

## HSMS-2805

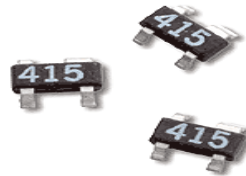
### Low reverse leakage Schottky diode

#### 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.

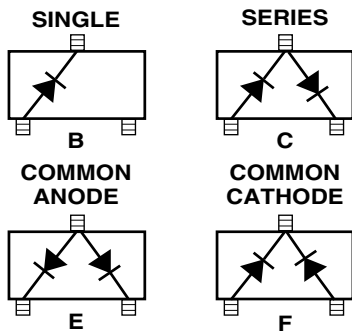
Note that Avago's manufacturing techniques assure that dice found in pairs and quads are taken from adjacent sites on the wafer, assuring the highest degree of match.

#### Features

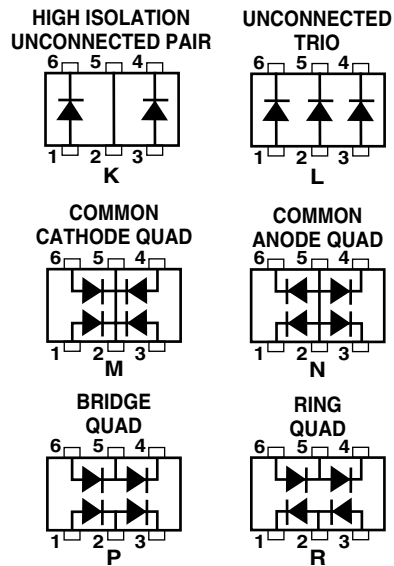
- Surface Mount Packages
- High Breakdown Voltage
- Low FIT (Failure in Time) Rate\*
- Six-sigma Quality Level
- Single, Dual and Quad Versions
- Tape and Reel Options Available
- Lead-free

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

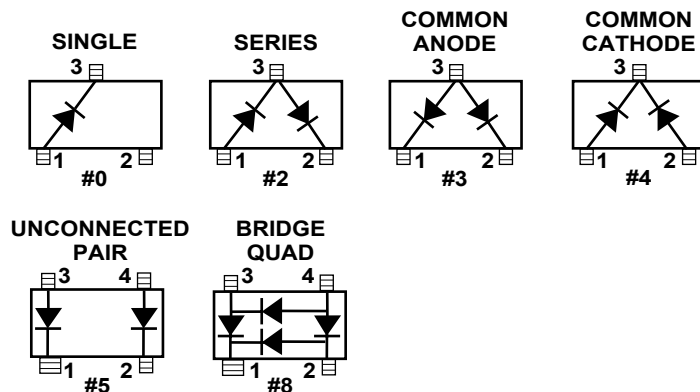
#### Package Lead Code Identification, SOT-323 (Top View)



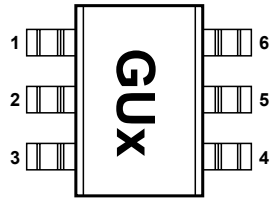
#### Package Lead Code Identification, SOT-363 (Top View)



#### 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<sub>C</sub> = 25°C

| Symbol           | Parameter                         | Unit | SOT-23/SOT-143          | SOT-323/SOT-363         |
|------------------|-----------------------------------|------|-------------------------|-------------------------|
| I <sub>f</sub>   | Forward Current (1 μs Pulse)      | Amp  | 1                       | 1                       |
| P <sub>IV</sub>  | Peak Inverse Voltage              | V    | Same as V <sub>BR</sub> | Same as V <sub>BR</sub> |
| T <sub>j</sub>   | Junction Temperature              | °C   | 150                     | 150                     |
| T <sub>stg</sub> | Storage Temperature               | °C   | -65 to 150              | -65 to 150              |
| θ <sub>JC</sub>  | Thermal Resistance <sup>[2]</sup> | °C/W | 500                     | 150                     |

### Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to the device.
2. T<sub>C</sub> = +25°C, where T<sub>C</sub> is defined to be the temperature at the package pins where contact is made to the circuit board.

## Electrical Specifications T<sub>A</sub> = 25°C, Single Diode<sup>[3]</sup>

| Part Number<br>HSMS <sup>[4]</sup> | Package Marking Code | Lead Code | Configuration                      | Minimum Breakdown Voltage<br>V <sub>BR</sub> (V) | Maximum Forward Voltage<br>V <sub>F</sub> (mV) | Maximum Forward Voltage<br>V <sub>F</sub> (V) @ I <sub>F</sub> (mA) | Maximum Reverse Leakage<br>I <sub>R</sub> (nA) @ V <sub>R</sub> (V) | Maximum Capacitance<br>C <sub>T</sub> (pF) | Typical Dynamic Resistance<br>R <sub>D</sub> (Ω) <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<br>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 <sub>R</sub> = 10 mA                           | I <sub>F</sub> = 1 mA                          |   |   | V <sub>F</sub> = 0 V<br>f = 1 MHz          | I <sub>F</sub> = 5 mA   |

### Notes:

1. DV<sub>F</sub> for diodes in pairs and quads in 15 mV maximum at 1 mA.
2. DC<sub>TO</sub> 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<sub>D</sub> = R<sub>S</sub> + 5.2Ω at 25°C and I<sub>F</sub> = 5 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.

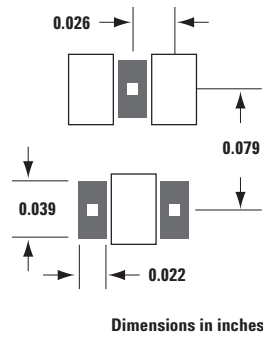


Figure 6. Recommended PCB Pad Layout for Avago's SC70 3L/SOT-323 Products.

## 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.

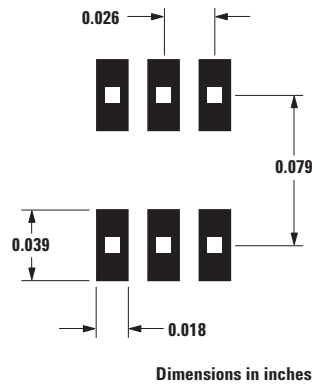


Figure 7. Recommended PCB Pad Layout for Avago's SC70 6L/SOT-363 Products.

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       |

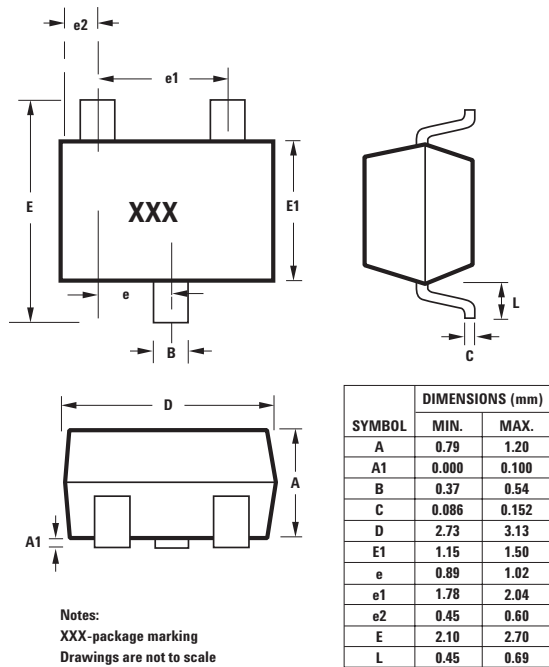
## Part Number Ordering Information

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

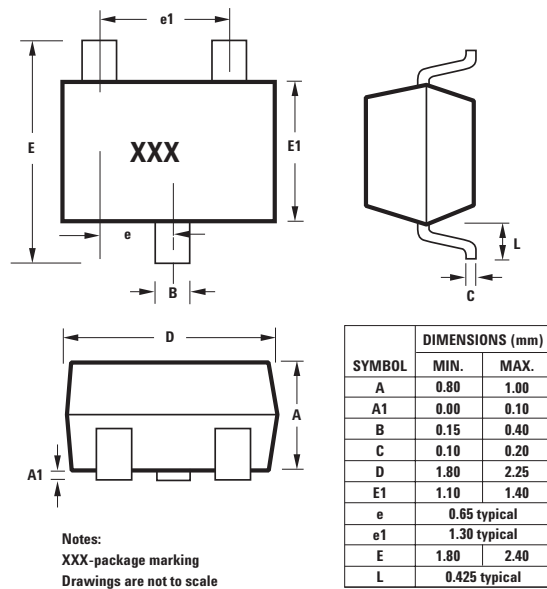
x = 0, 2, 3, 4, 5, 8, B, C, E, F, K, L, M, N, P, R

## Package Dimensions

### Outline 23 (SOT-23)

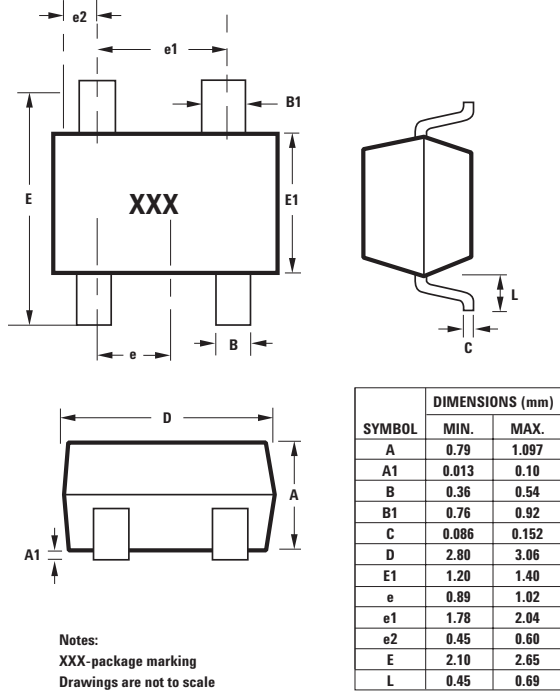


### Outline SOT-323 (SC-70 3 Lead)

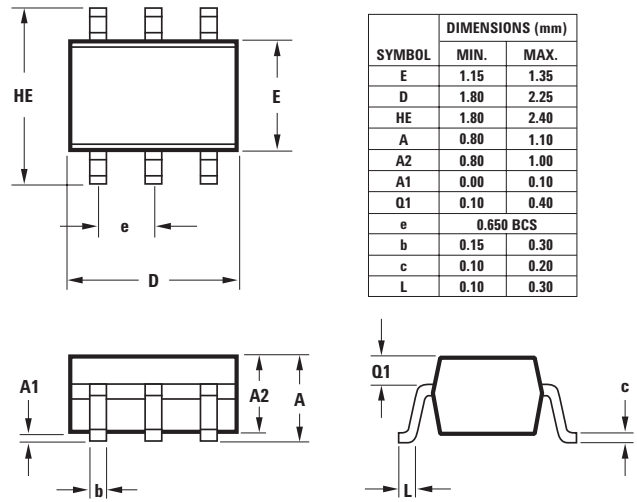


## Package Dimensions (Continued)

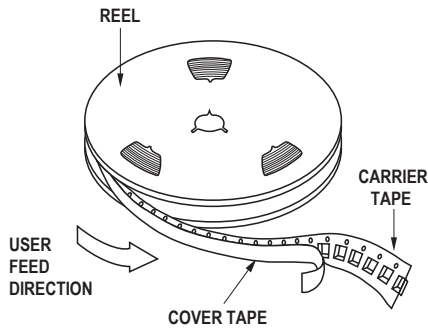
### Outline 143 (SOT-143)



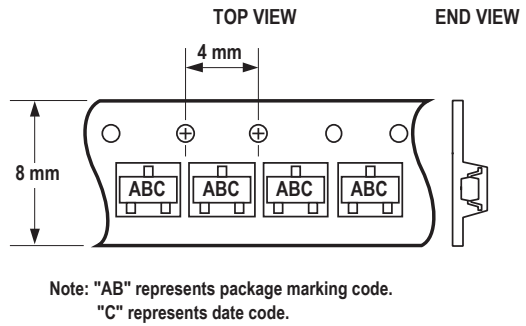
### Outline SOT-363 (SC-70 6 Lead)



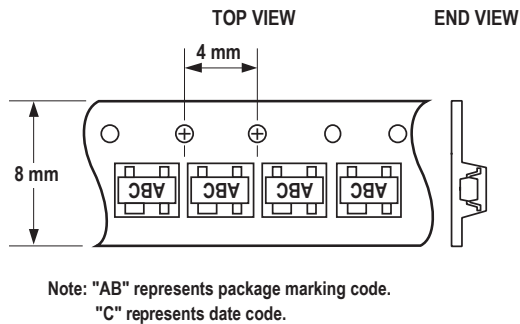
### Device Orientation



### For Outlines SOT-23, -323



### For Outline SOT-143



### For Outline SOT-363

