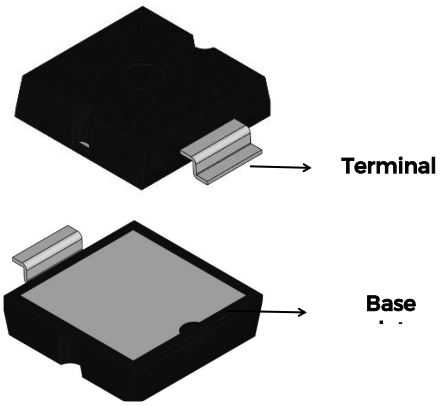
Technical Data
Data Sheet N2539, Rev. -

STPK30KP Series Transient Voltage Suppressor



SPD4-1

Features

- Low profile surface mount
- Fast response
- Suppresses transients up to 30kW @ 10/1000μs and 200kW @ 8/20μs
- This is a Pb – Free Device
- Base plate: Pure Sn plated; Terminal: Pure Sn plated
- Base plate is cathode, Terminal is anode
- Polarity: "A" Suffix designates unidirectional, "CA" Suffix designates bidirectional
- All SMC parts are traceable to the wafer lot
- Adding the U, UA, UX prefixes to part numbers for desired level of screening.
- Additional testing can be offered upon request

Applications

- **Protection from switching transients and induced RF**

Maximum Ratings and Thermal Characteristics@T_A=25˚C unless otherwise specified

Characteristic	Symbol	Value	Unit
Junction and Storage Temperature Range	T_J,T_{STG}	-55 to +150	˚C
Thermal Resistance Junction to Ambient (Note 1)	$R_{\theta JA}$	50	˚C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.0	˚C/W
Peak Pulse Power@10/1000μs(Note 2)	P_{PP}	30,000	W
$T_{Pclamping}$ (0 volts to $V_{(BR)}$ min) Unidirectional		<100	ps
Forward Clamping Voltage @ 500 Amps (Note 3)	V_{FS}	4.0	V
Forward Surge Current (Note 3)	I_{FSM}	1500	A
Solder Temperature @ 10 s	T_{SP}	260	˚C
Steady-State Power dissipation (Note 5) @T_A = 25˚C @T_C = 100˚C	P_D	2.5 (Note 1) 50 (Note 4)	W
Approximate Weight	wt	2.35	g

Note: 1. When mounted on FR4 board with recommended mounting pad(see pad layout).
2. With impulse repetition rate (duty factor) of 0.05% or less.
3. At 8.3ms Single half sine-wave (unidirectional devices only)
4. Case temperature controlled heat sink as specified.
5. Derating when P_{PP} also applying steady-state power.

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Electrical Characteristics @T_A=25°C unless otherwise specified

Part Number (Unidirectional)	Part Number (Bidirectional)	Stand-off Voltage V_{wm} (Note 1) (V)	Breakdown Voltage V_{BR} @ I_{BR} (mA) (V)		Clamping Voltage V_c (10*1000) @ I_{PP} (V) Max	Stand By Current I_R @ V_{wm} (µA) Max	Peak Pulse Current I_{pp} Max (A)	Temperature Coefficient Of V_{BR} mV/°C Max
STPK30KP14A	STPK30KP14CA	14	15.6-17.2	150	24.0	3000	1251*	10
STPK30KP15A	STPK30KP15CA	15	16.7-18.5	5	25.8	750	1164*	12
STPK30KP16A	STPK30KP16CA	16	17.8-19.7	5	27.2	450	1101*	12
STPK30KP17A	STPK30KP17CA	17	18.9-20.9	5	28.8	150	1041*	14
STPK30KP18A	STPK30KP18CA	18	20.0-22.1	5	30.8	60	975	16
STPK30KP20A	STPK30KP20CA	20	22.2-24.5	5	34.0	45	882	18

NOTE 1: Transient Voltage Suppressors are normally selected with reverse "Stand Off Voltage" V_{WM} which should be equal to or greater than the dc or continuous peak operating voltage level.

2: STPK30KPXXXA, "A" Suffix Designates Unidirectional Devices; STPK30KPXXXCA, "CA"Suffix Designates Bidirectional Devices.

* Surge Testing is performed to 1000Amps due to Equipment limitations.

SYMBOLS & DEFINITIONS			
Symbol	**Definition**	**Symbol**	**Definition**
V_{WM}	Working Peak(Standoff) Voltage	I_{PP}	Peak Pulse Current
$V_{(BR)}$	Breakdown Voltage	V_C	Claming Voltage
I_R	Standby Current	$I_{(BR)}$	Breakdown Current for $V_{(BR0}$

Ratings and Characteristics Curves

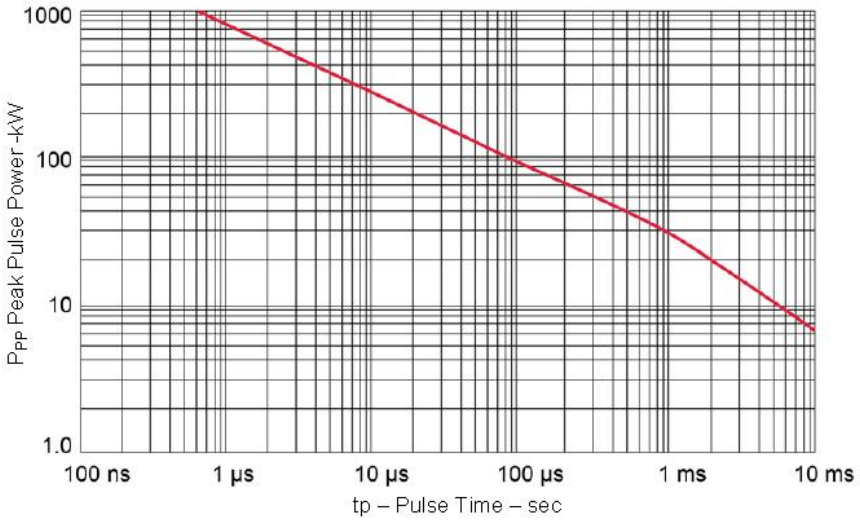

FIGURE 1
Peak Pulse Power vs. P

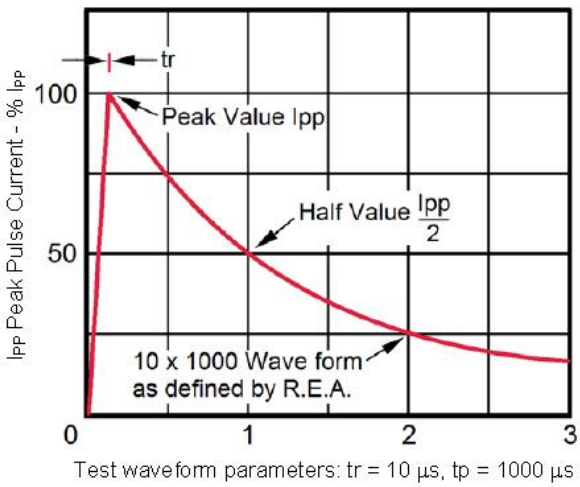

Figure 2
Pulse Waveform

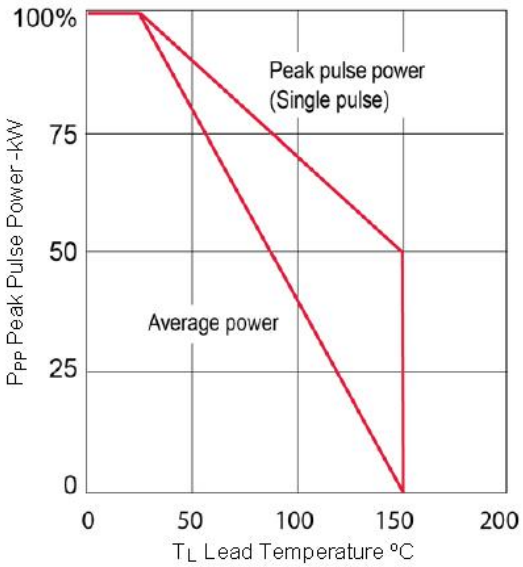

FIGURE 3
Derating Curve

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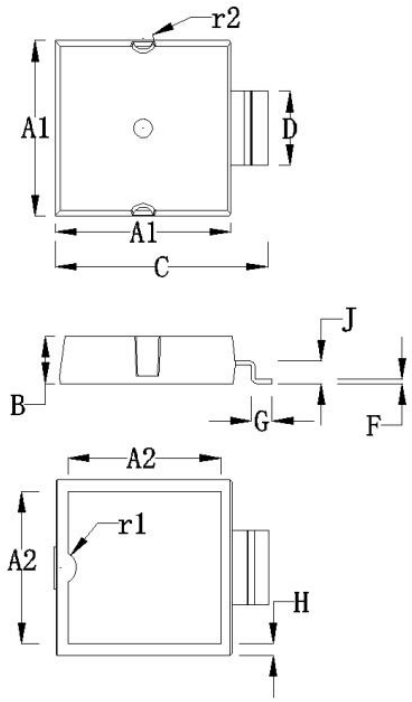
Mechanical Dimensions SPD4-1 (Inches/Millimeters)



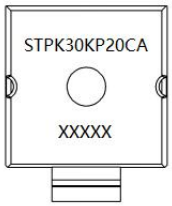
Ref.	Dimensions			
	Inches		Millimeters	
	min	max	min	max
A1	0.488	0.498	12.40	12.66
A2	0.414	0.442	10.52	11.22
B	0.128	0.144	3.24	3.66
C	0.587	0.610	14.90	15.50
D	0.208	0.214	5.28	5.43
F	0.009	0.014	0.23	0.35
G	0.054	0.066	1.37	1.67
J	0.057	0.069	1.45	1.75
H	0.032 TYP		0.83 TYP	
r1	0.045 TYP		1.14 TYP	
r2	0.027 TYP		0.70 TYP	

Ordering Information

Device	Package	Shipping
STPK30KP14A STPK30KP20CA	SPD4-1 (Pb-Free)	64pcs/bag
STPK30KP14ATR STPK30KP20CATR	SPD4-1 (Pb-Free)	500pcs/reel

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

Marking Diagram



Where XXXXX is YYWWL
Part number's example like this

Part number = STPK30KP20CA
YY = Year
WW = Week
L = Lot Number

Notes: Reliability Level will Marking.

Part Number Naming Rule

U STPK 30K P 14 A

Reliability Level:
N/A
U
UA
UX

Package Designation

P_{PP} Rating (W)

Plastic

Reverse Standoff Voltage

Polarity
A = Unidirectional
CA = Bidirectional

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SMC TVS Screening Options				
Screen or Test Description	**Screening Options**			
Prefix	**1)**	**U**	**UA**	**UX**
100% Wafer Probe	R	R	R	R
3-Sigma lot norm determination **2)**		R	R	R
Surge Test	1x	1x	1x	1x
100% DC Electrical Test Go-No-Go		R	R	R
Temperature Cycling		10 Cycles **3)**	10 Cycles	20 Cycles
Post TC Surge Test		1x **3)**	3x	10x
100% Thermal Impedance **4)**		R	R	R
100% DC Electrical Test			go-no-go	R
HTRB			24 hrs **5)**	96 hrs **6)**
100% DC Electrical Test	go-no-go	go-no-go	go-no-go	R
Delta Calculation				R
PDA Calculation				R
100% Visual Inspection	R	R	R	R
Certificate of Conformance	R	R	R	R
Group A Inspection				O
Group B Inspection				O
Group C Inspection				O

Notes:

R = to be performed. Electrical testing per datasheet limits

O = optional

1) Commercial flow

2) 3-Sima lot norm to remove atypical devices. For detailed requirements see below.

3) Test to be performed on TPK & STPK Series only. The condition is below:

High temp. side: 150 ˚C; Low temp. side: -55 ˚C; Duration time: HT 15min, LT 15 min

4) To be performed any time before completion of screening for unidirectional devices only.

5) 24 hours for unidirectional, 24 hours each side for bidirectional

6) 96 hours for unidirectional, 48 hours each side for bidirectional

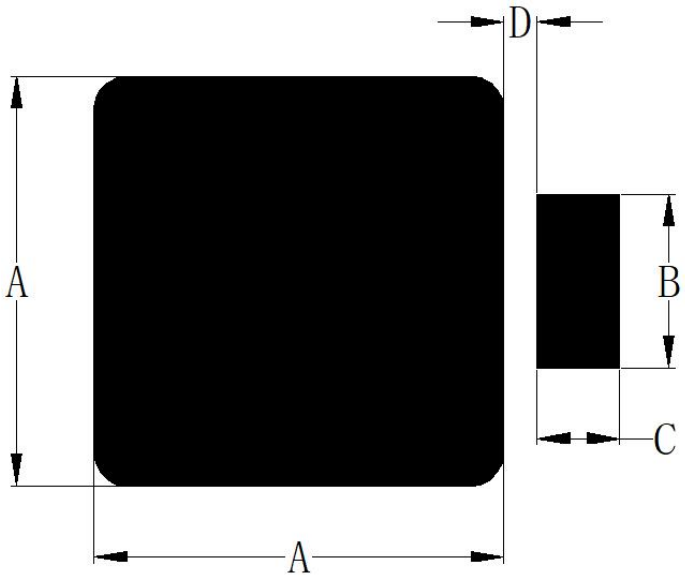
Test Procedure to remove Atypical Devices

This procedure will be used in the production testing and applied for each assembly lot when required by the screening option.

- read and record VBR and IR of 200 random samples of a particular assembly lot.
- calculate the average (μ) and standard deviation (σ) for each parameter.
- the testing limit will then be as follows:
  - VBR min = μ(VBR) - 3*σ(VBR)
  - VBR max = μ(VBR) + 3*σ(VBR)
  - IR max = μ(IR) + 3*σ(IR)

Once the testing limit is established for this assembly lot, the 100% production testing will be done based on the tighter limit for the parts of the same assembly lot.

PAD Layout Recommend Size



Ref.	Dimensions			
	Inches		Millimeters	
	min	max	min	max
A	0.451	0.461	11.45	11.71
B	0.225	0.235	5.72	5.97
C	0.094	0.104	2.38	2.64
D	0.042	0.050	1.06	1.26

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