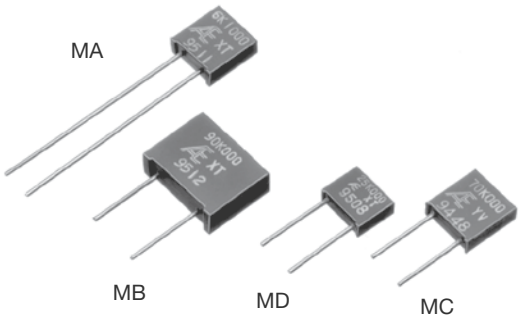
Alpha Electronics
A VPG Brand

Ultra Precision Resistor (Transfer Molded)



Pb-free Available
RoHS COMPLIANT

COMPOSITION OF TYPE NUMBER

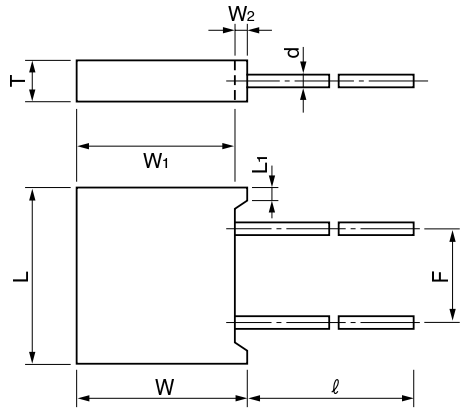
Example:

MA Y 10K000 A

- A — Tolerance
- 10K000 — Resistance Value
- Y — TCR
- MA — Type

Resistance value, in ohm, is expressed by a series of six characters, five of which represent significant digits. R or K is a dual-purpose letter that designates both the value range (R for ohmic; K for kilo-ohm) and the location of decimal point.

CONFIGURATION (DIMENSIONS IN mm)



Type	MA	MC	MB	MD
L	7.9±0.2		13.0±0.3	7.4±0.2
L_1	1.0 max.		1.5 max.	0.8 max.
W	8.3±0.2		10.0±0.3	6.0±0.2
W_1	8.0±0.2		9.5±0.3	5.7±0.2
W_2	0.3 max.		0.5 max.	0.4 max.
T	2.8±0.2	2.3±0.2	4.0±0.3	2.3±0.2
F	3.81±0.25	5.08±0.25	7.5±0.5	5.08±0.25
ℓ	25±10	10±3		
d	Dia. 0.65±0.05			

TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER

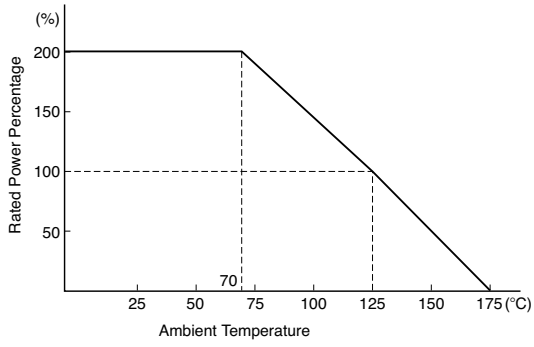
Type	TCR (ppm/°C) –55°C to +125°C*	Resistance Range (Ω)	Resistance Tolerance (%)*†	Rated Power (W) at 125°C
MA MC	0±15 (W)	1 to 5	±0.5 (D) ±1 (F)	0.3 (0.2 at 150 kΩ or above)
	0±5 (X)	5 to 30	±0.1 (B) ±0.5 (D) ±1 (F)	
	0±5 (X) 0±2.5 (Y) 0±1 (Z)**	30 to 200k	±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)	
MB	0±5 (X)	5 to 30	±0.1 (B) ±0.5 (D) ±1 (F)	0.5 (0.3 at 200 kΩ or above)
	0±5 (X) 0±2.5 (Y) 0±1 (Z)**	30 to 400k	±0.005 (V) ±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)	
MD	0±5 (X)	5 to 30	±0.1 (B) ±0.5 (D) ±1 (F)	0.125
	0±5 (X) 0±2.5 (Y)	30 to 100	±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)	
	0±5 (X) 0±2.5 (Y) 0±1 (Z)**	100 to 80k	±0.01 (T) ±0.02 (Q) ±0.05 (A) ±0.1 (B) ±0.5 (D) ±1 (F)	

* Symbols in parentheses are for type number composition.

† Resistance figures are the values obtained by measuring the leads at point 12.7±3.2 mm away from the base for Type MA and at point 5.0±1.0 mm for Types MC, MB and MD, but, in case of resistance below 10 ohm, the value at 1.6±0.6 mm away from the base for all types.

**Temperature characteristic Z is applicable for temperature range between 0°C and 60°C.

POWER DERATING CURVE



DSCC SPECIFICATIONS

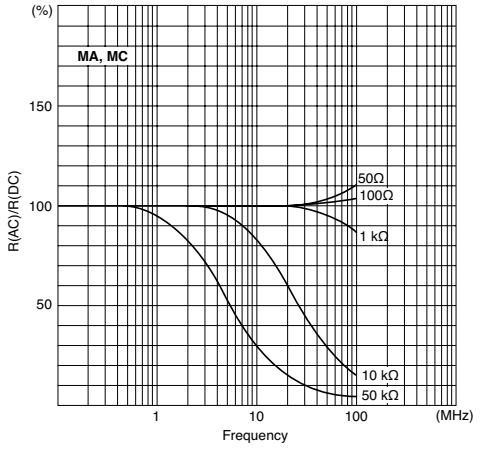
97009
97010
97011

PERFORMANCE

Parameters	Test Condition	MIL-PRF-55182/9 Specification	ALPHA Typical Test Data
Maximum Rated Operating Temperature **Working Temperature Range** **Maximum Working Voltage**		125°C –65°C to +175°C MA, MC=300V, MB=350V, MD=250V	
Power Conditioning **Thermal Shock** **Overload**	125°C, Rated Power, 100 hrs. –65°C/30 min. ↔ +150°C/30 min., 5 cycles Rated Power x 6.25, 5 sec.	±(0.20%+0.01Ω) ±0.05% ±0.05%	±0.005% ±0.005% ±0.005%
Solderability **Resistance to Solvents**	Steam Aging 8 hrs., 245°C, 5 sec. ❶ Isopropyl Alcohol + Mineral Spirits ❷ Water + Butyl Cellosolve + Monoethanolamine	over 95% coverage no damage	over 95% coverage no damage
Low Temperature Storage **Low Temperature Operation** **Terminal Strength**	–65°C, 24 hrs. –65°C, Rated Voltage, 45 min. 0.908 kg (2 pounds), 10 sec	±0.05% ±0.05% ±0.02%	±0.0025% ±0.0025% ±0.0025%
Dielectric Withstanding Voltage **Insulation Resistance** **Resistance to Soldering Heat** **Moisture Resistance**	Atmo.Pres.: 300V rms. Baro. Pres. 8 mHg: 200V rms. DC 100V, 2 min. +260°C, 10 sec. +65°C to –10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.)	±0.02% over 10,000 MΩ ±0.02% ±0.05%	±0.0025% over 10,000 MΩ ±0.0025% ±0.01%
Shock (Specified Pulse) **Vibration, High Frequency**	100G, 6 ms, Sawtooth Wave, X, Y, each 10 shocks 20G, 10 Hz to 2,000 Hz to 10 Hz, 20min., X, Y, each 4 hrs.	±0.01% ±0.02%	±0.0025% ±0.0025%
Life	125°C, Rated Voltage, 1.5 hr. – ON, 0.5 hr. – OFF, 2,000 hrs.	±0.05%	±0.015%
Life 70°C Power Rating	70°C, Rated Voltage x 2, 1.5 hr. – ON, 0.5 hr. – OFF, 2,000 hrs.	±0.05%	±0.015%
Storage Life	15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs.	±0.005%	±0.0025%
High Temperature Exposure	175°C, No Load, 2,000 hrs.	±0.5%	±0.015%
Current Noise **Voltage Coefficient** **Thermal EMF**		-32 dB 0,0005%/V 1.0 µV/°C	-42 dB 0,00003%/V 1.0 µV/°C

Type MA meets requirements of MIL-PRF-55182/9.

FREQUENCY CHARACTERISTICS



TEMPERATURE OF RESISTOR SURFACE