

## HSMS-2804

### Low reverse leakage Schottky diode

#### Description

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Lifecycle status: **Active**



#### Features

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General purpose Schottky diode in a broad range of package configurations. Optimised for High voltage clamp or analog DC switch applications. For low breakdown applications, like detectors or mixers, please refer to HSMS-282X. For low flicker (1/F) noise applications refer to HSMS-281X. VBR=70 V, CT=2.0pF, RD=35 Ohms, Vf @ 1 mA=410 mV.

# HSMS-280x

## Surface Mount RF Schottky Barrier Diodes



### Data Sheet



#### Description/Applications

These Schottky diodes are specifically designed for both analog and digital applications. This series offers a wide range of specifications and package configurations to give the designer wide flexibility. The HSMS-280x series of diodes is optimized for high voltage applications.

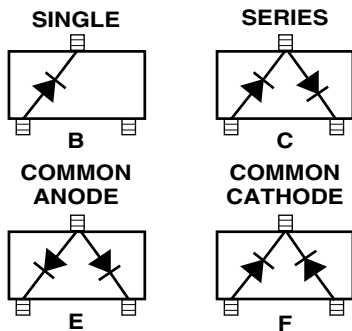
Note that Avago's manufacturing techniques assure that dice found in pairs and quads are taken from adjacent sites on the wafer, assuring the highest degree of match.

#### Features

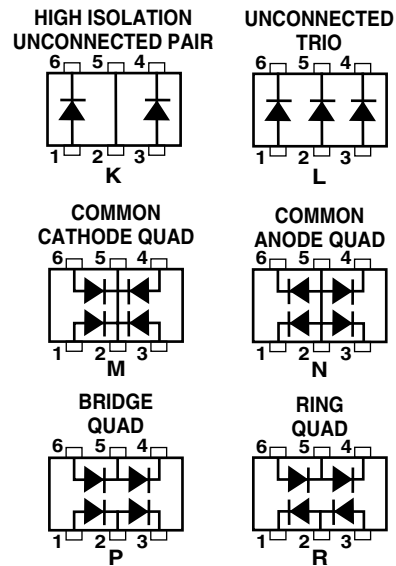
- Surface Mount Packages
- High Breakdown Voltage
- Low FIT (Failure in Time) Rate\*
- Six-sigma Quality Level
- Single, Dual and Quad Versions
- Tape and Reel Options Available
- Lead-free

\* For more information see the Surface Mount Schottky Reliability Data Sheet.

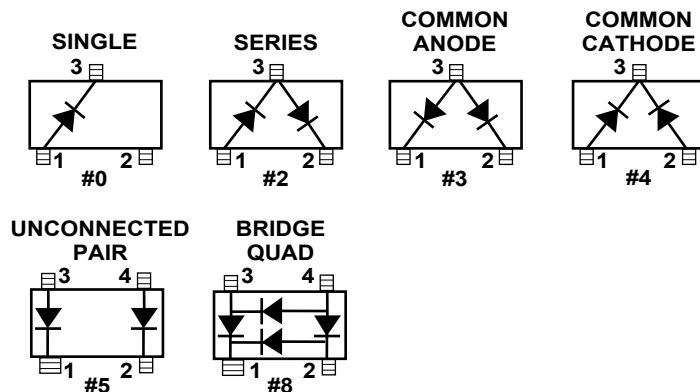
#### Package Lead Code Identification, SOT-323 (Top View)



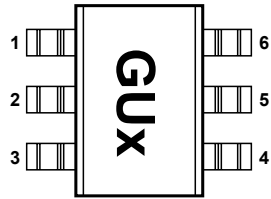
#### Package Lead Code Identification, SOT-363 (Top View)



#### Package Lead Code Identification, SOT-23/SOT-143 (Top View)



## Pin Connections and Package Marking, SOT-363



### Notes:

1. Package marking provides orientation and identification.
2. See "Electrical Specifications" for appropriate package marking.

### ESD WARNING:

Handling Precautions Should Be Taken To Avoid Static Discharge.

## Absolute Maximum Ratings<sup>[1]</sup> $T_C = 25^\circ\text{C}$

Symbol	Parameter	Unit	SOT-23/SOT-143	SOT-323/SOT-363
$I_f$	Forward Current (1 $\mu\text{s}$ Pulse)	Amp	1	1
$P_{IV}$	Peak Inverse Voltage	V	Same as $V_{BR}$	Same as $V_{BR}$
$T_j$	Junction Temperature	$^\circ\text{C}$	150	150
$T_{stg}$	Storage Temperature	$^\circ\text{C}$	-65 to 150	-65 to 150
$\theta_{jc}$	Thermal Resistance <sup>[2]</sup>	$^\circ\text{C}/\text{W}$	500	150

### Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to the device.
2.  $T_C = +25^\circ\text{C}$ , where  $T_C$  is defined to be the temperature at the package pins where contact is made to the circuit board.

## Electrical Specifications $T_A = 25^\circ\text{C}$ , Single Diode<sup>[3]</sup>

Part Number HSMS <sup>[4]</sup>	Package Marking Code	Lead Code	Configuration	Minimum Breakdown Voltage $V_{BR}$ (V)	Maximum Forward Voltage $V_F$ (mV)	Maximum Forward Voltage $V_F$ (V) @ $I_F$ (mA)	Maximum Reverse Leakage $I_R$ (nA) @ $V_R$ (V)	Maximum Capacitance $C_T$ (pF)	Typical Dynamic Resistance $R_D$ ( $\Omega$ ) <sup>[5]</sup>
2800	A0	0	Single						
2802	A2	2	Series						
2803	A3	3	Common Anode						
2804	A4	4	Common Cathode						
2805	A5	5	Unconnected Pair						
2808	A8	8	Bridge Quad <sup>[4]</sup>						
280B	A0	B	Single						
280C	A2	C	Series						
280E	A3	E	Common Anode	70	410	1.0 @ 15	200 @ 50	2.0	35
280F	A4	F	Common Cathode						
280K	AK	K	High Isolation Unconnected Pair						
280L	AL	L	Unconnected Trio						
280M	H	M	Common Cathode Quad						
280N	N	N	Common Anode Quad						
280P	AP	P	Bridge Quad						
280R	O	R	Ring Quad						
Test Conditions				$I_R = 10 \text{ mA}$	$I_F = 1 \text{ mA}$			$V_F = 0 \text{ V}$ $f = 1 \text{ MHz}$	$I_F = 5 \text{ mA}$

### Notes:

1.  $DV_F$  for diodes in pairs and quads in 15 mV maximum at 1 mA.
2.  $DC_{TO}$  for diodes in pairs and quads is 0.2 pF maximum.
3. Effective Carrier Lifetime ( $t$ ) for all these diodes is 100 ps maximum measured with Krakauer method at 5 mA.
4. See section titled "Quad Capacitance."
5.  $R_D = R_S + 5.2 \Omega$  at  $25^\circ\text{C}$  and  $I_F = 5 \text{ mA}$ .

## Applications Information Introduction — Product Selection

Avago's family of Schottky products provides unique solutions to many design problems.

The first step in choosing the right product is to select the diode type. All of the products in the HSMS-280x family use the same diode chip, and the same is true of the HSMS-281x and HSMS-282x families. Each family has a different set of characteristics which can be compared most easily by consulting the SPICE parameters in Table 1.

A review of these data shows that the HSMS-280x family has the highest breakdown voltage, but at the expense of a high value of series resistance ( $R_s$ ). In applications which do not require high voltage the HSMS-282x family, with a lower value of series resistance, will offer higher current carrying capacity and better performance. The HSMS-281x family is a hybrid Schottky (as is the HSMS-280x), offering lower 1/f or flicker noise than the HSMS-282x family.

In general, the HSMS-282x family should be the designer's first choice, with the -280x family reserved for high voltage applications and the HSMS-281x family for low flicker noise applications.

## Assembly Instructions

### SOT-323 PCB Footprint

A recommended PCB pad layout for the miniature SOT-323 (SC-70) package is shown in Figure 6 (dimensions are in inches). This layout provides ample allowance for package placement by automated assembly equipment without adding parasitics that could impair the performance.

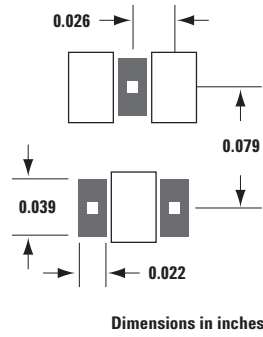


Figure 6. Recommended PCB Pad Layout for Avago's SC70 3L/SOT-323 Products.

## Assembly Instructions

### SOT-363 PCB Footprint

A recommended PCB pad layout for the miniature SOT-363 (SC-70, 6 lead) package is shown in Figure 7 (dimensions are in inches). This layout provides ample allowance for package placement by automated assembly equipment without adding parasitics that could impair the performance.

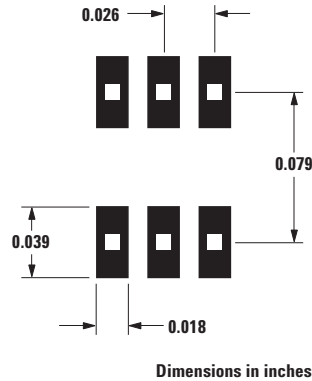


Figure 7. Recommended PCB Pad Layout for Avago's SC70 6L/SOT-363 Products.

Table 1. Typical SPICE Parameters

Parameter	Units	HSMS-280x	HSMS-281x	HSMS-282x
$B_V$	V	75	25	15
$C_{J0}$	pF	1.6	1.1	0.7
$E_G$	eV	0.69	0.69	0.69
$I_{BV}$	A	1 E-5	1 E-5	1 E-4
$I_S$	A	3 E-8	4.8 E-9	2.2 E-8
N		1.08	1.08	1.08
$R_S$	$\Omega$	30	10	6
$P_B (V_J)$	V	0.65	0.65	0.65
$P_T (XTI)$		2	2	2
M		0.5	0.5	0.5

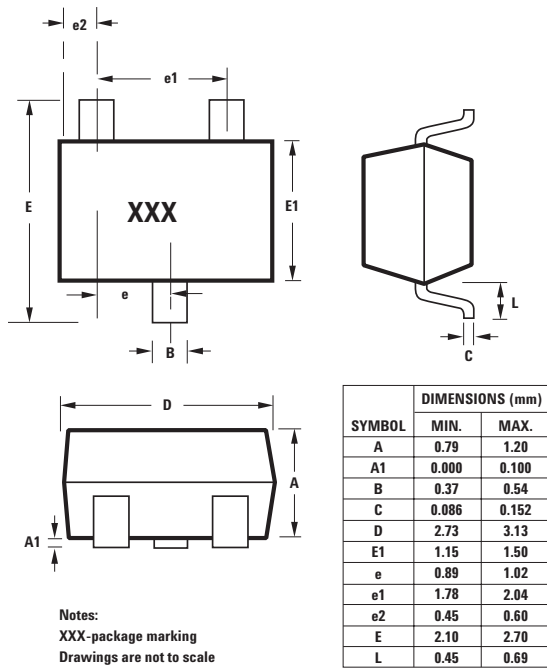
## Part Number Ordering Information

Part Number	No. of Devices	Container
HSMS-280x-TR2G	10000	13" Reel
HSMS-280x-TR1G	3000	7" Reel
HSMS-280x-BLKG	100	antistatic bag

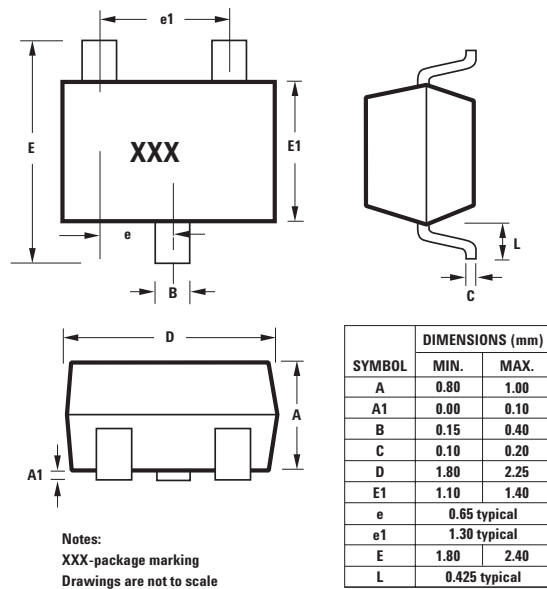
x = 0, 2, 3, 4, 5, 8, B, C, E, F, K, L, M, N, P, R

## Package Dimensions

### Outline 23 (SOT-23)

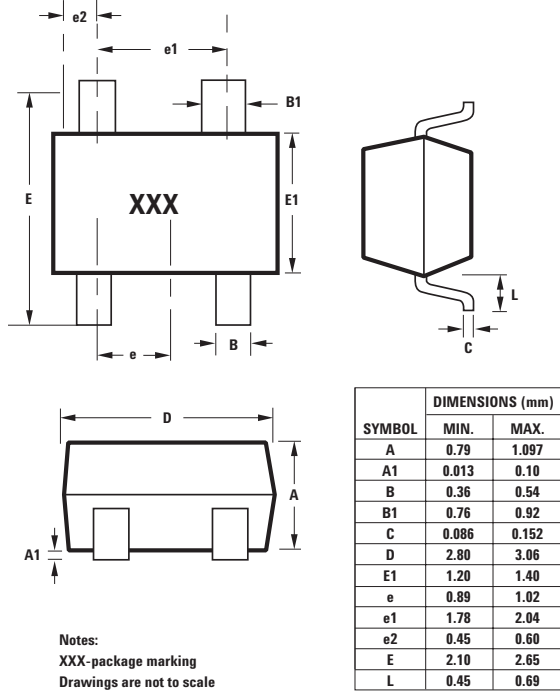


### Outline SOT-323 (SC-70 3 Lead)

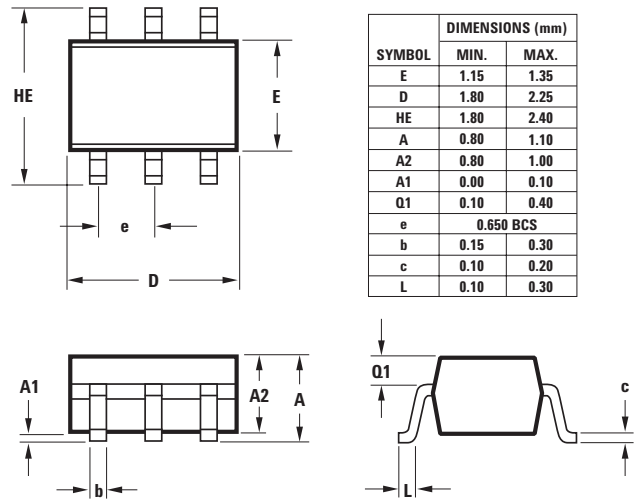


## Package Dimensions (Continued)

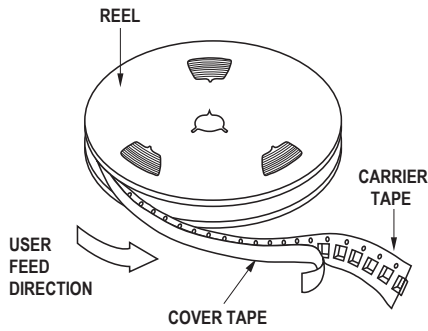
### Outline 143 (SOT-143)



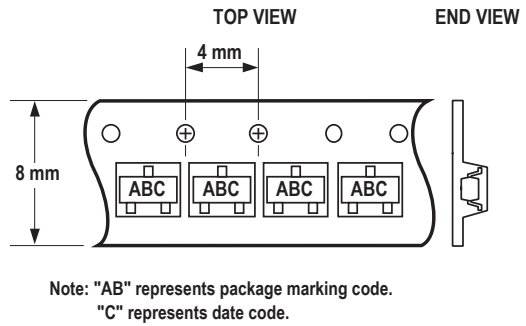
### Outline SOT-363 (SC-70 6 Lead)



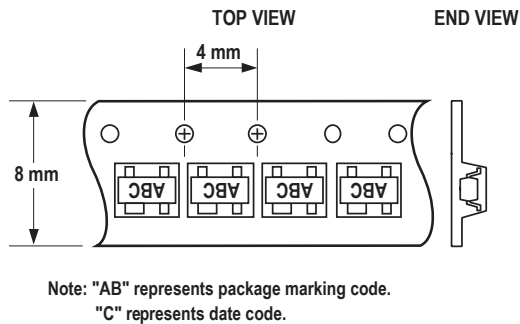
### Device Orientation



### For Outlines SOT-23, -323



### For Outline SOT-143



### For Outline SOT-363

