ESDH3Z12C-Q1

List

ESDH3Z12C-Q1

240W Bi-Directional TVS For ESD Protection : 12V

Features

- Protects one I/O or power line.
- 240 Watts peak pulse power per line (t_p=8/20μs).
- Operating voltage: 12V.
- Complies with following standards:
  - IEC 61000-4-2 (ESD) ±30kV (Air).
  - IEC 61000-4-2 (ESD) ±30kV (Contact).
  - IEC 61000-4-4 (EFT) 40A (5/50ns).
  - IEC 61000-4-5 (Lightning) 12A (8/20μs).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.ESDH3Z12C-Q1-H.

Applications

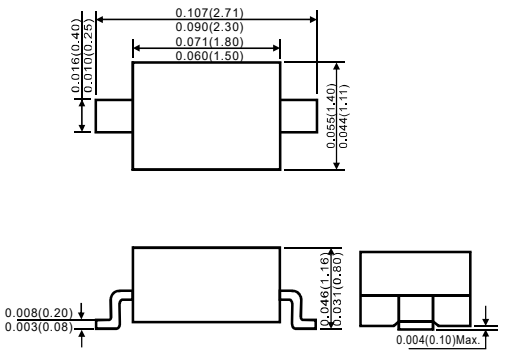
- Laptop computers.
- Cellular phones.
- Digital cameras.
- Personal digital assistants (PDA's).

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.

Package outline

SOD-323F



Dimensions in inches and (millimeters)

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

Parameter	Symbol	Value	Unit
Peak pulse power (8/20μs)	P_{PK}	240	W
Peak Pulse Current (8/20μs)	I_{PP}	12	A
Operating temperature	T_J	+125	°C
Storage temperature range	T_{STG}	-55 to +150	°C

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse working voltage	V_{RWM}				12	V
Breakdown voltage	V_{BR}	I_T = 1mA	13.3			V
Reverse leakage current	I_R	V_{RWM} = 12V (T_A=25°C)			0.5	μA
Clamping voltage	V_C	I_{PP} = 12A (t_p=8/20μs)		16	20	V
ESD Clamping voltage (Note1)	V_C	I_{PP} = 4A (t_p=0.2/0.1μs) (T_{LP})		13.4		V
		I_{PP} = 16A (t_p=0.2/0.1μs) (T_{LP})		14.2		
Dynamic resistance (Note1,2)	R_{DYN}	T_{LP} = 0.2/0.1μs		0.07		Ω
Junction capacitance	C_J	V_R = 0V, f =1.0MHz		30	40	pF

Note : 1. TLP setting: t_p=100ns, t_r=0.2ns, I_{TLP} and V_{TLP} sample window: t_1=70ns to t_2=90ns.
2. Dynamic resistance calculated from I_{PP}=4A to I_{PP}=16A using "Best fit".

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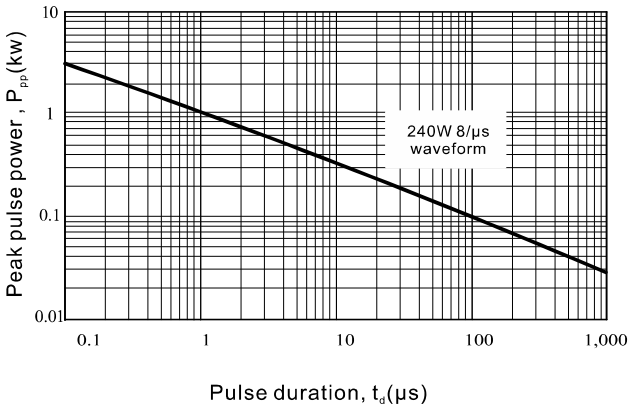
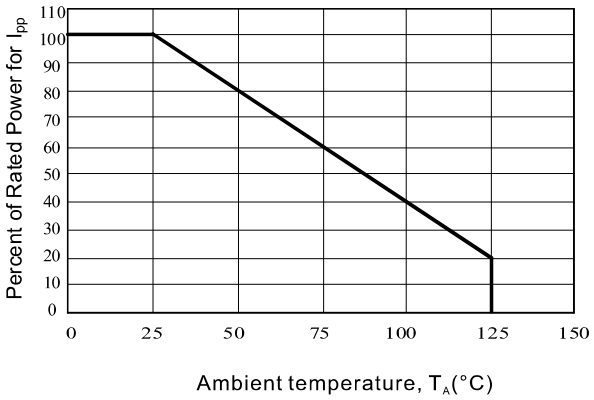
Rating and characteristic curves

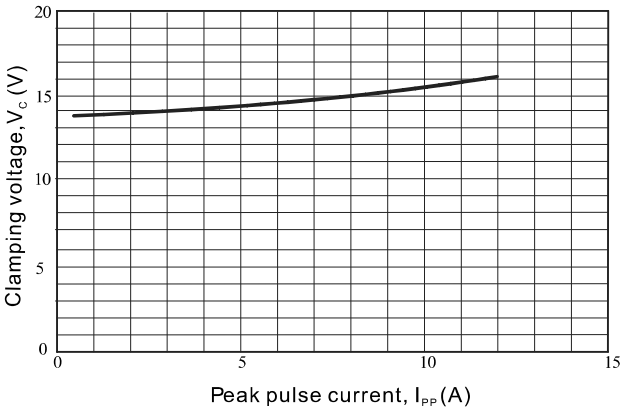
Peak pulse power vs. Pulse time



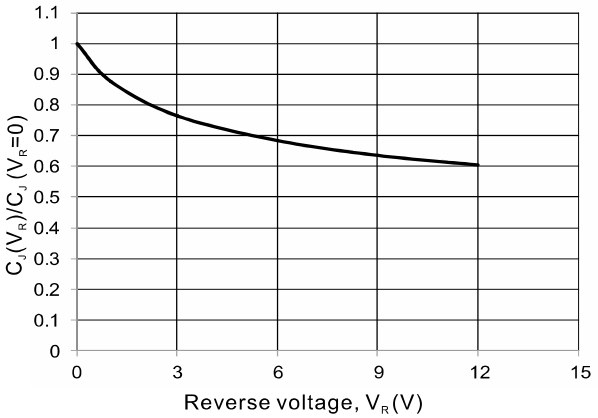
Power derating curve



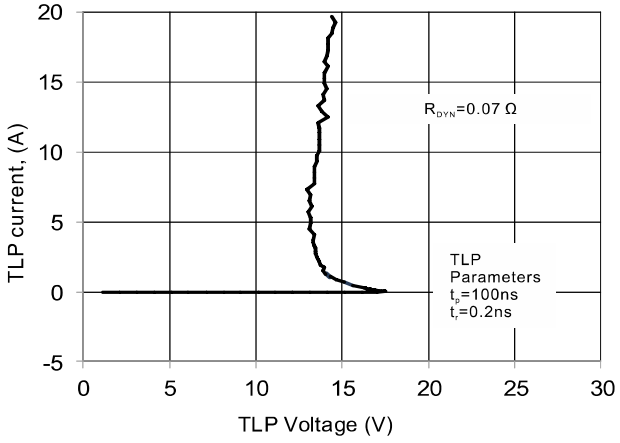
Clamping voltage vs. Peak pulse current



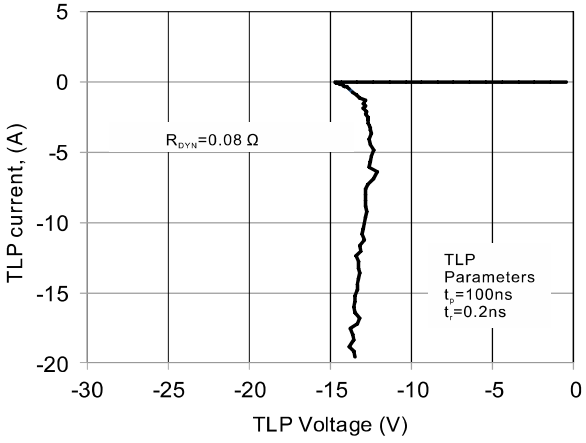
Normalized junction capacitance vs. reverse voltage



TLP positive I-V curve



TLP negative I-V curve



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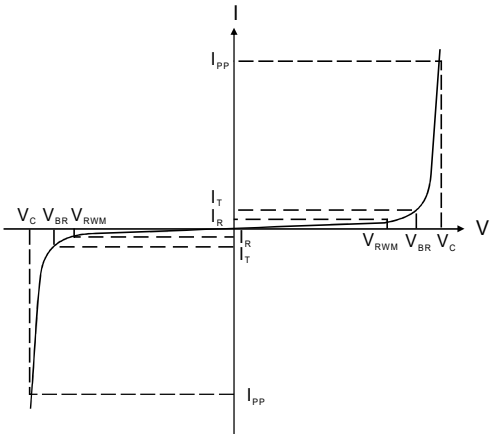
Electrical Parameters

Symbol	Parameter
I_{PP}	Reverse peak pulse current
V_C	Clamping voltage @ I_{PP}
V_{RWM}	Reverse stand-off voltage
I_R	Reverse leakage current @ V_{RWM}
V_{BR}	Reverse leakage current @ V_{RWM}
I_T	Test current



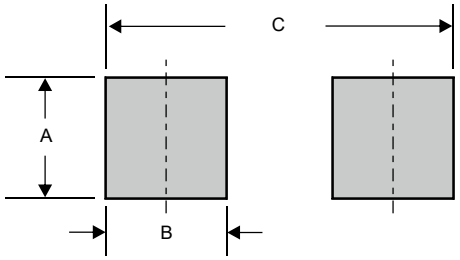
Pinning information

Pin	Simplified outline	Symbol
Bi-directional		

Marking

Type number	Marking code
ESDH3Z12C-Q1-H	12B

Suggested solder pad layout



Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323F	0.031 (0.80)	0.031 (0.80)	0.118 (3.00)

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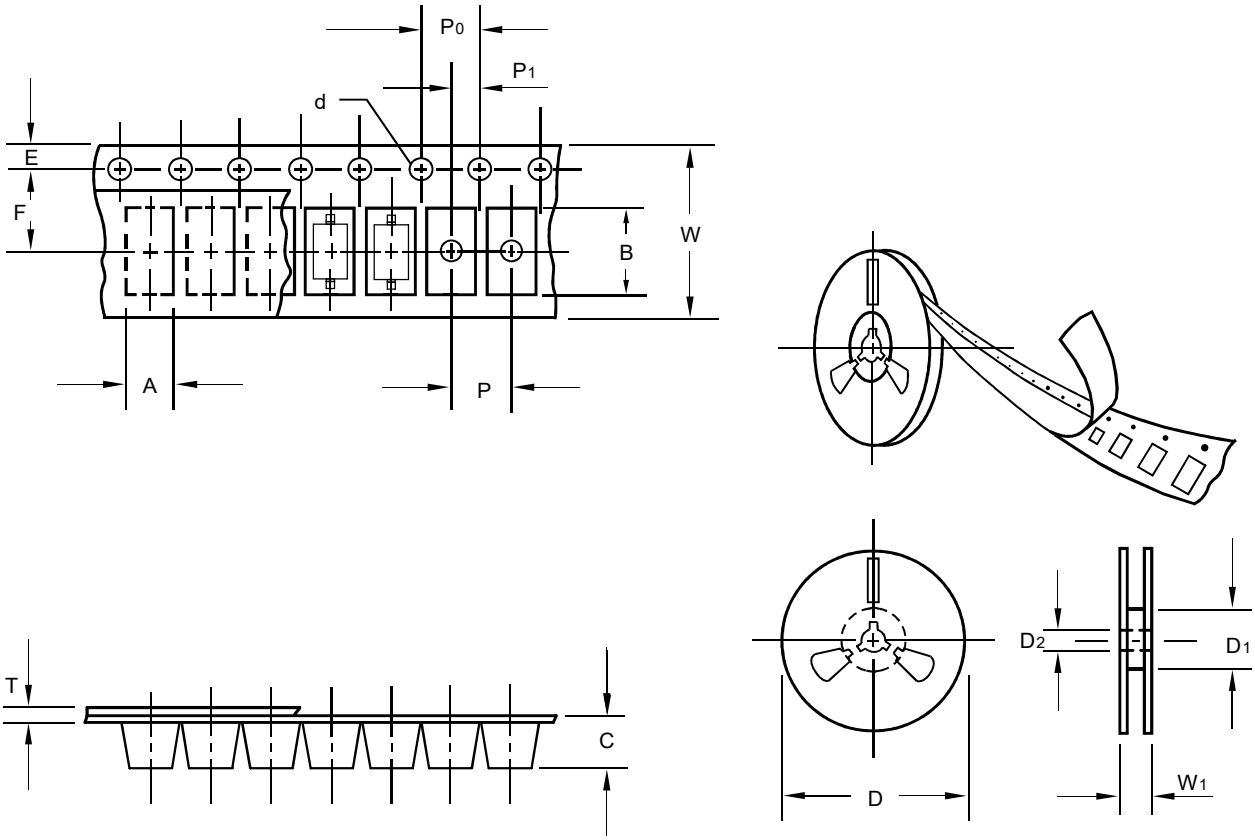
Packing information



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 accor dance with EIA standar RS-481-A and specifications listed above.

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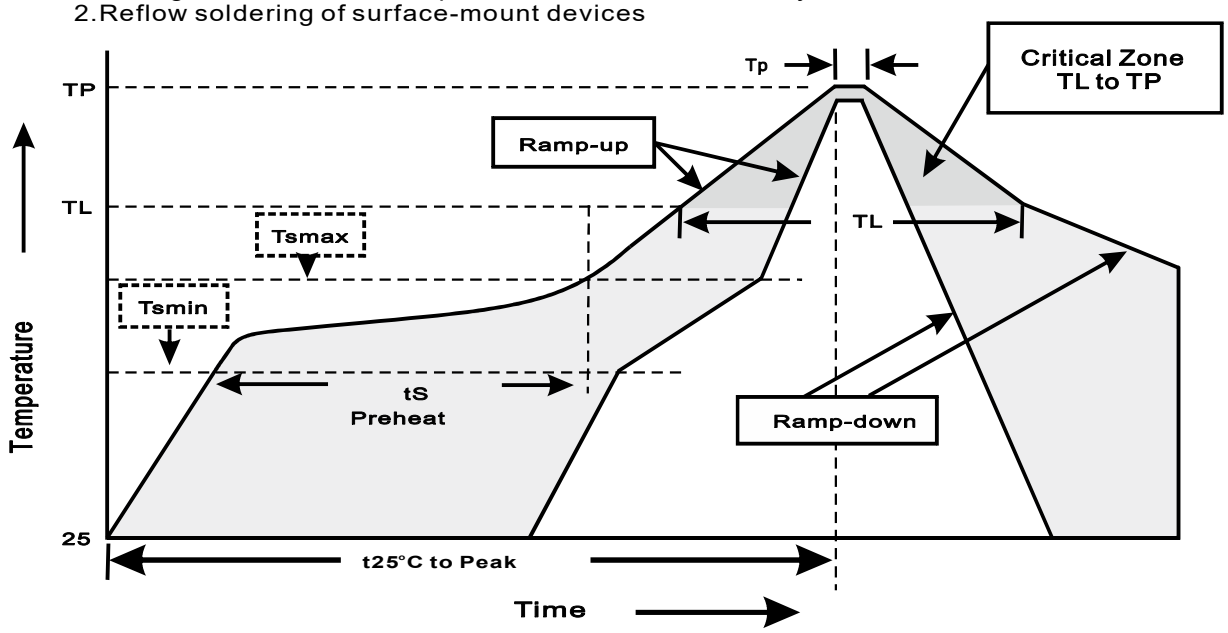
Reel packing

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

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. 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*80% (T_J=T_J max.)Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	Ta=150°C Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	-55°C(15min) to 150°C(15min)Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	P=2atm Ta=121°C RH=100% Test Duration:96hrs	JESD22 A-102
6. Solderability	245±5°C for 5sec	J-STD-002
7. Moisture Resistance	Ta=85°C/85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	260±5°C for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	Ta=85°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