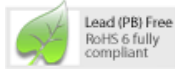


HSMS-2813

low 1/f noise general purpose Schottky diode

Description



Lifecycle status: **Active**



Features

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

HSMS-281x

Surface Mount RF Schottky Barrier Diodes



Data Sheet

Description/Applications

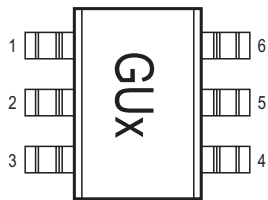
These Schottky diodes are specifically designed for both analog and digital applications. This series offers a wide range of specifications and package configurations to give the designer wide flexibility. The HSMS-281x series of diodes features very low flicker (1/f) noise.

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

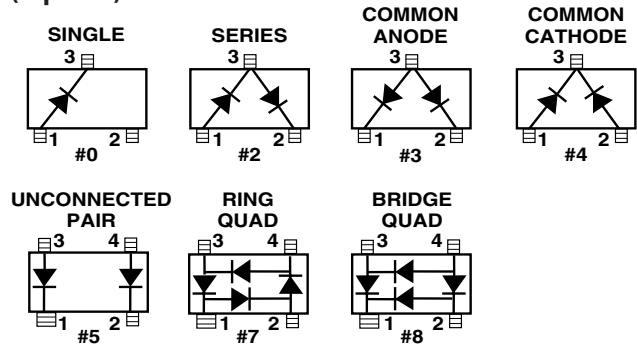


Notes:

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

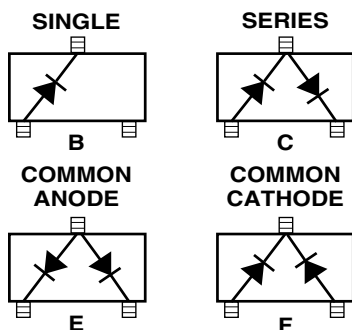
Package Lead Code Identification, SOT-23/SOT-143

(Top View)



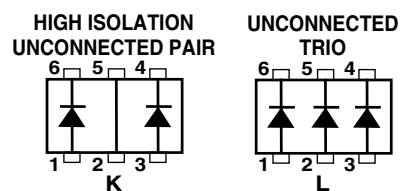
Package Lead Code Identification, SOT-323

(Top View)



Package Lead Code Identification, SOT-363

(Top View)



Absolute Maximum Ratings^[1] $T_C = 25^\circ\text{C}$

| Symbol | Parameter | Unit | SOT-23/SOT-143 | SOT-323/SOT-363 |
|---------------|---|---------------------------|------------------|------------------|
| I_f | Forward Current (1 μs 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 |
| θ_{jc} | Thermal Resistance ^[2] | $^\circ\text{C}/\text{W}$ | 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^[3]

| Part Number HSMS ^[4] | Package Marking Code | Lead Code | Configuration | Minimum Breakdown Voltage V_{BR} (V) | Maximum Forward Voltage V_F (mV) | Maximum Forward Voltage V_F (V) @ | | Maximum Reverse Leakage I_R (nA) @ | | Maximum Capacitance C_T (pF) | Typical Dynamic Resistance R_D (Ω) ^[5] |
|------------------------------------|----------------------|-----------|---------------------------------|---|---------------------------------------|--|-----------|---|------------|-----------------------------------|---|
| | | | | | | I_F (mA) | V_R (V) | V_R (V) | I_F (mA) | | |
| 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 ^[4] | | | | | | | | |
| 2818 | B8 | 8 | Bridge Quad ^[4] | | | | | | | | |
| 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. ΔV_F for diodes in pairs and quads in 15 mV maximum at 1 mA.
2. ΔC_{TO} for diodes in pairs and quads is 0.2 pF maximum.
3. Effective Carrier Lifetime (τ) 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°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 | Ω | 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.

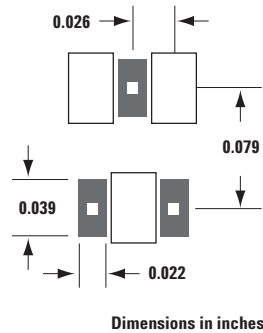


Figure 6. Recommended PCB Pad Layout for Avago's SC70 3L/SOT-323 Products.

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.

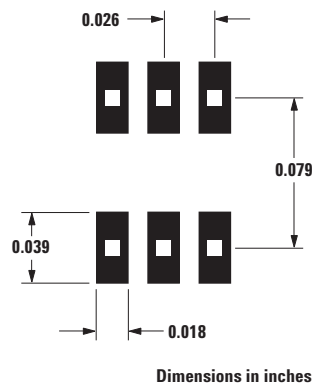


Figure 7. Recommended PCB Pad Layout for Avago's SC70 6L/SOT-363 Products.

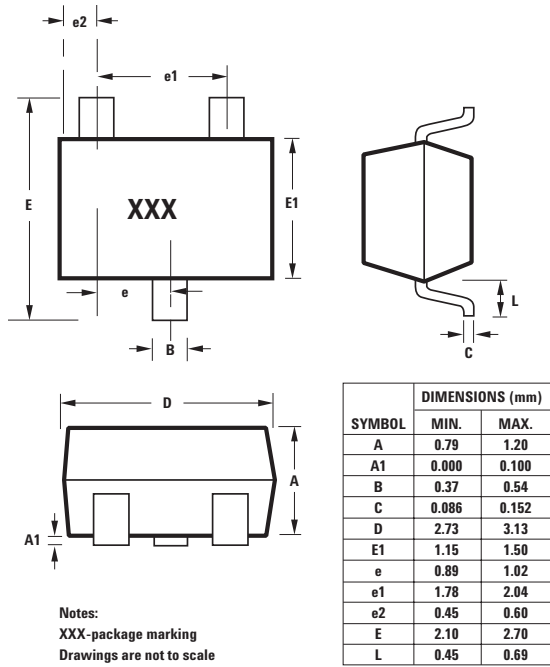
Part Number Ordering Information

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

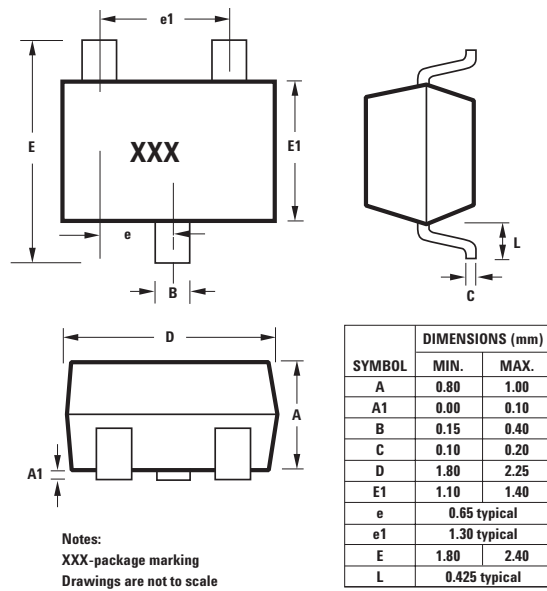
x = 0, 2, 3, 4, 5, 7, 8, B, C, E, F, K, L

Package Dimensions

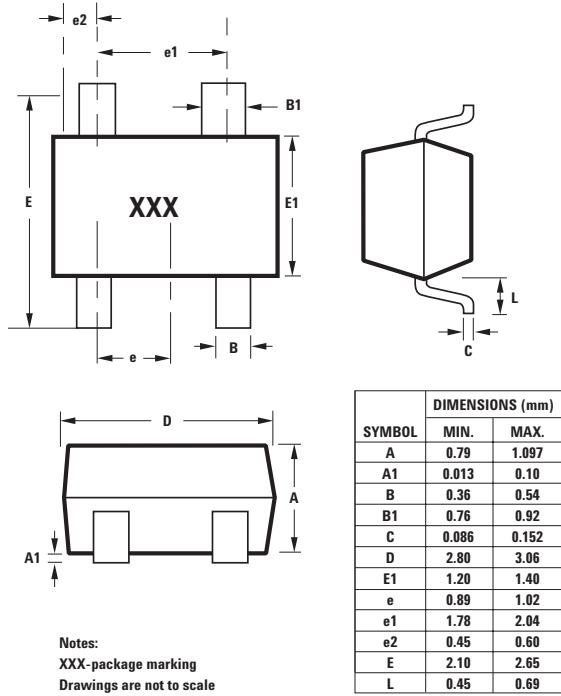
Outline 23 (SOT-23)



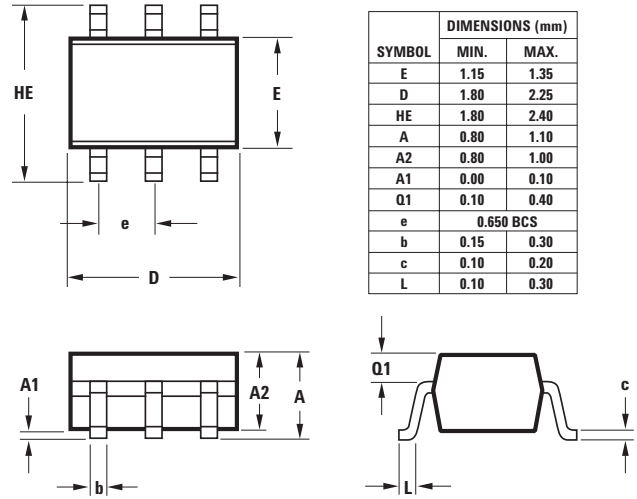
Outline SOT-323 (SC-70 3 Lead)



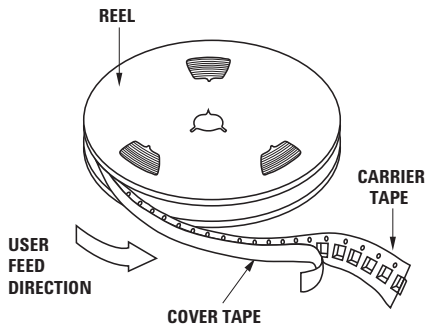
Outline 143 (SOT-143)



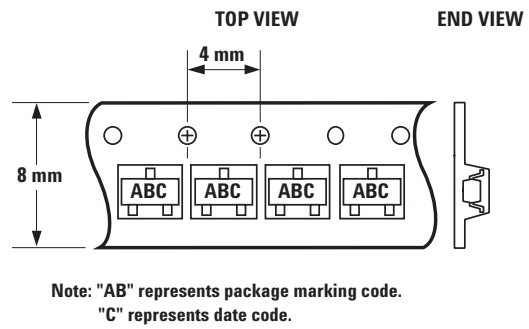
Outline SOT-363 (SC-70 6 Lead)



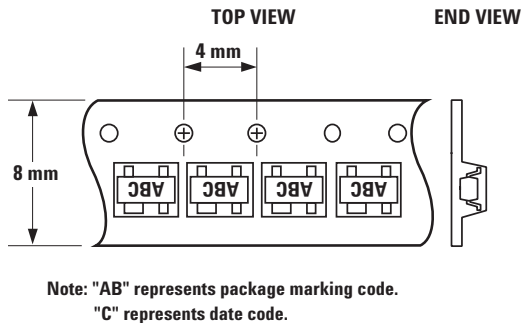
Device Orientation



For Outlines SOT-23, -323



For Outline SOT-143



For Outline SOT-363

