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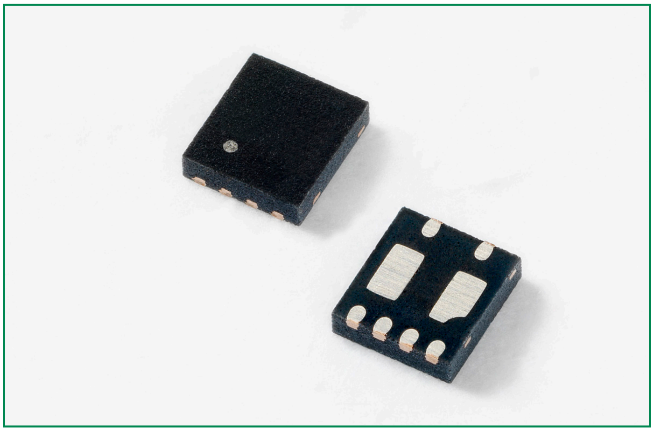
TVS Diode Arrays (SPA® Diodes)

Surge Protection - SP1224

SP1224 (100A) for USB V_{BUS}

HF RoHS Pb GREEN

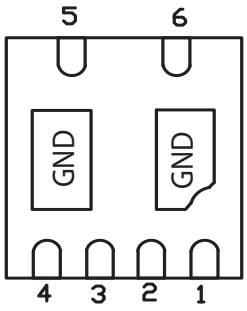


Description

This SP1224 TVS diode has a lightning surge rating of 100A (8/20 as defined in IEC 61000-4-5 2nd edition) and is intended for USB V_{BUS} protection. It provides superior protection for current intensive applications such as the USB fast charging circuits.

The SP1224 TVS is offered in a space saving 2.0 x 1.8 mm µDFN package with a typical height of 0.55 mm. This small form factor makes this component ideal for smart phones, tablets, and other portable electronics that are footprint challenged.

Pinout

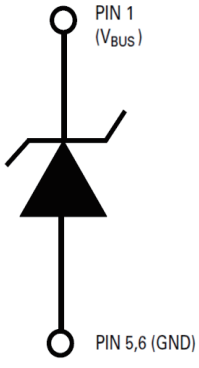


Bottom View

Features

- ESD, IEC 61000-4-2, ±30kV contact, ±30kV air
- EFT, IEC 61000-4-4, 80A (t_P=5/50ns)
- Lightning, 100A (8/20 as defined in IEC 61000-4-5 2nd edition)
- Protection for V_{BUS} operating up to 24V
- High current handling capability for fast charging applications
- Halogen free, lead free and RoHS compliant
- Moisture Sensitivity Level(MSL -1)

Functional Block Diagram



Applications

- V_{BUS} protection for fast charging USB circuits

Life Support Note:

Not Intended for Use in Life Support or Life Saving Applications

The products shown herein are not designed for use in life sustaining or life saving applications unless otherwise expressly indicated.

Revision: 08/13/18

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
I_{PP} (Pin 1)	Peak Current (t_p=8/20µs)	100	A
P_{PK}(Pin1)	Peak Pulse Power (t_p=8/20µs)	3700	W
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

CAUTION: Stresses at or above those listed in "Absolute Maximum Ratings" may cause permanent damage to the component. This is a stress only rating and operation of the component at these or any other conditions above those indicated in the operational sections of this specification is not implied. Also due to variations in test equipment stresses shown above are averages.

Electrical Characteristics (T_{OP}=25°C)

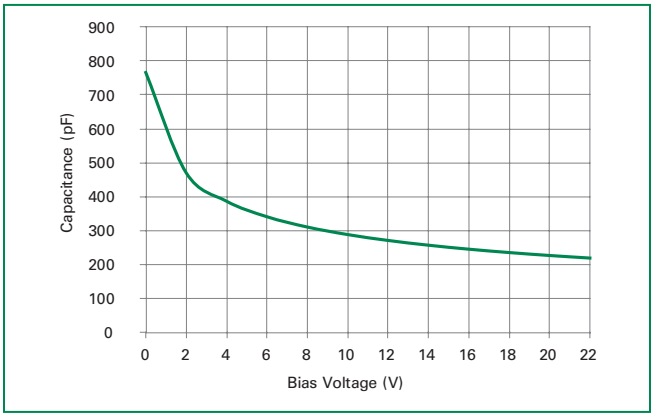
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R=1µA, Pin 1 to GND			22	V
Breakdown Voltage	V_{BR}	I_R=1mA, Pin 1 to GND	24		27	V
Reverse Leakage Current	I_{LEAK}	V_R=22V, Pin 1 to GND		0.02	0.5	µA
Forward Voltage	V_F	I_F=10mA, GND to Pin 1	0.6	0.7	1.0	V
Clamp Voltage[1]	V_C	I_{PP}=100A, t_p=8/20µs, Fwd		35	37	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_P=100ns, Pin1 to GND		0.15		Ω
ESD Withstand Voltage[1]	V_{ESD}	IEC 61000-4-2 (Contact)	±30			kV
		IEC 61000-4-2 (Air)	±30			kV
Diode Capacitance[1]	$C_{I/O-GND}$	Reverse Bias=0V, f=1MHz		770	850	pF

Notes:

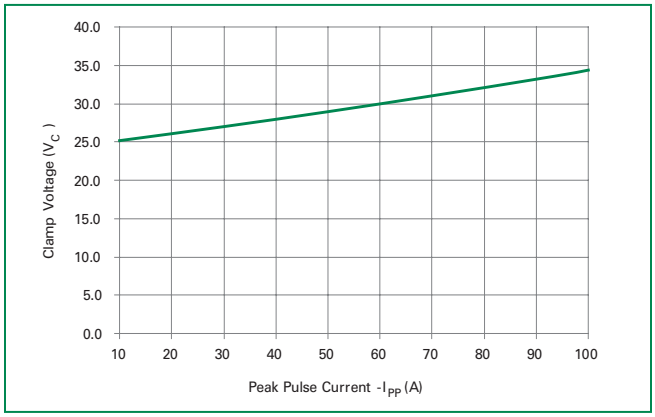
1 Parameter is guaranteed by design and/or component characterization.

2 Transmission Line Pulse (TLP) with 100ns width, 2ns rise time, and average window t1=70ns to t2= 90ns

Capacitance vs. Reverse Bias (Pin1 to GND)



Clamping Voltage vs. Peak Pulse Current (Pin1 to GND)



TVS Diode Arrays (SPA® Diodes)

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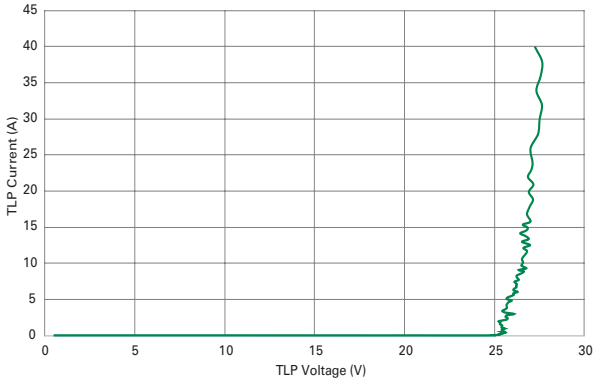
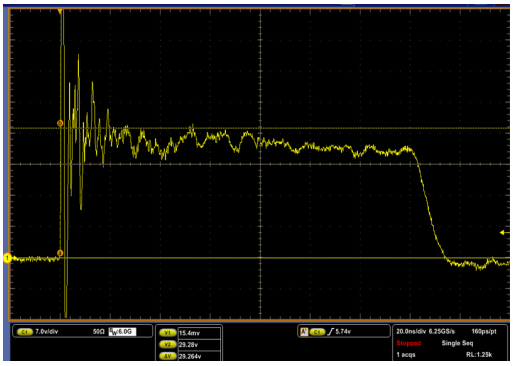
Transmission Line Pulsing (TLP) Plot

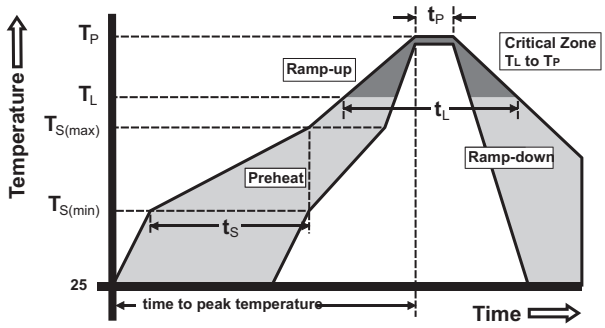


IEC 61000-4-2 +8kV Contact ESD Clamping Voltage



Soldering Parameters

Reflow Condition		Pb – 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 secs
Average ramp up rate (Liquidus) Temp (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Temperature (t_L)	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



Product Characteristics

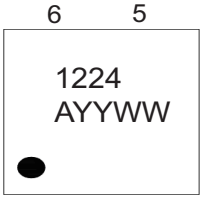
Lead Plating	Pre-Plated Frame
Lead Material	Copper Alloy
Substrate Material	Silicon
Body Material	Molded Compound
Flammability	UL Recognized compound meeting flammability rating V-0

Part Numbering System

SP 1224 - 01 U T G

- SP 1224: TVS Diode Arrays (SPA® Diodes)
- 01: Number of Channels
- U: Package U=µDFN-6
- T: T= Tape & Reel
- G: G= Green

Part Marking System



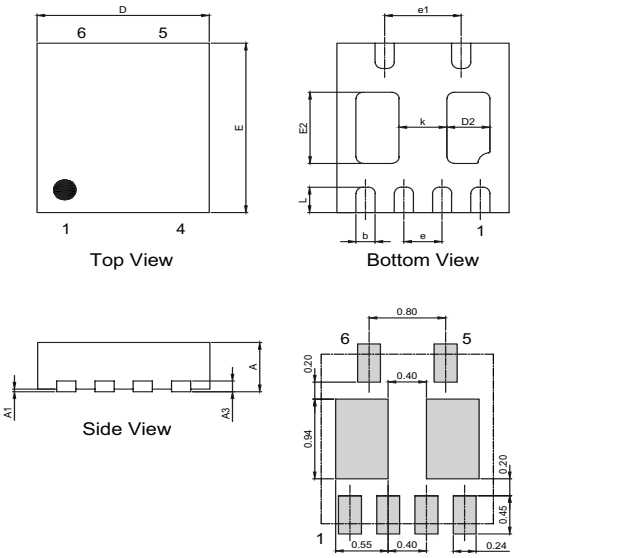
1224 = Part code
A = Assembly Code
YY = Year code
WW = Date code

Ordering Information

Part Number	Package	Min. Order Qty.
SP1224-01UTG	µDFN-6	3000

Revision: 08/13/18

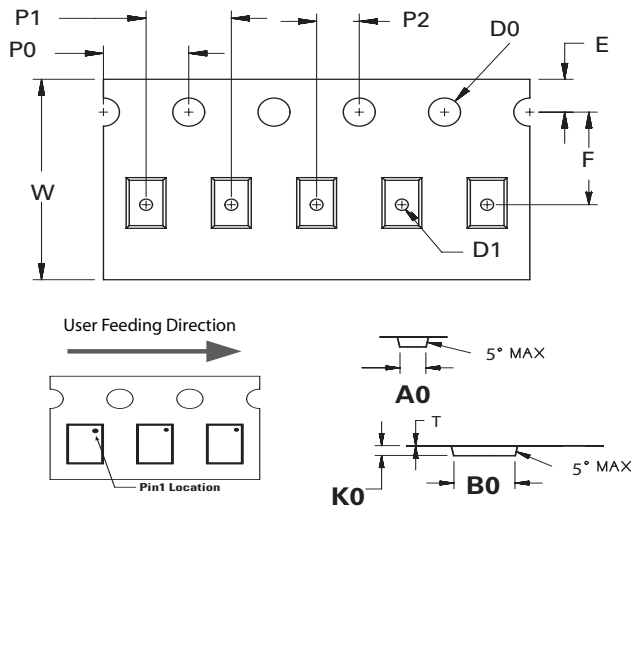
Package Dimensions — µDFN-6



Recommended soldering pad layout (Unit : mm)

µDFN6 (1.8x2.0x0.5mm) JEDEC MO-229						
Symbol	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	0.50	0.55	0.60	0.020	0.022	0.024
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3		0.125 REF			0.005 REF	
b	0.15	0.20	0.25	0.006	0.008	0.010
D	1.75	1.80	1.85	0.069	0.071	0.073
E	1.95	2.00	2.05	0.077	0.079	0.081
D2	0.35	0.45	0.55	0.014	0.018	0.022
E2	0.74	0.84	0.94	0.029	0.033	0.037
e		0.40 BSC			0.016 BSC	
e1		0.80 BSC			0.031 BSC	
L	0.20	0.30	0.40	0.008	0.012	0.016
K		0.50 REF			0.020 REF	

Embossed Carrier Tape & Reel Specification — µDFN-6



Symbol	Millimeters
A0	1.95 +/- 0.05
B0	2.30 +/- 0.05
D0	1.50 + 0.10
D1	Ø 0.60 + 0.05
E	1.75 +/- 0.10
F	3.50 +/- 0.05
K0	0.75 +/- 0.05
P0	4.00 +/- 0.10
P1	4.00 +/- 0.10
P2	2.00+/-0.05
T	0.25 +/- 0.02
W	8.00 + 0.30 /- 0.10

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- Консультации по применению компонента;
- Поставка образцов и прототипов;
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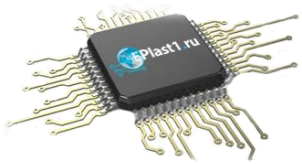

Как с нами связаться

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