ESD5Z24

List

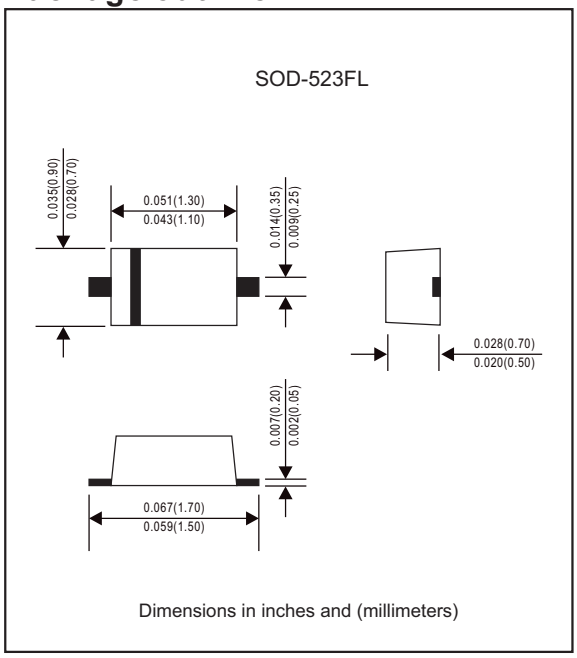
ESD5Z24

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

Features

- 504 Watts peak pulse power per line (tp=8/20μs)
- Protects one I/O or power line.
- Low clamping voltage.
- Working voltage 24V.
- Low leakage current.
- Provide transient protection:
  IEC 61000-4-2 (ESD) ±30kV (Air & Contact).
  IEC 61000-4-4 (EFT) 40A (5/50ns).
  IEC 61000-4-5 (Lightning) 9A (8/20μs).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.ESD5Z24-H.

Package outline



Dimensions in inches and (millimeters)

Applications

- Cellular Handsets & Accessories
- Personal Digital Assistants (PDAs)
- Notebooks & Handhelds
- Portable Instrumentation,Digital Cameras,MP3 players

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOD-523FL
- Terminals : Solder plated, solder able per MIL-STD-750, Method 2026
- Polarity : Indicated by cathode band
- Mounting Position : Any
- Weight : Approximated 0.002 gram

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

Parameter	Symbol	Value	Unit
Peak pulse power (t_p=8/20μs)	P_{PP}	504	W
Electrostatic discharge voltage (IEC61000-4-2 Contact & Air)	V_{ESD}	±30	kV
Peak pulse current (t_p=8/20μs, IEC61000-4-5)	I_{PP}	9	A
Operating temperature range	T_J	-55 to +125	℃
Storage temperature range	T_{STG}	-55 to +150	℃

Electrical characteristics (At T_A=25°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			500	nA
Forward voltage	I_F=10mA	V_F	0.6		1.0	V
Clamping voltage	I_{PP}=9A, t_p=8/20μs	V_C		52	56	V
Dynamic resistance, Note 1,2	T_{LP}=0.2/100ns	R_{DYN}		0.4		Ω
ESD clamping voltage, Note 1	I_{PP}=4A, t_p=0.2/100ns (TLP)	V_C		33		V
	I_{PP}=16A, t_p=0.2/100ns (TLP)	V_C		37.7		V
Junction capacitance	V_R=0V, f=1MHz	C_J		45	50	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 ".

Rating and characteristic curves(ESD5Z24)

Figure 1: Peak Pulse Power vs. Pulse Time

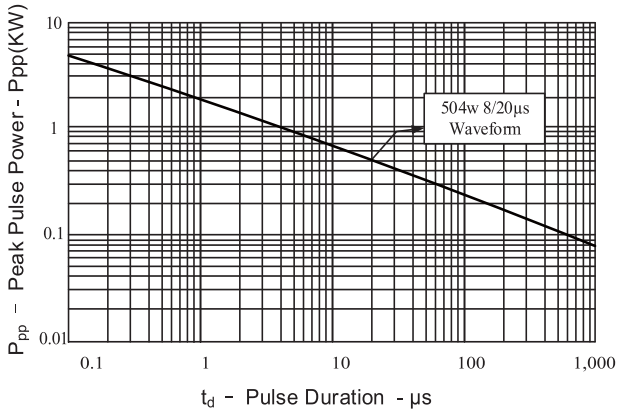


Figure 2: Power Derating Curve

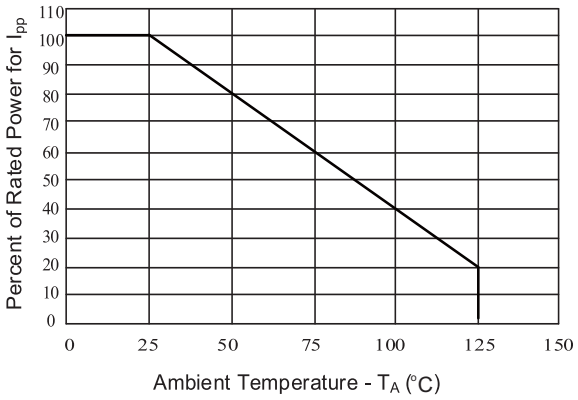


Figure 3: Clamping Voltage vs. Peak Pulse Current

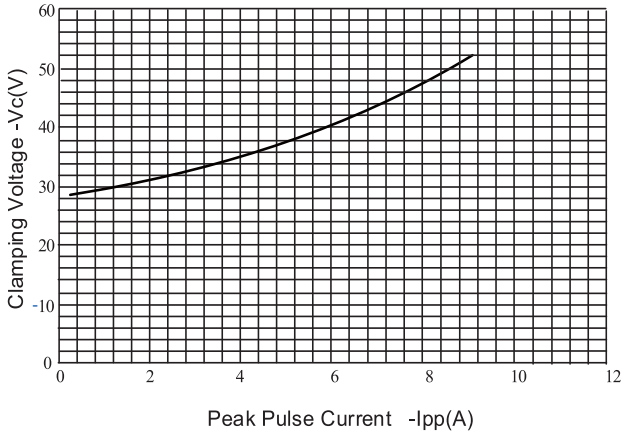


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

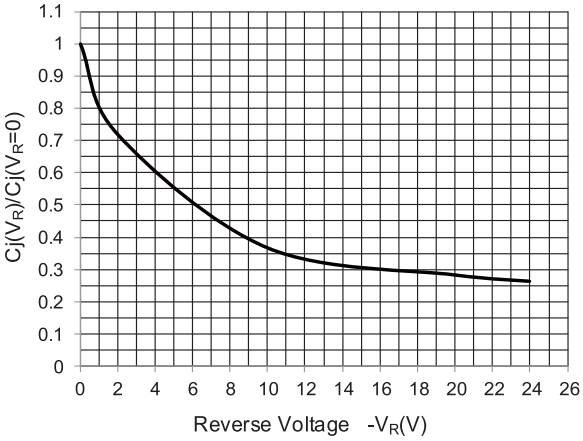


Figure 5: 8/20μs Pulse Waveform

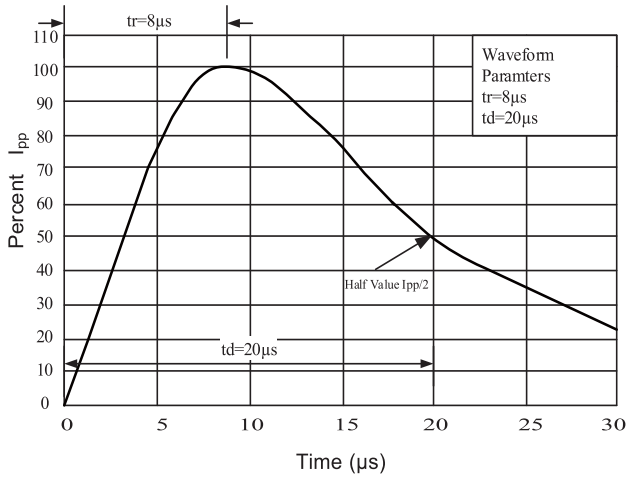
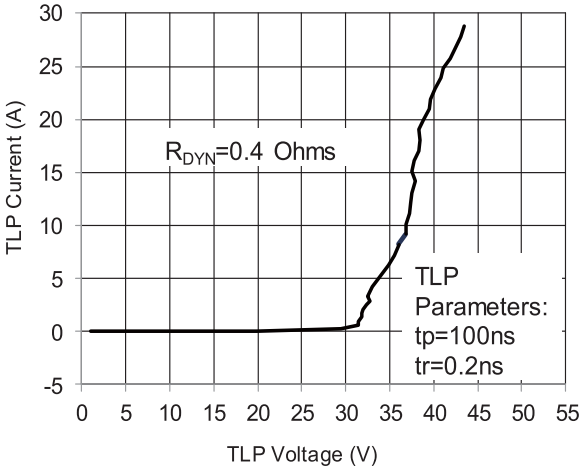


Figure 6: TLP I-V Curve



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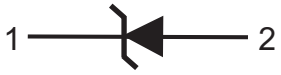
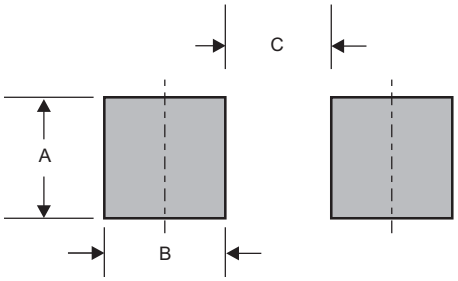
Pinning information

Pin	Simplified outline	Symbol
Pin1 cathode Pin2 anode		

Marking

Type number	Marking code
ESD5Z24	24

Suggested solder pad layout



Dimensions in inches and (millimeters)

PACKAGE	A	B	C
SOD-523FL	0.032 (0.80)	0.024 (0.60)	0.044 (1.10)

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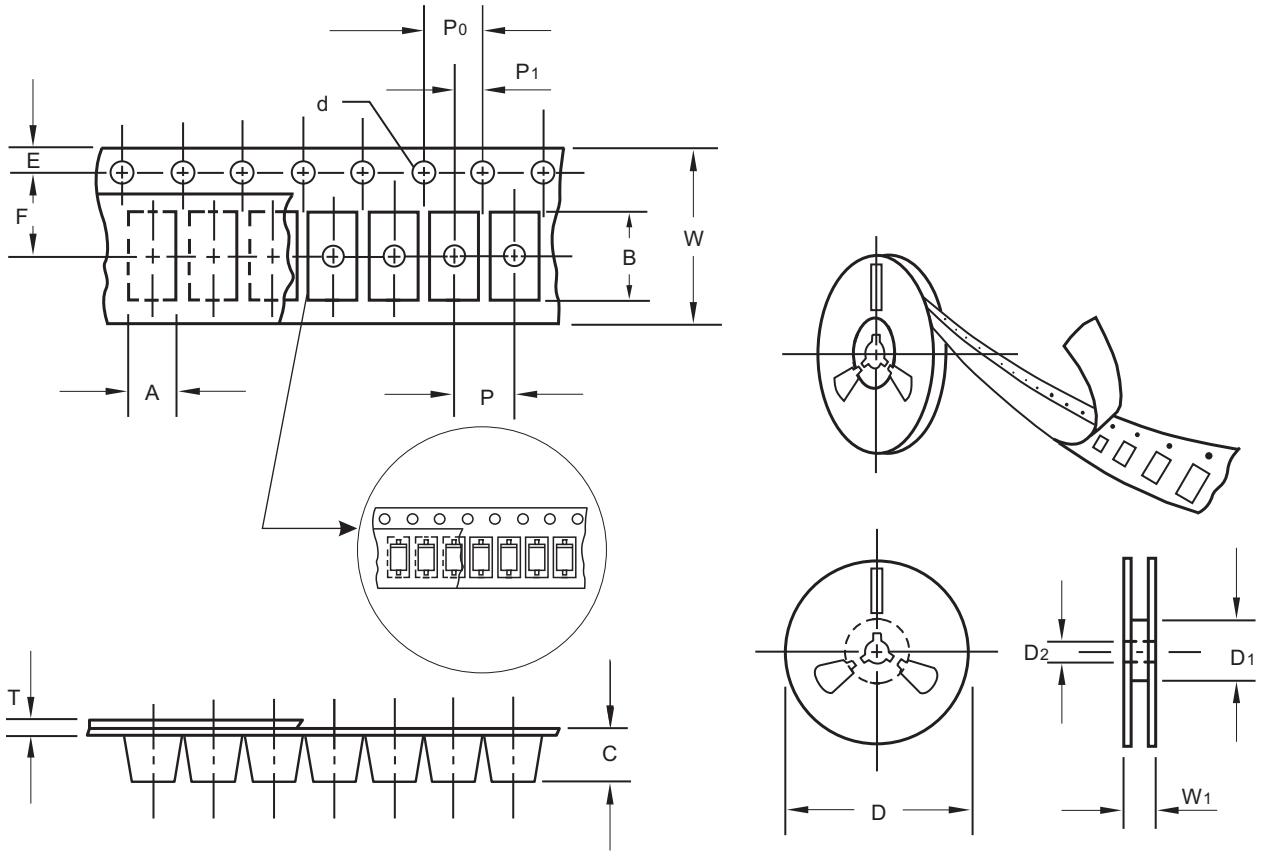
Packing information



unit:mm

Item	Symbol	Tolerance	SOD-523FL
Carrier width	A	0.1	0.90
Carrier length	B	0.1	1.94
Carrier depth	C	0.1	0.76
Sprocket hole	d	0.1	1.50
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	50.00
Feed hole diameter	D_2	0.2	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	2.00
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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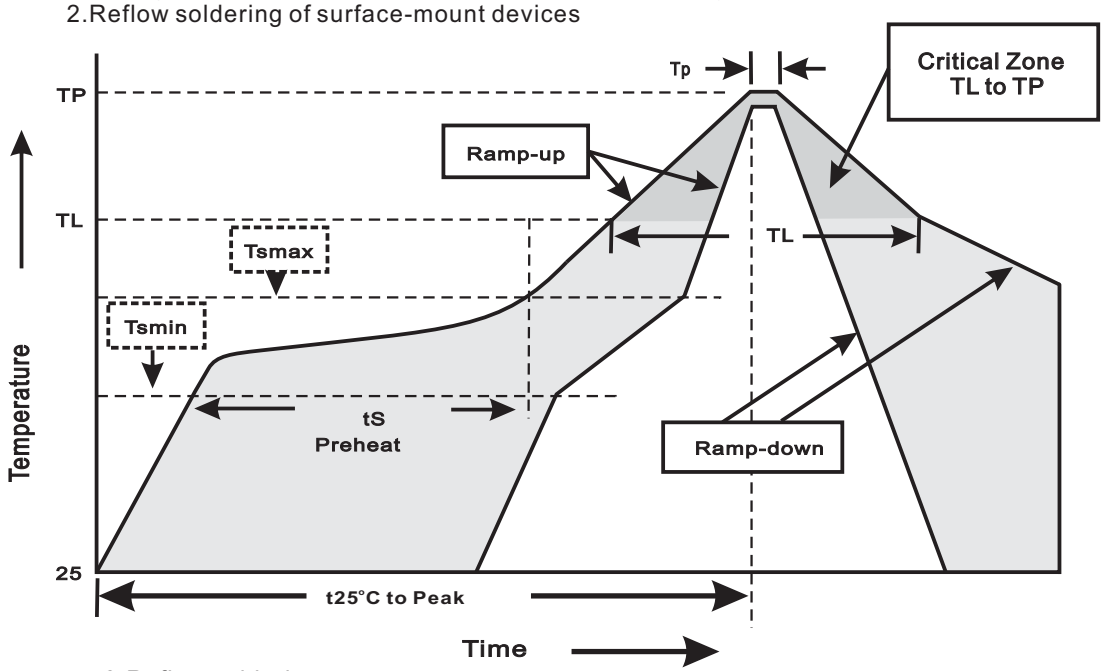
Reel packing

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)	APPROX. GROSS WEIGHT (kg)
SOD-523FL	7"	5,000	2.0	50,000	183*123*183	178	382*257*387	400,000	13.5

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. Solder Resistance	at 260±5°C for 10±2sec.	MIL-STD-750D METHOD-2031
2. Solderability	at 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
3. High Temperature Reverse Bias	V_{BR}=V_{BR} MIN*80% at T_J=125°C for 168 hrs.	MIL-STD-750D METHOD-1038
4. Pressure Cooker	15P_{SIG} at T_A=121°C for 4 hrs.	JESD22-A102
5. Temperature Cycling	-55°C to +125°C dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
6. Humidity	at T_A=85°C, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
7. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031