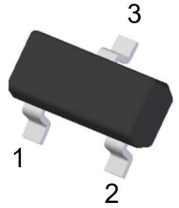


Descriptions

SP3PT23AXXP02 series are designed to protect components which are connected to data and transmission lines from voltage surges caused by electrostatic discharge (ESD), electrical fast transients (EFT) and lightning. TVS diodes are characterized by their high surge capability, low operating and clamping voltages, and fast response time. This makes them ideal for use as board level protection of sensitive semiconductor components. The low profile SOT-23 package allows flexibility in the design of crowded circuit boards.



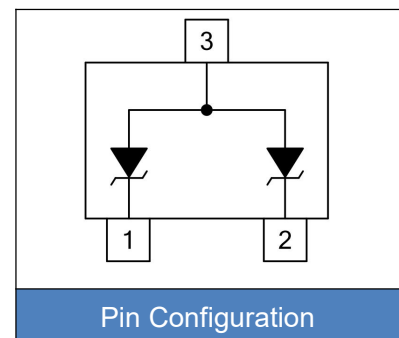
Features

- ◆ IEC61000-4-2 ESD 30KV Air, 30KV contact compliance
ESD 15KV Air, 8KV contact compliance for SP3PT23A36P02
- ◆ SOT-23 surface mount package
- ◆ Protects one bidirectional line or two unidirectional lines
- ◆ Working voltage: 3.3V, 5V, 12V, 15V, 24V and 36V
- ◆ Low leakage current
- ◆ Low operating and clamping voltages
- ◆ Solid-state silicon avalanche technology
- ◆ Lead Free/RoHS compliant
- ◆ Solder reflow temperature: Pure Tin-Sn, 260~270°C
- ◆ Flammability rating UL 94V-0
- ◆ Meets MSL level 1, per J-STD-020

Applications

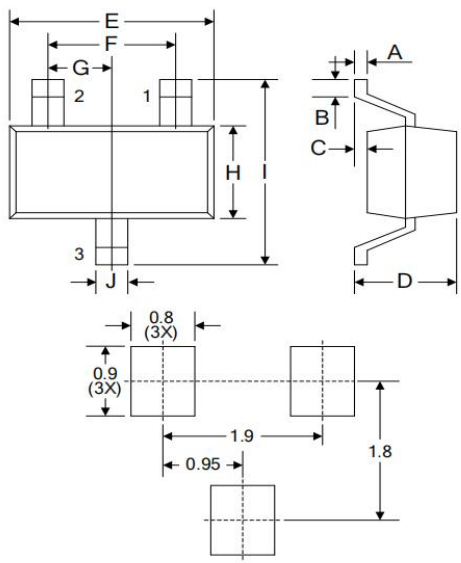
- ◆ Cellular handsets and accessories
- ◆ Personal digital assistants (PDA' s)
- ◆ Portable instrumentation
- ◆ Set Top Box (STB)
- ◆ Servers, notebook, and desktop PC
- ◆ Wireless bus protection
- ◆ RS-232, RS-422, RS-423 protection

Schematic



Dimensions (SOT-23)

Symbol	Dimension			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.08	0.18	0.003	0.007
B	0.15	-	0.006	-
C	-	0.13	-	0.005
D	0.89	1.09	0.035	0.043
E	2.80	3.05	0.110	0.120
F	1.90		0.075	
G	0.95		0.037	
H	1.19	1.40	0.047	0.055
I	2.10	2.49	0.083	0.098
J	0.35	0.50	0.014	0.020



Recommended Soldering Pad Layout

Maximum Ratings($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Rating		Symbol	Value	Unit
ESD voltage (3.3V, 5V, 12V, 15V, 24V)	(Contact discharge)	V_{ESD}	± 30	kV
	(Air discharge)		± 30	
ESD voltage (36V)	(Contact discharge)		± 8	kV
	(Air discharge)		± 15	
Storage & operating temperature range		T_{STG}, T_J	$-55^{\circ}\text{C} \sim +150^{\circ}\text{C}$	$^{\circ}\text{C}$

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

Part Number	Reverse Stand-Off Voltage	Breakdown Voltage @ I_T	Test Current	Maximum Clamping Voltage @ I_{PP}	Peak Pulse Current @ $t_p=8/20\mu\text{s}$	Reverse Leakage Current @ V_{RWM}	Capacitance At 1MHz 0V
	$V_{\text{RWM}}(\text{V})$	$V_{\text{BR}}(\text{V})_{\text{min}}$	$I_T(\text{mA})$	$V_C(\text{V})$	$I_{\text{PP}}(\text{A})$	$I_R(\mu\text{A})$	$C_j(\text{PF})$
SP3PT23A03P02	3.3	4.0	1	15	15	125	300
SP3PT23A05P02	5.0	6.0	1	20	15	5	220
SP3PT23A12P02	12	13.3	1	27	11	1	100
SP3PT23A15P02	15	16.7	1	30	10	1	90
SP3PT23A24P02	24	26.7	1	50	6	1	80
SP3PT23A36P02	36	40	1	76.8	5	1	70

Typical Characteristics Curves($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Figure 1. Power Derating Curve

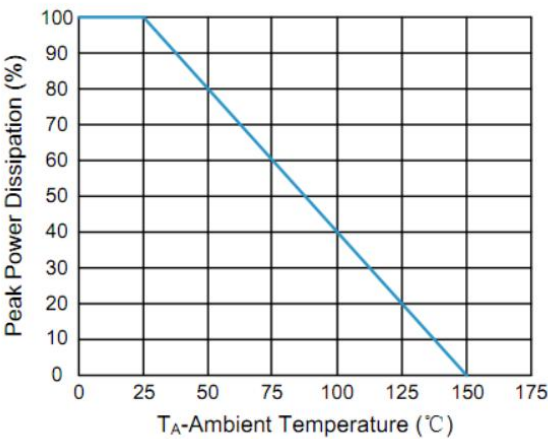


Figure 2. Pulse Waveforms

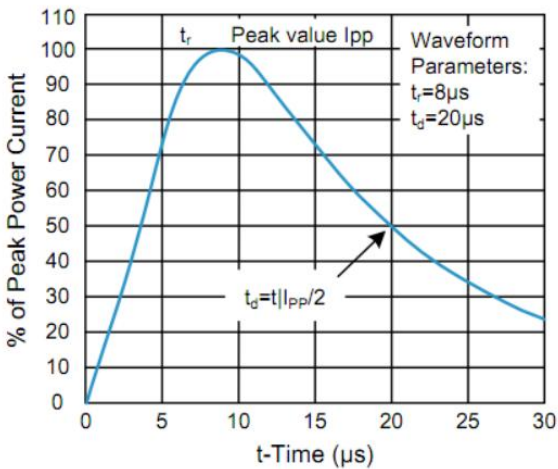


Figure 3. Forward Voltage vs. Forward Current

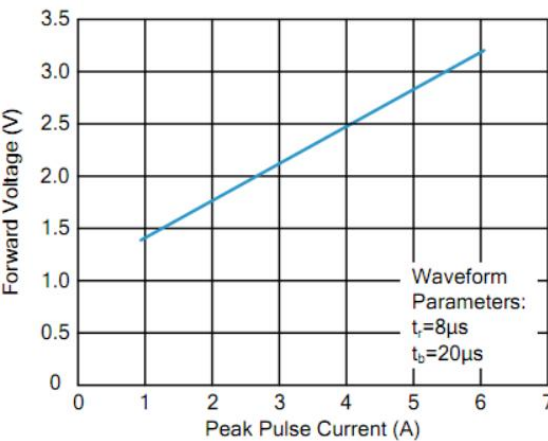
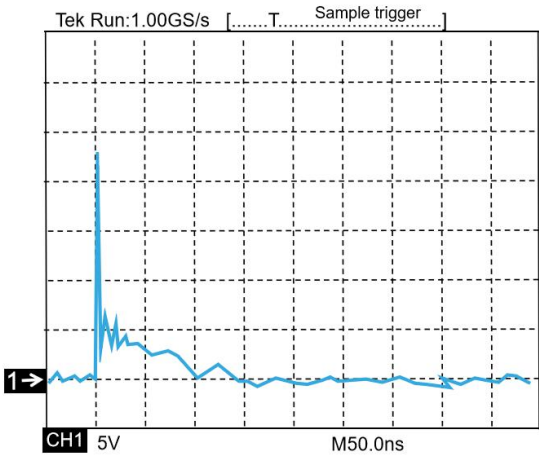
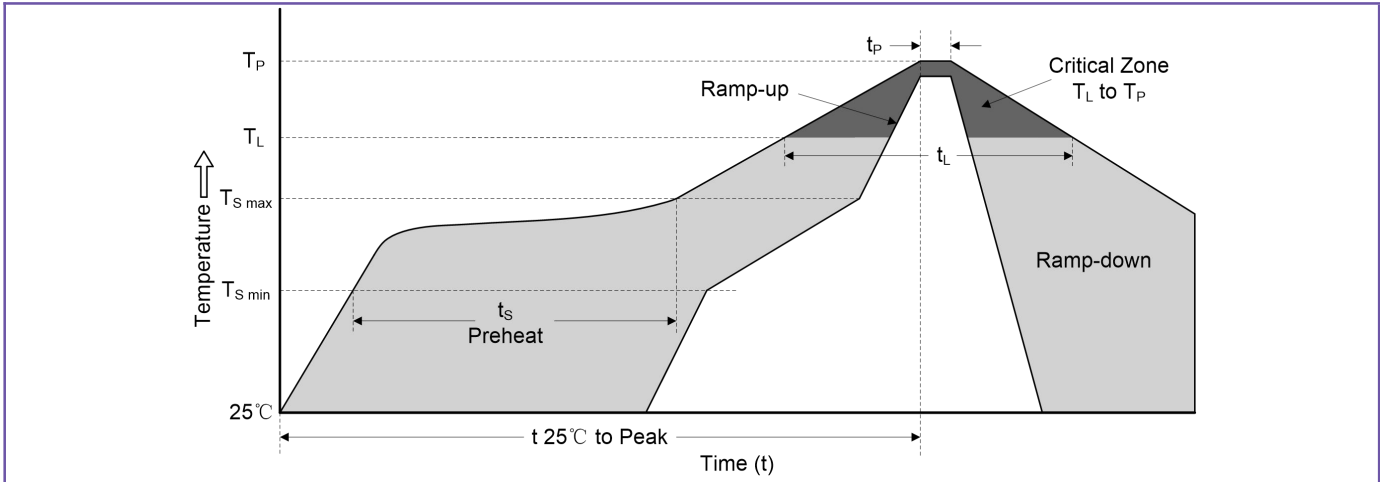


Figure 4. ESD Clamping(8kV Contact IEC61000-4-2)



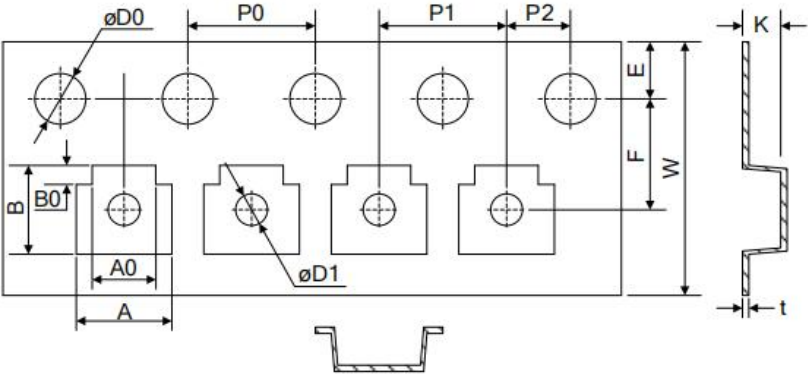
Reflow Soldering Parameters



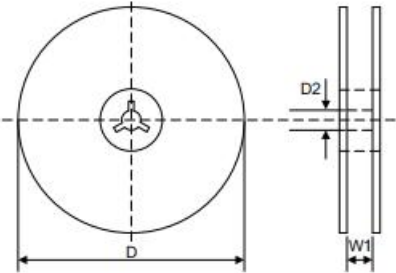
Reflow Condition		Lead-free Assembly
Pre heat	-Temperature Min ($T_{S\ min}$)	150°C
	-Temperature Max ($T_{S\ max}$)	200°C
	-Time (min to max) (t_s)	60-180 seconds
Average ramp-up rate (T_L to T_P)		3°C/second max.
$T_{S\ max}$ to T_L -Ramp-up Rate		3°C/second max.
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Time (min to max) (t_s)	60-150 seconds
Peak Temperature (T_P)		260(+0/-5)°C
Time within 5°C of actual Peak Temperature (t_P)		20-40 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to Peak Temperature(T_P)		8 minutes max.
Do not exceed		260°C

Packaging

Tape



Reel



Symbol	Dimension (mm)
W	8.00±0.30
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
D0	Φ1.55±0.10
D1	Φ1.00±0.05
E	1.75±0.10
F	3.50±0.10
A	3.10±0.10
A0	2.10±0.10
B	2.75±0.10
B0	0.65±0.10
K	1.10±0.10
t	0.20±0.05
D	Φ178.0±2.0
D2	Φ13.0
W	9.5
Quantity: 3000PCS	