MEV Series

Metal Film Precision MELF Resistor

FEATURES

- AEC-Q200 Compliance
- Thin film technology
- Excellent overall stability
- Sn termination on Ni barrier layer
- Tight tolerance down to ±0.1%
- Extremely low TCR down to ±10ppm/°C
- High power rating up to 1 Watt
- SMD enabled structure
- Lead-free and RoHS compliant

APPLICATIONS

- Automotive
- Industrial
- Telecommunication
- Medical Equipment
- Measurement/Testing Equipment

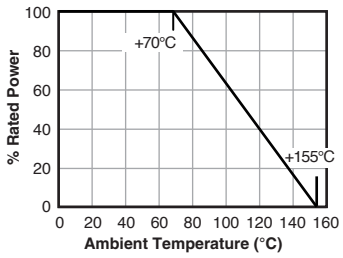
SERIES SPECIFICATIONS

Size	Power (W) @ 70°C	Max. Oper. Volt.	Max. Overload Voltage	Resistance (Ω) ±0.1%	±0.25%	±0.5%	±1%	±5%	TCR (ppm)
MEV02	0.2	200V	400V	100Ω-56K	100Ω-56K	100Ω-56K	100Ω-56K	100Ω-56K	±15
					100Ω-82K	49.9Ω-200K	49.9Ω-390K		±25
	0.3	200V	400V			8.2Ω-1M	8.2Ω-1M	8.2Ω-1M	±50
							40Ω-1M	40Ω-1M	±100
MEV04	0.4	200V	400V	10Ω-300K	10Ω-300K	10Ω-300K	10Ω-300K	10Ω-300K	±15
				10Ω-1M	10Ω-1M	10Ω-3.4M	4.02Ω-3.4M	4.02Ω-3.4M	±25
				10Ω-1M	1Ω - 1M	1Ω – 3.4MΩ	0.2Ω-3.4M	0.2Ω-3.4M	±50
							0.1Ω-1M	0.1Ω-1M	±100
MEV07	1.0	350V	700V	10Ω-300K	10Ω-300K	10Ω-300K	10Ω-300K	10Ω-300K	±15
				10Ω-1M	10Ω-1M	10Ω-3.4M	4.02Ω-3.4M	4.02Ω-3.4M	±25
				10Ω-1M	1Ω - 1M	1Ω – 3.4MΩ	0.2Ω-3.4M	0.2Ω-3.4M	±50
							0.1Ω-1M	0.1Ω-1M	±100

CHARACTERISTICS

Oper. Temp. Range	-55°C to +155°C
Max. resistance change	≤0.5% at P70 for resistance range, ΔR/R max., after 1000 h
Storage Temperature	15~28°C; Humidity < 80%RH
Rated Voltage	$\sqrt{P \cdot R}$ or Max. Operating Voltage whichever is lower

Derating



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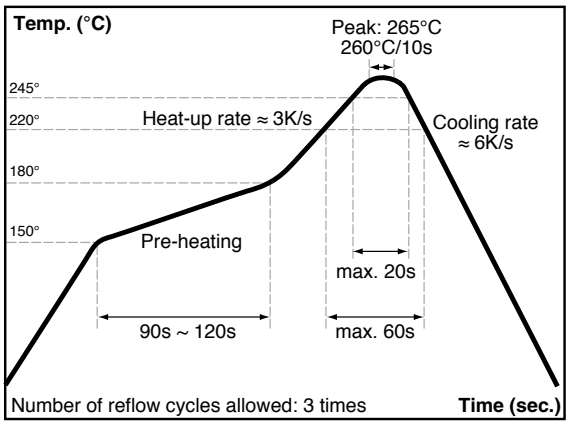
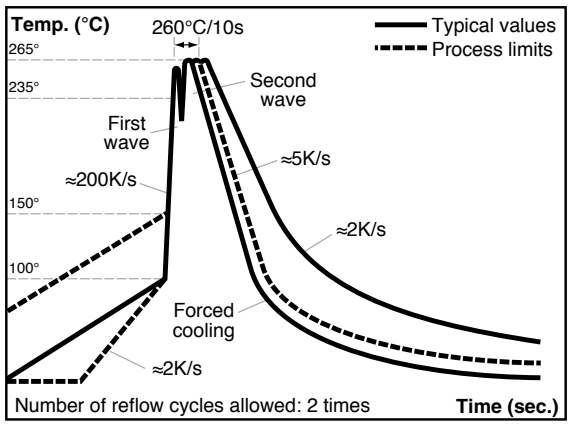
SOLDERING

IR Reflow Soldering

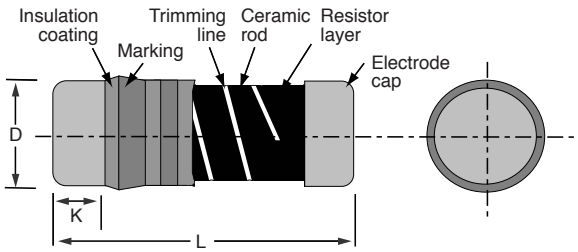


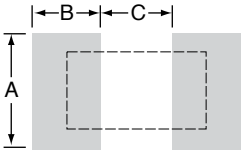
Wave Soldering (Flow Soldering)



(1) Time of IR reflow soldering at maximum temperature point 260°C: 10s
(2) Time of wave soldering at maximum temperature point 260°C: 10s
(3) Time of soldering iron at maximum temperature point 410°C: 5s

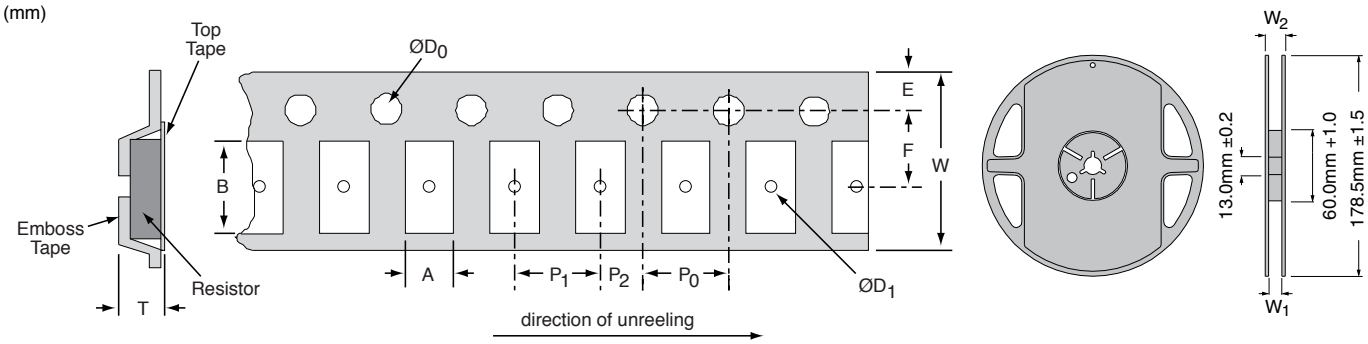
DIMENSIONS





Size	L (mm)	D (mm)	K (mm)	A (mm)	B (mm)	C (mm)	Weight (g) (per 1,000)
MEV02	2.20 ±.10	1.10 ±.10	0.45 ±.05	1.5	0.8	1.0	7.7
MEV04	3.50 ±.2	1.40 ±.15	0.8 ±.1	1.6	1.2	1.6	18.7
MEV07	5.90 ±.2	2.20 ±.20	1.3 ±.1	2.4	2.4	3.0	80.9

TAPE AND REEL



	A	B	W	W	F	P0	P1	P2	D0	D1	T	W1	W2	Qty.
MEV02	1.30 ±.1	2.40 ±.1	8.0 ±.1	1.75 ±.1	3.50 ±.05	4.00 ±.1	4.00 ±.1	2.00 ±.05	1.50 +.1	0.9 min.	1.50 ±.1	9.0 ±.5	12.5 ±.5	3,000
MEV04	1.55 ±.1	3.65 ±.1	8.0 ±.1	1.75 ±.1	3.50 ±.05	4.00 ±.1	4.00 ±.1	2.00 ±.05	1.50 +.1	0.9 min.	1.80 ±.1	9.0 ±.5	12.5 ±.5	3,000
MEV07	2.40 ±.1	6.15 ±.1	12.0 ±.1	1.75 ±.1	5.50 ±.05	4.00 ±.1	4.00 ±.1	2.00 ±.05	1.50 +.1	1.4 min.	2.70 ±.1	13.0 ±.5	15.5 ±.5	2,000

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PERFORMANCE

Item	Requirement	Method
TCR	As Spec	JIS-C-5201-1 4.8; IEC-60115-1 4.8; -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	10Ω-270KΩ: ±(0.1%+0.05Ω) <10Ω & >270KΩ: ±(0.15%+0.05Ω) 0102: ±(0.15%+0.05Ω)	JIS-C-5201-1 4.13; IEC-60115-1 4.13; RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
Insulation Resistance	≥10G	JIS-C-5201-1 4.6; IEC-60115-1 4.6; Max. Overload Voltage for 1 minute
Endurance	10Ω-270KΩ: ±(0.25%+0.05Ω) <10Ω & >270KΩ: ±(0.5%+0.05Ω) 0102: ±(0.5%+0.05Ω)	JIS-C-5201-1 4.25; IEC-60115-1 4.25.1;MIL-STD-202 Method 108;70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Biased Humidity	10Ω-270KΩ: ±(0.5%+0.05Ω) <10Ω & >270KΩ: ±(1%+0.05Ω) 0102: ±(2%+0.05Ω)	MIL-STD-202 Method 103;1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	10Ω-270KΩ: ±(0.25%+0.05Ω) <10Ω & >270KΩ: ±(1%+0.05Ω) 0102: ±(1%+0.05Ω)	MIL-STD-202 Method 108 at +155°C for 1000 hrs
Board Flex	10Ω-270KΩ: ±(0.1%+0.05Ω) <10Ω & >270KΩ: ±(0.5%+0.05Ω) 0102: ±(0.5%+0.05Ω)	AEC-Q200-005; Bending once for 60 seconds with 2mm
Solderability	95% min. coverage	JIS-C-5201-1 4.17; IEC-60115-1 4.17; J-STD-002; 245±5°C for 3 seconds
Resistance to Soldering Heat	10Ω-270KΩ: ±(0.1%+0.05Ω) <10Ω & >270KΩ: ±(0.25%+0.05Ω) 0102: ±(0.25%+0.05Ω)	MIL-STD-202 Method 210; 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover	JIS-C-5201-1 4.7; IEC-60115-1 4.7; 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%	JIS-C-5201-1 4.18; IEC-60068-2-58 8.2.1; 260±5°C for 30 seconds
Temperature Cycling	10Ω-270KΩ: ±(0.25%+0.05Ω) <10Ω & >270KΩ: ±(0.5%+0.05Ω) 0102: ±(1%+0.05Ω)	JESD22 Method JA-104; -55°C to +125°C, 1000 cycles
Mechanical Shock	±(0.25%+0.05Ω)	MIL-STD-202 Method 213; Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	±(0.5%+0.05Ω)	MIL-STD-202 Method 204; 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	±(0.5%+0.05Ω)	AEC-Q200-002; Human body, 2KV
Resistance to Solvents	No visible damage on appearance and marking.	MIL-STD-202 Method 215; Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken	AEC-Q200-006; Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	UL-94; V-0 or V-1 are acceptable. Electrical test not required.

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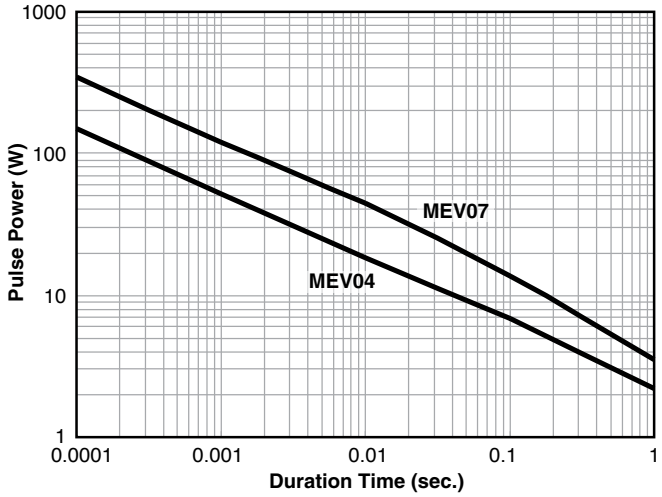
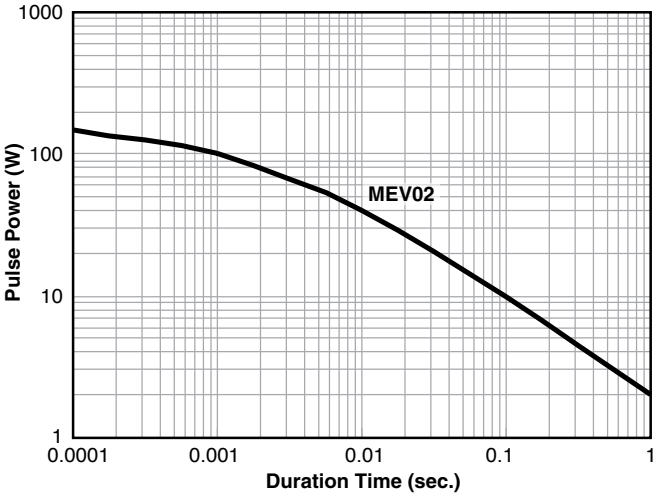
PULSE WITHSTANDING CAPACITY

The singel impulse graph is the result of 50 impulses of rectangular shape applied at one-minute intervals. The limit of acceptance ws a shift in resistance of less than 1% from the initial value. The power applied was subject to the restrictions of the maximum permissible impulse voltage graph shown.

Single Pulse (100Ω)



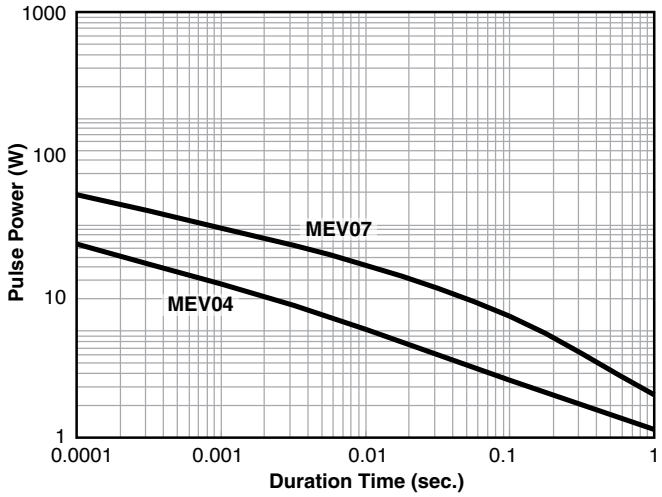
Single Pulse



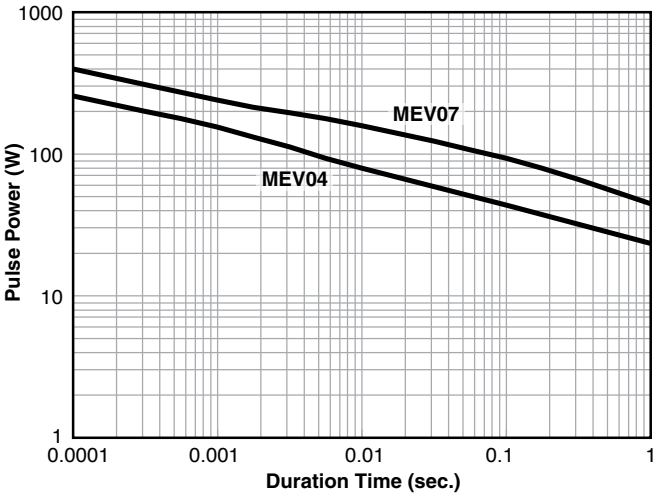
CONTINUOUS PULSE

The continuous load graph was obtained by applying repetitive rectangular pulses where the pulse period was adjusted so that the average power dissipated in the resistor was equal to its rated power at 70°C. Again the limit of acceptance was a shift in resistance of less than 1% from the initial value.

Continuous Pulse (100Ω)



Pulse Voltage (100Ω)



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MEV Series

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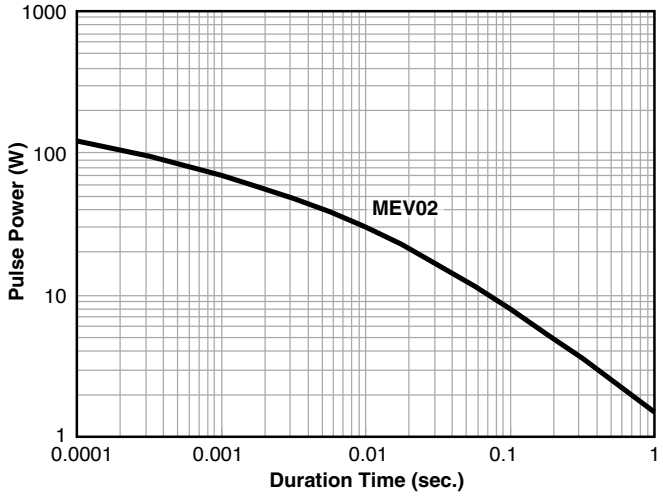
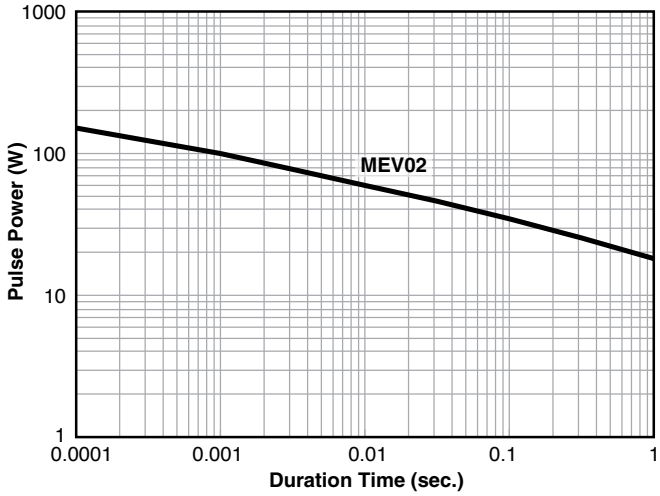
CONTINUOUS PULSE

MEV02 Series Continuous Pulse



MEV02 Series Pulse Voltage(100 Ohm)

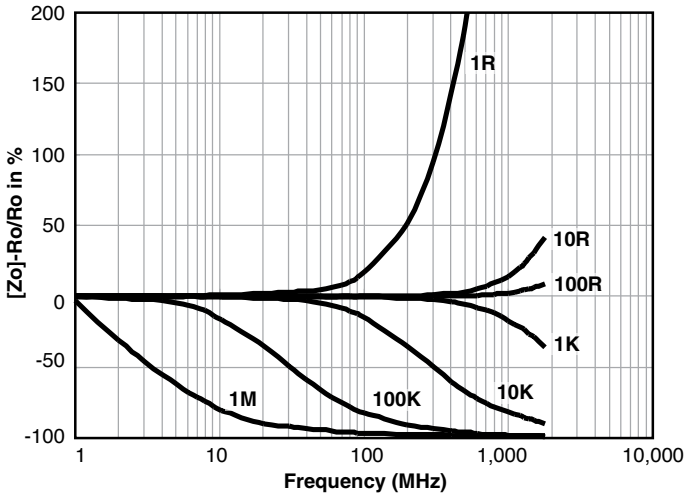


FREQUENCY BEHAVIOR

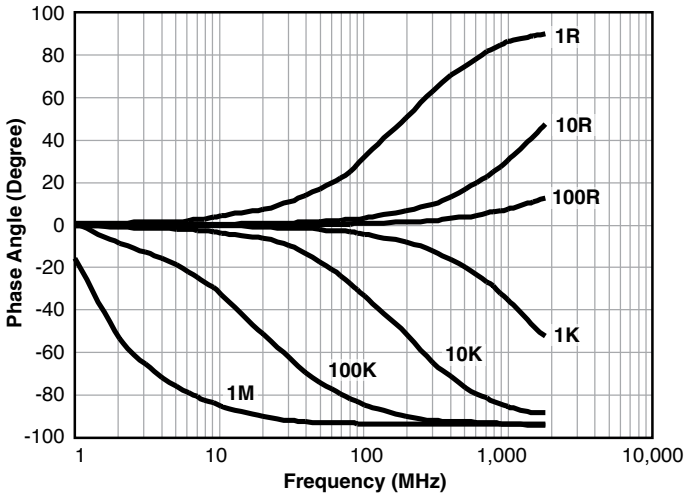
Resistors are designed to function according to ohmic laws. This is basically true of resistors for frequencies up to 100kHz. At higher frequencies, there is an additional contribution to the impedance by an ideal resistor switched in series with a coil and both switched parallel to a capacitor. The values of the capacitance and inductance are mainly determined by the dimensions of the terminations and the conductive path length.

The environment surrounding components has a large influence on the behavior of the component on the printed-circuit board.

Frequency vs. Impedance MEV04



Frequency vs. Phase Angle MEV04



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MEV Series

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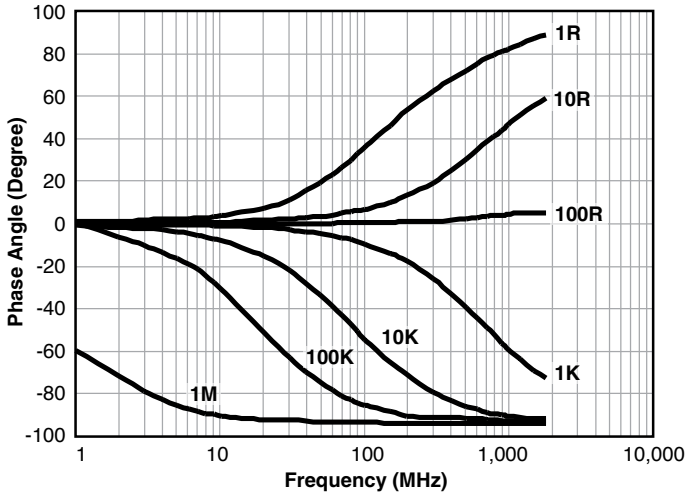
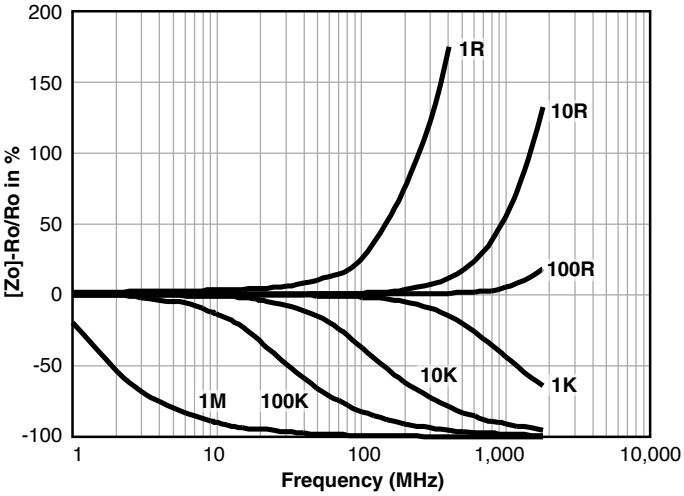
FREQUENCY BEHAVIOR

Frequency vs. Impedance MEV07



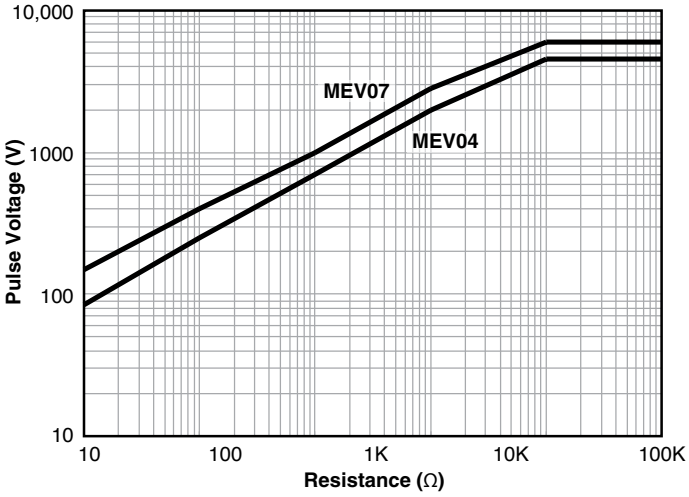
Frequency vs. Phase Angle MEV07



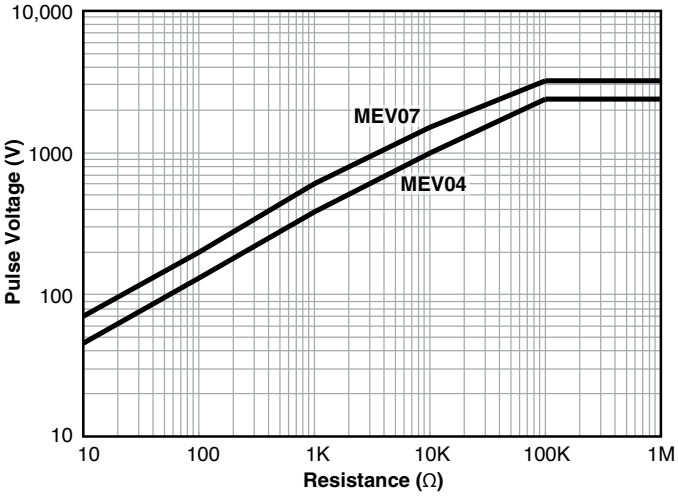
LIGHTNING SURGE

Resistors are tested in accordance with IEC 60115-1 using both 1.2/50us and 10/700us pulse shapes. The limit of acceptance is a shift in resistance of less than 0.5% from the initial value.

1.2/50µs Lightning Surge



10/700µs Lightning Surge



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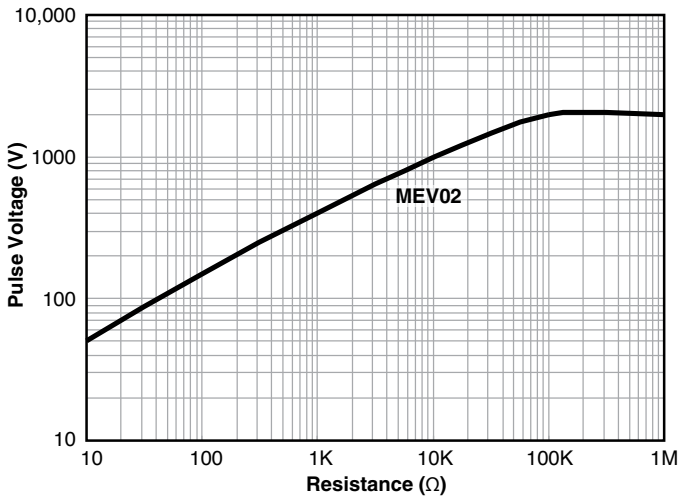
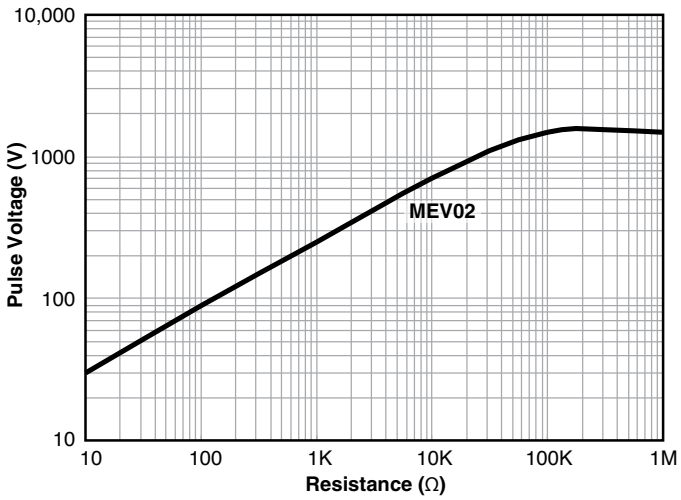
LIGHTNING SURGE

1.2/50µs Lightning Surge



10/700µs Lightning Surge

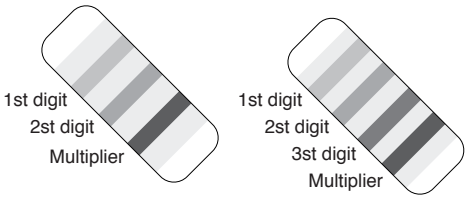


ORDERING INFORMATION

RoHS Compliant

M E V 0 2 Z 1 0 0 1 F E T

- **MELF series**
- **Size**
- **TCR**
  - Z = 15ppm
  - W = 25ppm
  - V = 50ppm
  - T = 100ppm
- **Resistance**
  - R500 = 0.5
  - 10R0 = 10
- **Tolerance**
  - J = 5%
  - F = 1%
  - D = 0.5%
  - C = 0.25%
  - B = 0.1%
- **Tape and reel**



Resistance more than two significant figures(<1R) or more than three significant figures(>1R) will not provide color code.

Silver	-	10^{-2}
Gold	-	10^{-1}
Black	0	10^{0}
Brown	1	10^{1}
Red	2	10^{2}
Orange	3	10^{3}
Yellow	4	10^{4}
Green	5	10^{5}
Blue	6	10^{6}
Violet	7	10^{7}
Grey	8	10^{8}
White	9	10^{9}

Resistance Tolerance

±5%	E-24	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1	
±1%	E-96	1.00	1.02	1.05	1.07	1.10	1.13	1.15	1.18	1.21	1.24	1.27	1.30	1.33	1.37	1.40	1.43	1.47	1.50	1.54	1.58	1.62	1.65	1.69	1.74	
		1.78	1.82	1.87	1.91	1.96	2.00	2.05	2.10	2.15	2.21	2.26	2.32	2.37	2.43	2.49	2.55	2.61	2.67	2.74	2.80	2.87	2.94	3.01	3.09	
		3.16	3.24	3.32	3.40	3.48	3.57	3.65	3.74	3.83	3.92	4.02	4.12	4.22	4.32	4.42	4.53	4.64	4.75	4.87	4.99	5.11	5.23	5.36	5.49	
		5.62	5.76	5.90	6.04	6.19	6.34	6.49	6.65	6.81	6.98	7.15	7.32	7.50	7.68	7.87	8.06	8.25	8.45	8.66	8.87	9.09	9.31	9.53	9.76	
±0.5% ±0.25% ±0.1%	E-192	10.0	10.1	10.2	10.4	10.5	10.6	10.7	10.9	11.0	11.1	11.3	11.4	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	13.0	13.2	
		13.3	13.5	13.7	13.8	14.0	14.2	14.3	14.5	14.7	14.9	15.0	15.2	15.4	15.6	15.8	16.0	16.2	16.4	16.5	16.7	16.9	17.2	17.4	17.6	
		17.8	18.0	18.2	18.4	18.7	18.9	19.1	19.3	19.6	19.8	20.0	20.3	20.5	20.8	21.0	21.3	21.5	21.8	22.1	22.3	22.6	22.9	23.2	23.4	
		23.7	24.0	24.3	24.6	24.9	25.2	25.5	25.8	26.1	26.4	26.7	27.1	27.4	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1	30.5	30.9	31.2	
		31.6	32.0	32.4	32.8	33.2	33.6	34.0	34.4	34.8	35.2	35.7	36.1	36.5	37.0	37.4	37.9	38.3	38.8	39.2	39.7	40.2	40.7	41.2	41.7	
		42.2	42.7	43.2	43.7	44.2	44.8	45.3	45.9	46.4	47.0	47.5	48.1	48.7	49.3	49.9	50.5	51.1	51.7	52.3	53.0	53.6	54.2	54.9	55.6	
		56.2	56.9	57.6	58.3	59.0	59.7	60.4	61.2	61.9	62.6	63.4	64.2	64.9	65.7	66.5	67.3	68.1	69.0	69.8	70.6	71.5	72.3	73.2	74.1	
		75.0	75.9	76.8	77.7	78.7	79.6	80.6	81.6	82.5	83.5	84.5	85.6	86.6	87.6	88.7	89.8	90.9	92.0	93.1	94.2	95.3	96.5	97.6	98.8	

rev 4/19-2

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