

ESDH3Z24C-Q1

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ESDH3Z24C-Q1

Surface Mount Bi-Directional TVS For ESD Protection Diode 24V

Features

- Bi-directional ESD protection of one line
- Reverse stand-off voltage: 24 V
- Low reverse clamping voltage
- Low leakage current
- Provide transient protection:
IEC 61000-4-2 (ESD) meets level 4
IEC 61000-4-4 (EFT) 40A (5/50ns)
IEC 61000-4-5 (Lightning) 8A (8/20us)
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Qualified to AEC-Q101 standards for high reliability
- Suffix "-H" indicates Halogen-free part, ex.ESDH3Z24C-Q1-H.

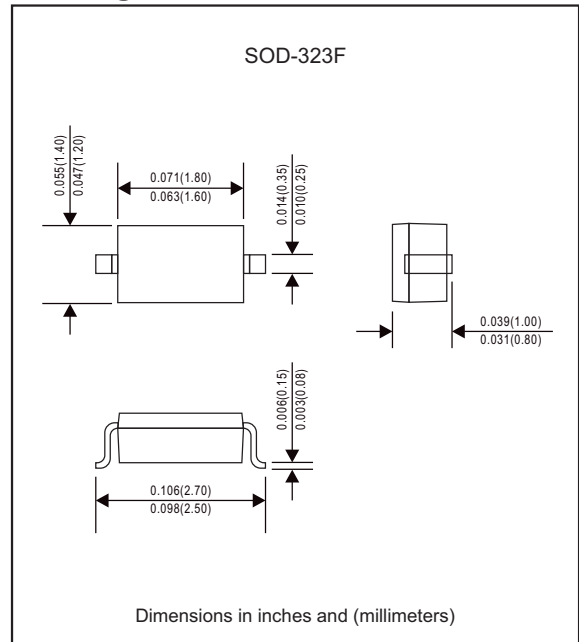
Applications

- Computers and peripherals
- Digital cameras
- Audio and video equipment
- Cellular handsets and accessories
- Other electronics equipments communication systems

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-323F
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.005 gram

Package outline



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

PARAMETER	SYMBOL	Limit	UNIT
Peak pulse power (According to IEC 61000-4-5)	P _{PP}	500	Watt
Peak pulse current (According to IEC 61000-4-5)	I _{PP}	8	A
IEC 61000-4-2 ESD air model contact model	V _{ESD}	±30	kV
Operating junction temperature range	T _J	-55 to +125	°C
Storage temperature range	T _{STG}	-55 to +150	°C

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse stand off voltage		V _{RWM}			24	V
Reverse breakdown voltage	I _T = 1mA,	V _{BR}	26.7			V
Reverse leakage current	V _{RWM} =24V	I _R			0.2	μA
Clamping voltage (Note 1)	I _{PP} =8A, tp=8/20μs	V _C		47	50	V
Clamping voltage (Note 2)	I _{PP} =4A, tp=0.2/100ns(TLP)	V _C		34.5		V
	I _{PP} =16A, tp=0.2/100ns(TLP)			40.5		
Junction capacitance	V _R =0V, f=1MHz	C _J		25	30	pF

Note:

1. Non-repetitive current pulse 8/20 us exponential decay waveform according to IEC61000-4-5.
2. TLP Setting: T_p=100ns, t_r=0.2ns, I_{TLP} and V_{TLP} sample windows: t₁=70ns to t₂=90ns.

Rating and characteristic curves (ESDH3Z24C-Q1)

FIG.1 Non-Repetitive Peak Pulse Power vs. Pulse Time

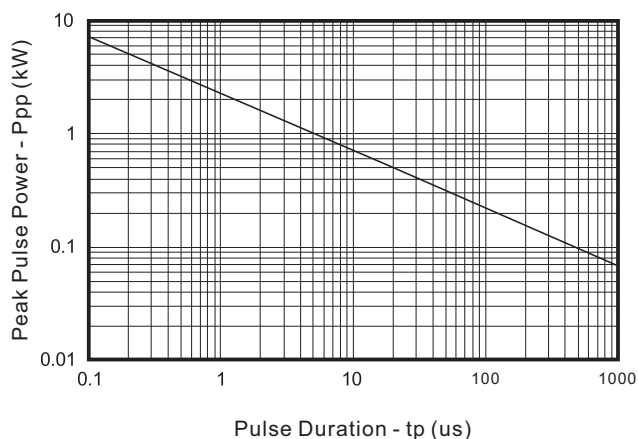


FIG.2 Power Derating Curve

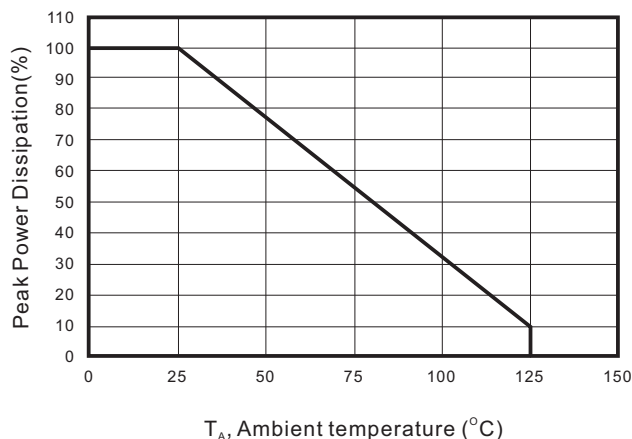


FIG.3 Clamping Voltage vs. Peak Pulse Current

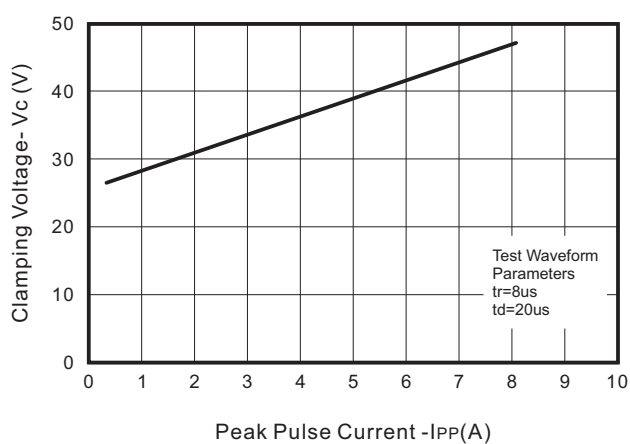


FIG.4 Normalized Junction Capacitance vs. Reverse Voltage

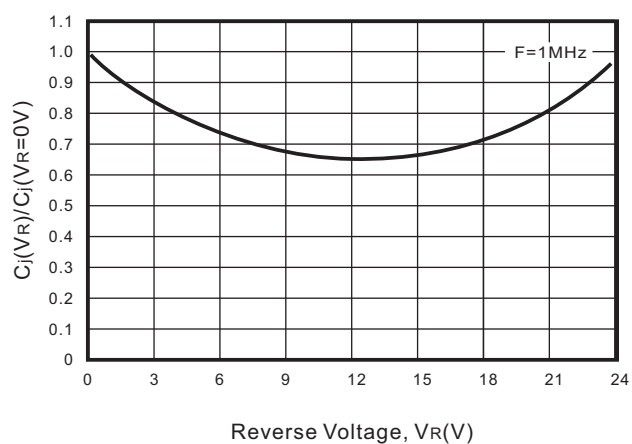


FIG.5 Pulse Waveform

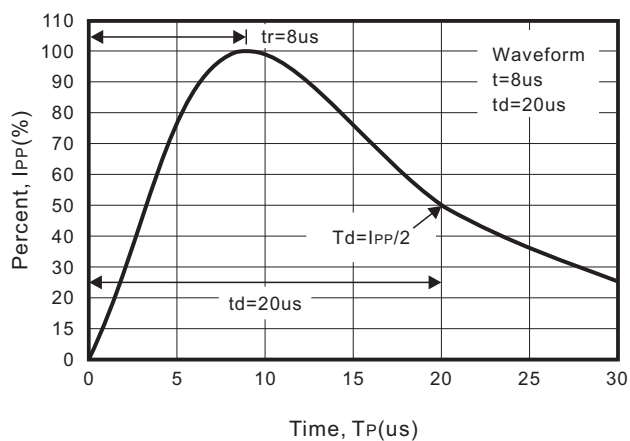
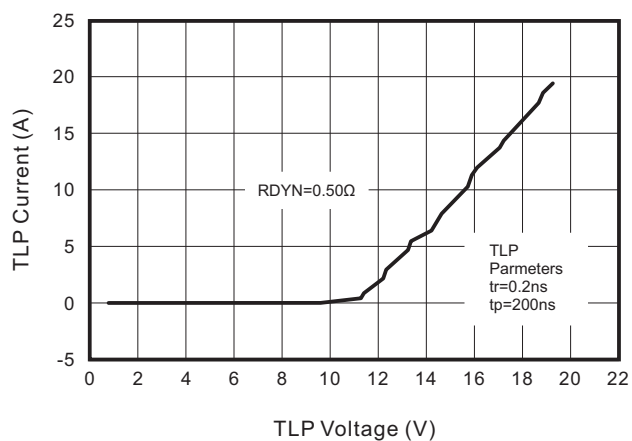


FIG.6 TLP Positive I-V Curve

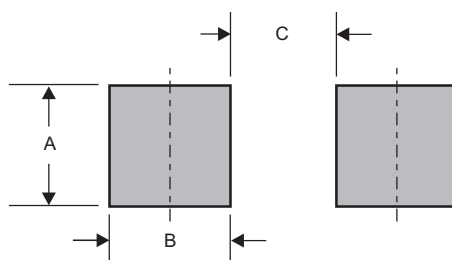


ESDH3Z24C-Q1**Pinning information**

Pin	Simplified outline	Symbol
Bi-Directional		

Marking

Type number	Marking code
ESDH3Z24C-Q1	24B

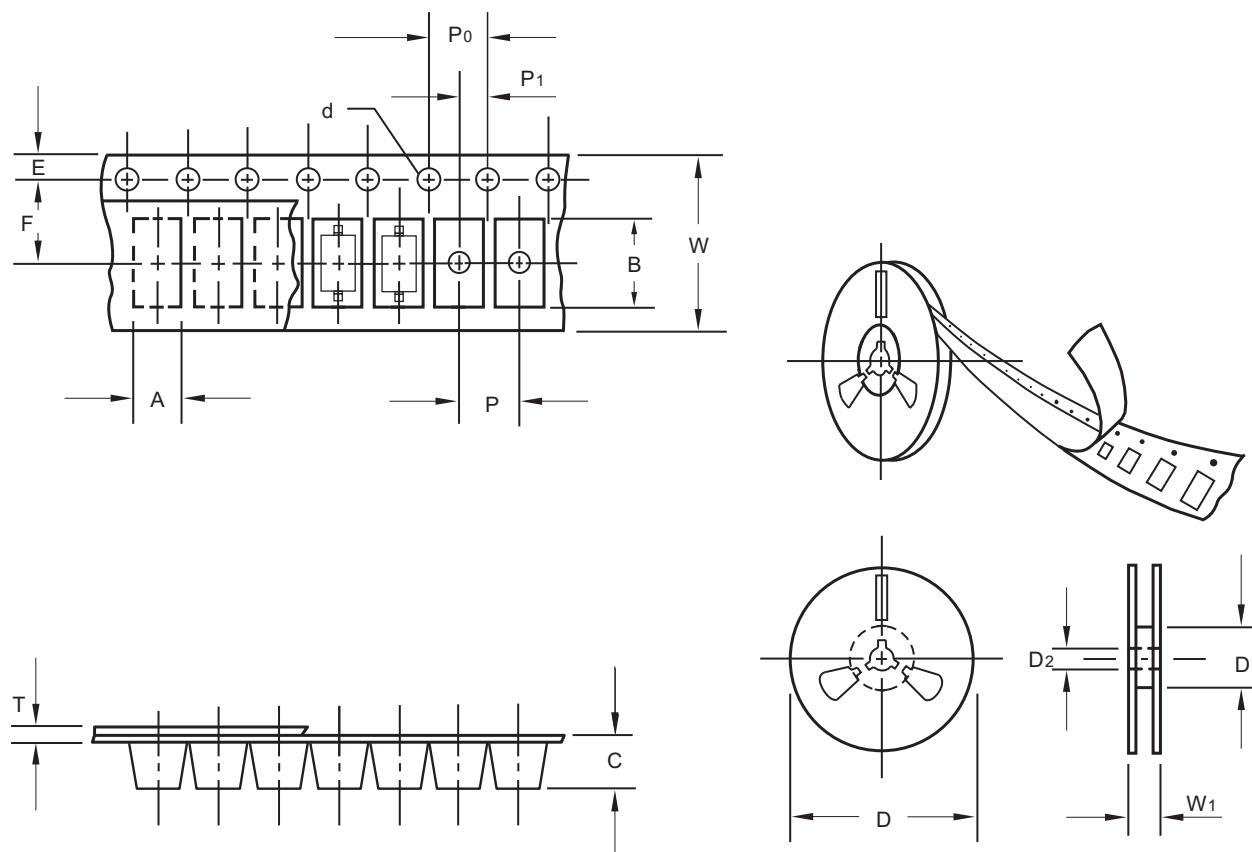
Suggested solder pad layout

Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323F	0.031 (0.80)	0.031 (0.80)	0.056 (1.40)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-323F
Carrier width	A	0.1	1.48
Carrier length	B	0.1	3.30
Carrier depth	C	0.1	1.25
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	55.00
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	4.00
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	9.50

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

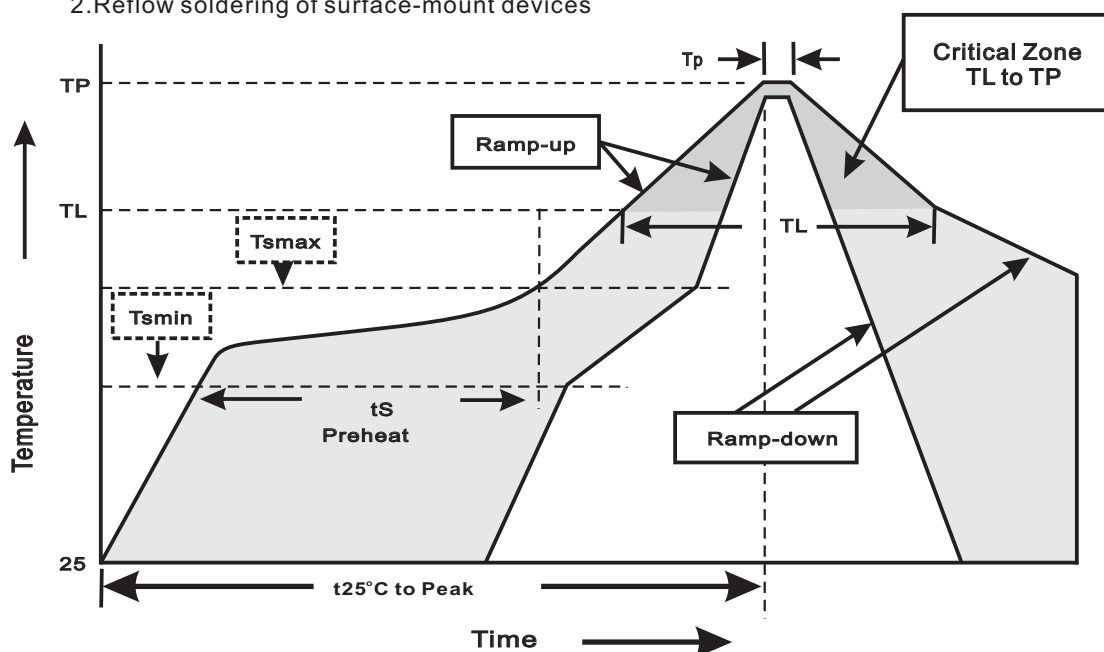
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Reel packing

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-323F	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	8.0

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_{min}) -Temperature Max(T_{max}) -Time(min to max)(t_s)	150°C 200°C 60~120sec
T_{max} 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. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	$V_{BR}=V_{BR\ MIN} \times 80\%$ ($T_j\ max=125^\circ C$) Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	$T_a=125^\circ C$ Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	$-55^\circ C(15min)$ to $150^\circ C(15min)$ Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	$P=2atm$ $T_a=121^\circ C$ $RH=100\%$ Test Duration:96hrs	JESD22 A-102
6. Solderability	$245 \pm 5^\circ C$ for 5sec	J-STD-002
7. Moisture Resistance	$T_a=85^\circ C/85\%$ Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	$260 \pm 5^\circ C$ for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	$T_a=85^\circ C$, 85%RH, with device reverse biased at 80% of rated breakdown voltage up to a maximum of 100V or limit of chamber Test Duration:1000hrs	JESD22-A101