BORN SEMICONDUCTOR

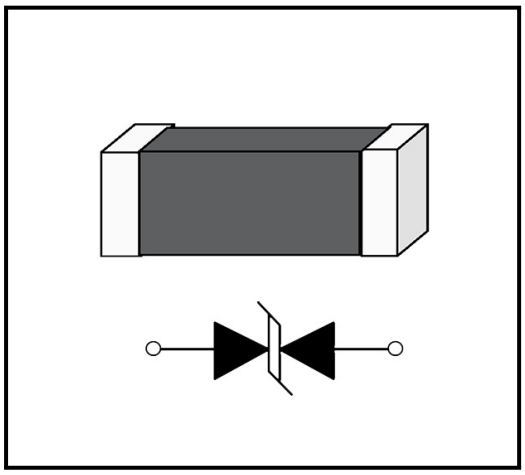
xxxxESDA-xxN Series

ESD Protection Diode

Features

- Deal ESD protection for high frequency, low voltage ap-plications.
- Exceeds testing requirements outlined in IEC 61000-4-2
- Ultra low capacitance (2pF typ.)
- Very low leakage current
- Fast response time
- Bi-directional

Package



Applications

- High Speed Data Ports (USB 2.0, IEEE 1394)
- Computers & Peripherals (Cell phone, PDA, HDTV, DVD players)

Mechanical Data

- Surface mount
- RoHS Compliant

Ordering information

Order code	Package	Base qty	Delivery mode
0201ESDA-xxN Series	0201	15k	Tape and reel
0402ESDA-xxN Series	0402	10k	Tape and reel
0603ESDA-xxN Series	0603	4k	Tape and reel

Absolute Maximum Rating

Rating	Symbol	Value	Units
ESD per IEC 61000-4-2 (Contact) ESD per IEC 61000-4-2 (Air)	V_{ESD}	±8 ±15	KV
Response time	T_{RISE}	<0.5	ns
Lead content	–	<1000	ppm
Withstanding ESD capability	IEC61000-4-2	Level 4	–
Operating Ambient Temperature	T_A	-50 to + 85	°C
Storage Temperature	T_{stg}	-50 to + 125	°C

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Electrical Characteristics

Part NO.	Working Voltage	Varistor[1] voltage measured	Maximum[2] ESD allowable clamping Voltage	Leakage[3] Current (at Initial State)	Leakage[3] Current (after ESD Test)	Typical Cap.Value at 1MHz
Symbol	$V_{DC(max.)}$	$V_{trigger}$	V_C	I_{LDC}	I_{LDCA}	C
Unit	V	V	V	μA	μA	pF
0201ESDA-03N	3.3	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-05N	5	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-09N	9	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-12N	12	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-14N	14	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-18N	18	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-24N	24	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-30N	30	60~80	<130	< 1	<2.0	2~4.5
0201ESDA-36N	36	60~80	<130	< 1	<2.0	2~4.5
0402ESDA-05N	5	100~150	<200	<0.1	<1.0	2~4.5
0402ESDA-09N	9	100~150	<200	<0.1	<1.0	2~4.5
0402ESDA-12N	12	100~150	<200	<0.1	<1.0	2~4.5
0402ESDA-14N	14	100~150	<200	<0.1	<1.0	2~4.5
0402ESDA-18N	18	100~150	<200	<0.1	<1.0	2~4.5
0402ESDA-24N	24	100~150	<200	<0.1	<1.0	2~4.5
0402ESDA-30N	30	100~150	<200	<0.1	<1.0	2~4.5
0402ESDA-36N	36	100~150	<200	<0.1	<1.0	2~4.5
0603ESDA-05N	5	100~150	<240	<0.1	<2.0	2~4.5
0603ESDA-09N	9	100~150	<240	<0.1	<2.0	2~4.5
0603ESDA-12N	12	100~150	<240	<0.1	<2.0	2~4.5
0603ESDA-14N	14	100~150	<240	<0.1	<2.0	2~4.5
0603ESDA-18N	18	100~150	<240	<0.1	<2.0	2~4.5
0603ESDA-24N	24	100~150	<240	<0.1	<2.0	2~4.5
0603ESDA-30N	30	100~150	<240	<0.1	<2.0	2~4.5
0603ESDA-36N	36	100~150	<240	<0.1	<2.0	2~4.5

Notes:

1 The varistor voltage was measured at 1 mA current

2.The Clamping voltage was measured at 8*20 us standard current.

3.The Leakage current was measured at working voltage.

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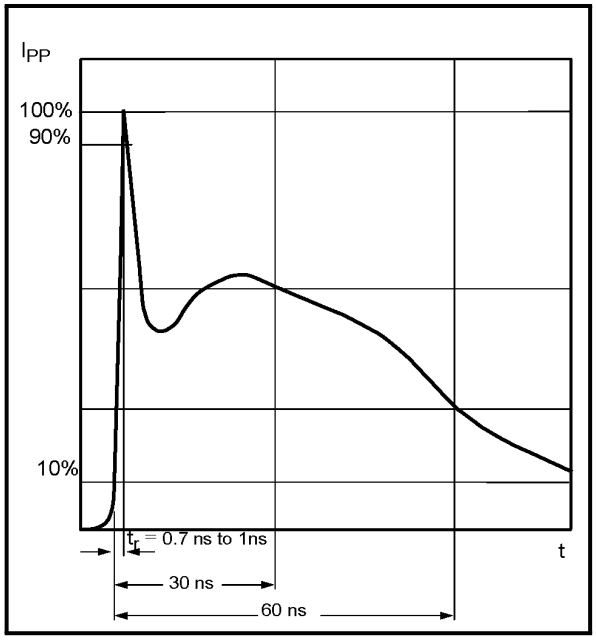
ESD Wave Form



Electrical Characteristics

SEVERITY LEVEL	AIR DIRCHARGE	DIRECT DISCHARGE
1	2KV	2KV
2	4KV	4KV
3	8KV	6KV
4	15KV	8KV

Note:IEC61000-4-2 compliant ESD current pulse waveform.

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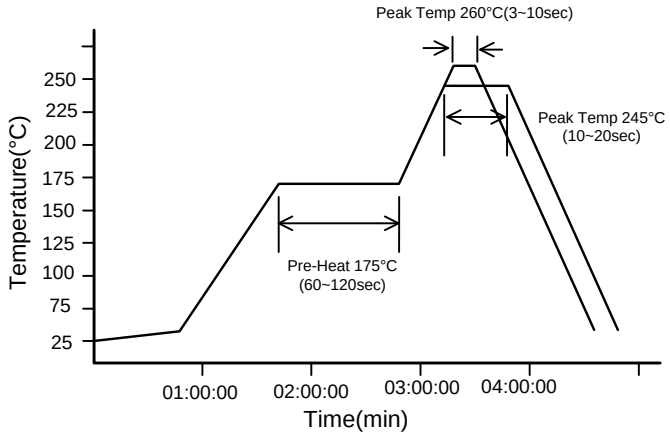
Soldering Parameters



IR reflow Pb free process suggestion profile

(1)The solder recommend is Sn96.5/Ag3.5 and thickness recommend as shown in table 5.3.

(2)Ramp-up rate (217°C to peak) + 3°C /second max.

(3)Temp. maintain at 175±25°C 180 seconds max.

(4)Temp. maintain above 217°C 60～150 seconds.

(5) Peak temperature range 245 +20/-10°C within 5°C of actually peak temperature (tp) 10~20 seconds.

(6) Ramp down rate -6°C/second max.

Environment Reliability Test

Characteristic	Test Method and Description			
High Temperature Storage	The specimen shall be subjected to 125±2°C for 1000±2 hours without load and then stored at room temperature and normal humidity for one or two hours. The change of varistor voltage shall be within 10%.			
Temperature Cycle	The temperature cycle of specified temperature shall be repeated five times and then stored at room temperature and normal humidity for one or two hours. The change of varistor voltage shall be within 10% and mechanical damage shall be examined.	Step	Temperature	Period
		1	-40±3°C	30±3min
		2	room temperature	1 hour
		3	125±3°C	30±3min
		4	room temperature	1 hour
High Temperature Load	After being continuously applied the maximum allowable voltage at 85±2°C for 1000±2 hours, the specimen shall be stored at room temperature and normal humidity for one or two hours. The change of varistor voltage shall be within 10%.			
Damp Heat Load/Humidity Load	The specimen should be subjected to 40±2°C and 90～95% RH, the maximum allowable voltage applied for 1000±2 hours and then stored at room temperature and normal humidity for one or two hours. The change of varistor voltage shall be within 10%.			
Low Temperature Storage	The specimen should be subjected to -40±2°C for 1000±2 hours without load and then stored at room temperature and normal humidity for one or two hours. The change of varistor voltage shall be within 10%.			

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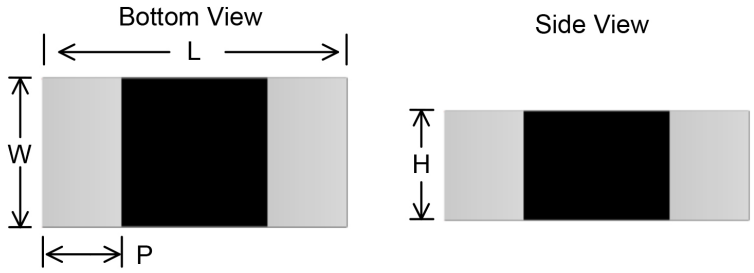
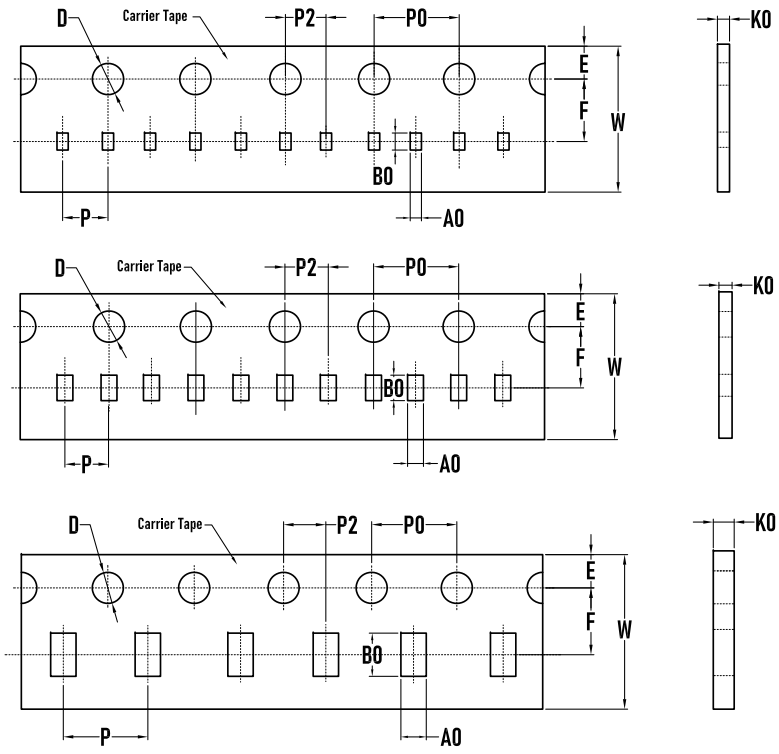
Outline Drawing



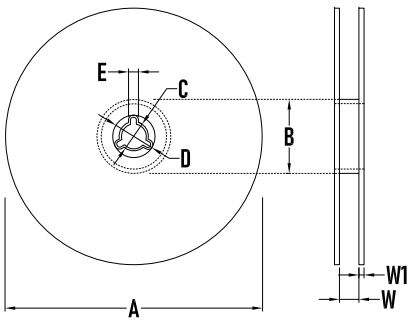
SYMBOL	MILLIMETERS		
	0201	0402	0603
L	0.60±0.03	1.00±0.10	1.60±0.15
W	0.30±0.03	0.50±0.10	0.80±0.10
P	0.15±0.05	0.25±0.10	0.30±0.10
H	0.30±0.03	0.60(Max.)	0.90(Max.)

Packaging Tape



SYMBOL	MILLIMETER		
	0201	0402	0603
A0	0.40±0.05	0.62±0.05	1.10±0.05
B0	0.70±0.05	1.12±0.05	1.90±0.05
K0	0.40±0.05	0.60±0.05	0.95±0.05
D	1.50 $^{+0.1}_{-0.05}$	1.55 $^{+0.1}_{-0.05}$	1.56 $^{+0.1}_{-0.05}$
P	2.00±0.10	2.00±0.10	4.00±0.10
P2	2.00±0.10	2.00±0.10	2.00±0.10
P0	4.00±0.10	4.00±0.10	4.00±0.10
W	8.00±0.10	8.00±0.10	8.00±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05	3.50±0.05

Packaging Reel



SYMBOL	MILLIMETER		
	0201	0402	0603
A	178±1	178±1	178±1
B	60±0.5	60±0.5	60±0.5
C	13.0±0.2	13.0±0.2	13.0±0.2
D	21±0.2	21±0.2	21±0.2
E	2.0±0.5	2.0±0.5	2.0±0.5
W	9.0±0.5	9.0±0.5	9.0±0.5
W1	1.5±0.1	1.5±0.1	1.5±0.1
Quantity	15000PCS	10000PCS	4000PCS

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