

# High temperature metal thin film resistor networks

■ RMA series

AEC-Q200 Compliant

## Features

- Conductive epoxy compatible chip resistor network
- Relative resistance tolerance:  $\pm 0.01\%$ , relative TCR:  $\pm 1\text{ppm}/^\circ\text{C}$
- Operating temperature up to  $230^\circ\text{C}$
- RoHS compliant, 100% lead free (gold terminal)
- Thin film structure enabling low noise and anti-sulfur

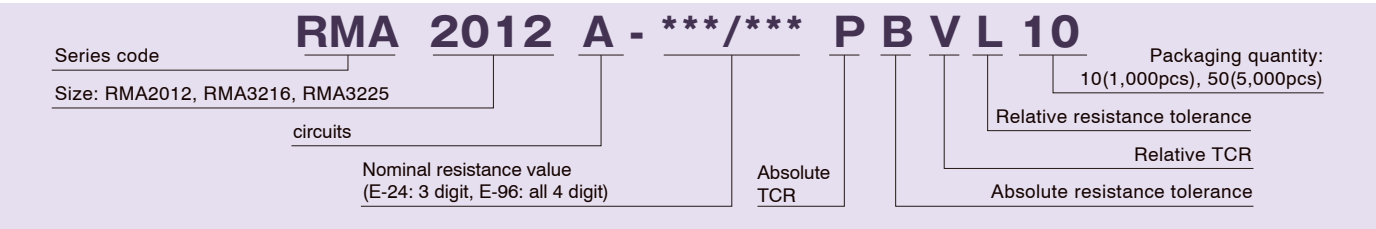
## Applications

- Automotive electronics
- High temperature electronic devices
- Downhole drilling

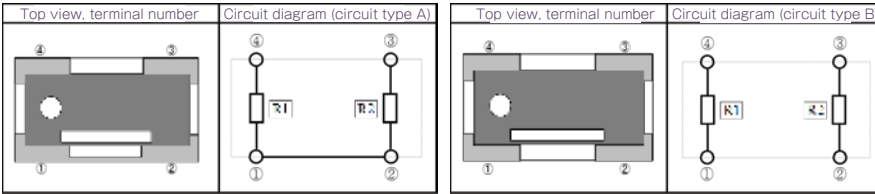
Thin film surface mount resistors

RMA series

## ◆ Part numbering system

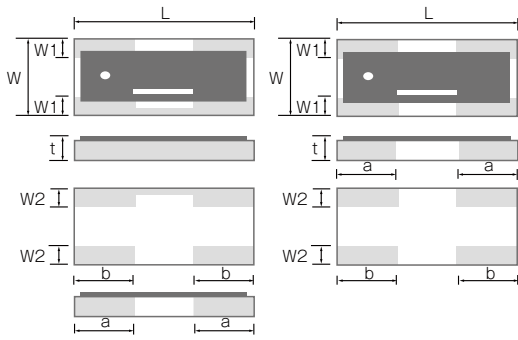


## ◆ Electrical Specification



Type	Power ratings (85°C)	Resistance range (Ω)	Resistance tolerance (Code)				Temperature coefficient of resistance (Code)				Packaging quantity (designation)
			Absolute tolerance	Tolerance ratio			Absolute TCR	TCR tracking			
				Resistance ratio = 1	1 < Resistance ratio ≤ 100	100 < Resistance ratio ≤ 500		Resistance ratio = 1	1 < Resistance ratio ≤ 100	100 < Resistance ratio ≤ 500	
RMA2012	0.05W / Element 0.1W / Package	100 ~ <300	$\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.02\%$ (P) $\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	-	$\pm 10\text{ppm}/^\circ\text{C}$ (N) $\pm 25\text{ppm}/^\circ\text{C}$ (P)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	-	tape & reel (T&R) 10=1,000pcs 50=5,000pcs
		300 ~ 100k	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.01\%$ (L) $\pm 0.02\%$ (P) $\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 5\text{ppm}/^\circ\text{C}$ (V) $\pm 10\text{ppm}/^\circ\text{C}$ (N) $\pm 25\text{ppm}/^\circ\text{C}$ (P)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	
RMA3216	0.063W / Element 0.125W / Package	100 ~ <300	$\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.02\%$ (P) $\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	-	$\pm 10\text{ppm}/^\circ\text{C}$ (N) $\pm 25\text{ppm}/^\circ\text{C}$ (P)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	-	
		300 ~ 500k	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.01\%$ (L) $\pm 0.02\%$ (P) $\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 5\text{ppm}/^\circ\text{C}$ (V) $\pm 10\text{ppm}/^\circ\text{C}$ (N) $\pm 25\text{ppm}/^\circ\text{C}$ (P)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	
RMA3225	0.1W / Element 0.2W / Package	100 ~ <300	$\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.02\%$ (P) $\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	-	$\pm 10\text{ppm}/^\circ\text{C}$ (N) $\pm 25\text{ppm}/^\circ\text{C}$ (P)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	-	
		300 ~ 500k	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.01\%$ (L) $\pm 0.02\%$ (P) $\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 0.05\%$ (W) $\pm 0.1\%$ (B) $\pm 0.5\%$ (D)	$\pm 5\text{ppm}/^\circ\text{C}$ (V) $\pm 10\text{ppm}/^\circ\text{C}$ (N) $\pm 25\text{ppm}/^\circ\text{C}$ (P)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 1\text{ppm}/^\circ\text{C}$ (X) $\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	$\pm 2\text{ppm}/^\circ\text{C}$ (W) $\pm 5\text{ppm}/^\circ\text{C}$ (V)	

### ◆ Dimensions



Type	Size (inch)	L	W	t	a	b	W1	W2
RMA2012	0805	2.0±0.2	1.25±0.2	0.45±0.1	0.5±0.2	0.6±0.2	0.4±0.2	0.35±0.2
RMA3216	1206	3.2±0.2	1.6±0.2	0.45±0.1	1.0±0.25	1.0±0.2	0.4±0.25	0.4±0.2
RMA3225	1209	3.2±0.2	2.5±0.2	0.45±0.1	1.0±0.25	1.0±0.2	0.4±0.25	0.6±0.2

(unit : mm)

Thin film surface mount resistors

RMA series

### ◆ Reliability specification

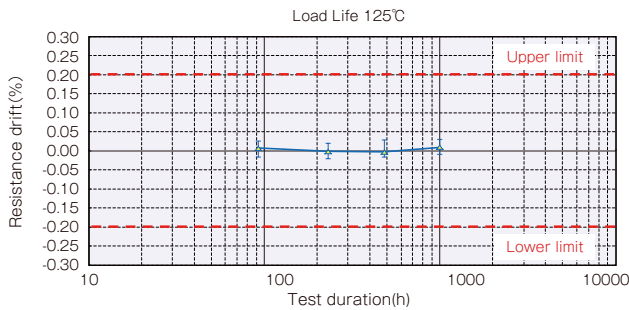
Test items	Condition (test methods (MIL-PRF-55342/JIS C5201-1))	Standard	
		absolute	relative
Short time overload	2.5 x rated voltage <sup>*1</sup> 5seconds	±(0.1%+0.01Ω)	±0.05%
Life (biased)	70°C, rated voltage, 90min on 30min off, 1000hours	±(0.1%+0.01Ω)	±0.05%
Temperature shock	85°C, 85%RH, 1/10 of rated power, 90min on 30min off, 1000hours	±(0.1%+0.01Ω)	±0.05%
High temperature exposure <sup>*2</sup>	-55°C (30min) ~ 125°C (30min)	±(0.1%+0.01Ω)	±0.05%
Resistance to soldering heat	155°C, no bias, 1000hours	±(0.1%+0.01Ω)	±0.05%

\*1 Rated voltage is given by  $E = \sqrt{R \times P}$  E= rated voltage (V), R=nominal resistance value(Ω), P=rated power(W)  
If rated voltage exceeds maximum voltage /element, maximum voltage/element is the rated voltage.

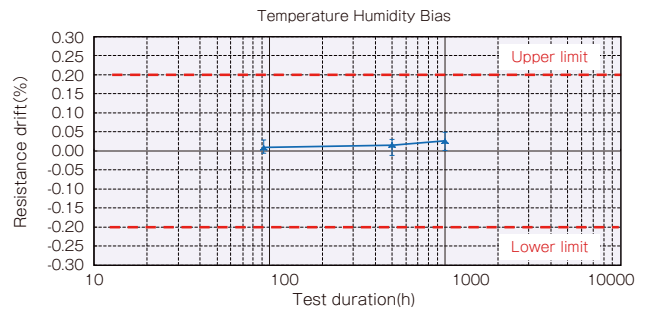
\*2 Please contact our sales office for details.

### ◆ Reliability test data

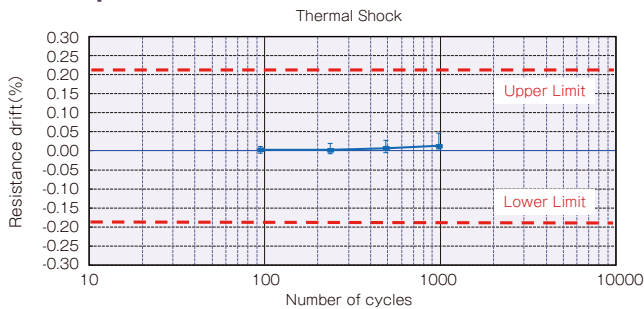
#### ○ Biased life test



#### ○ High temperature high humidity (biased)



#### ○ Temperature shock



### ◆ Derating Curve

