ESD9L5.0L1

List

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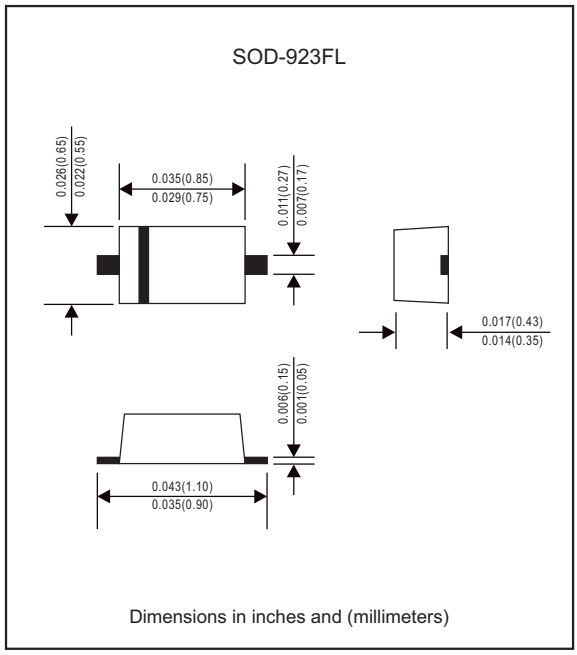
Surface Mount Uni-Directional TVS For ESD Protection Diode with Ultra Low Capacitance: 5.0V

Features

- Ultra low capacitance 0.5 pF (typ.)
- Low clamping voltage
- Stand-off voltage: 5 V
- Low leakage
- Response time is typically<1.0 ns
- Provide transient protection:
  IEC 61000-4-2 (ESD) ±25KV(Air) / ± 20KV (Contact)
  IEC 61000-4-4 (EFT) 40A (5/50ns)
- This is a Pb-Free device
- Suffix "-H" indicates halogen-free part, ex.ESD9L5.0L1-H

Package outline



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

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

Parameter	Symbol	Value	Unit
Peak Pulse Power (According to IEC 61000-4-5)	P_{PP}	10	W
Peak Pulse Current (According to IEC 61000-4-5)	I_{PP}	1	A
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	ESD	±25 ±20	KV
Operating junction temperature range	T_J	-55 to +125	°C
Storage temperature range	T_{STG}	-55 to +150	°C

Electrical characteristics (at T_A=25°C unless otherwise noted)

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Reverse Stand-Off Voltage		V_{RWM}			5	V
Reverse Breakdown Voltage	I_T=1mA	V_{BR}	6.0	8.0	9.0	V
Reverse Leakage Current	V_{RWM}=5V	I_R		0.1	1.0	uA
Clamping Voltage (Note 1)	I_{PP}=1.0A, T_P=8/20us	V_C			10	V
Junction Capacitance	Between I/O Pin and GND, V_R=0V, f=1MHz	C_J		0.5	0.8	pF

Note:
1. Non-repetitive current pulse 8/20 us exponential decay waveform according to IEC 61000-4-5.

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Fig.1 VOLTAGE SWEEPING OF I/O TO GND

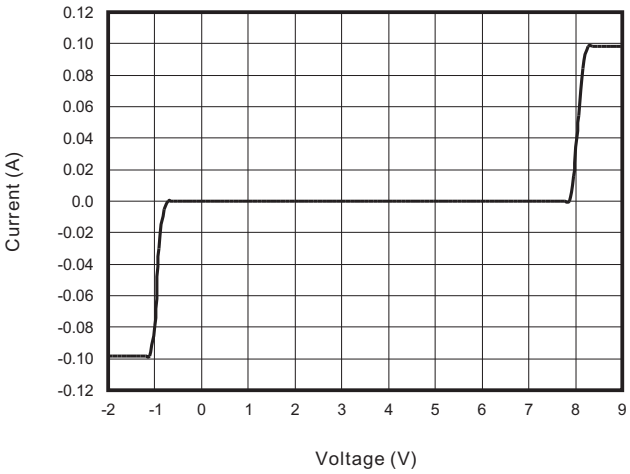


Fig.2 INSERTION LOSS S21 of I/O to GND

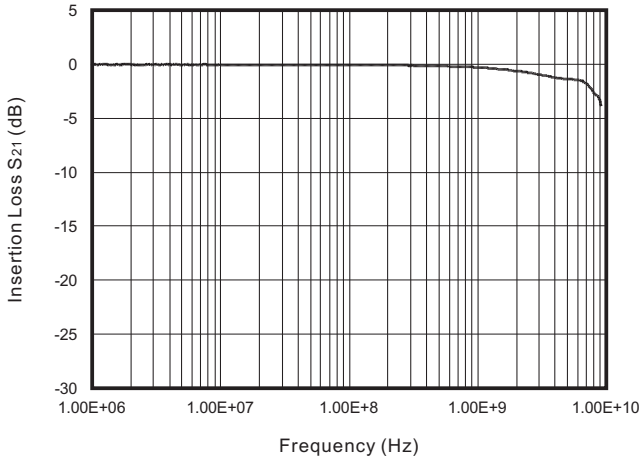


Fig.3 CAPACITANCE VS. REVERSE VOLTAGE

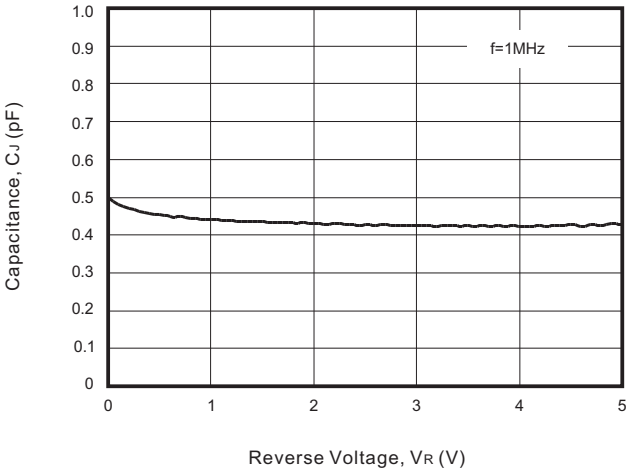


Fig.4 NORMALIZED CAPACITANCE VS. REVERSE VOLTAGE

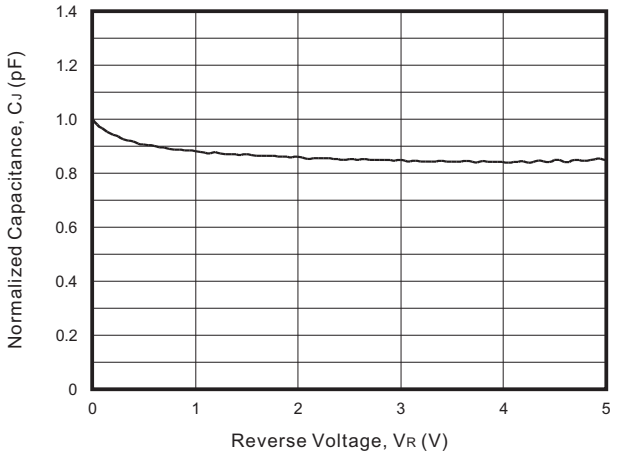


Fig.5 ESD CLAMPING OF I/O TO GND
(+8KV CONTACT PER IEC 61000-4-2)

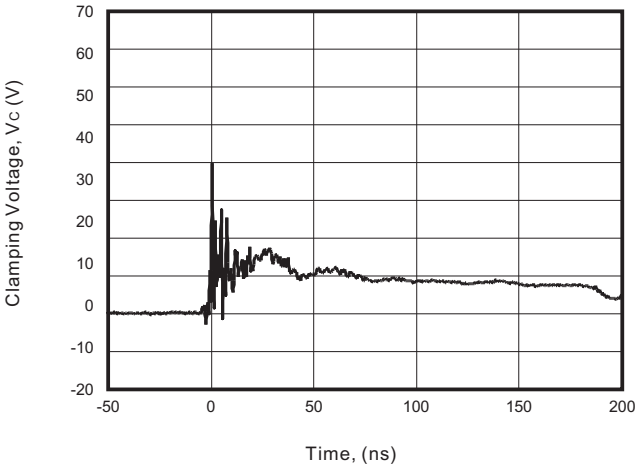
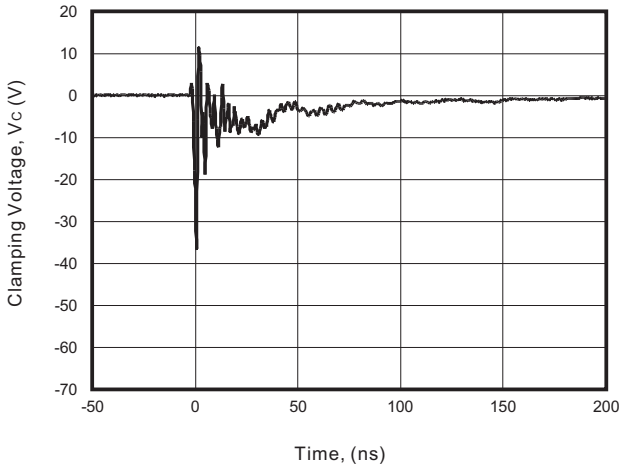


Fig.6 ESD CLAMPING OF I/O TO GND
(-8KV CONTACT PER IEC 61000-4-2)



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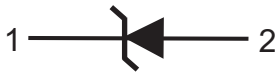
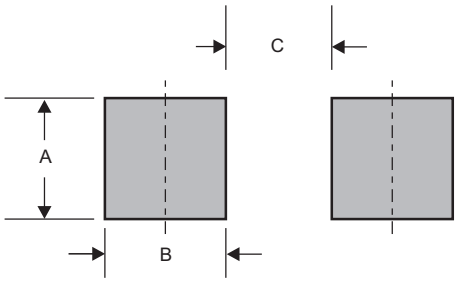
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
ESD9L5.0L1	C

Suggested solder pad layout



Dimensions in inches and (millimeters)

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

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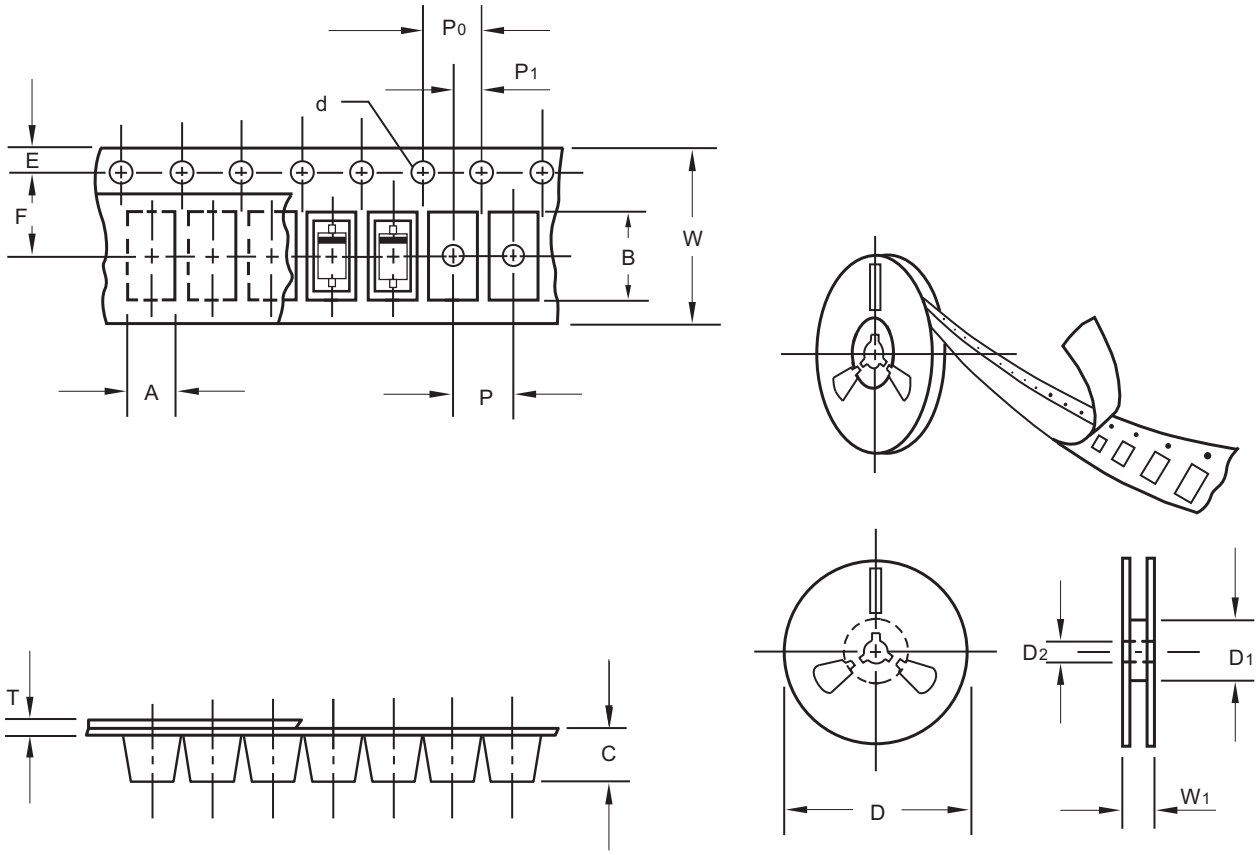
Packing information



unit:mm

Item	Symbol	Tolerance	SOD-923FL
Carrier width	A	0.05	0.67
Carrier length	B	0.05	1.12
Carrier depth	C	0.05	0.52
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	62.00
Feed hole diameter	D_2	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	P_0	0.1	4.00
Embossment center	P_1	0.1	2.00
Overall tape thickness	T	0.1	0.20
Tape width	W	0.3	8.00
Reel width	W_1	1.0	11.40

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

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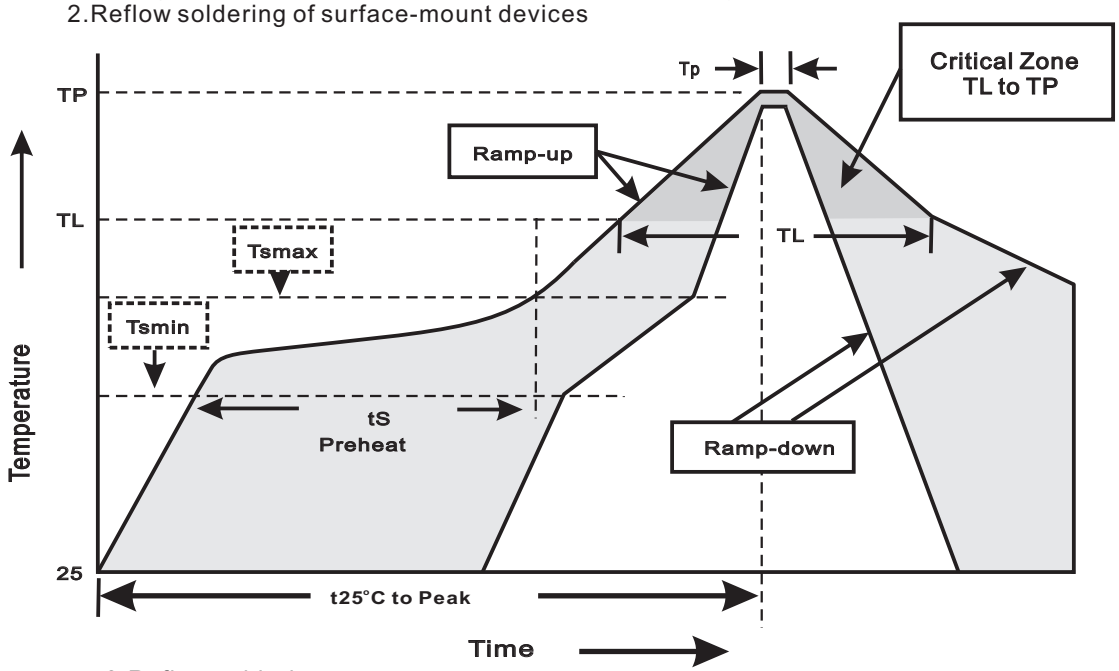
Reel packing

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"	10,000	2.0	100,000	183*123*183	178	382*257*387	800,000	11.2

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(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax 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. immerse body into solder 1/16"±1/32"	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=125°C for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	15P_{SIG} at T_A=121°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°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