

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 T_c = +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

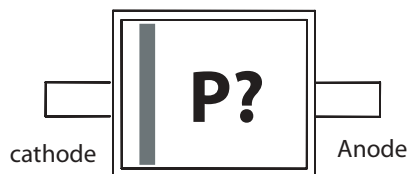
Notes:

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 $T_c = +25^\circ\text{C}$

	Forward Voltage V_F (mV)		Typical Capacitance C_T (pF)
	250 Min	350 Max	0.30
Test Conditions	$I_F = 1.0 \text{ mA}$	$I_F = 1.0 \text{ mA}$	$V_R = 0\text{V}$, $f = 1\text{MHz}$

Table 3. RF Electrical Specifications, $T_c = +25^\circ\text{C}$

	Typical Tangential Sensitivity TSS (dBm) @ $f =$			Typical Voltage Sensitivity (mV/ μW) @ $f =$			Typical Video Resistance R_V (K Ω)
	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 $I_b = 5 \mu\text{A}$			Power in = -40 dBm $R_L = 100 \text{ K}\Omega$, $I_b = 5 \mu\text{A}$			$I_b = 5 \mu\text{A}$

Typical Performance Curves at $T_c = +25^\circ\text{C}$

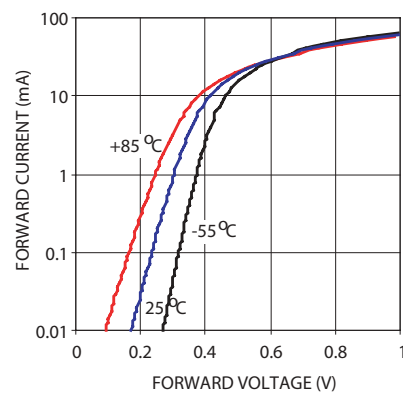


Figure 1. Forward Current vs. Forward Voltage at Temperature

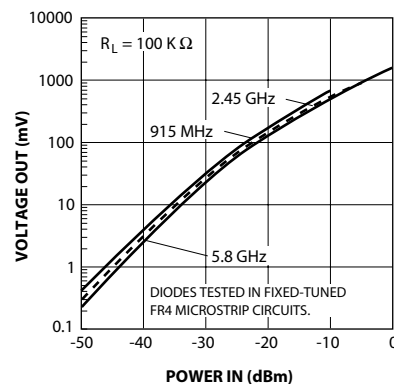


Figure 2. +25°C Output Voltage vs. Input Power, 3uA Bias

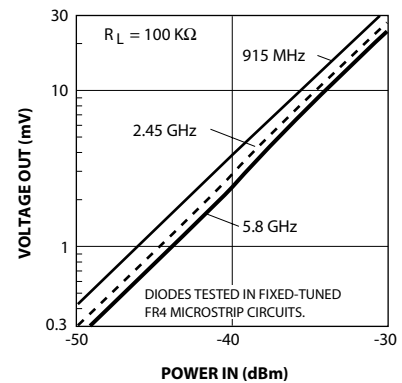


Figure 3. +25°C Expanded Output Voltage vs. Input Power.

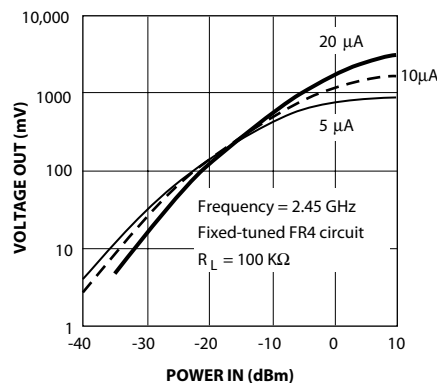


Figure 4. Dynamic Transfer Characteristic as a function of DC Bias

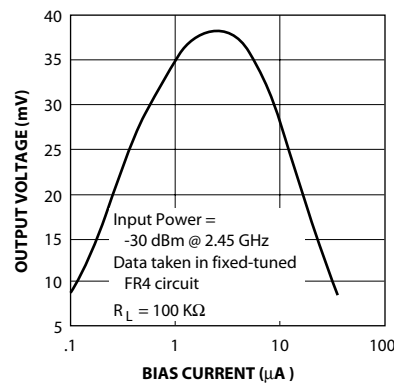
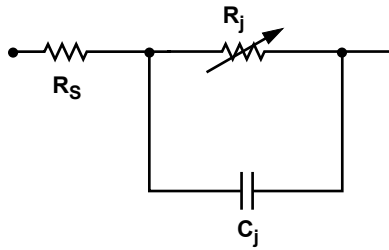


Figure 5. Voltage Sensitivity as a Function of DC Bias Current

Equivalent Linear Circuit Model, Diode chip



R_S = series resistance (see Table of SPICE parameters)

C_j = junction capacitance (see Table of SPICE parameters)

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

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)

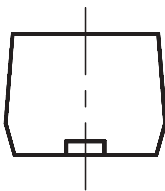
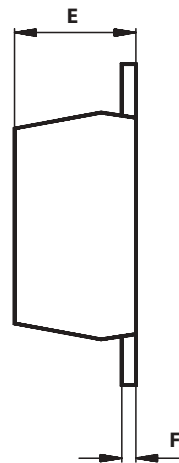
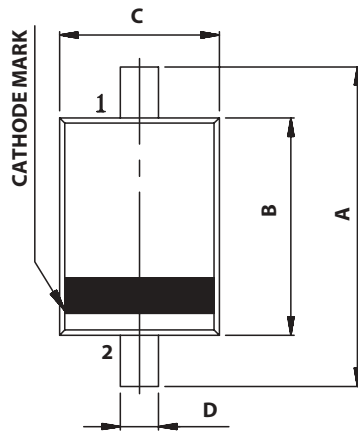
Note:

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

SPICE Parameters

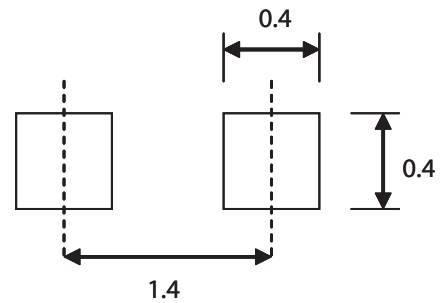
Parameter	Units	Value
B_V	V	7.0
C_{J0}	pF	0.18
E_G	eV	0.69
I_{BV}	A	1E - 5
I_S	A	5E - 8
N		1.08
R_S	Ω	6.0
P_B (VJ)	V	0.65
P_T (XTI)		2
M		0.5

Package Outline and Dimension



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

PCB Footprint



Unit : mm

The diagram illustrates the carrier tape assembly. It shows a reel of carrier tape with a cover tape. The user feed direction is indicated by an arrow. The top view shows the pitch between components is 4 mm. The end view shows the profile of the tape. Dimensions include a 4 mm pitch and an 8 mm width.

Technical drawing of a mechanical part, showing a side view and two section views (A-A' and B-B').

Side View Dimensions:

- Top edge: 2 ± 0.05 (width of first hole), 4 ± 0.1 (width of second hole), 1.75 ± 0.1 (total width).
- Bottom edge: 3.5 ± 0.05 (width of first hole), 8 ± 0.2 (total width).
- Central hole: $\varnothing 1.5 \pm 0.1$ (diameter), 4 ± 0.1 (width of hole).
- Section lines: A-A' (horizontal), B-B' (vertical).

Section A-A' (1:1):

- Top edge: 1.35 (width of top flange), 1.85 ± 0.05 (width of top flange).
- Bottom edge: 0.7 ± 0.05 (width of bottom flange).
- Angle: $\text{Max } 3^\circ$ (fillet radius).

Section B-B' (3:1):

- Top edge: 0.45 (width of top flange).
- Bottom edge: 0.90 ± 0.05 (width of bottom flange).
- Angle: $\text{Max } 3^\circ$ (fillet radius).

Surface resistance : $10^4 \sim 10^8 \text{ W/cm}^3$

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

