

ELECTRONICS



# Metal Oxide Varistors

RL0402E Series

# Metal Oxide Varistors - RL0402E Series

## Features

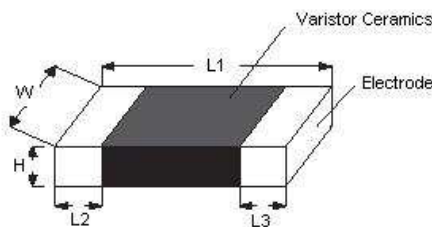
1. Excellent ESD clamping & Small Insertion Loss
2. High transient current capability, Fastest response time
3. Capacitance is designed to ultra-low value, which can be efficiently suitable to high speed data line.
4. EU-RoHS Compliance

## Product Name

R	L	0	4	0	2	E	0	0	5	M	0	1	5	K
Brand Name		EIA 0402			Type E:ESD		Varistor Voltage			M±30%		capacitance 0.15PF=015		Type

## Package Dimensions

Unit:mm



EIA	L1(mm)	W(mm)	H(mm)	L2&L3(mm)
0402	1.00±0.15	0.50±0.10	0.60	0.20±0.10

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### Electrical Characteristics

Part Number	Max. Operating Voltage	Max. Leakage Current	capacitance	Trigger Voltage	Clamping Voltage	Attenuation	esd capability <sup>3</sup> Cont.Discharge
	V <sub>DC</sub> (V)	( $\mu$ A)	@1MHz(Cp)	(V)	(V)		
RL0402E005M005K	5	0.001	0.05	450	50	-3dB at 5GHz	8KV
RL0402E005M015K	5	0.05	0.15	250	50	-3dB at 5GHz	8KV
RL0402E005M500K	5	1	5	200	50	-	8KV
RL0402E005M015K	5	0.05	0.15	250	50	-3dB at 5GHz	8KV
RL0402E008M100K	8	1	1	200	50	-	8KV
RL0402E012M015K	12	1	0.15	200	50	-3dB at 5GHz	8KV
RL0402E012M100K	12	1	1	200	50	-	8KV
RL0402E015M005K	15	0.001	0.05	450	50	-3dB at 5GHz	8KV
RL0402E018M015K	18	1	0.15	250	50	-3dB at 5GHz	8KV
RL0402E018M100K	18	1	1	200	50	-	8KV
RL0402E018M300K	18	1	3	125	50	-	8KV
RL0402E024M250K	24	1	2.5	200	50	-	8KV

## Notes:

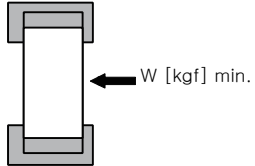
1. Leakage current at Max. operating Voltage

2. Capacitance is measured with 1Vrms

3. per IEC 61000-4-2, 30A@8KV, level 4, clamp measurement made 30ns after initiation of pulse, all test IN contact discharge mode.

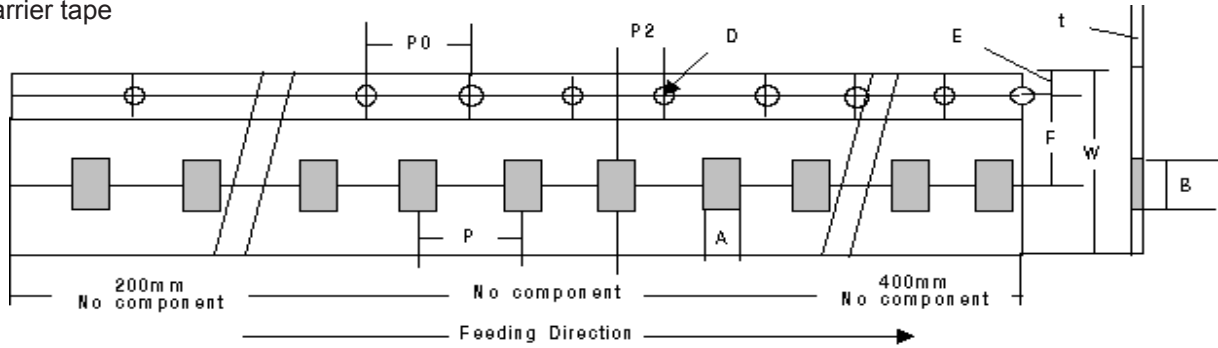
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### Electrical Rating

No	Item	Test Condition / Description	Requirement
1	Operation Range	1. -40°C ~ 85°C	-
2	Leakage current	Satisfaction to the specification, under 1uA	Applied voltage : specified working voltage
3	Capacitance	Satisfaction to the specification, under 1pF	Frquency & OSC level : 1MHz, 1.0Vrms
4	Solderability	More than 90% of the terminal electrode shall be covered with new solder.	1. Type of solder : H63A 2. Soldering Temp & Time : 230+/-5°C, 5+/-1 sec
5	Reflow soldering	1. No Serious mechanical damage 2. More than 50% of the terminal electrode shall be covered with new solder 3. Leakage Current :≤ 10uA	1. Type of solder : H63A 2. Temp & Time : max 260+/-5°C, min 10sec * Refer to the soldering profile of page 6
6	Humidity Load Test	1. No Serious mechanical damage 2. Leakage Current :≤ 10uA	Test Temp. & Relative Humidity & Time : 85+/- 5°C, 85 +/- 5% RH, Vw Applied, 500 +/- 12hrs
7	Thermal Shock	1. No Serious mechanical damage 2. Leakage Current :≤ 10uA	1. Step 1 : -40 +/- 5°C, Step 2 : 85 +/- 5°C 2. Cycle : 30min ± 3min, each 5 cycles
8	High Temp. Test	1. No Serious mechanical damage 2. Leakage Current :≤ 10uA	Temp. & time : 85+/-5°C , 1000 +/- 24hrs
9	Adhesive strength	1. No Serious mechanical damage under condition of 1005 : min 0.5kgf, 1608 : min 1.0kgf	
10	ESD	1. No mechanical damage after test 2. Leakage Current :≤ 10uA * ESD gun (IEC61000-4-2 standard) * C=150pF R=330Ω	1. Contact discharge * Voltage :+/-8kV(Level 4) * Number : 10 times in 10sec 2. Air discharge * Voltage :+/-15kV(Level 4) * Number : 10 times in 10sec

## Packing specifications

### 1. Carrier tape

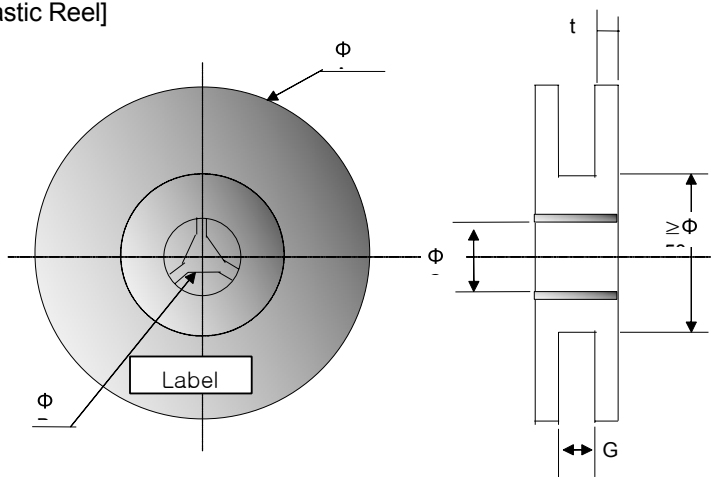


Unit:mm

Size	A	B	W	D	E	F	P	P0	P2	t
0402	0.65+/-0.10	1.15+/-0.10	8.00+/-0.20	1.50+/-0.25	1.75+/-0.10	3.50+/-0.50	2.0+/-0.1	4.0+/-0.10	2.0+/-0.10	1.1max

### 2. Reel & Label

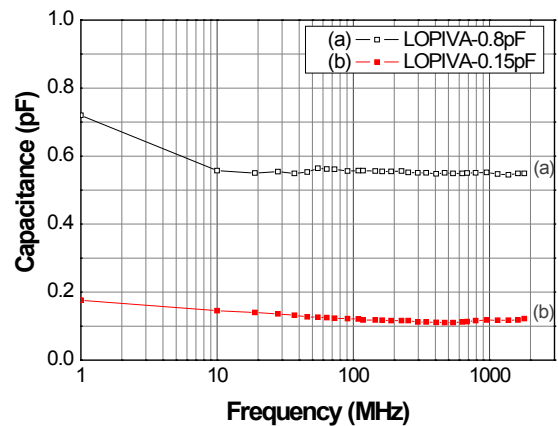
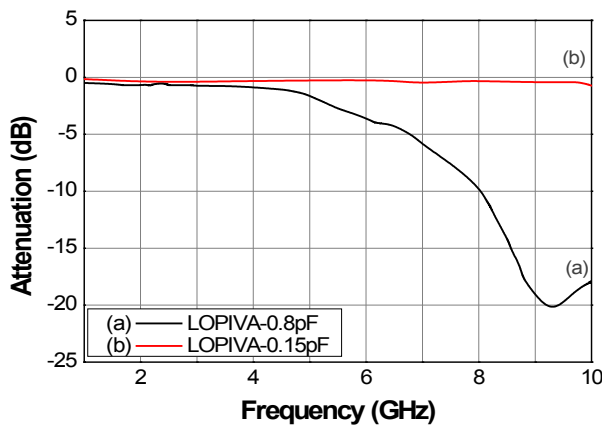
[Plastic Reel]



Unit:mm

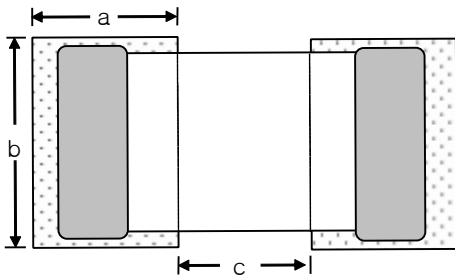
Code	dimension
$\Phi A$	178+/-2.0
$\Phi B$	13.0+/-0.5
$\Phi C$	22.0+/-2.0
G	10.0+/-1.5
t	2.5+/-0.5

## Frequency properties ; Cp, Insertion Loss



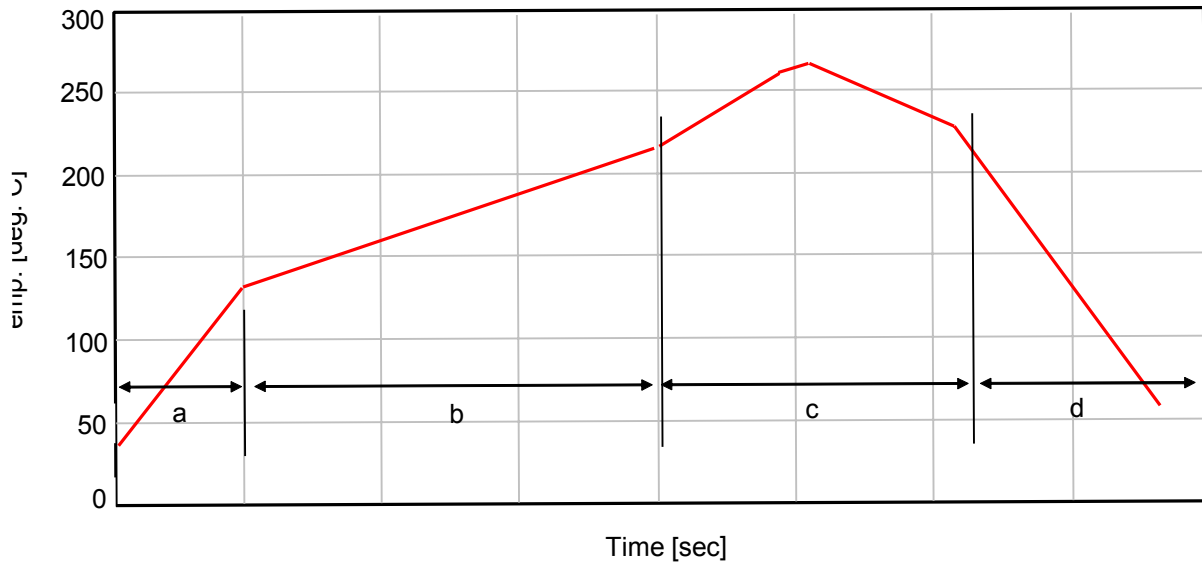
## Packing specifications

### 1) Land Pattern Design



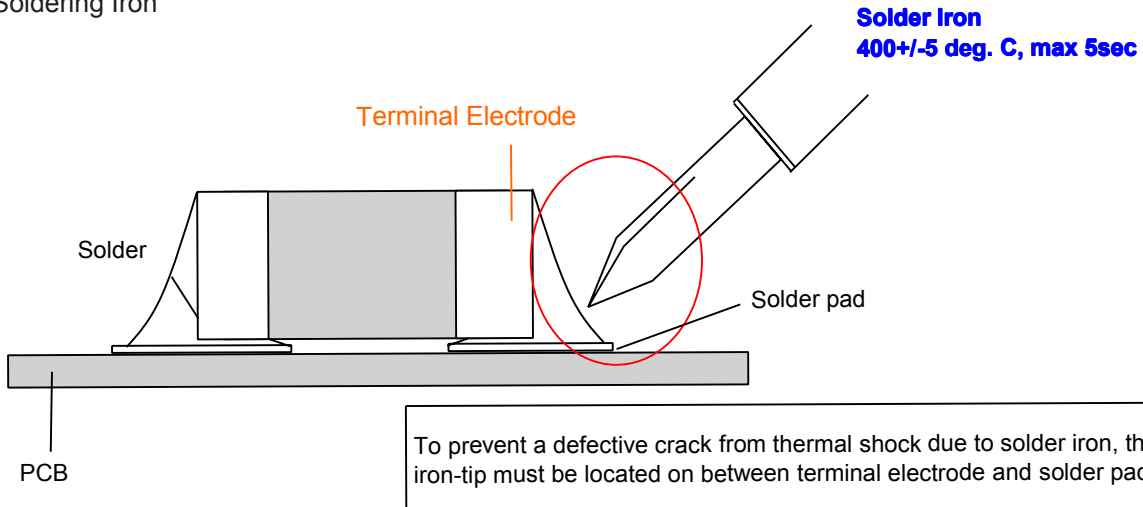
Code	Land Dimension with Chip Size [mm]			
	0201	0402	0603	0805
a	0.20~0.35	0.30~0.50	0.60~0.70	0.60~0.70
b	0.25~0.40	0.40~0.60	0.60~0.80	0.80~1.10
c	0.25~0.40	0.30~0.50	0.60~0.80	1.00~1.20

### 2) Reflow Soldering



Zone	temp. range [deg. C]	time [sec]	Remark
a	Curing RT ~ 130	60	* Solder : Sn-Ag-Cu * 260deg. C, over 10sec
b	Preheat max 220	90 ~ 150	
c	Soldering 220 ~ 260 [max 270]	90 ~ 150	
d	Cooling 220 ~ RT	min 60	

### 3) Soldering Iron



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