

ESD9Z SERIES

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ESD9Z SERIES

Surface Mount Uni-Directional TVS
For ESD Protection Diode - 3.3V - 5.0V

Features

- Small body outline dimensions
- Low body height
- Stand-off voltage: 3.3V,5.0V
- Low leakage
- Response time is typically < 1ns
- Provide transient protection:
IEC 61000-4-2 (ESD) level 4
IEC 61000-4-4 (EFT) 80A (5/50ns)
IEC 61000-4-5 (Surge) (8/20us)
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free parts, ex. ESD9Z3.3-H

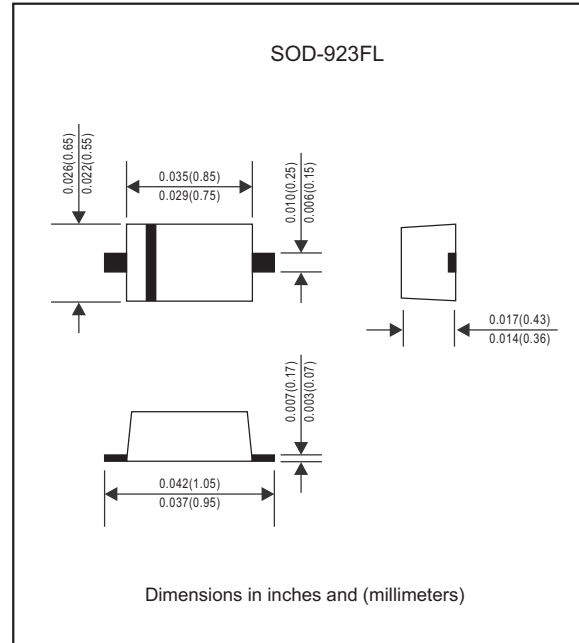
Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-923FL
- Terminals :Plated terminals, solderable per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.00044 gram

Applications

- Cellular phones audio
- MP3 players
- Digital cameras
- Portable applications
- mobile telephone

Package outline



Maximum ratings (at T_A=25°C unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	Value	UNIT
Peak power dissipation	tp = 8/20 us	P _{PP}	100	W
Total power dissipation	on FR-5 board(Note1)@ T _A =25°C	P _D	150	mW
IEC61000-4-2(ESD)	air discharge contact discharge	E _{SD}	±15 ±8.0	kV
ESD voltage	per human body model	E _{SD}	16	kV
Lead solder temperature-maximum	10 second duration	T _L	260	°C
Operating junction temperature range		T _J	-55 to +150	°C
Storage temperature range		T _{STG}	-55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.
1. FR-5 = 1.0 X 0.75 X 0.62 in.

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Electrical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted, $V_F = 0.9\text{V Max.}$ @ $I_F = 10\text{mA}$ for all types)

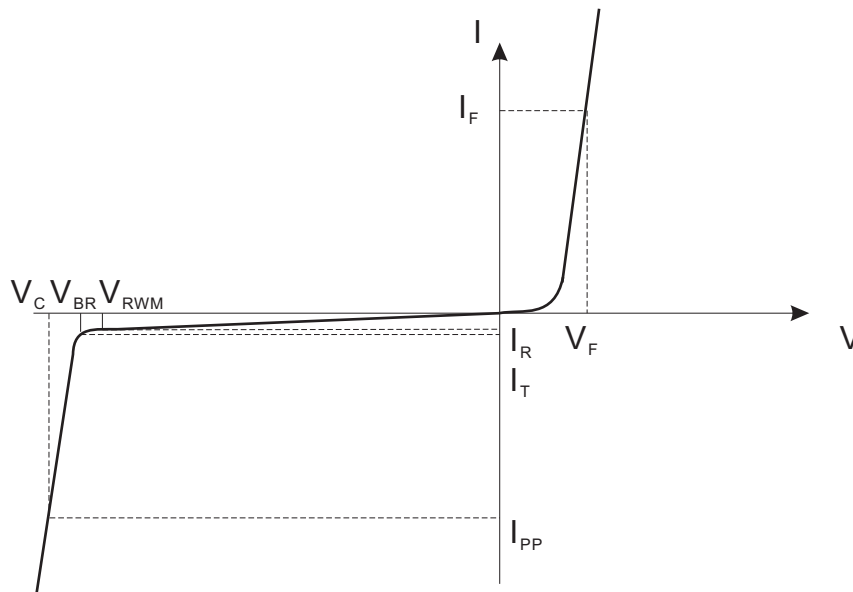
Part No.	V_{RWM} (V) Max	I_R (μA) @ V_{RWM} Max	V_{BR} (V)@ I_T (Note 2) Min	I_T (mA)	I_{PP} (Note 3) (A) Typ	V_C (V)(Note 3) @Max I_{PP} Max	P_{PK} (W) (8/20 μs) Max	C_j (pF) $V_R=0\text{V}$ and $f=1\text{MHz}$ Typ.
ESD9Z3.3	3.3	2.5	5.0	1.0	9.8	10.4	102	80
ESD9Z5.0	5.0	1.0	6.2	1.0	8.7	12.3	107	65

Over voltage available upon request.

2. V_{BR} is measured with a pulse test current I_T at an ambient temperature of 25°C .

3. Surge current waveform per Figure.

Typical characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)



Uni-Directional TVS

- V_C : Clamping Voltage @ I_{PP}
- I_{PP} : Maximum Reverse Peak Pulse Current
- V_{RWM} : Maximum Working Peak Reverse voltage
- I_R : Maximum Reverse Leakage Current @ V_{RWM}
- V_{BR} : Breakdown voltage @ I_T
- I_T : Test Current
- I_F : Forward Current
- V_F : Forward Voltage @ I_F
- C_j : Capacitance @ $V_R = 0\text{V}$ and $f = 1\text{MHz}$

Rating and characteristic curves (ESD9Z SERIES)

Fig.1-TYPICAL BREAKDOWN VOLTAGE VERSUS TEMPERATURE

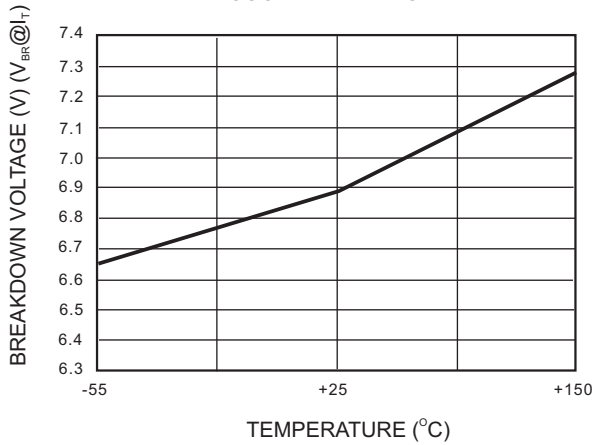


FIG.2-TYPICAL LEAKAGE CURRENT VERSUS TEMPERATURE

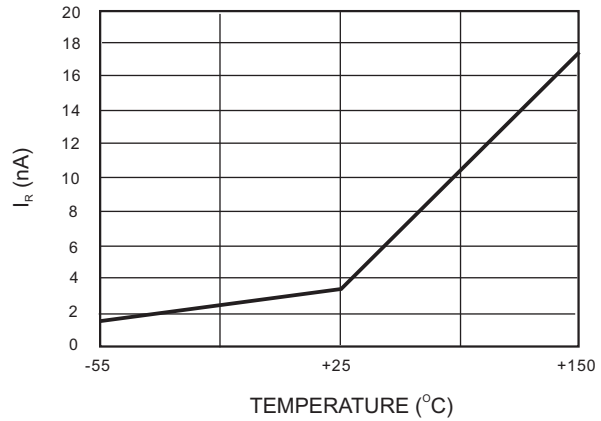


FIG.3- 8/20us PULSE WAVEFORM

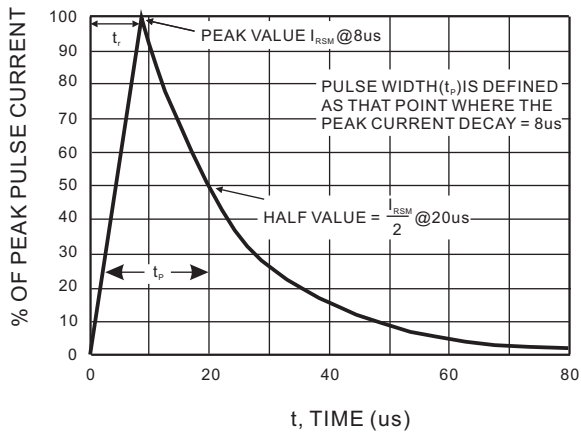


FIG.4-POSITIVE 8kV CONTACT PER IEC 61000-4-2-ESD9Z5.0

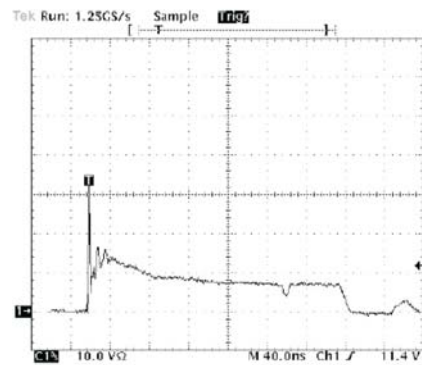
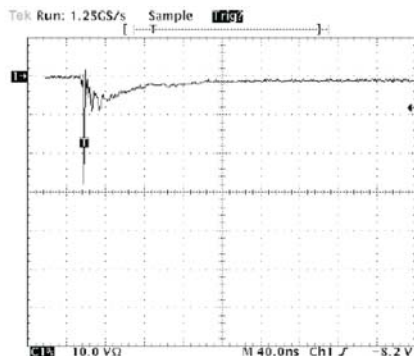




FIG.5-NEGATIVE 8kV CONTACT PER IEC 61000-4-2-ESD9Z5.0



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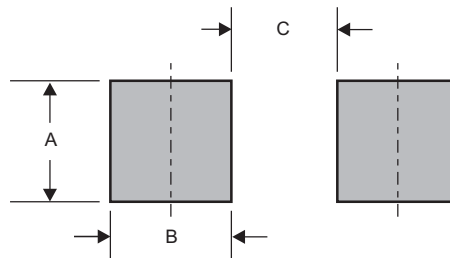
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
ESD9Z3.3	E
ESD9Z5.0	G

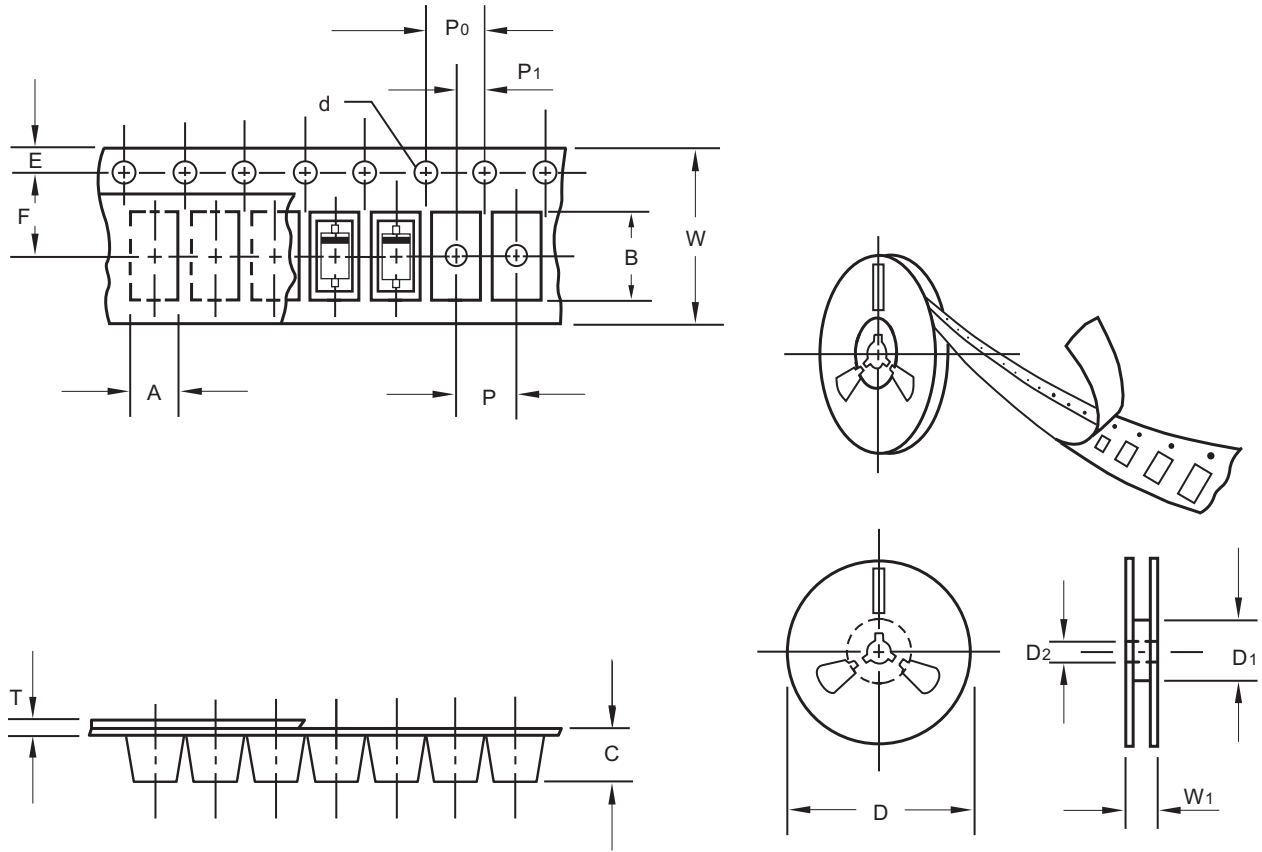
Suggested solder pad layout



PACKAGE	A	B	C
SOD-923FL	0.016 (0.40)	0.012 (0.30)	0.024 (0.60)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-923FL
Carrier width	A	0.05	0.70
Carrier length	B	0.05	1.12
Carrier depth	C	0.05	0.48
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	62.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	2.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

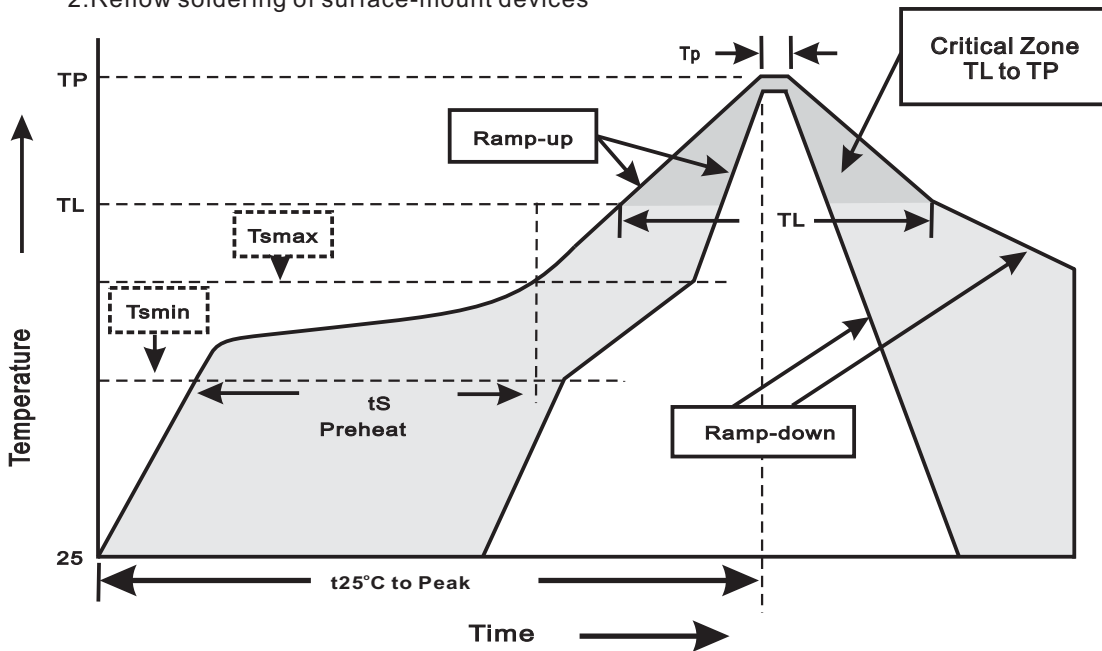
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Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOD-923FL	7"	8,000	2.0	80,000	183*123*183	178	382*257*387	640,000	9.50

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T _L to T _P)	<3°C/sec
Preheat -Temperature Min(T _{smmin}) -Temperature Max(T _{smmax}) -Time(min to max)(t _s)	150°C 200°C 60~120sec
T _{smmax} to T _L -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T _L) -Time(t _L)	217°C 60~260sec
Peak Temperature(T _P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t _p)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

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High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at 260±5°C for 10±2sec.	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_{BR} = V_{BR\ Min} * 80\%$ at $T_J=150^\circ\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{SIG}$ at $T_A=121^\circ\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A=85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031