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HSMS-286Y

Microwave Schottky Detector Diodes In Surface Mount SOD-523 Package



Data Sheet

Description/Applications

The HSMS-286Y of Avago Technologies is a DC biased detector Diode that designed and optimized for use from 915MHz to 5.8GHz. They are ideal for RF/ID and RF Tag applications as well as large signal detection, modulation, RF to DC conversion or voltage doubling.

The device is housed in a miniature low cost surface mount SOD-523 package. This miniature package is particularly useful in the application where board space is the major concern.

Table 1. Absolute Maximum Ratings [1] at Tc = +25°C

| Symbol | Parameter | Unit | Max Rating |
|------------------|-----------------------------------|------|------------|
| P _{IV} | Peak Inverse Voltage | V | 4 |
| T _J | Junction Temperature | °C | 150 |
| T _{STG} | Storage Temperature | °C | -65 to 150 |
| T _{OP} | Storage Temperature | °C | -65 to 150 |
| θ _{jb} | Thermal Resistance ^[2] | °C/W | 175 |

Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to the device.
2. Thermal Resistance is measured from junction to board using IR method.

Features

- Space saving SOD-523 package
- High Detection Sensitivity
 - Up to 50 mW/uW at 915 MHz
 - Up to 35 mW/uW at 2.45 GHz
 - Up to 25 mW/uW at 5.80 GHz
- Tape and Reel Options Available
- MSL 1 & Lead Free

Package Marking and Pin Connections



Note: Package marking provides orientation and identification

"P" = Device Code

"?" = Month code indicates the month of manufacture



Attention: Observe precautions for handling electrostatic sensitive devices.

ESD Machine Model <30V

ESD Human Body Model =50 V

Refer to Avago Technologies Application Note A004R: *Electrostatic Discharge, Damage and Control*.

Table 2. Electrical Specifications at Tc = +25°C

| | Forward Voltage V _F (mV) | | Typical Capacitance C _T (pF) |
|-----------------|-------------------------------------|-------------------------|-----------------------------------------|
| | 250 Min | 350 Max | 0.30 |
| Test Conditions | I _F = 1.0 mA | I _F = 1.0 mA | V _R = 0V , f = 1MHz |

Table 3. RF Electrical Specifications, Tc = +25°C

| | Typical Tangential Sensitivity TSS (dBm) @ f = | | | Typical Voltage Sensitivity (mV/μW) @ f = | | | Typical Video Resistance R _V (KΩ) |
|-----------------|---------------------------------------------------|----------|---------|----------------------------------------------------------------------|----------|---------|-------------------------------------------------|
| | 915 MHz | 2.45 GHz | 5.8 GHz | 915 MHz | 2.45 GHz | 5.8 GHz | |
| | -57 | -56 | -55 | 50 | 35 | 25 | 5.0 |
| Test Conditions | Video Bandwidth = 2 MHz I _b = 5 μA | | | Power in = -40 dBm R _L = 100 KΩ, I _b = 5 μA | | | I _b = 5 μA |

Typical Performance Curves at Tc = +25°C

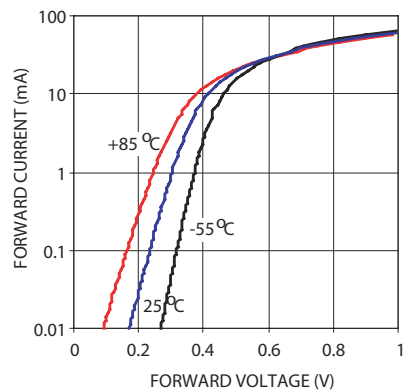


Figure 1. Forward Current vs. Forward Voltage at Temperature

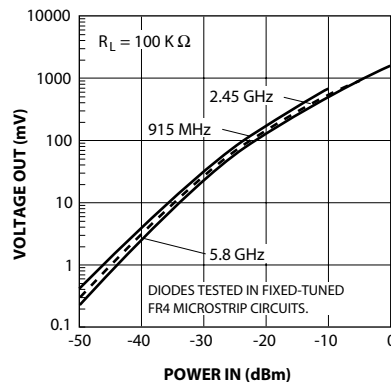


Figure 2. +25°C Output Voltage vs. Input Power, 3uA Bias

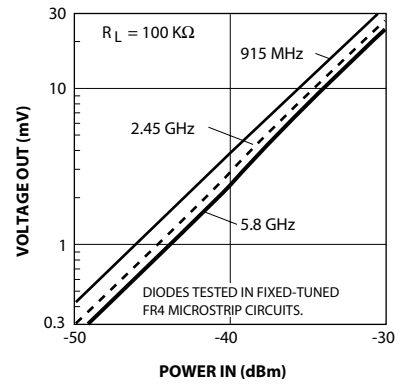


Figure 3. +25°C Expanded Output Voltage vs. Input Power.

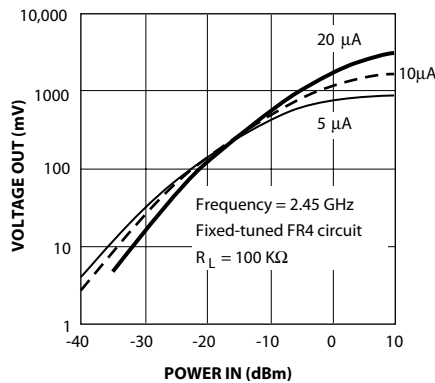


Figure 4. Dynamic Transfer Characteristic as a function of DC Bias

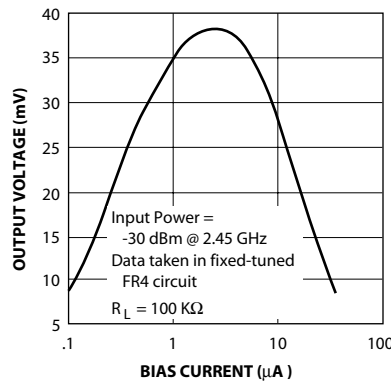
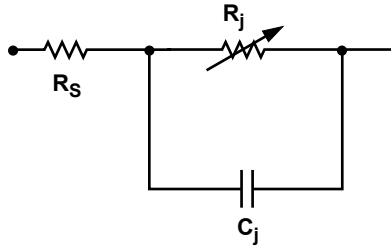


Figure 5. Voltage Sensitivity as a Function of DC Bias Current

**Equivalent Linear Circuit Model,
Diode 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, K

n = ideality factor (see table of SPICE parameters)

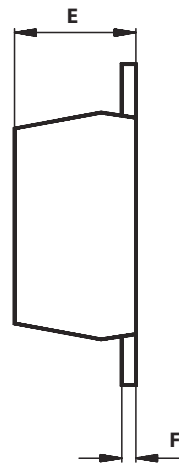
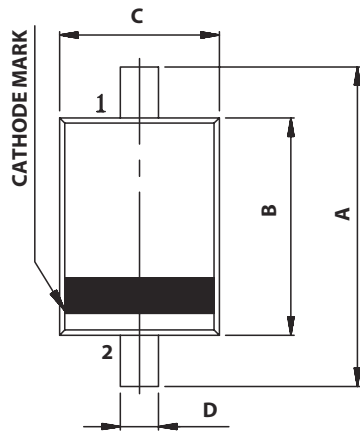
Note:

To effectively model the packaged HSMS-286x product, please refer to Application Note AN1124.

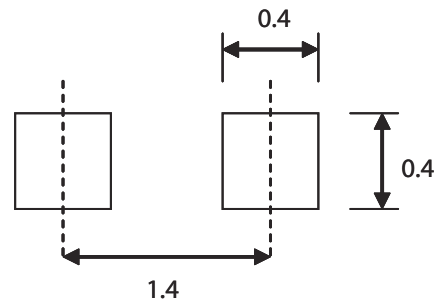
SPICE Parameters

| Parameter | Units | Value |
|-------------|----------|--------|
| B_V | V | 7.0 |
| C_{J0} | pF | 0.18 |
| E_G | eV | 0.69 |
| I_{BV} | A | 1E - 5 |
| I_S | A | 5E - 8 |
| N | | 1.08 |
| R_S | Ω | 6.0 |
| P_B (VJ) | V | 0.65 |
| P_T (XTI) | | 2 |
| M | | 0.5 |

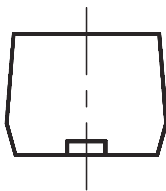
Package Outline and Dimension



PCB Footprint

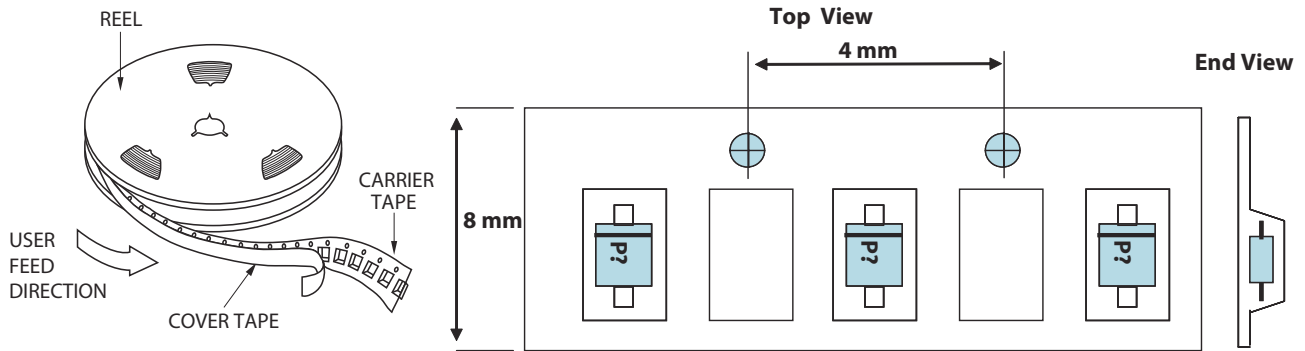


Unit : mm

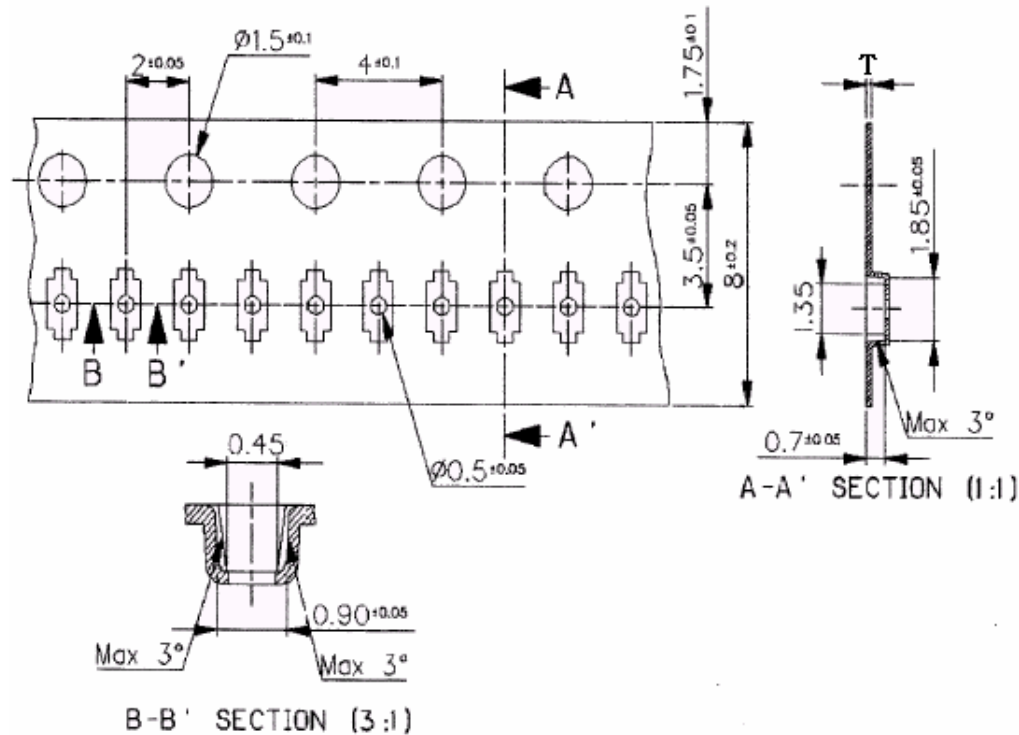


| DIM | MILLIMETERS |
|-----|-------------|
| A | 1.60 ± 0.10 |
| B | 1.20 ± 0.10 |
| C | 0.80 ± 0.10 |
| D | 0.30 ± 0.05 |
| E | 0.60 ± 0.10 |
| F | 0.13 ± 0.05 |

Device Orientation



Tape Dimension



Specification < Unit : mm >

hole pitch : 50 Pitch Tolerance : 200 ± 0.3

General Tolerance : ± 0.1

Surface resistance : $104 \sim 108 \text{ W/cm}^3$

Part Number Ordering Information

| Part number | No. of Units | Container |
|----------------|--------------|-----------------|
| HSMS-286Y-BLKG | 100 | Anti-static bag |
| HSMS-286Y-TR1G | 3000 | 7" reel |

For product information and a complete list of distributors, please go to our web site: www.avagotech.com

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