SPHV-C Series
200W Discrete Bidirectional TVS Diode

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
P_{pk}	Peak Pulse Power (t_p=8/20µs)	200	W
T_{OP}	Operating Temperature	-40 to 125	°C
T_{STOR}	Storage Temperature	-55 to 150	°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

SPHV12-C Electrical Characteristics (TOP=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R≤1µA			12.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	13.3			V
Reverse Leakage Current	I_{LEAK}	V_R=12V			1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd			19.0	V
		I_{PP}=8A, t_p=8/20µs, Fwd			25.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.48		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			8.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC61000-4-2 (Contact Discharge)	±30			kV
		IEC61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz			30	pF

Note:
1. Parameter is guaranteed by design and/or device characterization.
2. Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

SPHV15-C Electrical Characteristics (TOP=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R≤1µA			15.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	16.7			V
Reverse Leakage Current	I_{LEAK}	V_R=15V			1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd			22.0	V
		I_{PP}=5A, t_p=8/20µs, Fwd			30.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.43		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			5.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC61000-4-2 (Contact Discharge)	±30			kV
		IEC61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz			24	pF

Note:
1. Parameter is guaranteed by design and/or device characterization.
2. Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

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SPHV-C Series
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SPHV24-C Electrical Characteristics (TOP=25°C)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R≤1µA			24.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	26.7			V
Reverse Leakage Current	I_{LEAK}	V_R=24V			1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd			36.0	V
		I_{PP}=3A, t_p=8/20µs, Fwd			50.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		0.65		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			3.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC61000-4-2 (Contact Discharge)	±24			kV
		IEC61000-4-2 (Air Discharge)	±30			kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz			17	pF

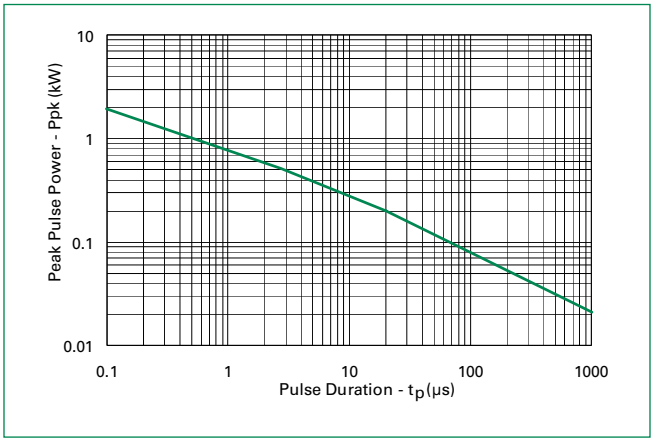
Note:
1. Parameter is guaranteed by design and/or device characterization.
2. Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

SPHV36-C Electrical Characteristics (TOP=25°C)

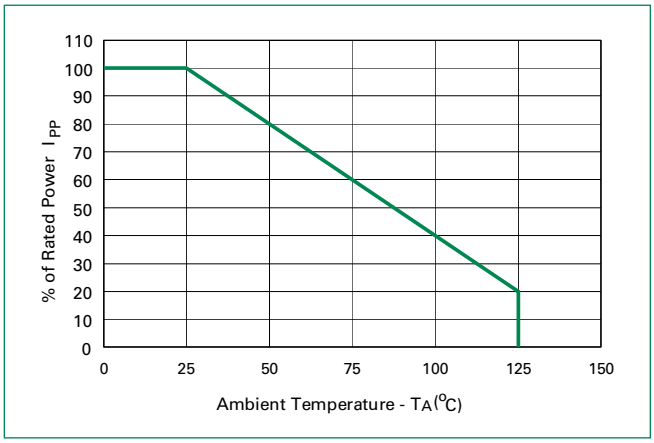
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Reverse Standoff Voltage	V_{RWM}	I_R≤1µA			36.0	V
Breakdown Voltage	V_{BR}	I_R=1mA	40.0			V
Reverse Leakage Current	I_{LEAK}	V_R=36V			1.0	µA
Clamp Voltage[1]	V_C	I_{PP}=1A, t_p=8/20µs, Fwd			52.0	V
		I_{PP}=2A, t_p=8/20µs, Fwd			65.0	V
Dynamic Resistance[2]	R_{DYN}	TLP, t_p=100ns, I/O to GND		1.33		Ω
Peak Pulse Current	I_{pp}	t_p=8/20µs			2.0	A
ESD Withstand Voltage[1]	V_{ESD}	IEC61000-4-2 (Contact Discharge)	±15			kV
		IEC61000-4-2 (Air Discharge)	±20			kV
Diode Capacitance[1]	$C_{I/O-I/O}$	Reverse Bias=0V, f=1MHz			13	pF

Note:
1. Parameter is guaranteed by design and/or device characterization.
2. Transmission Line Pulse (TLP) with 100ns width and 200ps rise time.

Non-Repetitive Peak Pulse Power vs. Pulse Time



Power Derating Curve



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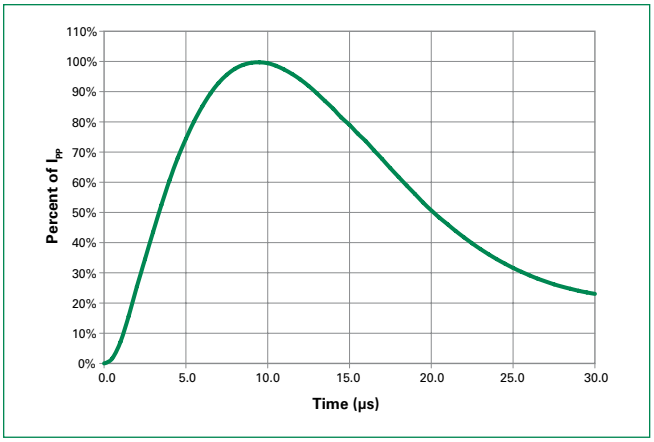
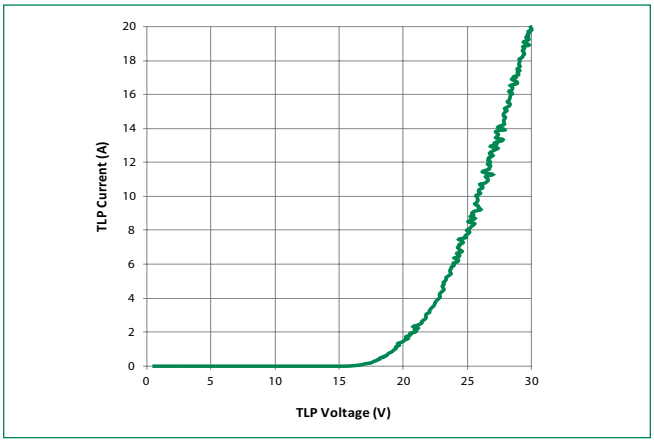
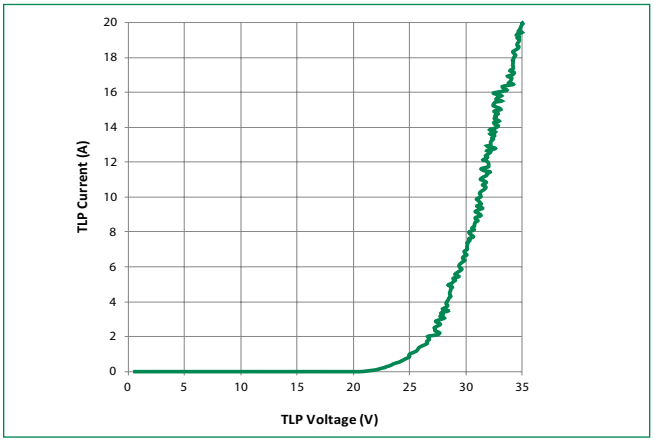
8/20µs Pulse Waveform



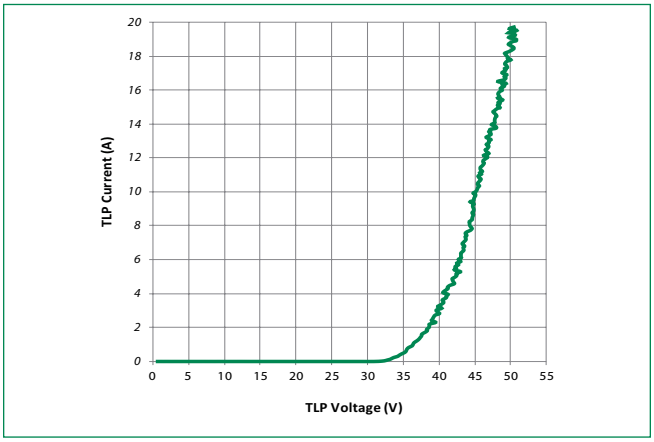
SPHV12-C Transmission Line Pulsing(TLP) Plot



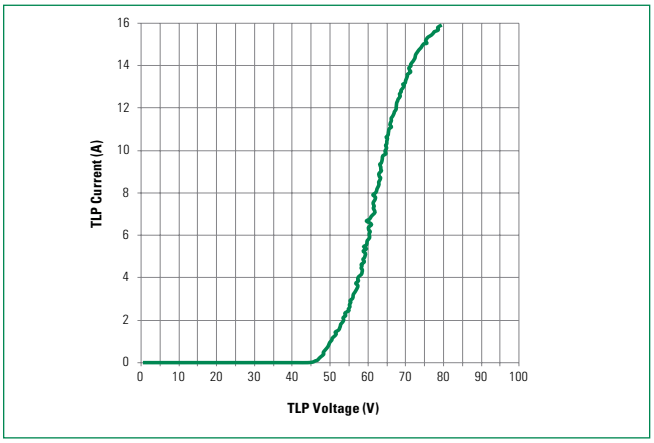
SPHV15-C Transmission Line Pulsing(TLP) Plot



SPHV24-C Transmission Line Pulsing(TLP) Plot



SPHV36-C Transmission Line Pulsing(TLP) Plot



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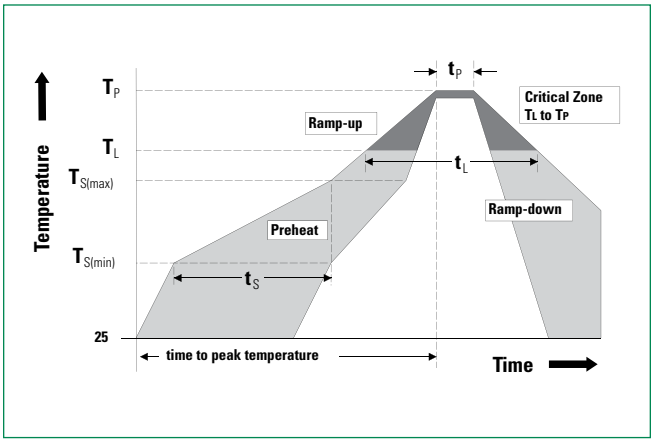
SPHV-C Series
200W Discrete Bidirectional TVS Diode

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



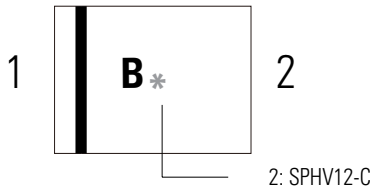
Product Characteristics

Lead Plating	Matte Tin, Pre-Plated Frame
Lead Material	Copper Alloy
Substitute Material	Silicon
Body Material	Molded Compound
Flammability	UL Recoginized compound meeting flammability rating V-0

Ordering Information

Part Number	Package	Marking	Min. Order Qty.
SPHV12-01ETG-C	SOD882	B2	10000
SPHV15-01ETG-C		B5	
SPHV24-01ETG-C		B4	
SPHV36-01ETG-C		B6	
SPHV24-01KTG-C	SOD882 with side exposed leadframe	B4	10000

Part Marking System



2: SPHV12-C
5: SPHV15-C
4: SPHV24-C
6: SPHV36-C

Part Numbering System

SPHV ** – 01 x T G – C

TVS Diode Arrays
(SPA® Diodes)

Voltage

Number of Channels

Package
E: SOD882
K: SOD882 with side exposed leadframe

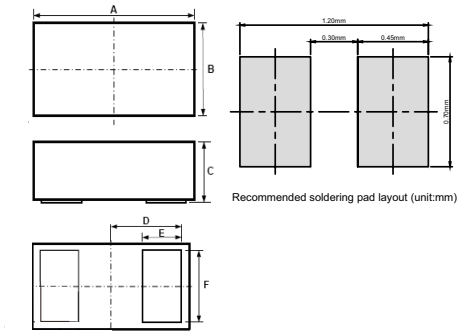
T= Tape & Reel

G= Green

Bidirectional

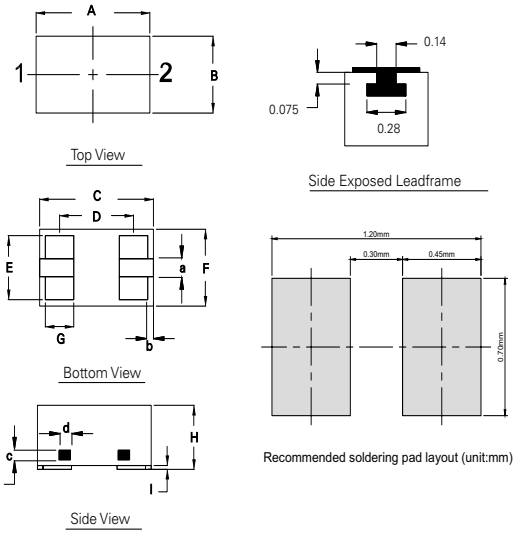
SPHV-C Series
200W Discrete Bidirectional TVS Diode

Package Dimensions — SOD882(SPHVxx-01ETG-C)



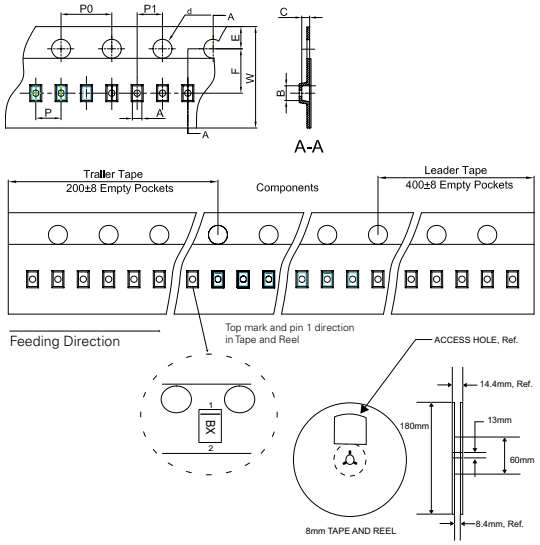
Symbol	Package	SOD882				
	JEDEC	MO-236				
		Millimeters			Inches	
		Min	Typ	Max	Min	Typ	Max
A		0.90	1.00	1.10	0.037	0.039	0.041
B		0.50	0.60	0.70	0.022	0.024	0.026
C		0.40	0.50	0.60	0.016	0.020	0.024
D			0.45			0.018	
E		0.20	0.25	0.35	0.008	0.010	0.012
F		0.45	0.50	0.55	0.018	0.020	0.022

Package Dimensions — SOD882 with side exposed leadframe(SPHV24-01KTG-C)



Symbol	Package	SOD882 with side exposed leadframe				
	JEDEC	MO-236				
		Millimeters			Inches	
		Min	Typ	Max	Min	Typ	Max
A		0.90	1.00	1.10	0.037	0.039	0.043
B		0.50	0.60	0.70	0.020	0.024	0.028
C		0.90	1.00	1.10	0.037	0.039	0.043
D		0.55	0.65	0.75	0.022	0.026	0.030
E		0.40	0.50	0.60	0.016	0.020	0.024
F		0.50	0.60	0.70	0.020	0.024	0.028
G		0.20	0.25	0.30	0.008	0.010	0.012
H		0.40	0.50	0.60	0.016	0.020	0.024
I			0.05 max			0.002 max	
a		-	0.14	-	-	0.006	-
b		-	0.05	-	-	0.002	-
c		-	0.075	-	-	0.003	-
d		-	0.10	-	-	0.004	-

Embossed Carrier Tape & Reel Specification



Symbol	Millimeters
A	0.70+/-0.045
B	1.10+/-0.045
C	0.65+/-0.045
d	1.55+/-0.10
E	1.75+/-0.05
F	3.50+/-0.05
P	2.00+/-0.10
P0	4.00+/-0.10
P1	2.00+/-0.10
W	8.00 + 0.30 -0.10

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