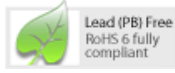


## HSMS-2812

### low 1/f noise general purpose Schottky diode

#### Description

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Lifecycle status: **Active**



#### Features

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The HSMS-281x family are General purpose, low flicker (1/f) noise schottky diodes. VBR=20 V, CT=1.2pF, RD=15 Ohms, Vf @ 1 mA=410 mV

**Data Sheet**

**Description/Applications**

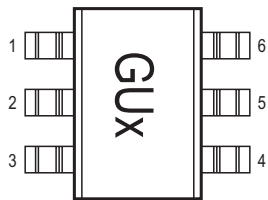
These Schottky diodes are specifically designed for both analog and digital applications. This series offers a wide range of specifications and package configurations to give the designer wide flexibility. The HSMS-281x series of diodes features very low flicker (1/f) noise.

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
- Low Flicker Noise
- Low FIT (Failure in Time) Rate\*
- Six-sigma Quality Level
- Single, Dual and Quad Versions
- Tape and Reel Options Available
- Lead-free Option Available
- For more information see the Surface Mount Schottky Reliability Data Sheet.

**Pin Connections and Package Marking**

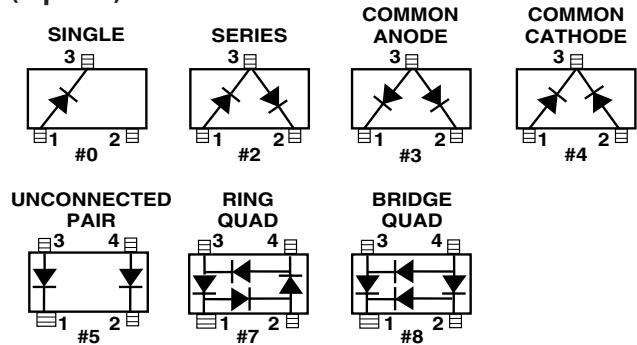


**Notes:**

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

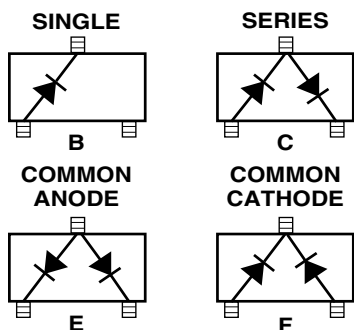
**Package Lead Code Identification, SOT-23/SOT-143**

**(Top View)**



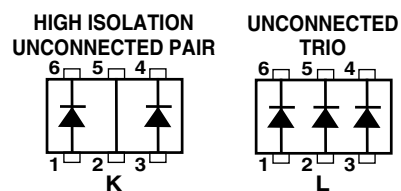
**Package Lead Code Identification, SOT-323**

**(Top View)**



**Package Lead Code Identification, SOT-363**

**(Top View)**



## 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.
- ESD WARNING: Handling Precautions Should Be Taken To Avoid Static Discharge.

## Electrical Specifications $T_C = 25^\circ\text{C}$ , 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		Maximum Reverse Leakage		Maximum Capacitance $C_T$ (pF)	Typical Dynamic Resistance $R_D$ ( $\Omega$ ) <sup>[5]</sup>
						$V_F$ (V) @ $I_F$ (mA)	$I_F$ (mA)	$I_R$ (nA) @ $V_R$ (V)	$V_R$ (V)		
2810	B0	0	Single	20	410	1.0	35	200	15	1.2	15
2812	B2	2	Series								
2813	B3	3	Common Anode								
2814	B4	4	Common Cathode								
2815	B5	5	Unconnected Pair								
2817	B7	7	Ring Quad <sup>[4]</sup>								
2818	B8	8	Bridge Quad <sup>[4]</sup>								
281B	B0	B	Single								
281C	B2	C	Series								
281E	B3	E	Common Anode								
281F	B4	F	Common Cathode								
281K	BK	K	High Isolation Unconnected Pair								
281L	BL	L	Unconnected Trio								
Test Conditions											
								$f = 1 \text{ MHz}$			

Notes:

1.  $\Delta V_F$  for diodes in pairs and quads in 15 mV maximum at 1 mA.
2.  $\Delta C_{TO}$  for diodes in pairs and quads is 0.2 pF maximum.
3. Effective Carrier Lifetime ( $\tau$ ) 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-282x family use the same diode chip, and the same is true of the HSMS-281x and HSMS-280x 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.

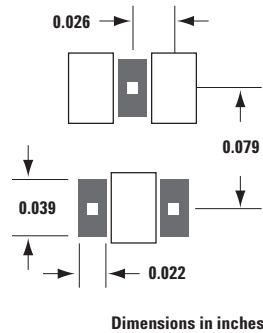
**Table 1. Typical SPICE Parameters.**

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	6.0
$P_B (V_J)$	V	0.65	0.65	0.65
$P_T (XTI)$		2	2	2
M		0.5	0.5	0.5

## 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.

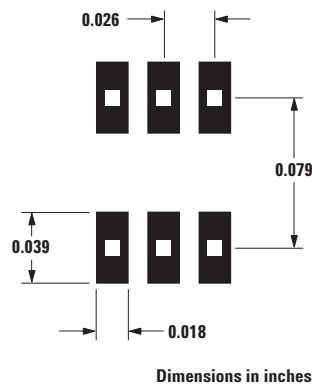


**Figure 6. Recommended PCB Pad Layout for Avago's SC70 3L/SOT-323 Products.**

## 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.**

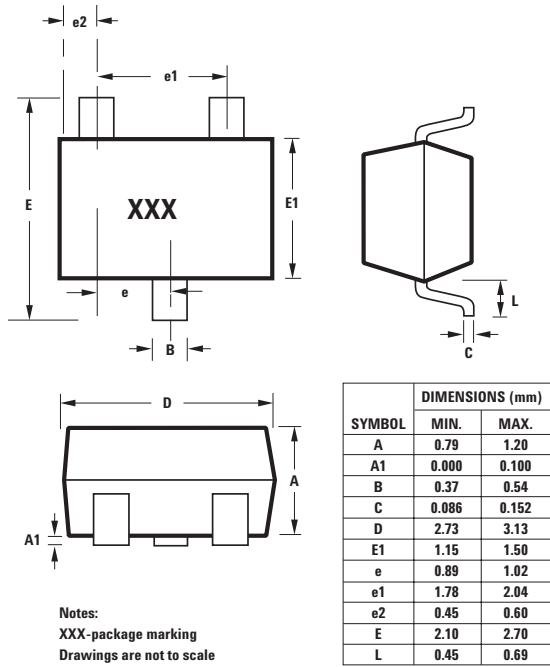
## Part Number Ordering Information

Part Number	No. of Devices	Container
HSMS-281x-TR2G	10000	13" Reel
HSMS-281x-TR1G	3000	7" Reel
HSMS-281x-BLKG	100	antistatic bag

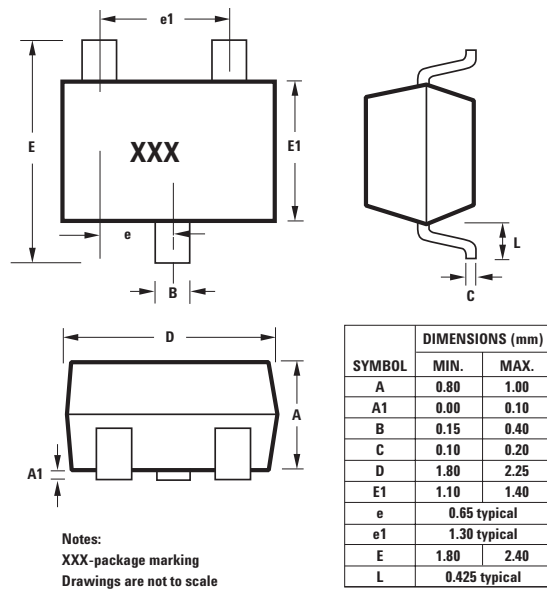
x = 0, 2, 3, 4, 5, 7, 8, B, C, E, F, K, L

## Package Dimensions

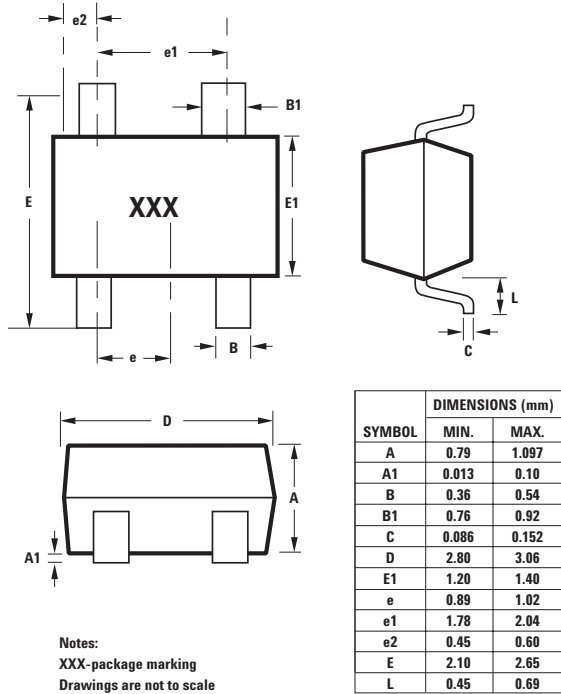
### Outline 23 (SOT-23)



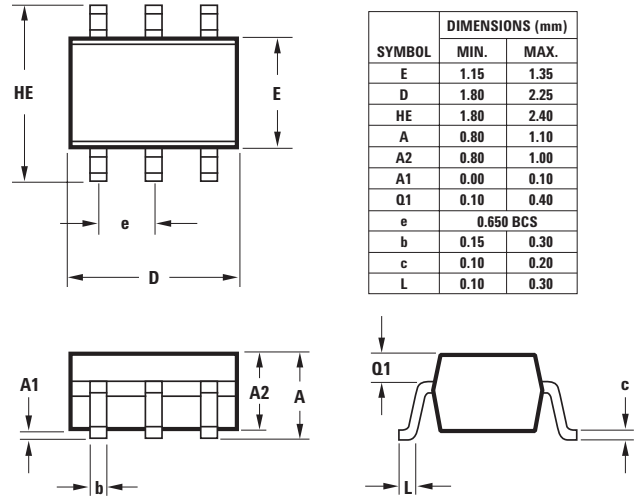
### Outline SOT-323 (SC-70 3 Lead)



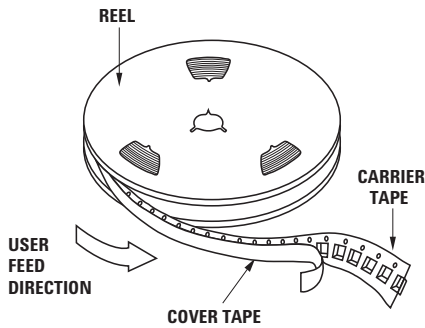
### Outline 143 (SOT-143)



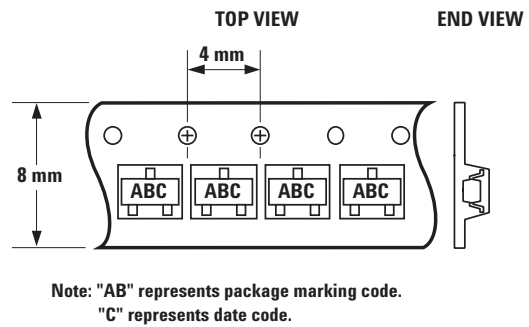
### Outline SOT-363 (SC-70 6 Lead)



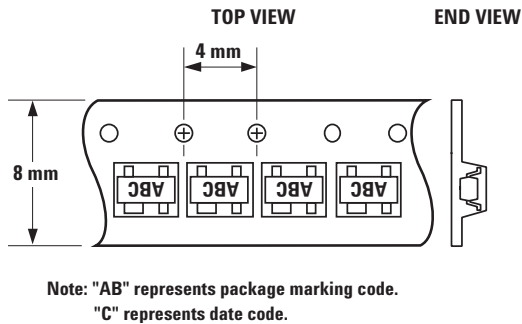
### Device Orientation



### For Outlines SOT-23, -323



### For Outline SOT-143



### For Outline SOT-363

