$ ± 1	10R - 220K [*] 1R0 - 330K [*]	

* Higher values on request, ask about extended value ranges

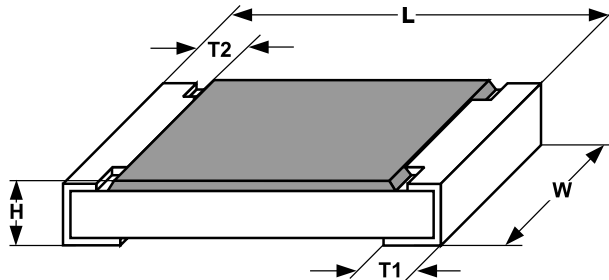
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material
- Marking: 4 digits, M10 - no marking

TECHNICAL SPECIFICATIONS									
PARAMETER	UNIT	M10		M11		M12		M25	
Rated Dissipation at 70 °C (EN 140 401-801 EIA 575)	W	0.063		0.1	0.063	0.125	0.1	0.25	0.125
Limiting Element Voltage ²⁾	V _≡	25		75		150		200	
Insulation Voltage (1 min)	V _{dc/ac peak}	> 50		> 100		> 200		> 300	
Thermal Resistance ¹⁾	K/W	≤ 870 ¹⁾	-	≤ 550 ¹⁾	-	≤ 440 ¹⁾	-	≤ 220 ¹⁾	-
Insulation Resistance	Ω	> 10 ⁹							
Category Temperature Range	°C	- 55 to + 125 (+ 155)							
Failure Rate	h ⁻¹	0.3 • 10 ⁻⁹							
Weight/1000 pcs	g	0.65		2		5.5		10	

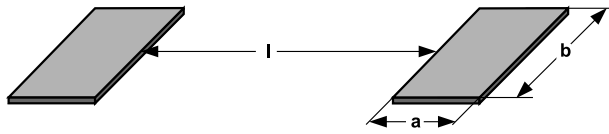
¹⁾ Measuring conditions in acc. with EN 140 401-801 ²⁾ Rated voltage: $\sqrt{P \times R}$



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 ^{+0.10} / _{-0.05}	0.85 ± 0.1	0.45 ± 0.05	0.30 ± 0.2	0.3 ± 0.2
0805	2012	2.0 ^{+0.20} / _{-0.10}	1.25 ± 0.15	0.45 ± 0.05	0.30 ^{+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



SIZE		SOLDER PAD DIMENSIONS [in millimeters]					
INCH	METRIC	REFLOW			WAVE SOLDERING		
		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

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBERING: M1004020D5620DP000



MODEL/SIZE	SPECIAL CHARACTER	TCR	VALUE	TOLERANCE	PACKAGING	SPECIAL
M100402 M110603 M120805 M251206	0 = Neutral	D = ± 25 ppm/K C = ± 50 ppm/K	3 digit value 1 digit multiplier Multiplier 8 = *10 ⁻² 9 = *10 ⁻¹ 0 = *10 ⁰ 1 = *10 ¹ 2 = *10 ² 3 = *10 ³	B = ± 0.1 % C = ± 0.25 % D = ± 0.5 % F = ± 1 %	P0 P1 P5 PN PZ	up to 2 digits 00 = standard

PRODUCT DESCRIPTION: M10 25 562R 0.5 % P0

M10	25	562R	0.5 %	P0
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING ¹⁾
M10 M11 M12 M25	± 25 ppm/K ± 50 ppm/K	49K9 = 49.9 kΩ 5R1 = 5.1 Ω	± 0.1 % ± 0.25 % ± 0.5 % ± 1 %	P0 P1 P5 PN PZ

¹⁾ Please refer to table PACKAGING, page 146.

NOTE: Products can be ordered using either the Product Description or the Part Number.

M10, M11, M12, M25

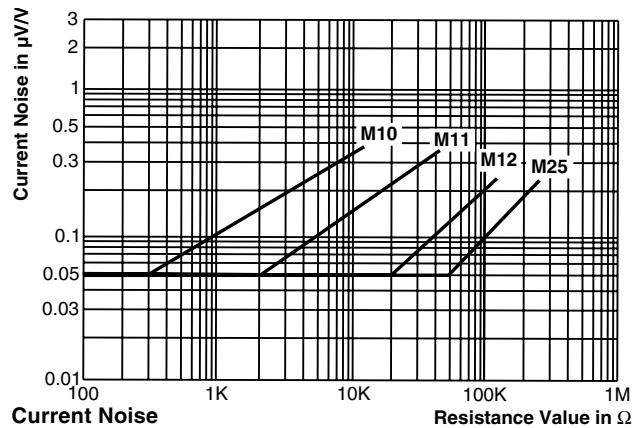
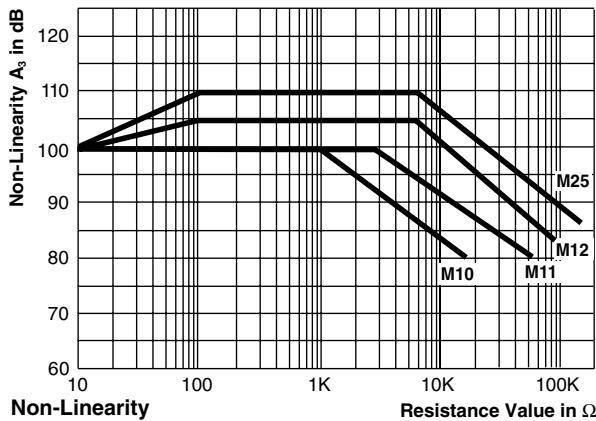
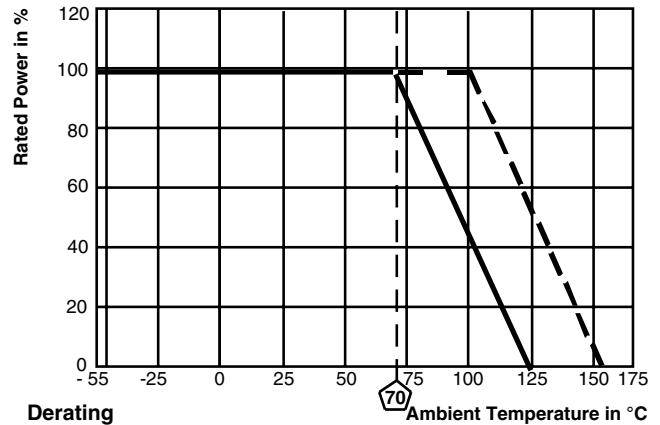
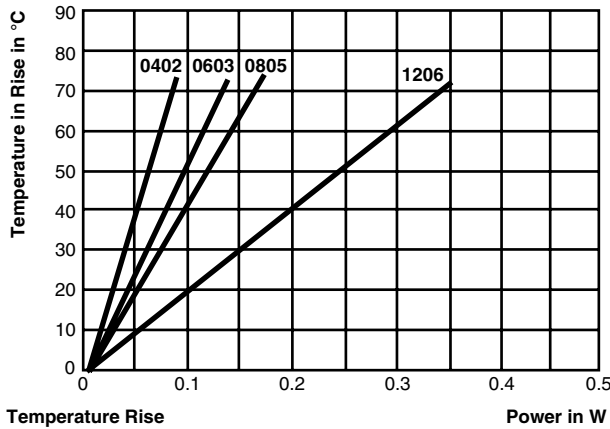
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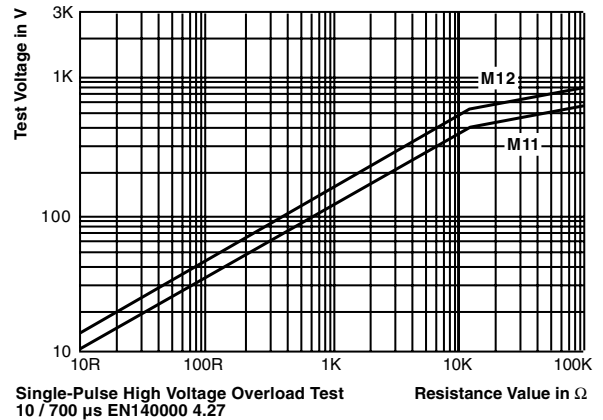
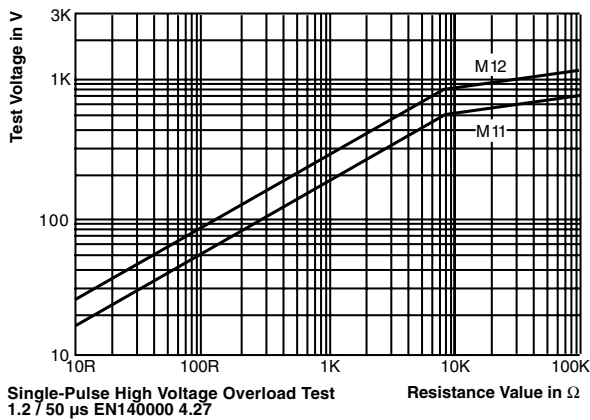
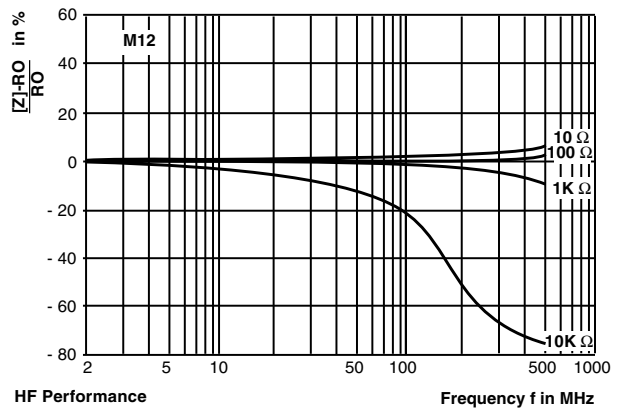
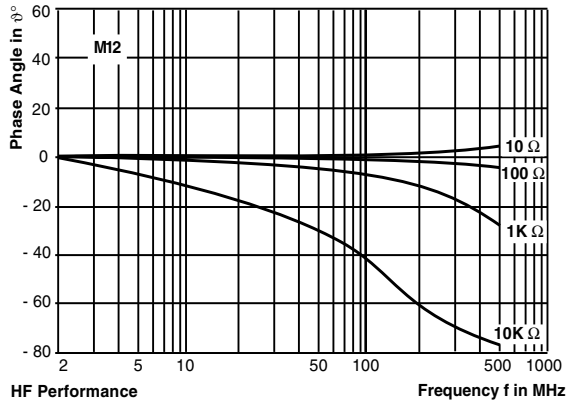
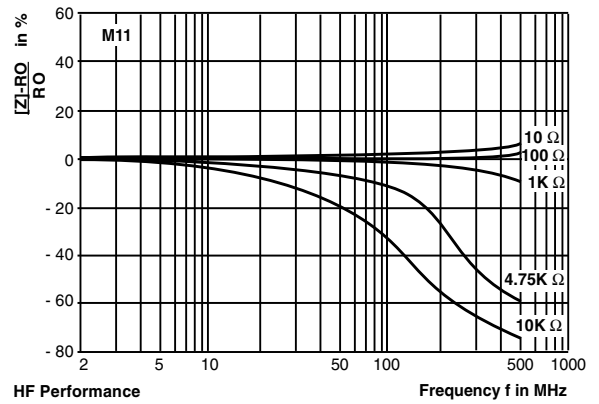
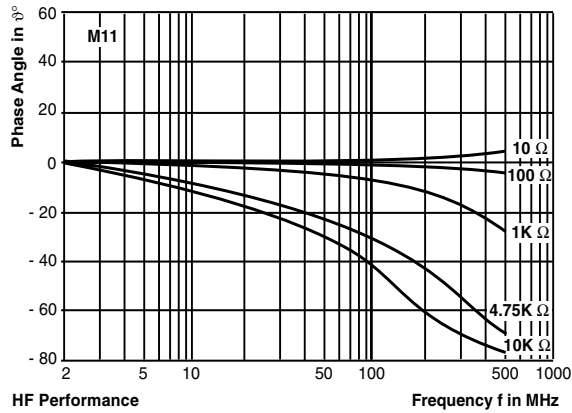
Thin Film, Rectangular, Resistor Chips

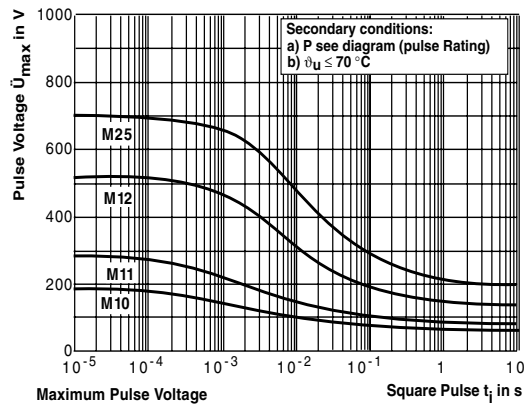
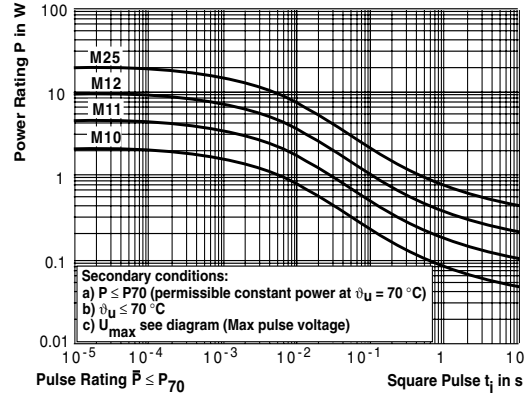
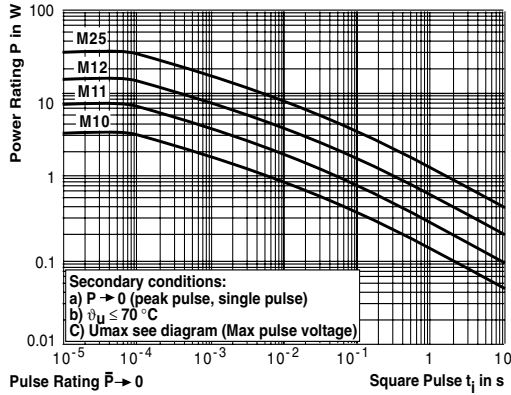


PACKAGING				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	PACKING CODE
				PAPER
M10	8 mm	180 mm/7"	10 000	P0
		330 mm/13"	50 000	PZ
M11	8 mm	180 mm/7"	1000 ¹⁾	P1
M12		180 mm/7"	5000	P5
M25		330 mm/13"	20 000	PN

1) For \leq TCR 25 ppm/K and Tolerance \leq 0.1 % only.







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



APPLICABLE SPECIFICATIONS

- CECC40000/40400/40401-801
- EN140400/IEC 60115 - 1/EN 140 401-801



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