

ESDA3L05-Q1-H

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ESDA3L05-Q1-H

750W Low Capacitance Uni-Directional TVS For ESD Protection Array 5.0V

Features

- Uni-directional ESD protection of one line.
- Low capacitance: 2pF.
- Low reverse clamping voltage.
- Low leakage current.
- Fast response time.
- Protection one data/power line to:
IEC 61000-4-2 (ESD) $\pm 25\text{kV}$ (Contact), $\pm 25\text{kV}$ (Air).
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

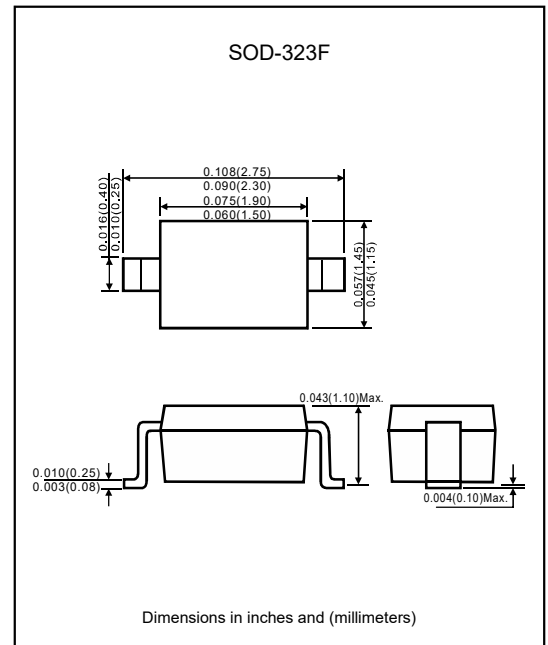
Applications

- Ethernet 10/100/1000 base T, portable electronics, USB interface.
- Cellular phones, high speed data lines, and handheld-wireless systems.
- Other electronics equipment communication systems.
- Personal digital assistants (PDAs).

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



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

Parameter	Symbols	Ratings	Unit
Peak pulse power (Note2)	P_{PK}	750	W
Peak pulse current (Note2)	I_{PP}	30	A
ESD per IEC 61000-4-2 (Note1) (Air)	V_{ESD}	± 25	kV
ESD per IEC 61000-4-2 (Note1) (Contact)		± 25	
JESD22-A114-B ESD voltage per human body model (Note1)		± 16	
ESD voltage per machine model (Note1)		± 0.4	
Lead solder temperature (10 second duration)	T_L	260	$^\circ\text{C}$
Operating temperature	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

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

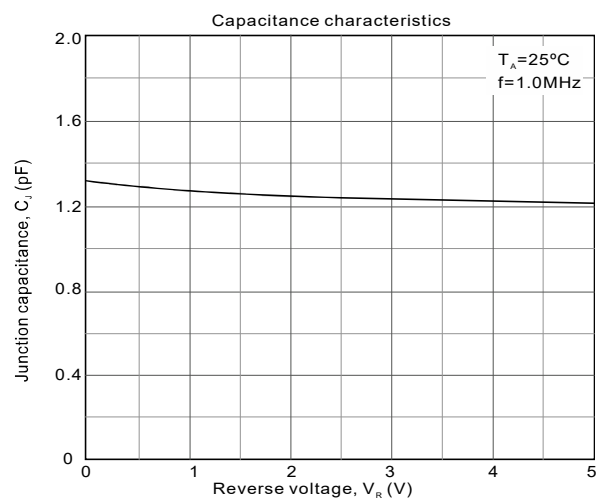
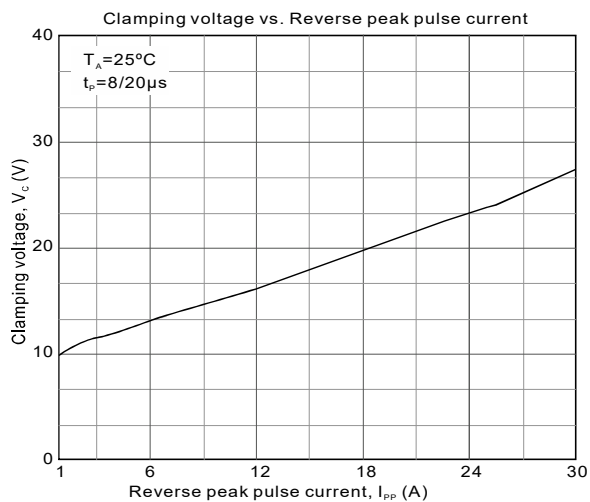
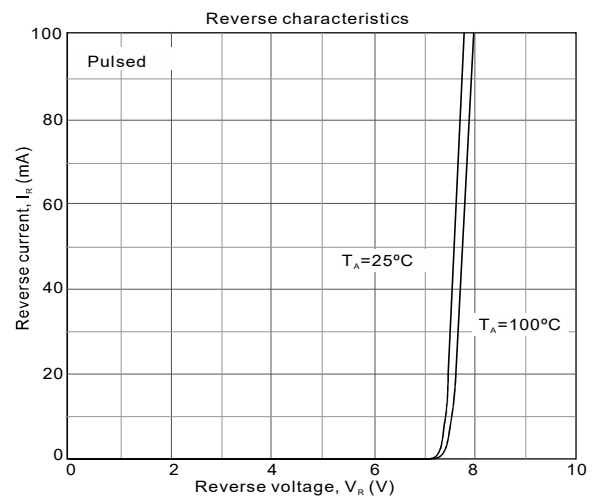
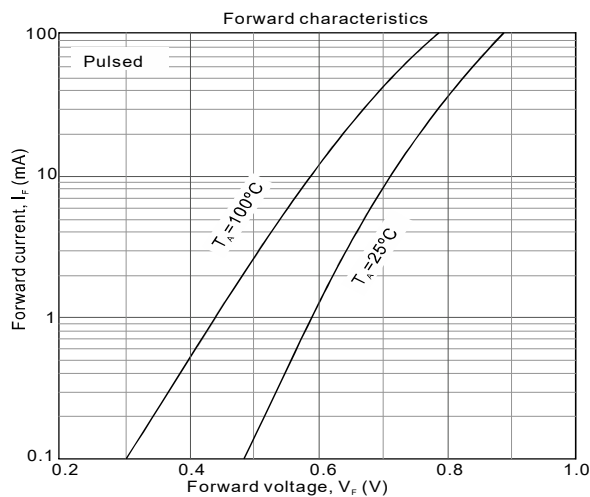
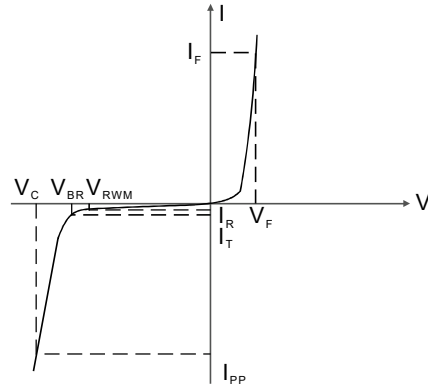
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reverse working voltage (Note3)	V_{RWM}				5	V
Reverse breakdown voltage	V_{BR}	$I_T = 1\text{mA}$	6		8	V
Reverse leakage current	I_R	$V_{RWM} = 5\text{V}$			1	μA
Clamping voltage (Note2)	V_C	$I_{PP} = 30\text{A}$			27	V
Junction capacitance	C_J	$V_R = 0\text{V}, f = 1.0\text{MHz}$			2	pF

Note: 1. Device stressed with ten non-repetitive ESD pulses.
 2. Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC61000-4-5.
 3. Other voltage available upon request.

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Rating and characteristic curves

Symbol	Parameter
I_{PP}	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 @ I_T
I_T	Test current
I_F	Forward current
V_F	Forward voltage @ I_F



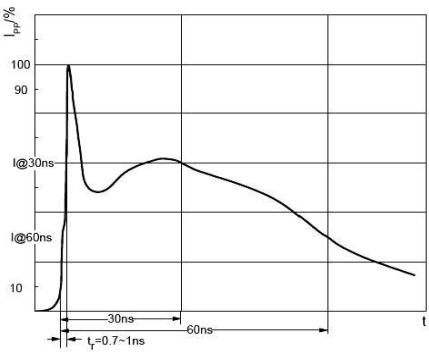
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ESD standard compliance

IEC61000-4-2 standard

Contact discharge		Air discharge	
Level	Test voltage (kV)	Level	Test voltage (kV)
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15

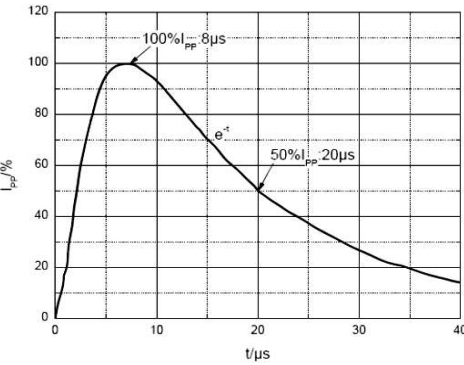
ESD pulse waveform according to IEC61000-4-2



JESD22-A114-B standard

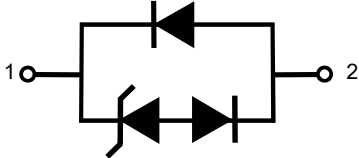
ESD class	Human body discharge (V)
0	0 ~ 249
1A	250 ~ 499
1B	500 ~ 999
1C	1000 ~ 1999
2	2000 ~ 3999
3A	4000 ~ 7999
3B	8000 ~ 15999

8/20μs pulse waveform according to IEC 61000-4-5



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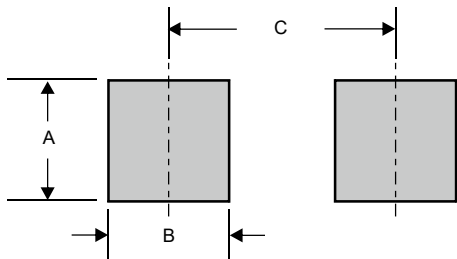
Pinning information

Pin	Simplified outline	Symbol
Pin1 Cathode Pin2 Anode		

Marking

Type number	Marking code
ESDA3L05-Q1-H	$\bar{V}5$

Suggested solder pad layout

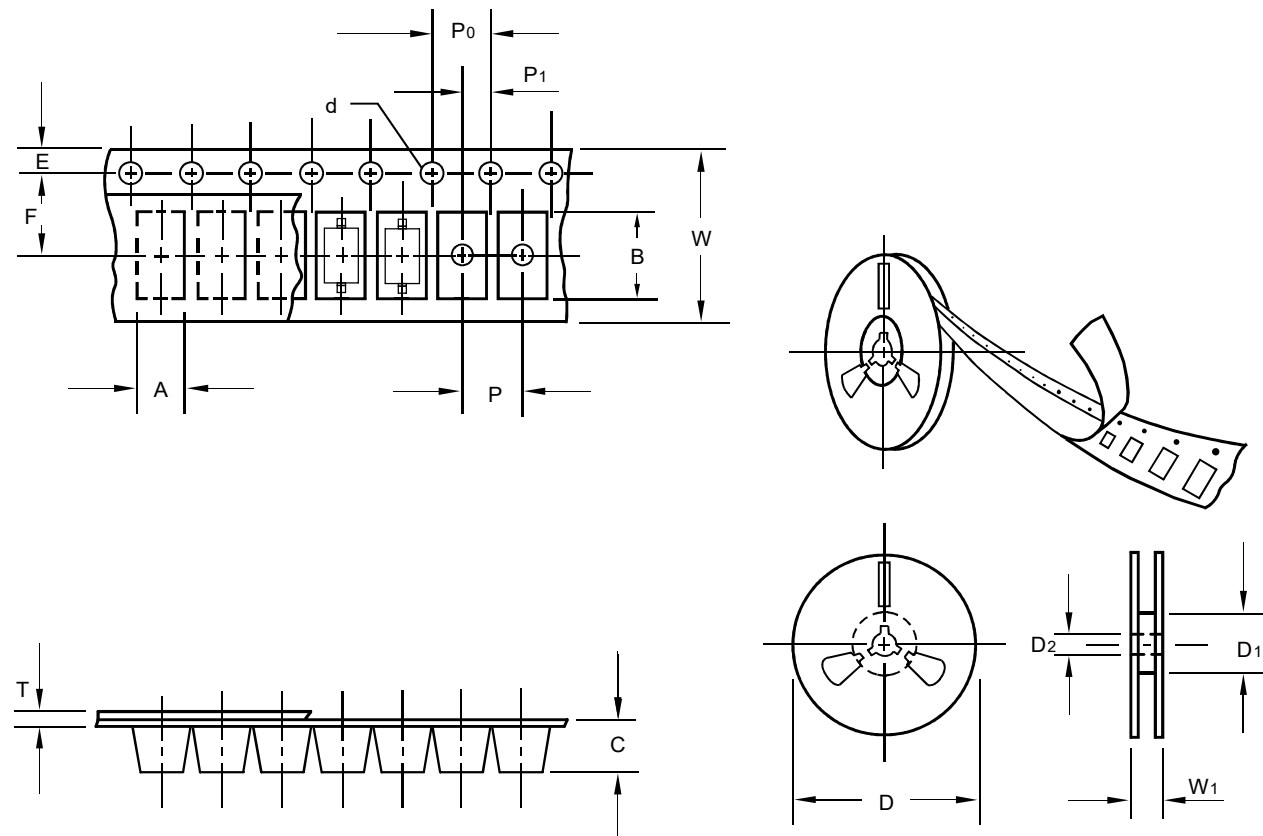


Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323F	0.028 (0.70)	0.028 (0.70)	0.085 (2.15)

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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	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	53.40
Feed hole diameter	D2	1.0	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
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	12.30

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

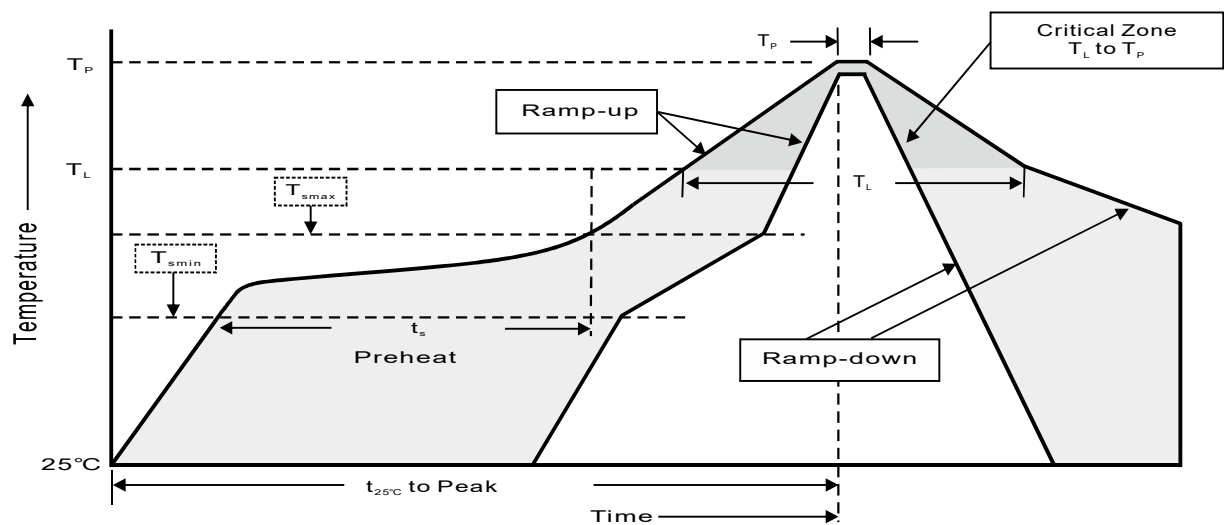
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Reel packing

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-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 (T_{smin}) - Temperature Max (T_{smax}) - Time (Min to Max) (t_s)	150°C 200°C 60 ~ 120 sec
T_{smax} to T_L - Ramp-up rate	< 3 °C/sec
Time maintained above : - Temperature (T_L) - Time (T_L)	217°C 60 ~ 260 sec
Peak temperature (T_p)	255 °C -0/+5°C
Time with 5°C of actual peak temperature (T_p)	10 ~30 sec
Ramp-down rate	< 6 °C/sec
Time 25°C to peak temperature	< 6 minutes

ESDA3L05-Q1-H**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	$T_a=150^{\circ}C$ 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	$245\pm5^{\circ}C$ 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	$260\pm5^{\circ}C$ 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