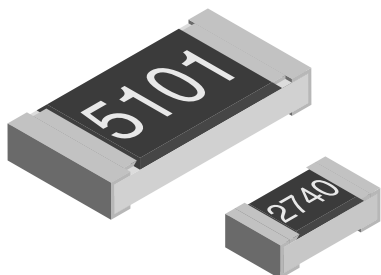


Thin Film, Rectangular, Resistor Chips



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 $\pm 0.2\%$

RoHS
COMPLIANT

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING $P_{70^\circ\text{C}}$		LIMITING ELEMENT VOLTAGE MAX V_{E}	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	± 25 ; ± 50	± 0.5 ; ± 1	10R - 20K [*]	24 - 96
M11	0603	1608	0.1	0.063	75	± 25	± 0.1 ; ± 0.25 ; ± 0.5 ; ± 1	10R - 56K [*]	24 - 96
						± 50	± 0.1 ; ± 0.25 ; ± 0.5 ; ± 1	10R - 56K [*] ; 1R0 - 100K [*]	
M12	0805	2012	0.125	0.1	150	± 25	± 0.1 ; ± 0.25 ; ± 0.5 ; ± 1	10R - 100K [*]	24 - 96
						± 50	± 0.1 ; ± 0.25 ; ± 0.5 ; ± 1	10R - 100K [*] ; 1R0 - 220K [*]	
M25	1206	3216	0.25	0.125	200	± 25	± 0.1 ; ± 0.25 ; ± 0.5 ; ± 1	10R - 220K [*]	24 - 96
						± 50	± 0.1 ; ± 0.25 ; ± 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

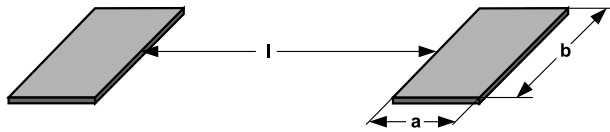
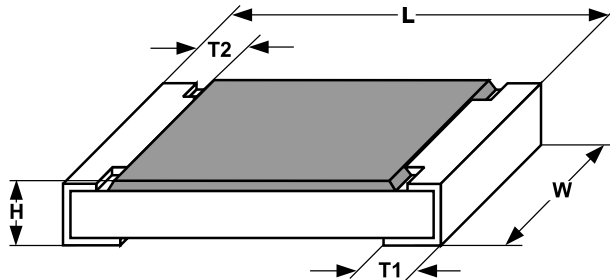
TECHNICAL SPECIFICATIONS

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_{E}	25		75		150		200	
Insulation Voltage (1 min)	$V_{\text{dc/ac peak}}$	> 50		> 100		> 200		> 300	
Thermal Resistance ¹⁾	K/W	$\leq 870^{(1)}$	-	$\leq 550^{(1)}$	-	$\leq 440^{(1)}$	-	$\leq 220^{(1)}$	-
Insulation Resistance	Ω	$> 10^9$							
Category Temperature Range	$^\circ\text{C}$	- 55 to + 125 (+ 155)							
Failure Rate	h^{-1}	$0.3 \cdot 10^{-9}$							
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

		SOLDER PAD DIMENSIONS [in millimeters]					
SIZE		REFLOW			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

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBERING: M1004020D5620DP000

M	1	0	0	4	0	2	0	D	5	6	2	0	D	P	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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 = $\times 10^{-2}$ 9 = $\times 10^{-1}$ 0 = $\times 10^0$ 1 = $\times 10^1$ 2 = $\times 10^2$ 3 = $\times 10^3$	B = ± 0.1 % C = ± 0.25 % D = ± 0.5 % F = ± 1 %	P0 P1 P5 PN PZ	up to 2 digits 00 = standard

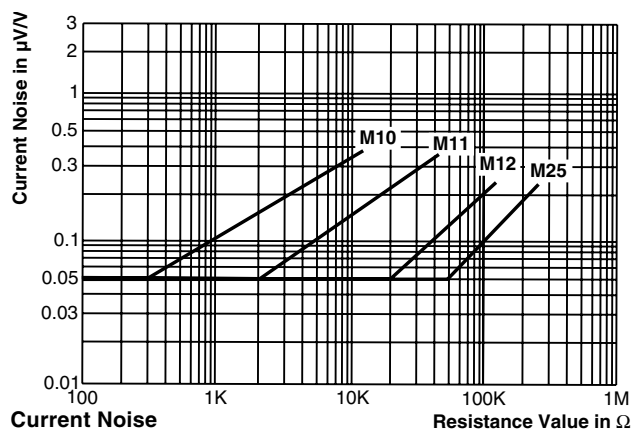
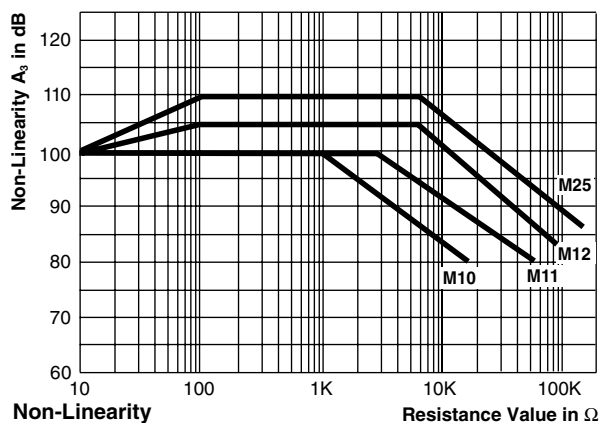
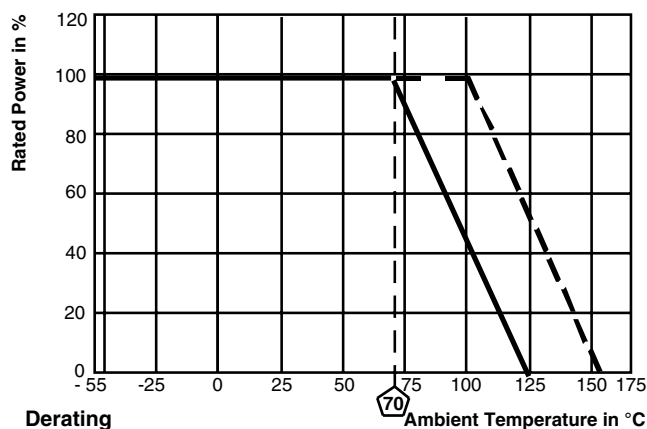
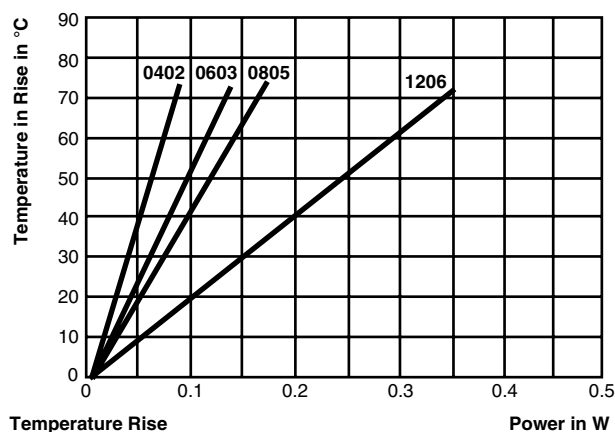
PRODUCT DESCRIPTION: M10 25 562R 0.5 % P0

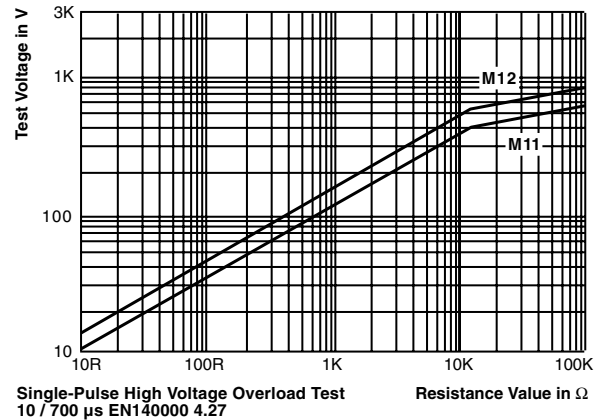
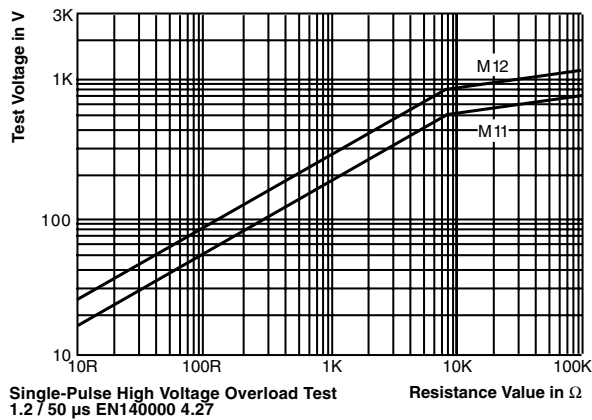
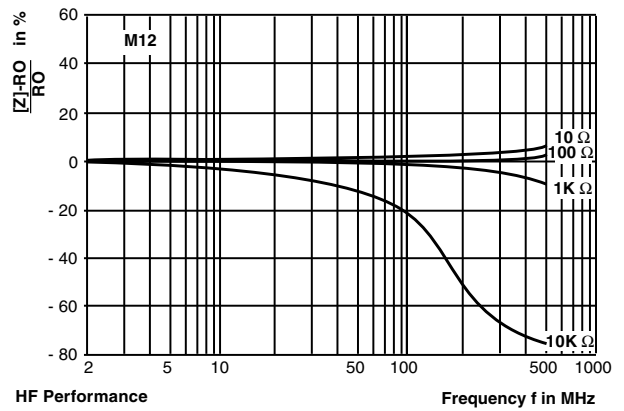
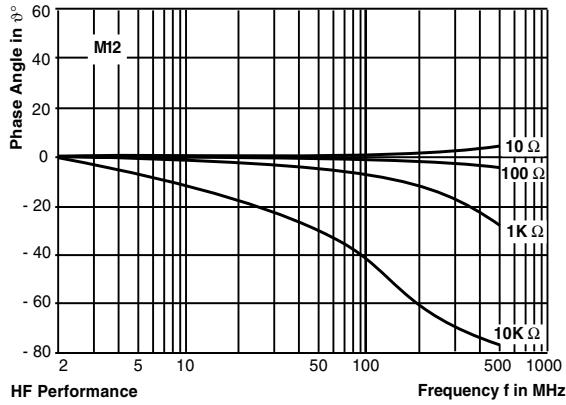
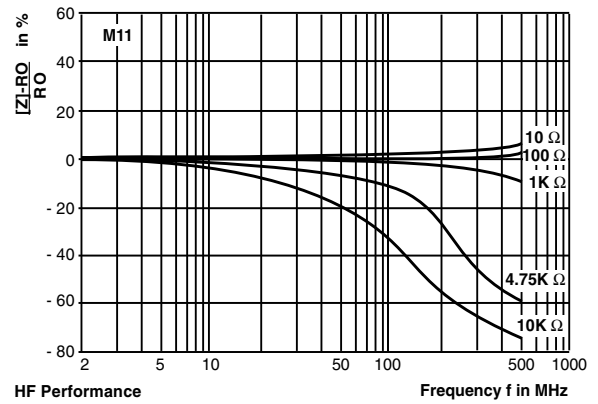
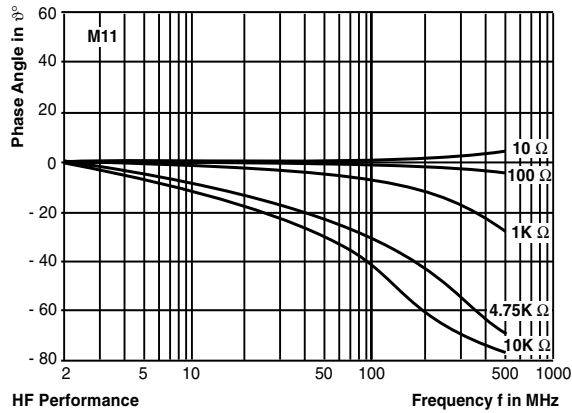
M10	25	562R	0.5 %	P0
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING ¹⁾
M10 M11 M12 M25	± 25 ppm/K ± 50 ppm/K	49K9 = 49.9 k Ω 5R1 = 5.1 Ω	± 0.1 % ± 0.25 % ± 0.5 % ± 1 %	P0 P1 P5 PN PZ

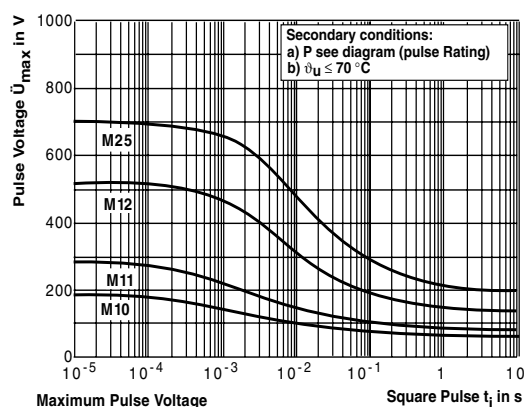
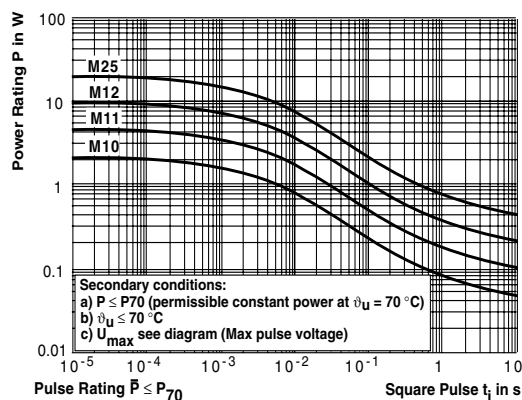
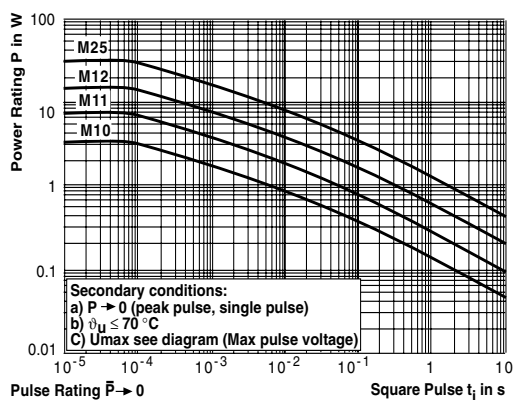
¹⁾ Please refer to table PACKAGING, page 146.**NOTE:** Products can be ordered using either the Product Description or the Part Number.

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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