

Products > RF ICs/Discretes > Schottky Diodes > Demonstration Circuit Boards > DEMO-HSMS285-0

DEMO-HSMS285-0

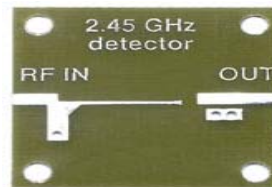
## Demonstration circuit board for HSMS-2850, HSMS-2852 and HSMS-2855

### Description

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Lifecycle status: **Active**



### Features

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- 2.45 GHz TAG circuit using the HSMS-2850 zero bias Schottky diode
- Fits package: SOT-23 (pkg 33), SOT-143 (pkg 11)
- Use with: HSMS-2850, HSMS-2852 and HSMS-2855

# Data Sheet

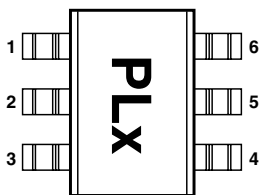
## Description

Avago's HSMS-285x family of zero bias Schottky detector diodes has been designed and optimized for use in small signal (Pin <-20 dBm) applications at frequencies below 1.5 GHz. They are ideal for RF/ID and RF Tag applications where primary (DC bias) power is not available.

**Important Note:** For detector applications with input power levels greater than -20 dBm, use the HSMS-282x series at frequencies below 4.0 GHz, and the HSMS-286x series at frequencies above 4.0 GHz. The HSMS-285x series IS NOT RECOMMENDED for these higher power level applications.

Available in various package configurations, these detector diodes provide low cost solutions to a wide variety of design problems. Avago's manufacturing techniques assure that when two diodes are mounted into a single package, they are taken from adjacent sites on the wafer, assuring the highest possible degree of match.

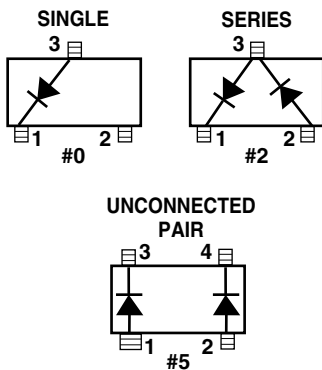
## Pin Connections and Package Marking



Notes:

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

## SOT-23/SOT-143 Package Lead Code Identification (top view)



## Features

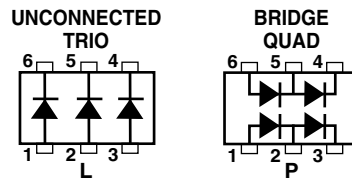
- Surface Mount SOT-23/SOT-143 Packages
- Miniature SOT-323 and SOT-363 Packages
- High Detection Sensitivity:  
up to 50 mV/μW at 915 MHz
- Low Flicker Noise:  
-162 dBV/Hz at 100 Hz
- Low FIT (Failure in Time) Rate\*
- Tape and Reel Options Available
- Matched Diodes for Consistent Performance
- Better Thermal Conductivity for Higher Power Dissipation
- Lead-free Option Available

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

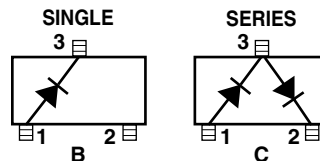


**Attention: Observe precautions for handling electrostatic sensitive devices.**  
ESD Machine Model (Class A)  
ESD Human Body Model (Class 0)  
Refer to Avago Application Note A004R:  
*Electrostatic Discharge Damage and Control.*

## SOT-363 Package Lead Code Identification (top view)



## SOT-323 Package Lead Code Identification (top view)



### SOT-23/SOT-143 DC Electrical Specifications, $T_c = +25^\circ\text{C}$ , Single Diode

Part Number HSMS-	Package Marking Code	Lead Code	Configuration	Maximum Forward Voltage		Maximum Reverse Leakage,	Typical Capacitance $C_T$ (pF)
				$V_F$ (mV)		$I_R$ ( $\mu\text{A}$ )	
2850	P0	0	Single	150	250	175	0.30
2852	P2	2	Series Pair <sup>[1,2]</sup>				
2855	P5	5	Unconnected Pair <sup>[1,2]</sup>				
Test Conditions				$I_F = 0.1 \text{ mA}$	$I_F = 1.0 \text{ mA}$	$V_R = 2\text{V}$	$V_R = -0.5 \text{ V to } -1.0\text{V}$ $f = 1 \text{ MHz}$

Notes:

- $\Delta V_F$  for diodes in pairs is 15.0 mV maximum at 1.0 mA.
- $\Delta C_T$  for diodes in pairs is 0.05 pF maximum at  $-0.5\text{V}$ .

### SOT-323/SOT-363 DC Electrical Specifications, $T_c = +25^\circ\text{C}$ , Single Diode

Part Number HSMS-	Package Marking Code	Lead Code	Configuration	Maximum Forward Voltage		Maximum Reverse Leakage,	Typical Capacitance $C_T$ (pF)
				$V_F$ (mV)		$I_R$ ( $\mu\text{A}$ )	
285B	P0	B	Single	150	250	175.	0.30
285C	P2	C	Series Pair				
285L	PL	L	Unconnected Trio				
285P	PP	P	Bridge Quad				
Test Conditions				$I_F = 0.1 \text{ mA}$	$I_F = 1.0 \text{ mA}$	$V_R = 2\text{V}$	$V_R = 0.5 \text{ V to } -1.0\text{V}$ $f = 1 \text{ MHz}$

Notes:

- $\Delta V_F$  for diodes in pairs is 15.0 mV maximum at 1.0 mA.
- $\Delta C_T$  for diodes in pairs is 0.05 pF maximum at  $-0.5\text{V}$ .

### RF Electrical Specifications, $T_c = +25^\circ\text{C}$ , Single Diode

Part Number HSMS-	Typical Tangential Sensitivity TSS (dBm) @ $f = 915 \text{ MHz}$	Typical Voltage Sensitivity $g$ (mV/ $\mu\text{W}$ ) @ $f = 915 \text{ MHz}$	Typical Video Resistance $R_V$ (K $\Omega$ )
2850	-57	40	8.0
2852			
2855			
285B			
285C			
285L			
285P			
Test Conditions	Video Bandwidth = 2 MHz Zero Bias	Power in = $-40 \text{ dBm}$ $R_L = 100 \text{ K}\Omega$ , Zero Bias	Zero Bias

### Absolute Maximum Ratings, $T_C = +25^\circ\text{C}$ , Single Diode

Symbol	Parameter	Unit	Absolute Maximum <sup>[1]</sup>	
			SOT-23/143	SOT-323/363
$P_{IV}$	Peak Inverse Voltage	V	2.0	2.0
$T_J$	Junction Temperature	$^\circ\text{C}$	150	150
$T_{STG}$	Storage Temperature	$^\circ\text{C}$	-65 to 150	-65 to 150
$T_{OP}$	Operating Temperature	$^\circ\text{C}$	-65 to 150	-65 to 150
$\theta_{jc}$	Thermal Resistance <sup>[2]</sup>	$^\circ\text{C}/\text{W}$	500	150

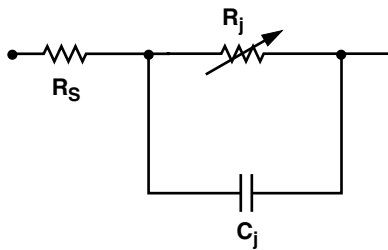
**ESD WARNING:**  
**Handling Precautions Should Be Taken**  
**To Avoid Static Discharge.**

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.

### Equivalent Linear Circuit Model

HSMS-285x chip



$R_S$  = series resistance (see Table of SPICE parameters)

$C_j$  = junction capacitance (see Table of SPICE parameters)

$$R_j = \frac{8.33 \times 10^{-5} nT}{I_b + I_s}$$

where

$I_b$  = externally applied bias current in amps

$I_s$  = saturation current (see table of SPICE parameters)

$T$  = temperature,  $^\circ\text{K}$

$n$  = ideality factor (see table of SPICE parameters)

Note:

To effectively model the packaged HSMS-285x product, please refer to Application Note AN1124.

### SPICE Parameters

Parameter	Units	HSMS-285x
$B_V$	V	3.8
$C_{J0}$	pF	0.18
$E_G$	eV	0.69
$I_{BV}$	A	3 E-4
$I_s$	A	3 E-6
$N$		1.06
$R_S$	$\Omega$	25
$P_B (V_J)$	V	0.35
$P_T (XTI)$		2
$M$		0.5

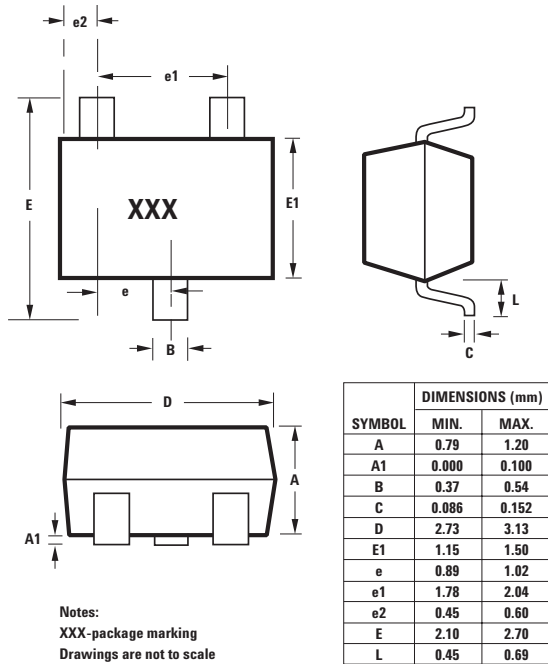
## Part Number Ordering Information

Part Number	No. of Devices	Container
HSMS-285x-TR2G	10000	13" Reel
HSMS-285x-TR1G	3000	7" Reel
HSMS-285x-BLK G	100	antistatic bag

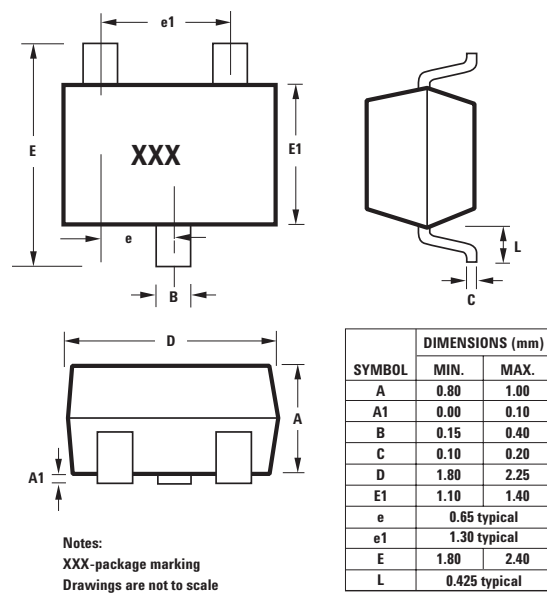
where x = 0, 2, 5, B, C, L and P for HSMS-285x.

## Package Dimensions

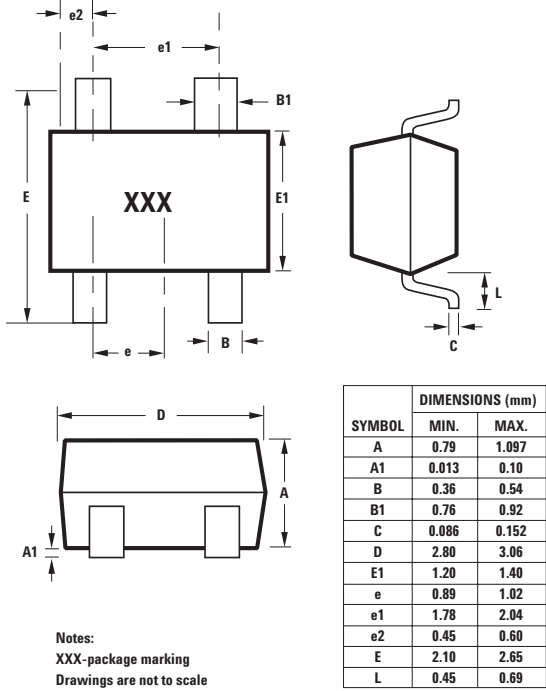
### Outline 23 (SOT-23)



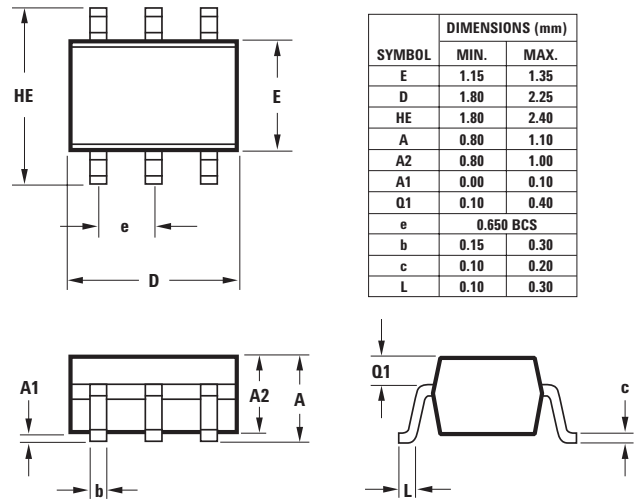
### Outline SOT-323 (SC-70 3 Lead)



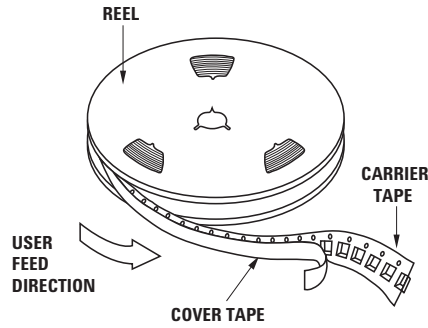
### Outline 143 (SOT-143)



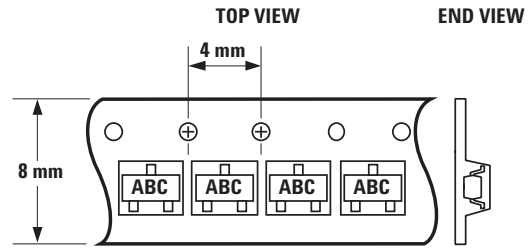
### Outline SOT-363 (SC-70 6 Lead)



### Device Orientation

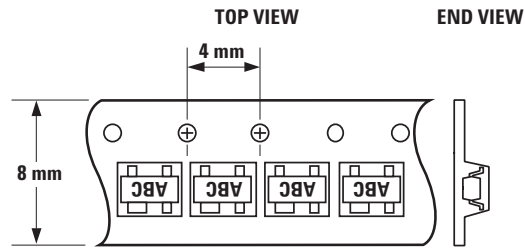


### For Outlines SOT-23, -323



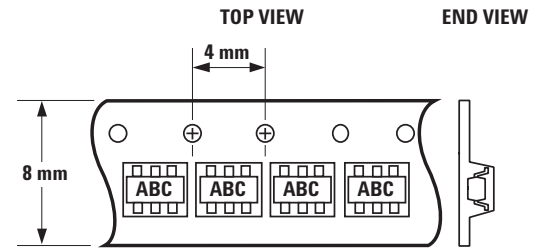
Note: "AB" represents package marking code.  
"C" represents date code.

### For Outline SOT-143



Note: "AB" represents package marking code.  
"C" represents date code.

### For Outline SOT-363



Note: "AB" represents package marking code.  
"C" represents date code.