

ESDHP3FL4.5

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ESDHP3FL4.5

2550W Uni-Directional TVS For ESD Protection 4.7V

Features

- 2550W peak pulse power per line. ($t_p=8/20\mu s$)
- Working voltage: 4.7 V.
- Low leakage current and low clamping voltage.
- Protects one I/O or power line.
- Complies with following standards:
 - IEC 61000-4-2 (ESD) $\pm 30kV$ (Air), $\pm 30kV$ (Contact).
 - IEC 61000-4-4 (EFT) 40A (5/50ns).
 - IEC 61000-4-5 (Lightning) 170A (8/20 μs)
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.ESDHP3FL4.5-H.

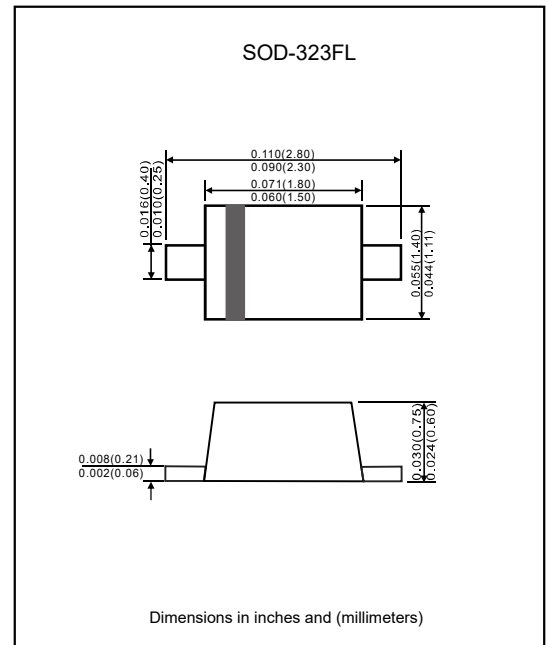
Applications

- Laptop computers, cellular phones and digital cameras.
- Personal digital assistants (PDAs).

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOD-323FL.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



Maximum ratings (At $T_a=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Peak pulse power (8/20 μs)	P_{PK}	2550	W
Peak pulse current (8/20 μs)	I_{PP}	170	A
ESD per IEC 61000-4-2 (Air)	V_{ESD}	± 30	kV
ESD per IEC 61000-4-2 (Contact)		± 30	
Junction temperature	T_J	+125	$^{\circ}C$
Storage temperature range	T_{STG}	-55 to +150	$^{\circ}C$

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

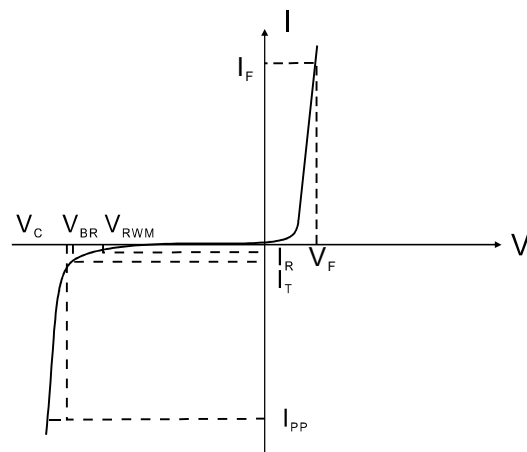
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reverse working voltage	V_{RWM}				4.7	V
Breakdown voltage	V_{BR}	$I_T = 1\text{mA}$	4.8		7	V
Forward voltage	V_F	$I_F = 10\text{mA}$	0.6		1	V
Reverse leakage current	I_R	$V_{RWM} = 4.7\text{V}$, $T=25^\circ\text{C}$			500	nA
Clamping voltage	V_C	$I_{PP} = 1\text{A}$, $t_p = 8/20\mu\text{s}$			8.5	V
	V_C	$I_{PP} = 170\text{A}$, $t_p = 8/20\mu\text{s}$			15	
ESD Clamping voltage (Note1)	V_C	$I_{PP} = 4\text{A}$, $t_p = 0.2/100\text{ns}$ (TLP)		6.1		V
		$I_{PP} = 16\text{A}$, $t_p = 0.2/100\text{ns}$ (TLP)		6.6		
Dynamic resistance (Note1,2)	R_{DYN}	TLP= 0.2/100ns		0.04		Ω
Junction capacitance	C_J	$V_R = 0\text{V}$, $f = 1.0\text{MHz}$		485	600	pF

Note: 1. TLP setting: $t_p=100\text{ns}$, $t_r=0.2\text{ns}$, I_{TLP} and V_{TLP} sample window: $t_1=70\text{ns}$ to $t_2=90\text{ns}$.

2. Dynamic resistance calculated from $I_{PP}=4\text{A}$ to $I_{PP}=16\text{A}$ using "best fit".

Rating and characteristic curves

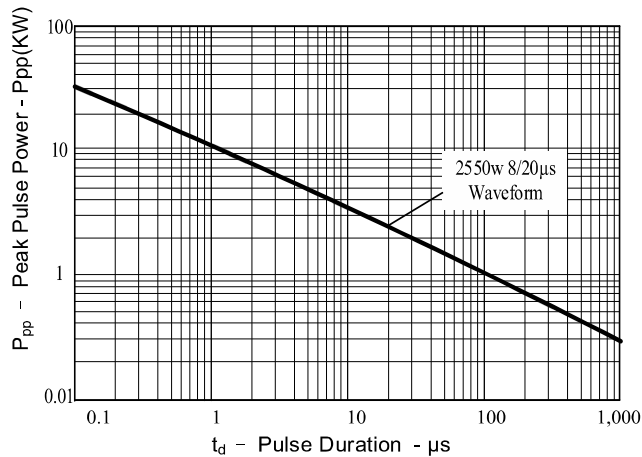
Symbol	Parameter
I_{PP}	Reverse peak pulse current
V_C	Clamping voltage @ I_{PP}
V_{RWM}	Reverse stand-off voltage
I_R	Reverse leakage current @ V_{RWM}
V_{BR}	Breakdown voltage @ I_T
I_T	Test current
I_F	Forward current
V_F	Forward voltage @ I_F



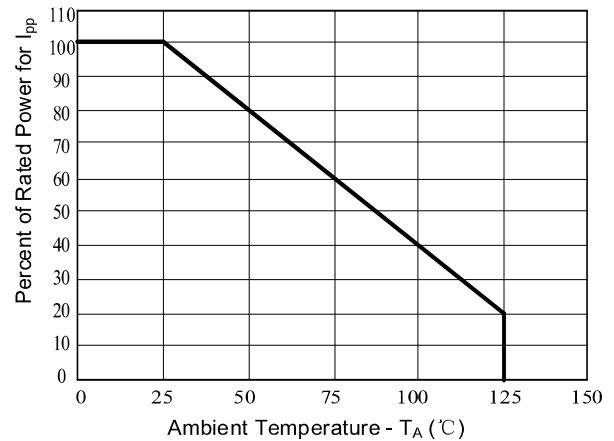
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Rating and characteristic curves

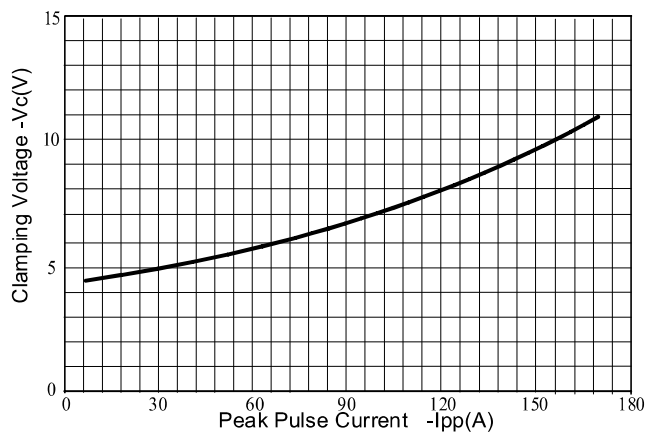
Peak Pulse Power vs. Pulse Time



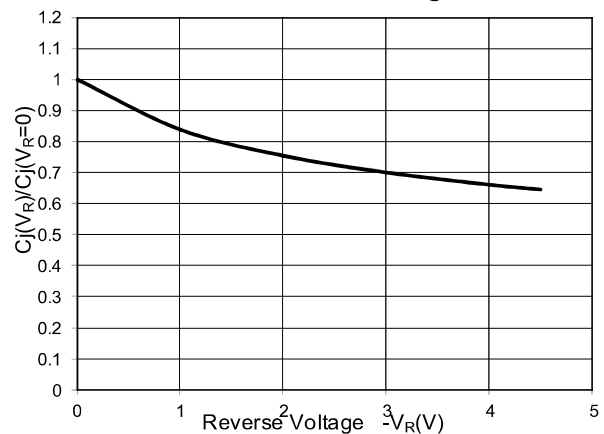
Power Derating Curve



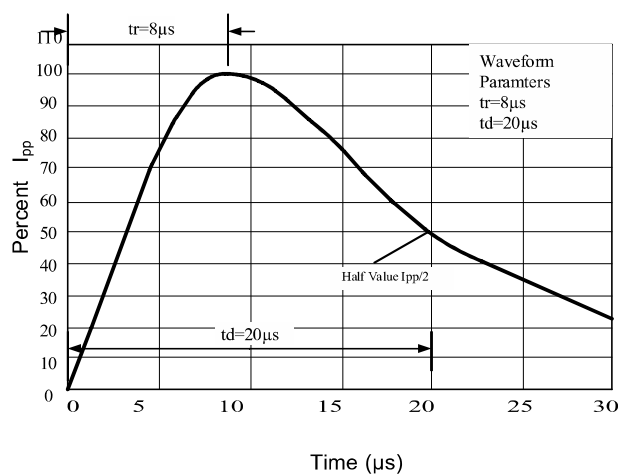
Clamping Voltage vs. Peak Pulse Current



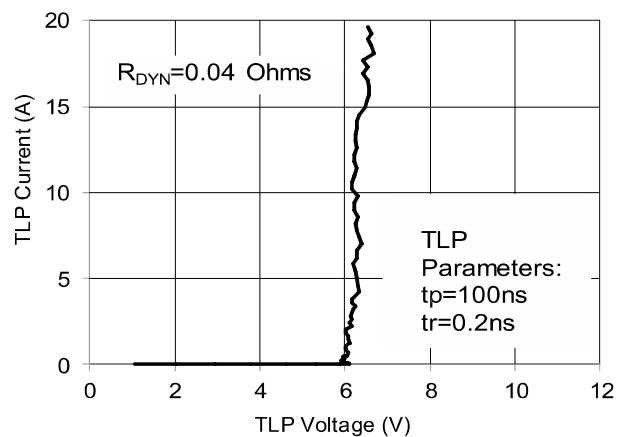
Normalized Junction Capacitance vs. Reverse Voltage



Pulse Waveform



TLP Curve



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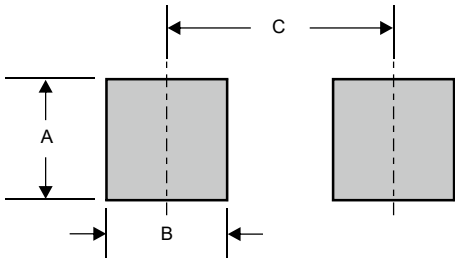
Pinning information

Pin	Simplified outline	Symbol
Pin1 Cathode Pin2 Anothe		

Marking

Type number	Marking code
ESDHP3FL4.5	HQX

Suggested solder pad layout

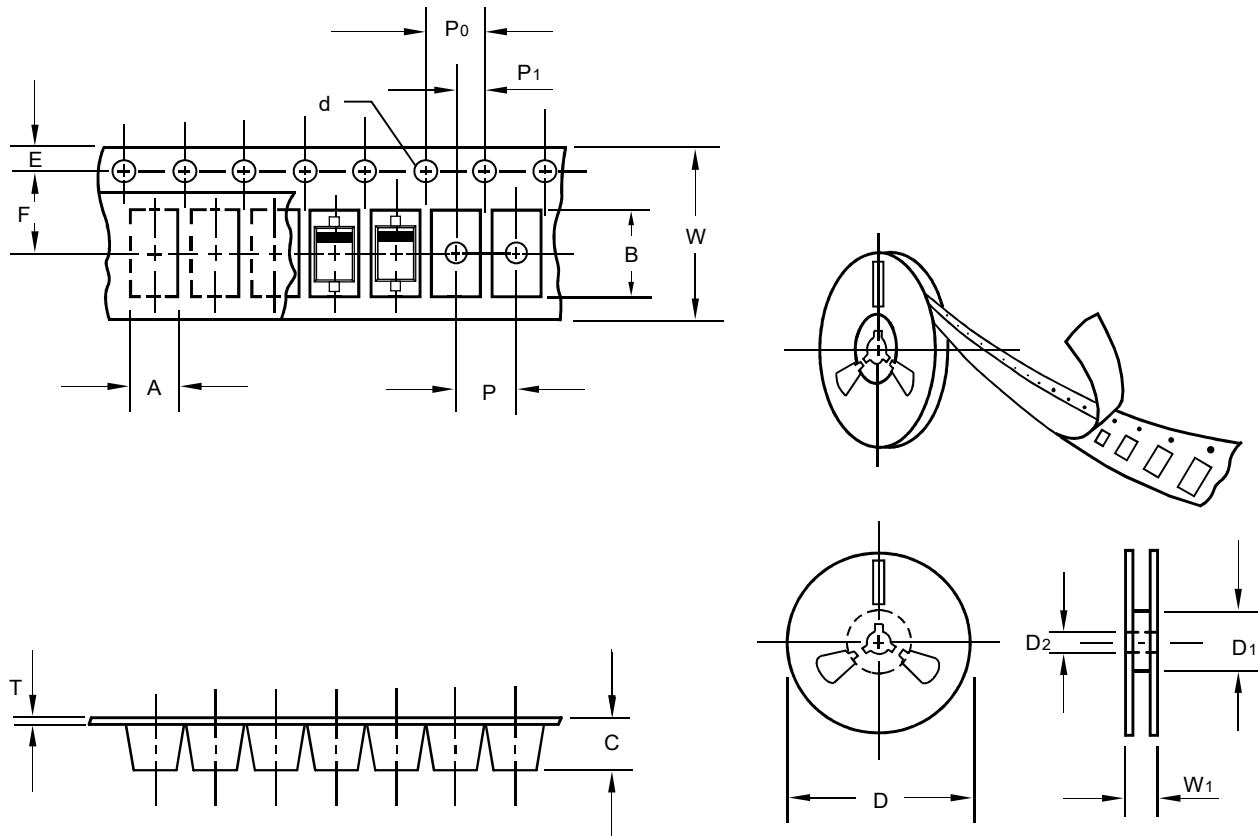


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323FL	0.016 (0.40)	0.020 (0.50)	0.067 (1.70)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-323FL
Carrier width	A	0.1	1.45
Carrier length	B	0.1	2.75
Carrier depth	C	0.1	0.97
Sprocket hole	d	0.1	1.55
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	4.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Carrier thickness	T	0.02	0.21
Tape width	W	0.1	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.

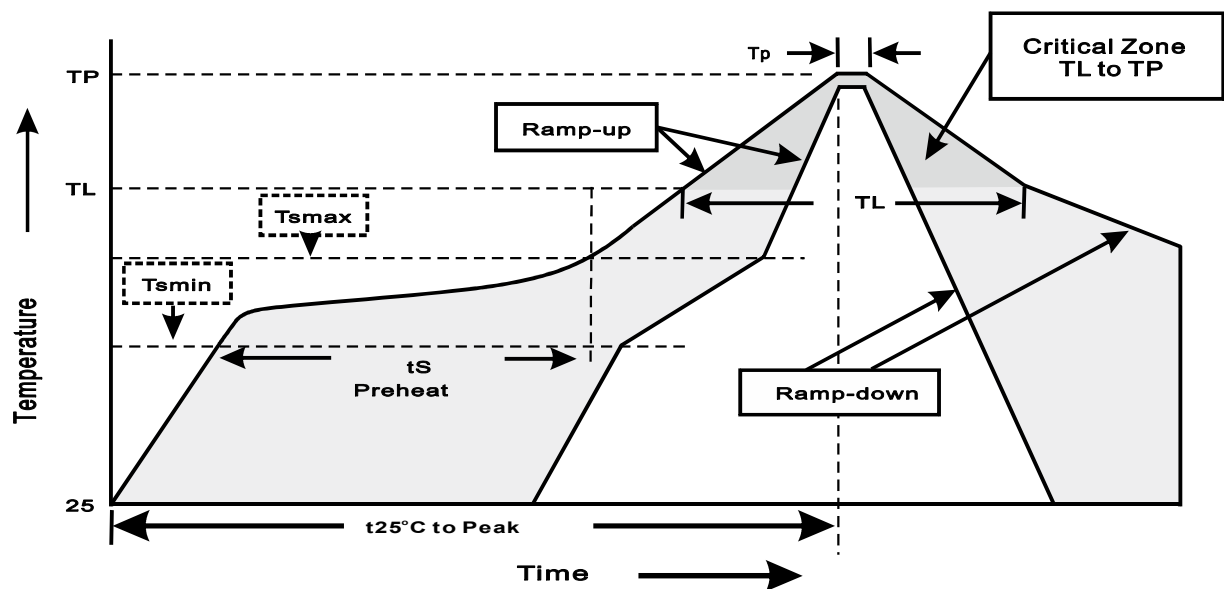
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Reel packing

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)
SOD-323FL	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)	$<3^{\circ}\text{C}/\text{sec}$
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	$<3^{\circ}\text{C}/\text{sec}$
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	$<6^{\circ}\text{C}/\text{sec}$
Time 25°C to Peak Temperature	$<6\text{minutes}$