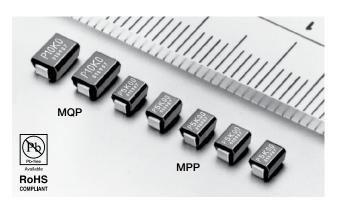
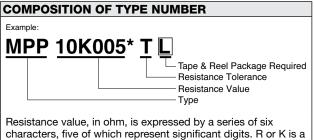
# Z-Foil Ultra High-Precision SMT Resistor (Molded, J-Lead Terminal)



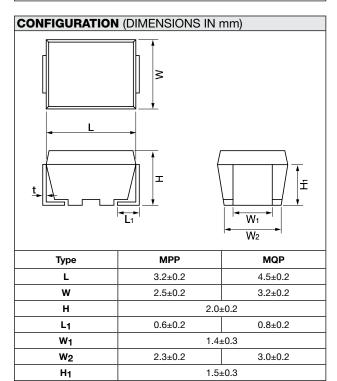
A VPG Brand

Alpha Electronics



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 the decimal point.

\* Imprinting indicates up to 3 significant digits but ordered resistance value is traceable by date code



0.15±0.05

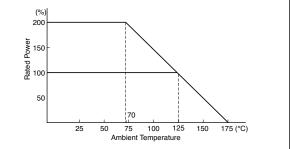
## FEATURES

- Temperature coefficient of resistance (TCR): 0.05 ppm/°C typical (0°C to +60°C) by New Generation Z-Foil Technology
- 0.2 ppm/°C typical (–25°C to +125°C, +25°C ref.)
- Resistance tolerance: to ±0.01%
- Power coefficient "ΔR due to self heating": 5 ppm at rated power (typical)
- Power rating: to 200 mW (MPP) and 250 mW (MQP) at  $+70^{\circ}\mathrm{C}$
- Load life stability: to ±0.005% at 70°C, 2000h at rated power (typical)
- Not restricted to standard values, we can supply specific "as required" values at no extra cost or delivery (e.g., 1K2345 vs. 1K)

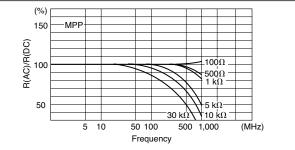
# TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER

Туре	TCR (ppm/°C) -25°C to +125°C	Resistance Range (Ω)	Resistance Tolerance (%)	Rated Power (W) at 125°C	
МРР	±0.2±3.8	30 to <50	±0.1(B)	0.1	
	±0.2±2.8	50 to <100	±0.1(B)		
	±0.2±1.8	100 to <1k	±0.02(Q) ±0.05(A) ±0.1(B)		
		1k to ≤20k	±0.01(T) ±0.02(Q) ±0.05(A) ±0.1(B)		
MQP	±0.2±3.8	30 to <50	±0.1(B)	0.125	
	±0.2±2.8	50 to <100	±0.1(B)		
	±0.2±1.8	100 to <1k	±0.02(Q) ±0.05(A) ±0.1(B)		
		1k to ≤40k	±0.01(T) ±0.02(Q) ±0.05(A) ±0.1(B)		

### POWER DERATING CURVE



### FREQUENCY CHARACTERISTICS

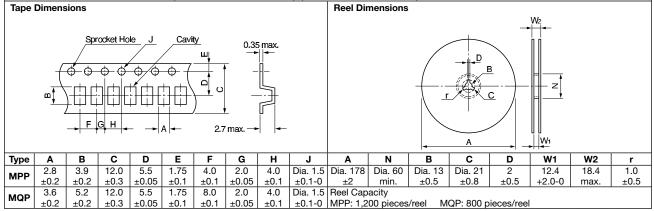


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## **MPP, MQP Series**

PERFORMANCE								
Parameters	Test Condition	Specification		Typical				
Farameters	lest condition	MP/MQ	MPP/MQP	MPP/MQP				
Maximum Rated Operating Temperature		125°C						
Working Temperature Range		–65°C to +175°C						
Maximum Working Voltage			100V					
Maximum Working Current			350 mA					
Thermal Shock	–65°C/30 min.↔+150°C/30 min., 5 cycles	±0.05%	±0.01%	±0.005%				
Overload	Rated Voltage x 2.5, 5 sec.	±0.05%	±0.01%	±0.005%				
Low Temperature Storage and Life	–65°C, No Load, 24 hrs.→Rated Voltage, 45 min.	±0.05%	±0.01%	±0.005%				
Outstanding PC Board Bending	3 mm Bend, 60 sec.	±0.05%	±0.01%	±0.005%				
Dielectric Withstanding Voltage	AC 200V, 1 min.	±0.01%	±0.01%	±0.005%				
Insulation Resistance	DC 100V, 1 min.	over 10,000 MΩ						
Resistance to Soldering Heat	260°C, 10 sec.	±0.05%	±0.03%	±0.01%				
Moisture Resistance	+65°C to -10°C, 90% RH to 98% RH, Rated Voltage,	±0.05%	±0.03%	±0.01%				
	10 cycles (240 hrs.)							
Shock	100G, 6 ms, Sawtooth Wave, X, Y, Z, each 10 shocks	±0.02%	±0.02%	±0.01%				
Vibration, High Frequency	20G, 10 Hz to 2,000 Hz to 10 Hz, 20 min., X, Y, Z, each 2.5 hrs.	±0.02%	±0.02%	±0.01%				
Storage Life	15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs.	±0.005%	±0.005%	±0.0025%				
High Temperature Exposure	175°C, No Load, 2,000 hrs.	±0.05%	±0.05%	±0.03%				
Life	70°C, Rated Power, 1.5 hr. – on, 0.5 hr. – off, 2,000 hrs.	_	±0.01%	±0.005%				
	70°C, Rated Power × 2, 1.5 hr. – on, 0.5 hr. – off, 2,000 hrs.	_	±0.03%	±0.01%				





#### PRECAUTION IN USING FACE-BONDED CHIP RESISTORS

#### 1. Storage

Storage conditions or environment may adversely affect solderability of the exterior terminals. Do not store in high temperature and humidity. The recommended storage environment is lower than 40°C, has less than 70% RH humidity and is free from harmful gases such as sulphur and chlorine.

#### 2. Caution in Soldering

• Hand Soldering—Hand soldering is applicable as shown at right. Recommended

350

310

230

d 270

Not Applicable

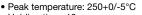
10 20 30 40 50 60 (sec

Length of contact

Applicable

5

- Temp. of iron tip: 240°C to 270°C
- Power of iron: 20W or less Iron
- · Diameter of tip: dia. 3 mm max.
- Solder Reflow in Furnace
  - Recommended



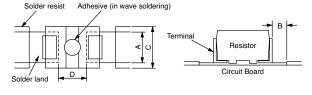
- Holding time: 10 sec. max.
- To cool gradually at room temperature
- Dipping in Solder (Wave or Still)
  - Recommended
  - Temp. of solder: 260°C max
  - Length of dipping: 10 seconds
- To cool gradually at room temperature
- Other

Corrosion-free flux, such as rosin, is recommended. Do not apply pressure to the molded housing immediately after soldering.

#### 3. Cleaning

- Use volatile cleaner such as methylalcohol or propyl alcohol.
- 4. Circuit Board Design The dimensions of solder land must be determined in conformity with

the size of resistors and with the soldering method. They are also subject to the mounting machine and the material of the substrate. See example below.



Туре	А	В	С	D
MPP	1.0 += 0.0	0.5 to 1.5	2.2 to 2.6	1.8
MQP	1.6 to 2.0			2.5

When parts are mounted on a board in high density, solder can possibly attach to the resistors in an excessive amount to affect performance or reliability of the resistors. To prevent this effect, the use of solder resist is recommended to isolate solder lands.



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