



# 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 <sub>IV</sub>	Peak Inverse Voltage	V	4
T <sub>J</sub>	Junction Temperature	°C	150
T <sub>STG</sub>	Storage Temperature	°C	-65 to 150
T <sub>OP</sub>	Storage Temperature	°C	-65 to 150
θ <sub>jb</sub>	Thermal Resistance <sup>[2]</sup>	°C/W	175

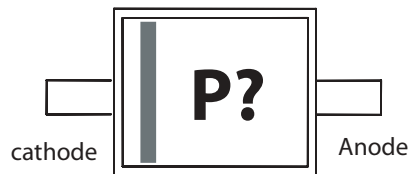
Notes:

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*.

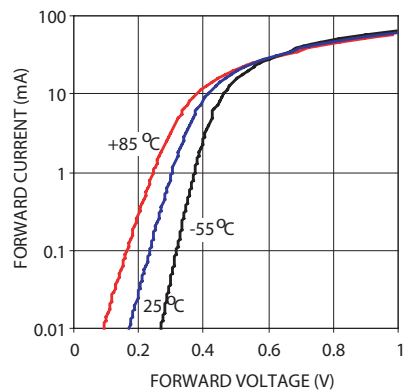
**Table 2. Electrical Specifications at Tc = +25°C**

	Forward Voltage V <sub>F</sub> (mV)		Typical Capacitance C <sub>T</sub> (pF)
		250 Min	350 Max
Test Conditions	I <sub>F</sub> = 1.0 mA	I <sub>F</sub> = 1.0 mA	V <sub>R</sub> = 0V , f = 1MHz

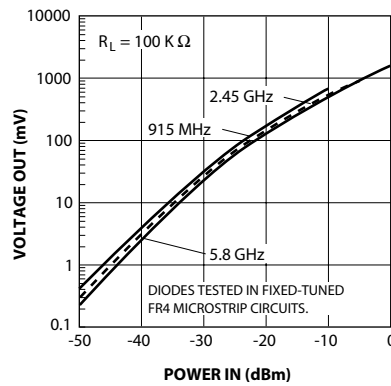
**Table 3. RF Electrical Specifications, Tc = +25°C**

	Typical Tangential Sensitivity TSS (dBm) @ f =			Typical Voltage Sensitivity (mV/μW) @ f =			Typical Video Resistance R <sub>V</sub> (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 <sub>b</sub> = 5 μA			Power in = -40 dBm R <sub>L</sub> = 100 KΩ, I <sub>b</sub> = 5 μA			I <sub>b</sub> = 5 μA

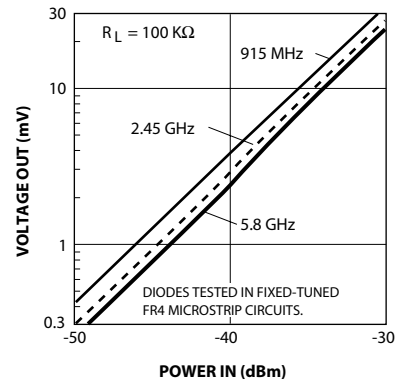
**Typical Performance Curves at Tc = +25°C**



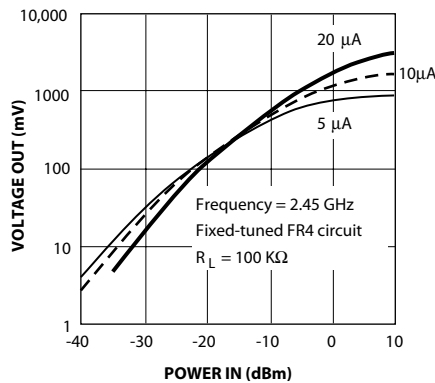
**Figure 1. Forward Current vs. Forward Voltage at Temperature**



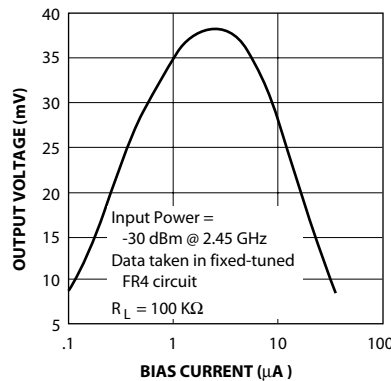
**Figure 2. +25°C Output Voltage vs. Input Power, 3uA Bias**



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

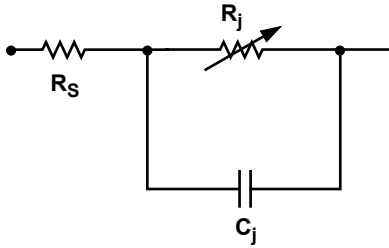


**Figure 4. Dynamic Transfer Characteristic as a function of DC Bias**



**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)

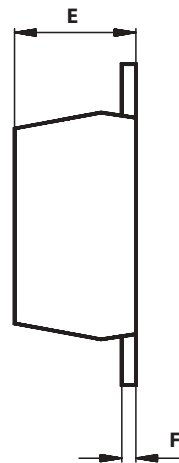
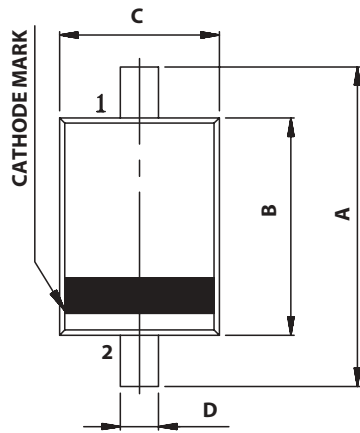
Note:

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

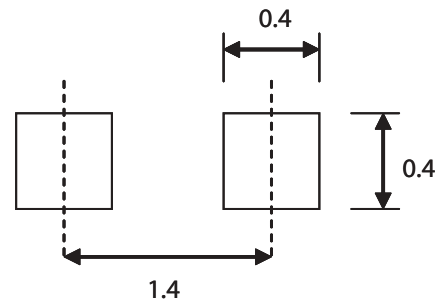
**SPICE Parameters**

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
$R_S$	$\Omega$	6.0
$P_B$ (VJ)	V	0.65
$P_T$ (XTI)		2
$M$		0.5

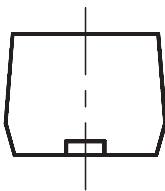
**Package Outline and Dimension**



**PCB Footprint**

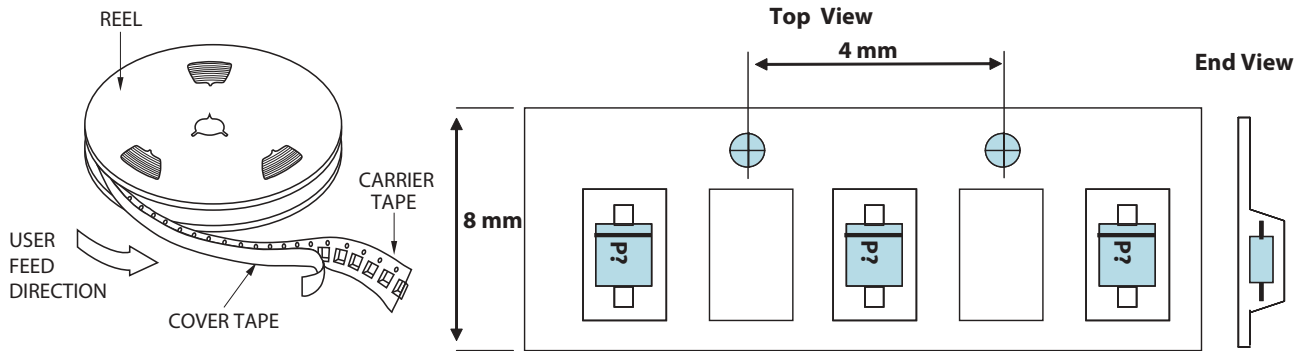


Unit : mm

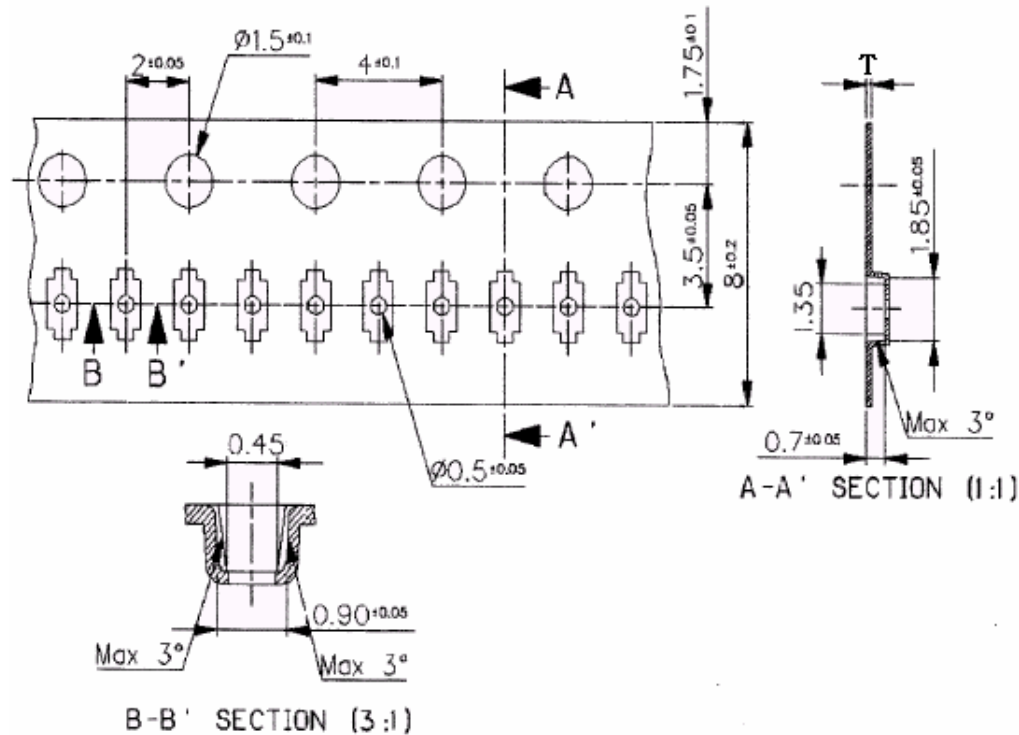


DIM	MILLIMETERS
A	1.60 ± 0.10
B	1.20 ± 0.10
C	0.80 ± 0.10
D	0.30 ± 0.05
E	0.60 ± 0.10
F	0.13 ± 0.05

## Device Orientation



## Tape Dimension



Specification < Unit : mm >

hole pitch : 50 Pitch Tolerance :  $200 \pm 0.3$

General Tolerance :  $\pm 0.1$

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](http://www.avagotech.com)

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