ESD9ZxxC SERIES

List

List.. 1
Package outline.. 2
Features.. 2
Mechanical data.. 2
Maximum ratings 2
Electrical characteristics.. 2
Rating and characteristic curves.. 3
Pinning information.. 4
Marking.. 4
Suggested solder pad layout.. 4
Packing information.. 5
Reel packing.. 6
Suggested thermal profiles for soldering processes.. 6
High reliability test capabilities.. 7

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Document ID	Issued Date	Revised Date	Revision	Page.
DS-221818	2008/02/10	2011/05/30	C	7

ESD9ZxxC SERIES

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

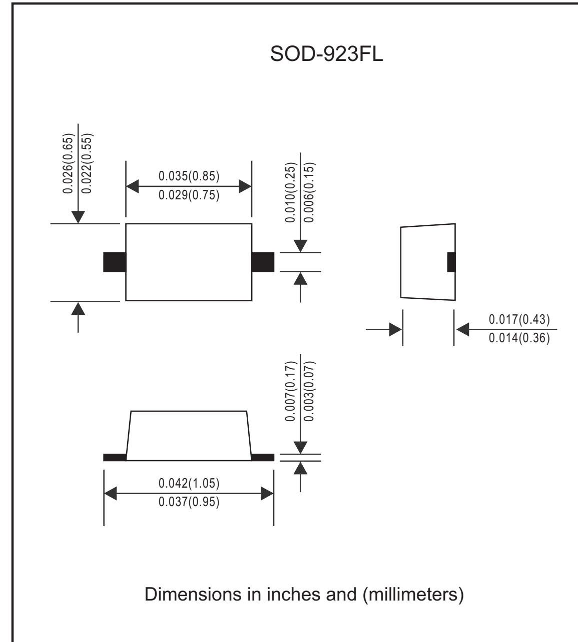
Features

- 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) 40A (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. ESD9Z3.3C-H

Mechanical data

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

Package outline



Applications

- Cellular phones
- Portable devices
- Digital cameras
- Power supplies

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

PARAMETER	CONDITIONS	Symbol	Value	UNIT
Peak power dissipation	tp = 8/20 us	P_{PP}	150	W
IEC61000-4-2(ESD)	air discharge contact discharge	E_{SD}	±15 ±8.0	kV
IEC61000-4-4(EFT)		E_{FT}	40	A
ESD voltage	per human body model	E_{SD}	16	kV
Lead solder temperature-maximum	10 second duration	T_L	260	°C
Operating temperature range		T_{op}	-40~ +125	°C
Maximum junction temperature		T_J	150	°C
Storage temperature range		T_{STG}	-55~+155	°C

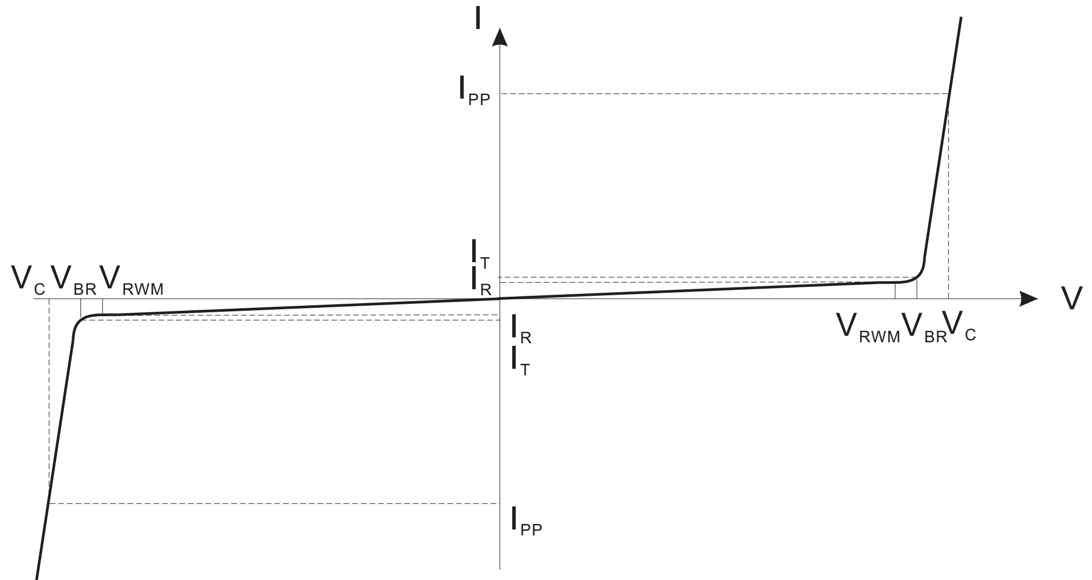
Electrical characteristics (at T_A=25°C unless otherwise noted)

Part No.	V_{RWM} (V)	I_R(uA) @V_{RWM}	V_{BR}(V)@I_T (Note 1)		I_T (mA)	V_C(V)(Note 1) @IPP=5.0A*	V_C(V)(Note 1) @Max I_{PP}*	I_{PP} (A)*	P_{PK} (W)*	C_J(pF) V_R=0V and f=1MHz
	Max	Max	Min	Max		Typ	Max	Max	Max	Typ.
ESD9Z3.3C	3.3	1.0	5.0	7.0	1.0	8.4	14.1	11.2	158	25
ESD9Z5.0C	5.0	1.0	5.6	8.0	1.0	11.6	18.6	9.4	174	15

Note *Surge current waveform per Figure 1.
1. VBR is measured with a pulse test current IT at an ambient temperature of 25℃

ESD9ZxxC SERIES

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



Bi-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

C_J : Capacitance @V_R = 0V and f = 1MHz

Rating and characteristic curves (ESD9ZxxC SERIES)

FIG.1- PULSE WAVEFORM

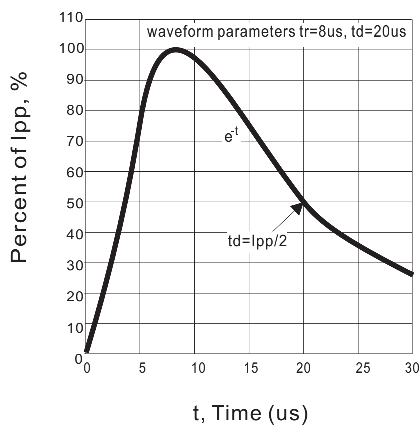
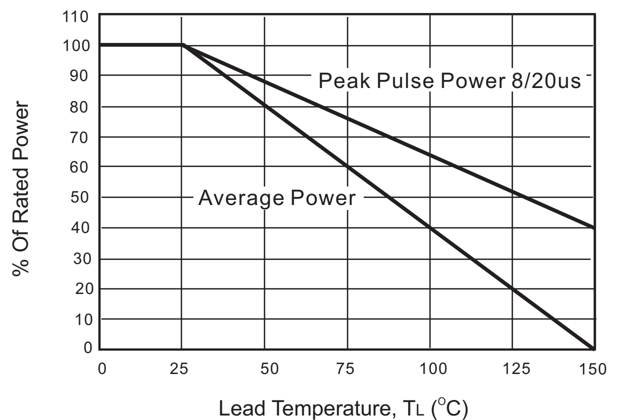


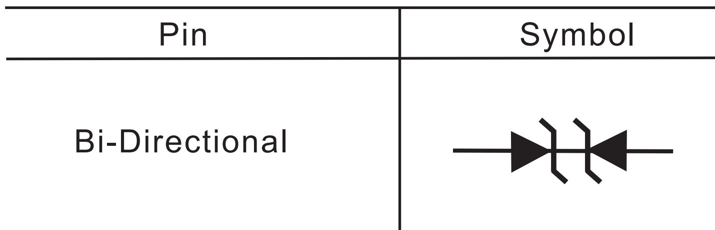
Fig.2- POWER RATING CURVE



Document ID	Issued Date	Revised Date	Revision	Page.
DS-221818	2008/02/10	2011/05/30	C	7

ESD9ZxxC SERIES

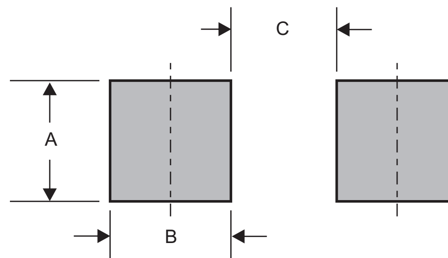
Pinning information

Pin	Symbol
Bi-Directional	

Marking

Type number	Marking code
ESD9Z3.3C	B
ESD9Z5.0C	C

Suggested solder pad layout

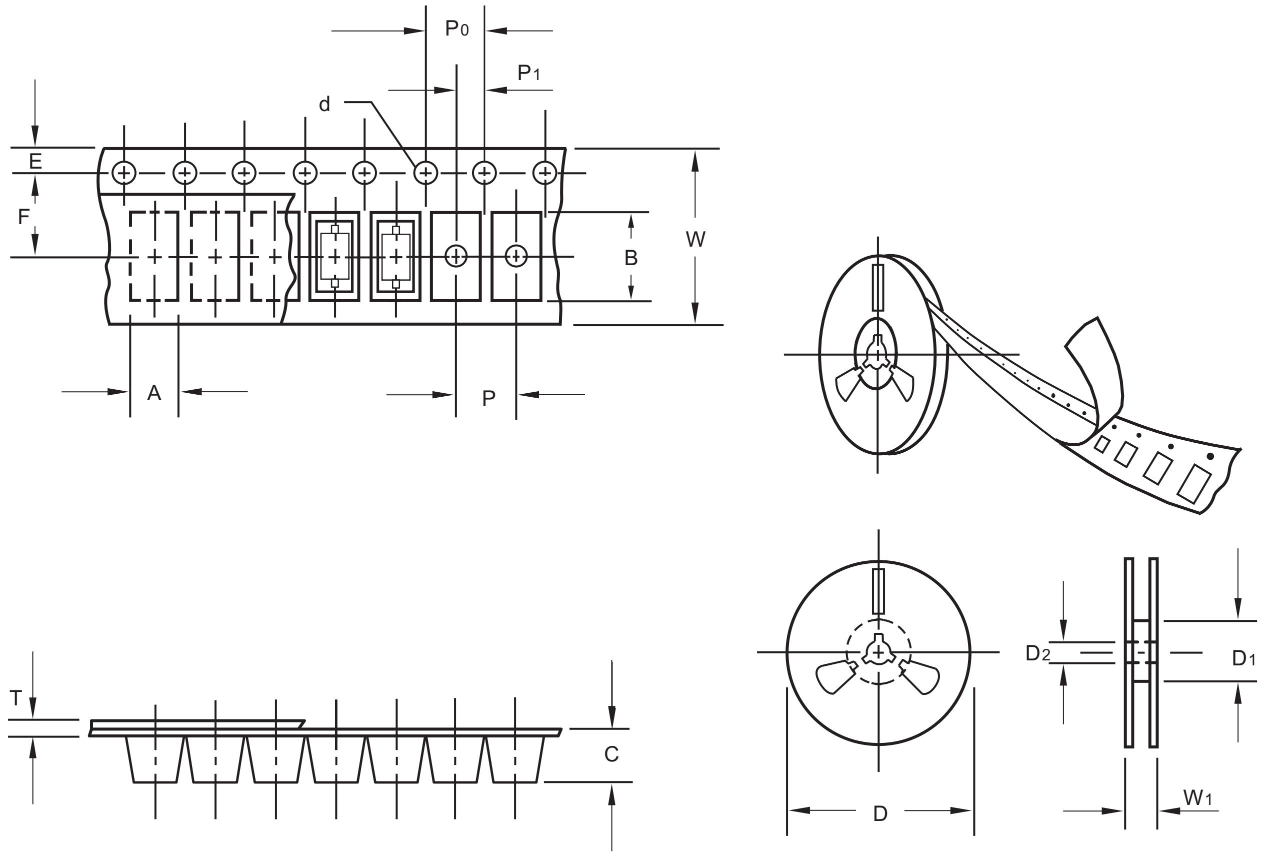


Dimensions in inches and (millimeters)

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

ESD9ZxxC SERIES

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	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	0.23
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 481-D and specifications listed above.

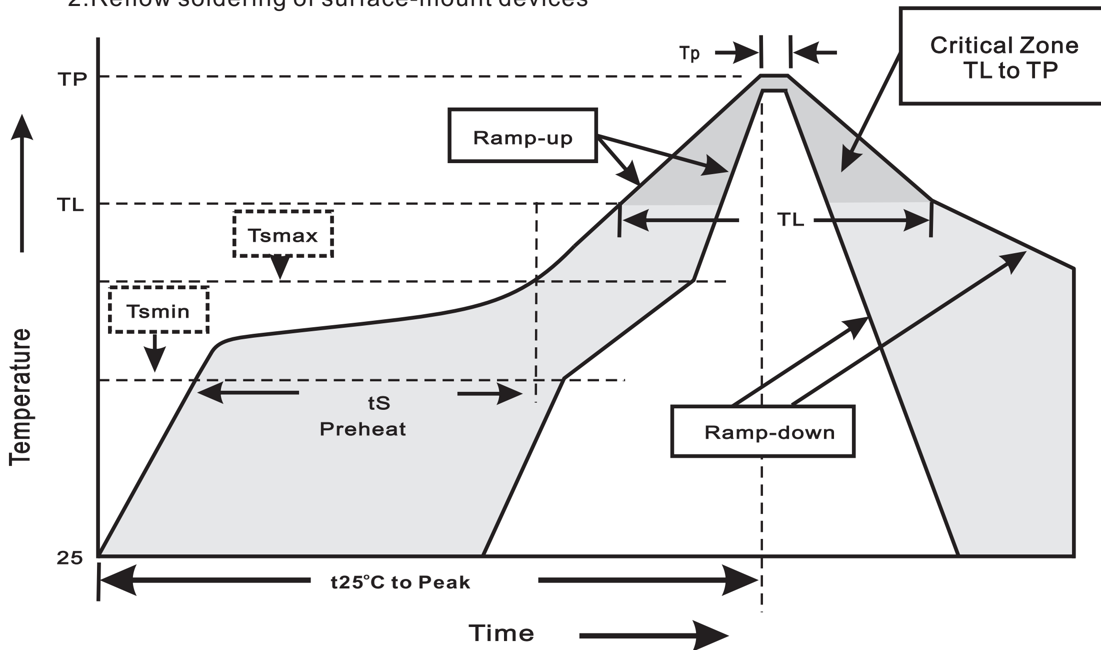
ESD9ZxxC SERIES

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(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

ESD9ZxxC SERIES

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°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