

ESDAP3L03CL1

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ESDAP3L03CL1

SMD Ultra Low Capacitance Bi-Directional TVS For ESD Protection Array:3.3V

Features

- Bi-directional ESD protection of one line
- Reverse stand-off voltage: 3.3V
- Low reverse clamping voltage
- Low leakage current
- Provide transient protection:
IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air)
 $\pm 30\text{kV}$ (Contact)
IEC 61000-4-4 (EFT) 40A (5/50ns)
IEC 61000-4-5 (Surge) 20A (8/20us)
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex.ESDAP3L03C1-H.

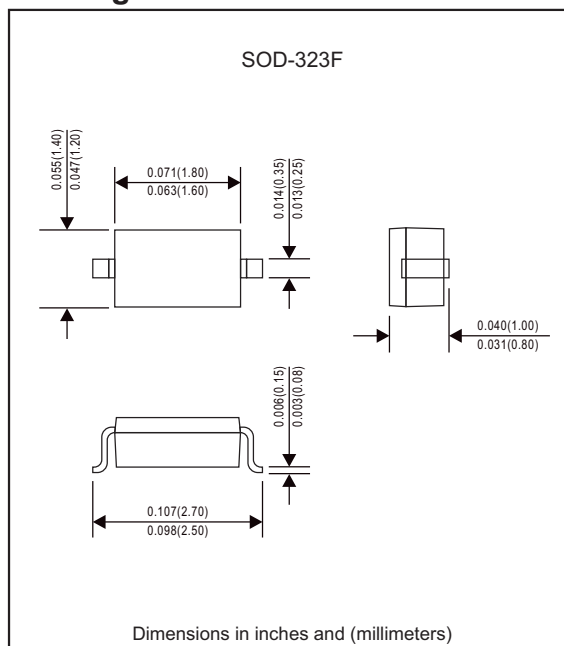
Applications

- Cellular Phones.
- Desktops/Servers and Notebooks.
- Portable Instrumentation.
- Analog Inputs.

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($t_p = 8/20\mu\text{s}$)	PPP	320	Watt
Peak pulse current($t_p = 8/20\mu\text{s}$)	IPP	20	A
Lead solder temperature-maximum (10 second duration)	TL	260	$^\circ\text{C}$
IEC 61000-4-2 ESD air model contact model	VESD	± 30 ± 30	kV
Operating junction temperature range	TJ	-55 to +150	$^\circ\text{C}$
Storage temperature range	TSTG	-55 to +150	$^\circ\text{C}$

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

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Reverse stand off voltage		VRWM			3.3	V
Reverse leakage current	VRWM = 3.3V	IR		0.01	0.5	μA
Trigger voltage	IT = 1uA	Vt	6.0		7.5	V
Holding voltage	Ih = 10mA	Vh	4.0		5.0	V
Clamping voltage	IPP=1A, tp=8/20 μs	VC			8.0	V
	IPP=10A, tp=8/20 μs				12.0	
	IPP=20A, tp=8/20 μs				16.0	
Junction capacitance	VR=0V, f=1MHz	CJ		0.6		pF
	VR=3.3V, f=1MHz			0.6		

Rating and characteristic curves (ESD3AP3L03CL1)

Fig.1 PULSE WAVEFORM

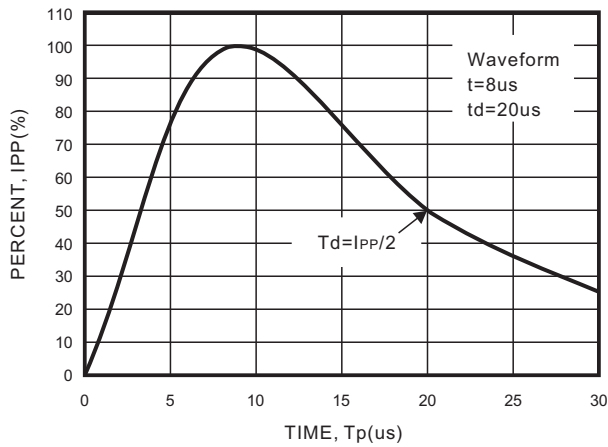


Fig.2 INSERTION LOSS S₂₁ of I/O to GND

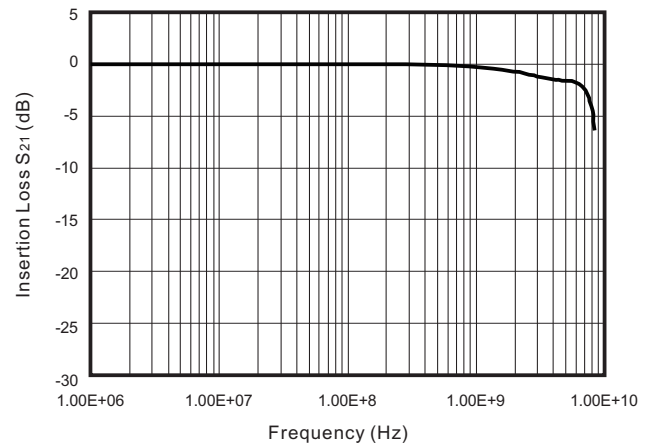


Fig.3 CLAMPING VOLTAGE VS CURRENT IPP

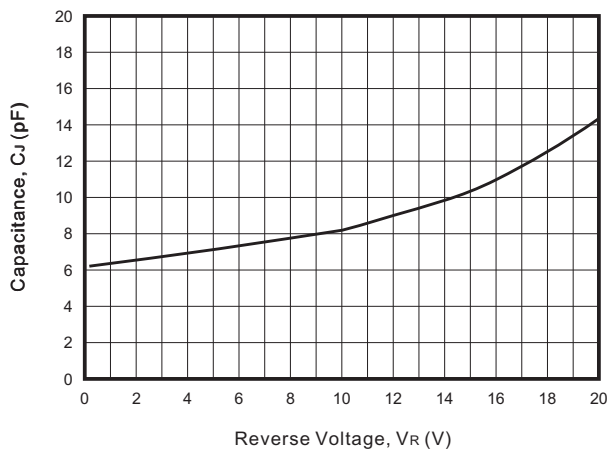


Fig.4 NORMALIZED CAPACITANCE VS. REVERSE VOLTAGE

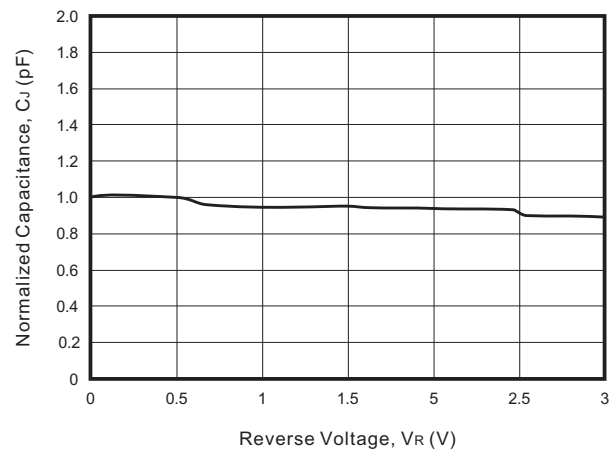


Fig.5 ESD CLAMPING OF I/O TO GND
(+8KV CONTACT PER IEC 61000-4-2)

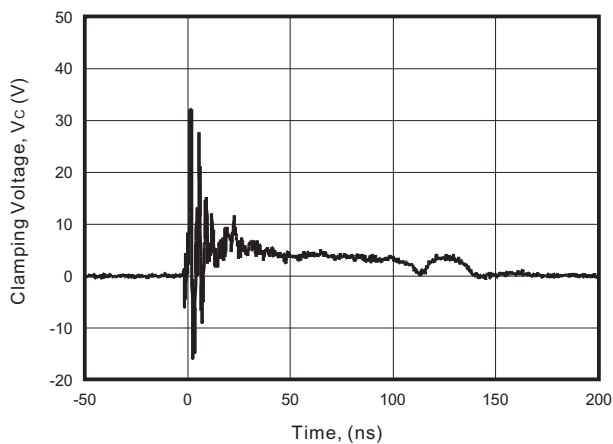
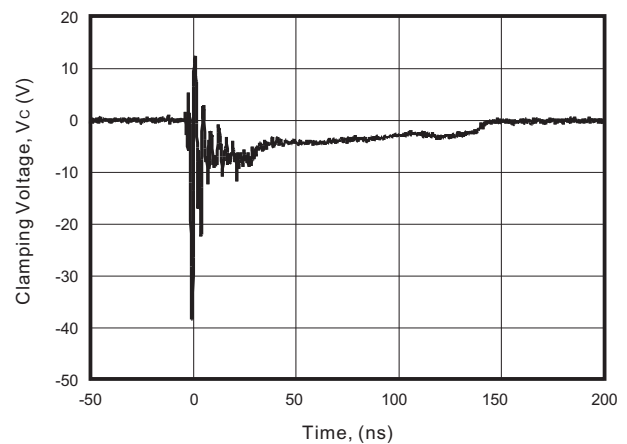
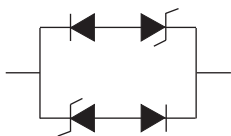


Fig.6 ESD CLAMPING OF I/O TO GND
(-8KV CONTACT PER IEC 61000-4-2)

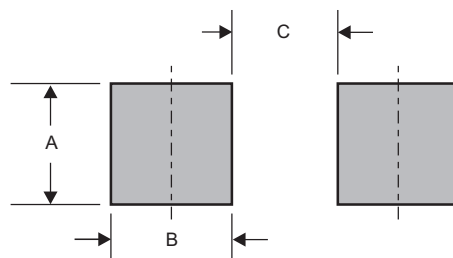


ESDAP3L03CL1**Pinning information**

Pin	Simplified outline	Symbol
Bi-Directional		

Marking

Type number	Marking code
ESDAP3L03CL1	CC,HH

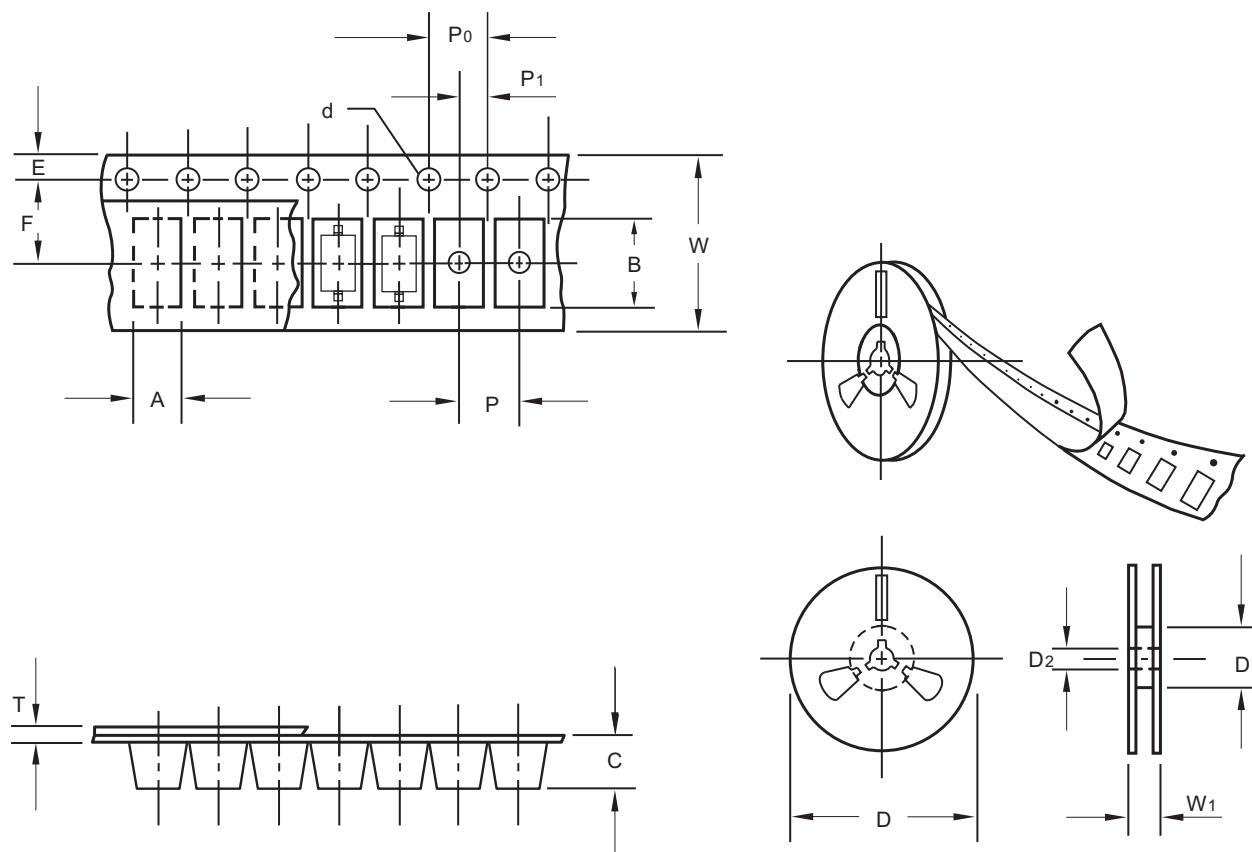
Suggested solder pad layout

Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-323F	0.033 (0.83)	0.025 (0.63)	0.063 (1.60)

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Packing information



unit:mm

Item	Symbol	Tolerance	SOD-323F
Carrier width	A	0.1	1.46
Carrier length	B	0.1	2.90
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.

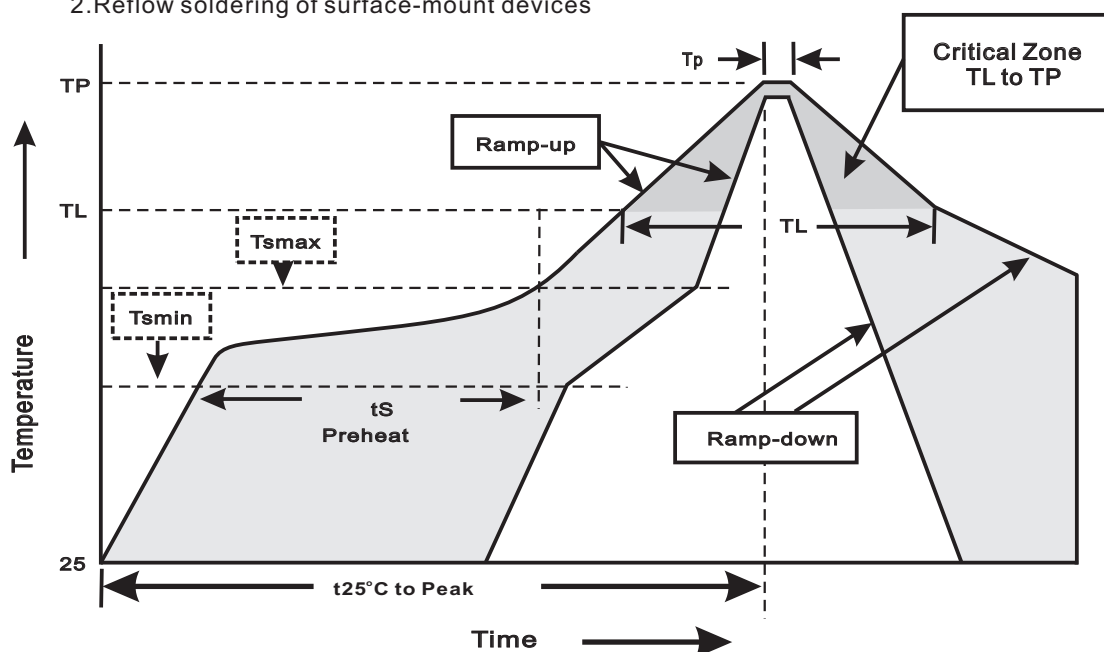
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Reel packing

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 _{Smin}) -Temperature Max(T _{Smax}) -Time(min to max)(t _S)	150°C 200°C 60~120sec
T _{Smax} 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. Solder Resistance	at $260 \pm 5^{\circ}\text{C}$ for $10 \pm 2\text{sec.}$	MIL-STD-750D METHOD-2031
2. Solderability	at $245 \pm 5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	$V_{\text{BR}} = V_{\text{BR Min}} * 80\%$ at $T_J = 150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	$15P_{\text{SIG}}$ at $T_A = 121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at $T_A = 85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 150°C for 1000 hrs.	MIL-STD-750D METHOD-1031