RL0402-0603E series

Applications

1. CMOS and MOSFET protection from ESD
2. Computer ESD and I/O protection
3. Telecommunication transient protection
   - USB2.0 port, IEEE-1394, RF module, Antenna circuit, high speed Protocol Etc.

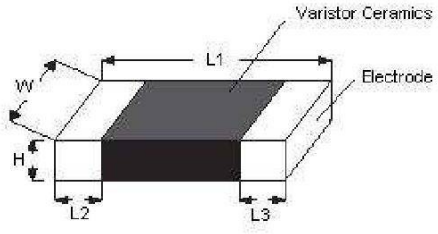
Features

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	Type	Varistor Voltage	M±30%	capacitance	K:±20%
	0402	E:ESD			0.15PF=015	
	0603					



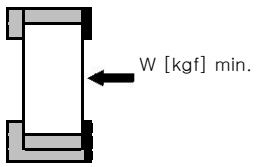
EIA	L1(mm)	W(mm)	H(mm)	L2&L3(mm)
0402	1.00±0.15	0.50±0.10	0.60	0.20±0.10
0603	1.60±0.15	0.80±0.15	0.95	0.35±0.15

Electriacl Characteristics (@ TA = 25 °C Unless Otherwise Noted)

Part Number	Max. Operating Voltage	Max. Leakage Curren	capacitance	Trigger Voltage	Clamping Voltage	Attenuation	esd capability3 Cont.Discharge
	V_{DC}(V)	(uA)	@1MHz(C_p)	(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
RL0402E012M015K	12	1	0.15	200	50	-3dB at 5GHz	8KV
RL0402E012M100K	12	1	1	200	50		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
RL0603E005M005K	5	0.001	0.05	450	50	-3dB at 5GHz	8KV
RL0603E005M015K	5	0.05	0.15	250	50	-3dB at 5GHz	8KV
RL0603E005M250K	5	1	2.5	200	50		8KV
RL0603A005M500K	5	1	5	15	25		8KV
RL0603E012M005K	12	0.05	0.05	250	50	-3dB at 5GHz	8KV
RL0603E012M015K	12	1	0.15	200	50	-3dB at 5GHz	8KV
RL0603E012M100K	12	1	1	200	50		8KV
RL0603E018M015K	18	1	0.15	250	50	-3dB at 5GHz	8KV
RL0603E018M100K	18	1	1	200	50		8KV
RL0603E018M300K	18	1	3	125	50		8KV
RL0603E024M250K	24	1	2.5	200	50		8KV

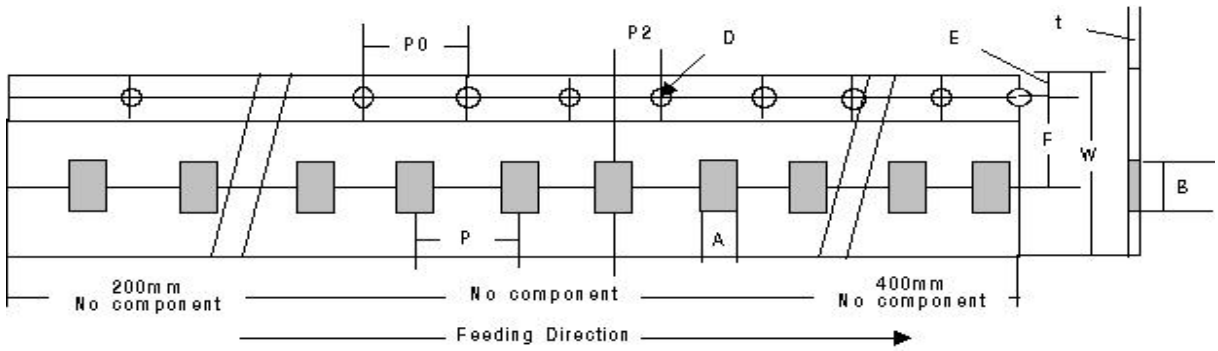
Notes:
1.Leakage current at Max.operating Voltage
2.Capacitance is measured with 1Vrms
3.per IEC 61000-4-2,30A@8KV,level 4,clamp measuremtne made 30ns after initiation of pulse,all test IN contact discharge mode.

Electrical Rating

No	Item	Requirements	Test method
1	Operation Range	1. -40℃ ~ 85℃	
2	Leakage current	1. Satisfaction to the specification, under 1uA	1. Applied voltage : specified working voltage
3	Capacitance	1. Satisfaction to the specification, under 1pF	1. Frquency & OSC level : 1MHz, 1.0Vrms
4	Solderability	1. More than 90% of the terminal electrode shall be covered with new solder.	1. Type of solder : H63A 2. Soldering Temp & Time : 230+/-5℃, 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 Currrent : ≤ 10uA	1. Type of solder : H63A 2. Temp & Time : max 260+/-5℃, min 10sec * Refer to the soldering profile of page 6
6	Humidity Load Test	1. No Serious mechanical damage 2. Leakage Currrent : ≤ 10uA	1. Test Temp. & Relative Humidity & Time : 85+/- 5℃, 85 +/- 5% RH, Vw Applied, 500 +/- 12hrs
7	Thermal Shock		1. Step 1 : -40 +/- 5℃, Step 2 : 85 +/- 5℃ 2. Cycle : 30min ± 3min, each 5 cycles
8	High Temp. Test		1. Temp. & time : 85+/-5℃ , 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



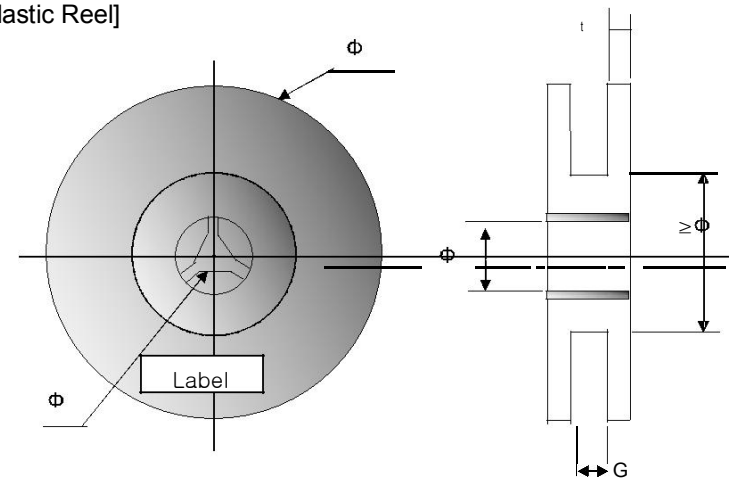
unit :mm

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
0603	1.10+/-0.10	1.90+/-0.10					4.0+/-0.1			

* paper type

2. Reel & Label

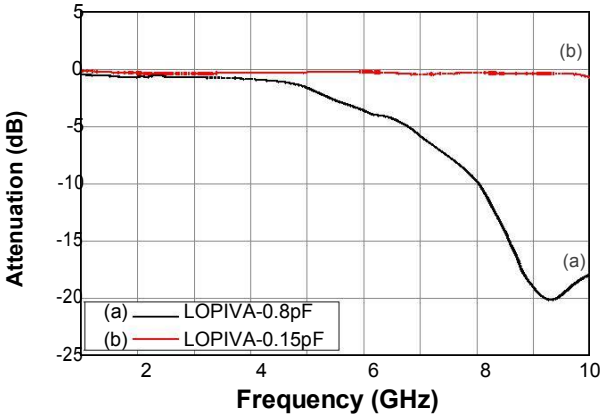
[Plastic Reel]

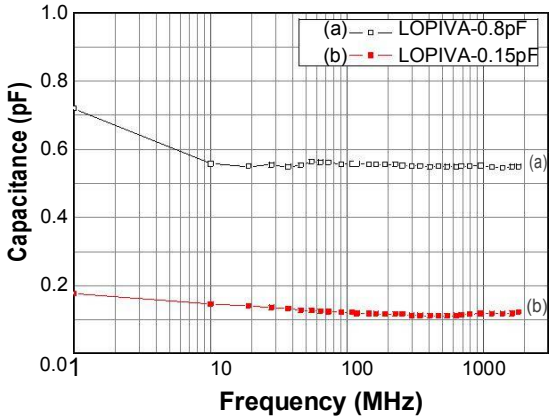


unit : mm

code	dimension
A	178+/-2.0
B	13.0+/-0.5
C	22.0+/-2.0
G	10.0+/-1.5
t	2.5+/-0.5

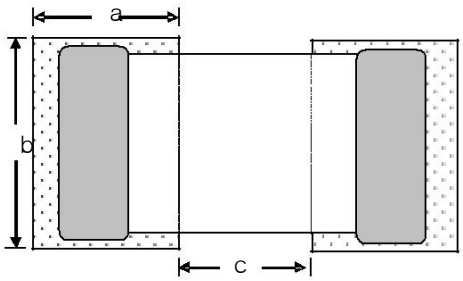
Frequency properties ; Cp, Insertion Loss





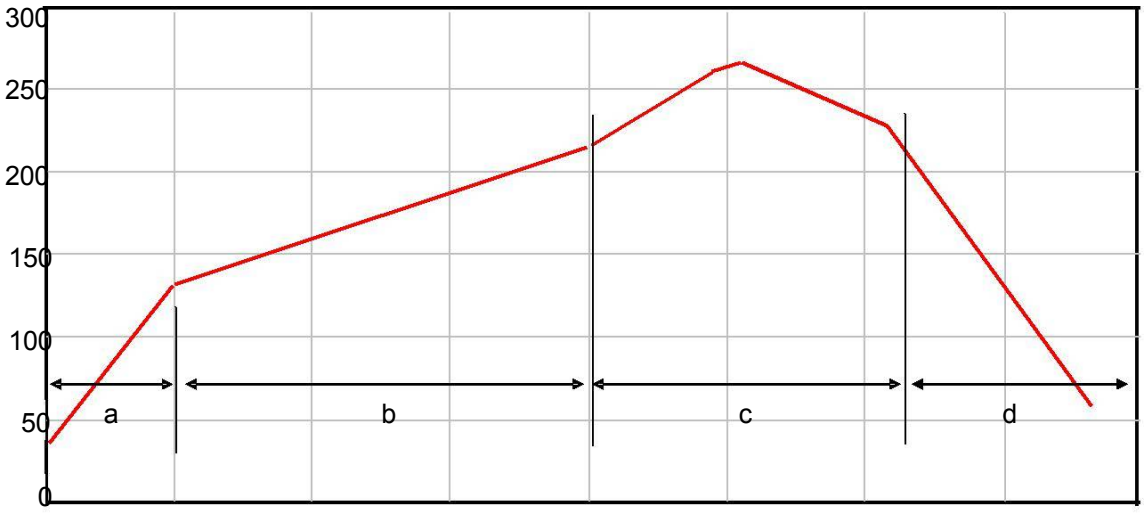
Recommended Soldering condition

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

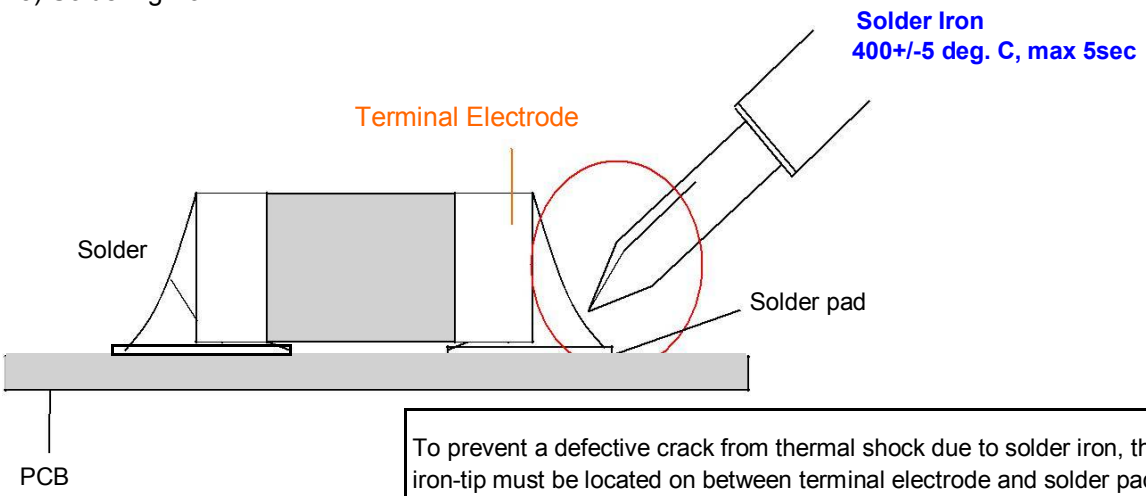
2) Reflow Soldering



Time [sec]

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

3) Soldering Iron



To prevent a defective crack from thermal shock due to solder iron, the end of iron-tip must be located on between terminal electrode and solder pad

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