HSMS-2700

High power clipping/clamping diode

Description

Lead (PB) Free
RoHS 6 fully compliant

Lifecycle status: Active

Features

Low frequency, ultra low series resistance (Rs) Schottky diode, with low capacitance, and fast switching times. The HSMS-270X family of products are the ideal choice for analog and digital designs requiring circuit protection or waveform cleanup with high switching speed and high current handling capability. Rs=0.65 Ohms. Ct=6.7 pF. Vbr=15V. Vf=550mV @ 100mA

HSMS-2700, 2702, 270B, 270C

High Performance Schottky Diode
for Transient Suppression

Data Sheet

Description

The HSMS-2700 series of Schottky diodes, commonly referred to as clipping/clamping diodes, are optimal for circuit and waveshape preservation applications with high speed switching. Ultra-low series resistance, R_S, makes them ideal for protecting sensitive circuit elements against higher current transients carried on data lines. With picosecond switching, the HSMS-270x can respond to noise spikes with rise times as fast as 1 ns. Low capacitance minimizes waveshape loss that causes signal degradation.

Features

- Ultra-low Series Resistance for Higher Current Handling
- Picosecond Switching
- Low Capacitance
- Lead-free Option Available

Applications

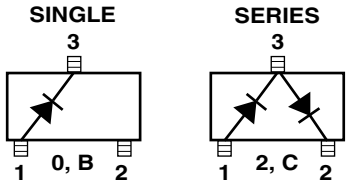
RF and computer designs that require circuit protection, high-speed switching, and voltage clamping.

HSMS-270x DC Electrical Specifications, T_A = +25°C[1]

Part Number HSMS-	Package Marking Code[2]	Lead Code	Configuration	Package	Maximum Forward Voltage V_F (mV)	Minimum Breakdown Voltage V_{BR} (V)	Typical Capacitance C_T (pF)	Typical Series Resistance R_S (Ω)	Maximum Eff. Carrier Lifetime τ (ps)
-2700	J0	0	Single	SOT-23	550[3]	15[4]	6.7[5]	0.65	100[6]
-270B		B		SOT-323 (3-lead SC-70)					
-2702		2		SOT-23					
-270C	J2	C	Series	SOT-323 (3-lead SC-70)					

Notes:
1. T_A = +25°C, where T_A is defined to be the temperature at the package pins where contact is made to the circuit board.
2. Package marking code is laser marked.
3. I_F = 100 mA; 100% tested
4. I_R = 100 µA; 100% tested
5. V_F = 0; f =1 MHz
6. Measured with Karkauer method at 20 mA; guaranteed by design.

Package Lead Code Identification (Top View)



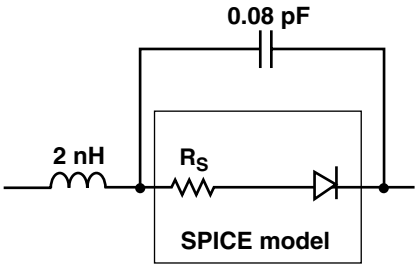
Absolute Maximum Ratings, T_A= 25°C

			Absolute Maximum [1]	
Symbol	**Parameter**	**Unit**	**HSMS-2700/-2702**	**HSMS-270B/-270C**
I_F	DC Forward Current	mA	350	750
$I_{F\text{-}peak}$	Peak Surge Current (1µs pulse)	A	1.0	1.0
P_T	Total Power Dissipation	mW	250	825
P_{INV}	Peak Inverse Voltage	V	15	15
T_J	Junction Temperature	°C	150	150
T_{STG}	Storage Temperature	°C	-65 to 150	-65 to 150
θ_{JC}	Thermal Resistance, junction to lead	°C/W	500	150

Note:

1. Operation in excess of any one of these conditions may result in permanent damage to the device.

Linear and Non-linear SPICE Model

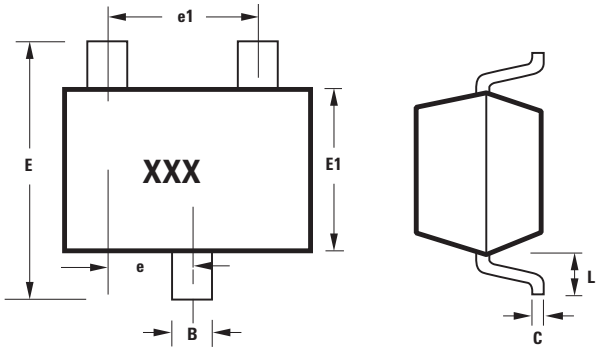


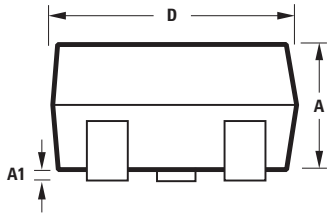
SPICE Parameters

Parameter	Unit	Value
BV	V	25
CJO	pF	6.7
EG	eV	0.55
IBV	A	10E-4
IS	A	1.4E-7
N		1.04
RS	Ω	0.65
PB	V	0.6
PT		2
M		0.5

Package Dimensions

Outline SOT-323 (SC-70 3 Lead)



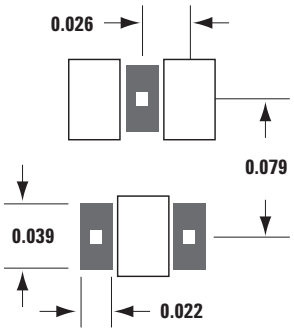


Notes:
XXX-package marking
Drawings are not to scale

SYMBOL	DIMENSIONS (mm) MIN.	MAX.
A	0.80	1.00
A1	0.00	0.10
B	0.15	0.40
C	0.10	0.20
D	1.80	2.25
E1	1.10	1.40
e	0.65 typical	
e1	1.30 typical	
E	1.80	2.40
L	0.425 typical	

Recommended PCB Pad Layout

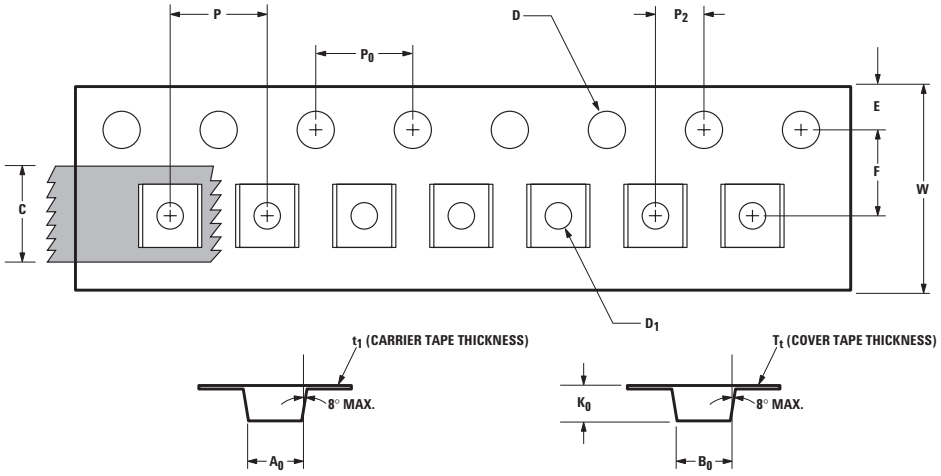
For Avago's SC70 3L/SOT-323 Products



Dimensions in inches

Tape Dimensions and Product Orientation

For Outline SOT-323 (SC-70 3 Lead)



DESCRIPTION		SYMBOL	SIZE (mm)	SIZE (INCHES)
CAVITY	LENGTH	A_0	2.40 ± 0.10	0.094 ± 0.004
	WIDTH	B_0	2.40 ± 0.10	0.094 ± 0.004
	DEPTH	K_0	1.20 ± 0.10	0.047 ± 0.004
	PITCH	P	4.00 ± 0.10	0.157 ± 0.004
	BOTTOM HOLE DIAMETER	D_1	1.00 + 0.25	0.039 + 0.010
PERFORATION	DIAMETER	D	1.55 ± 0.05	0.061 ± 0.002
	PITCH	P_0	4.00 ± 0.10	0.157 ± 0.004
	POSITION	E	1.75 ± 0.10	0.069 ± 0.004
CARRIER TAPE	WIDTH	W	8.00 ± 0.30	0.315 ± 0.012
	THICKNESS	t_1	0.254 ± 0.02	0.0100 ± 0.0008
COVER TAPE	WIDTH	C	5.4 ± 0.10	0.205 ± 0.004
	TAPE THICKNESS	T_t	0.062 ± 0.001	0.0025 ± 0.00004
DISTANCE	CAVITY TO PERFORATION (WIDTH DIRECTION)	F	3.50 ± 0.05	0.138 ± 0.002
	CAVITY TO PERFORATION (LENGTH DIRECTION)	P_2	2.00 ± 0.05	0.079 ± 0.002

for three values of ambient temperature. The SOT-323 products, with their copper leadframes, can safely handle almost twice the current of the larger SOT-23 diodes. Note that the term "ambient temperature" refers to the temperature of the diode's leads, not the air around the circuit board. It can be seen that the HSMS-270B and HSMS-270C products in the SOT-323 package will safely withstand a steady-state forward current of 550 mA when the diode's terminals are maintained at 75°C.

For pulsed currents and transient current spikes of less than one microsecond in duration, the junction does not have time to reach thermal steady state. Moreover, the diode junction may be taken to temperatures higher than 150°C for short time-periods without impacting device MTTF. Because of these factors, higher currents can be safely handled. The HSMS-270x family has the highest current handling capability of any Avago diode.

Part Number Ordering Information

Part Number	No. of Devices	Container
HSMS-2700-BLKG	100	Antistatic Bag
HSMS-2700-TR1G	3,000	7" Reel
HSMS-2700-TR2G	10,000	13" Reel
HSMS-2702-BLKG	100	Antistatic Bag
HSMS-2702-TR1G	3,000	7" Reel
HSMS-2702-TR2G	10,000	13" Reel
HSMS-270B-BLKG	100	Antistatic Bag
HSMS-270B-TR1G	3,000	7" Reel
HSMS-270B-TR2G	10,000	13" Reel
HSMS-270C-BLKG	100	Antistatic Bag
HSMS-270C-TR1G	3,000	7" Reel
HSMS-270C-TR2G	10,000	13" Reel