

# HSMP-381Z

Low Distortion Attenuator RF PIN Diodes  
In Surface Mount SOD-323 Package



## Data Sheet

### Description/Applications

Avago Technologies' HSMP-381Z is designed for low distortion attenuator applications. It is housed in a low cost, industrial standard surface mount package - SOD-323. This package offers customers who already use them in SOT-23 and SOT-323 packages, a logical transition to a smaller package outline to accommodate end product design with limited board space.

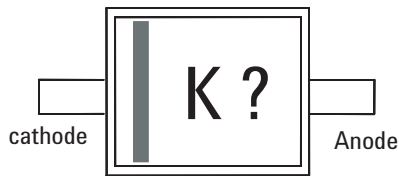
The HSMP-381Z has low distortion and high IP3 characteristics. The device can operate in microwave frequencies and suitable to be used as attenuating circuits in Infrastructure and CATV applications.

A SPICE model is not available for PIN diodes as SPICE does not provide for a key PIN diode characteristic -- carrier lifetime.

### Features

- 2 Leads Surface Mount Package
- Low Distortion Attenuating
- Microwave Frequency Operation
- Tape and Reel Options Available
- Low Failure in Time (FIT) Rate
- MSL1 & Lead Free

### Package Marking and Pin Connections



Note:

Package marking provides orientation and identification

"K" = Device Code

"?" = Month code indicates the month of manufacture

**Table 1. Absolute Maximum Ratings <sup>[1]</sup> at Tc = +25°C**

Symbol	Parameter	Unit	Max Rating
I <sub>f</sub>	Forward Current (1 μs Pulse)	Amp	1
P <sub>IV</sub>	Peak Inverse Voltage	V	100
T <sub>j</sub>	Junction Temperature	°C	150
T <sub>stg</sub>	Storage Temperature	°C	-60 to 150
θ <sub>jb</sub>	Thermal Resistance <sup>[2]</sup>	°C/W	135

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.

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

	Minimum Breakdown Voltage V <sub>BR</sub> (V)	Maximum Total Capacitance C <sub>T</sub> (pF)	Minimum Resistance at I <sub>F</sub> = 0.01mA, R <sub>H</sub> (Ω)	Maximum Resistance at I <sub>F</sub> = 20mA, R <sub>L</sub> (Ω)	Maximum Resistance at I <sub>F</sub> = 100mA, R <sub>T</sub> (Ω)	Resistance at I <sub>F</sub> = 1mA, R <sub>M</sub> (Ω)
	100	0.35	1500	10	3.0	48 to 70
Test Conditions	V <sub>R</sub> = V <sub>BR</sub> Measure I <sub>R</sub> ≤ 10uA	V <sub>R</sub> = 50V f = 1MHz	I <sub>F</sub> = 0.01mA f = 100MHz	I <sub>F</sub> = 20mA f = 100MHz	I <sub>F</sub> = 100mA f = 100MHz	I <sub>F</sub> = 1mA f = 100MHz

Note : R<sub>s</sub> parameters are tested under AQL 1.0**Table 3. Typical Parameters at Tc = +25°C**

	Carrier Lifetime τ (ns)	Reverse Recovery Time T <sub>rr</sub> (ns)	Total Capacitance C <sub>T</sub> (pF)
	1500	300	0.27
Test Conditions	I <sub>F</sub> = 50mA I <sub>R</sub> = 250mA	V <sub>R</sub> = 10V I <sub>F</sub> = 20mA 90% Recovery	V <sub>R</sub> = 50V f = 1MHz

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

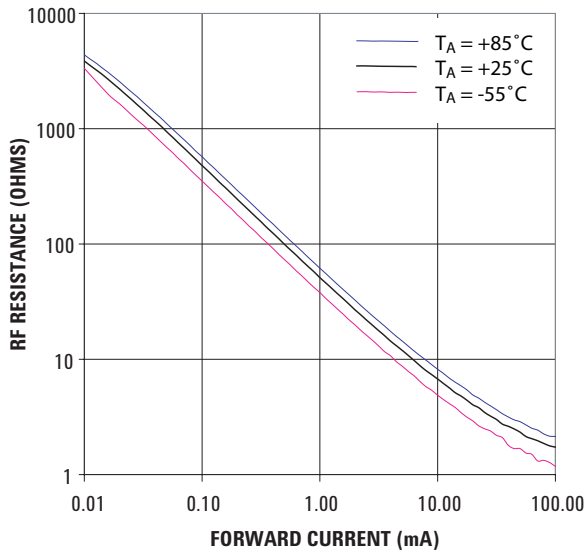


Figure 1. RF Resistance vs. Forward Bias Current

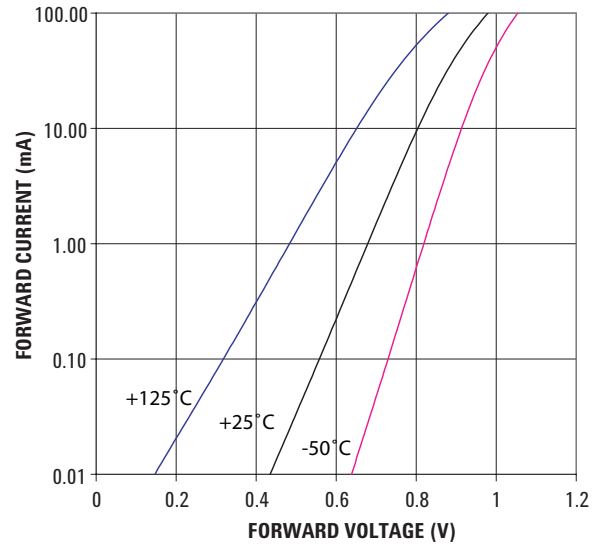


Figure 2. Forward Current vs. Forward Voltage

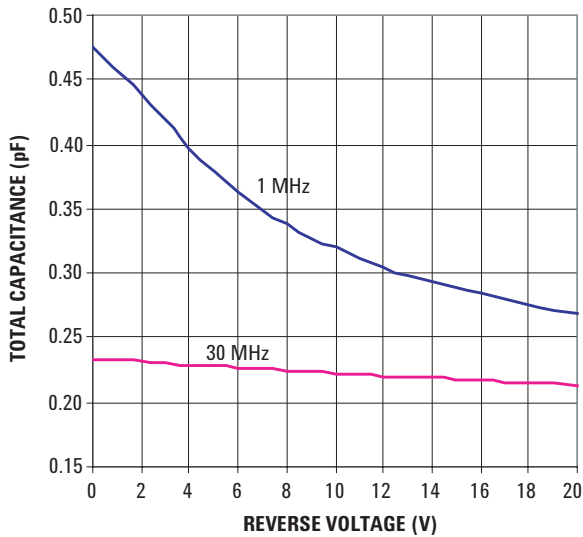


Figure 3. RF Capacitance vs. Reverse Bias

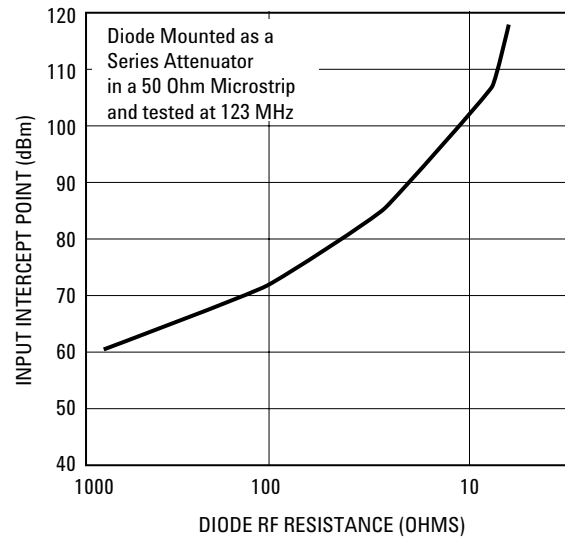
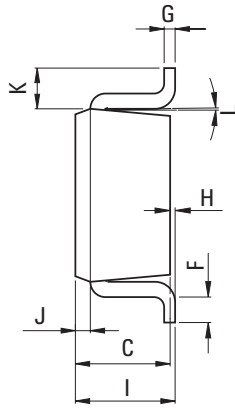
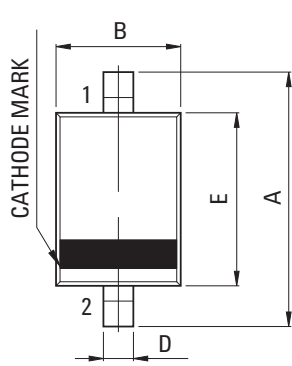


Figure 4. 2nd Harmonic Input Intercept Point vs. Diode RF Resistance

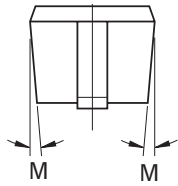
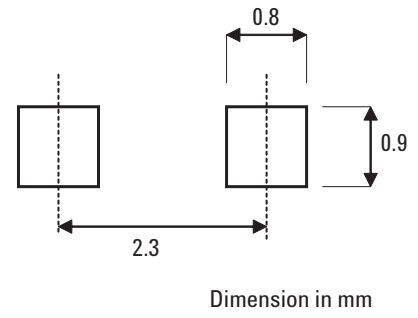
Note:

- Typical values were derived using limited samples during initial product characterization and may not be representative of the overall distribution.

## Package Outline and Dimension

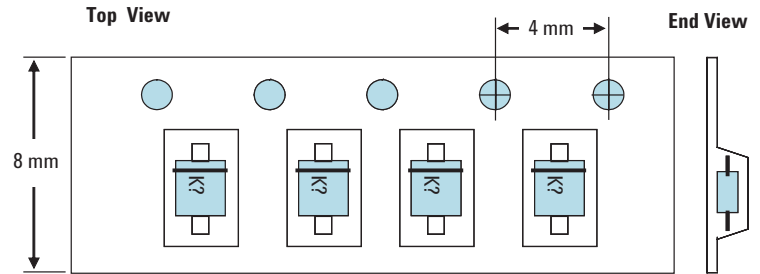
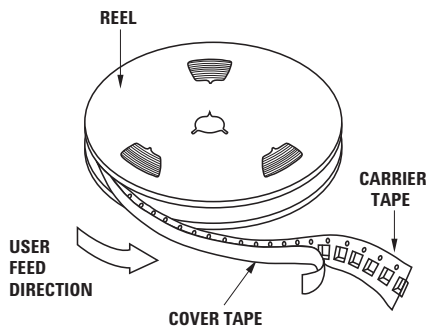


## PCB Footprint



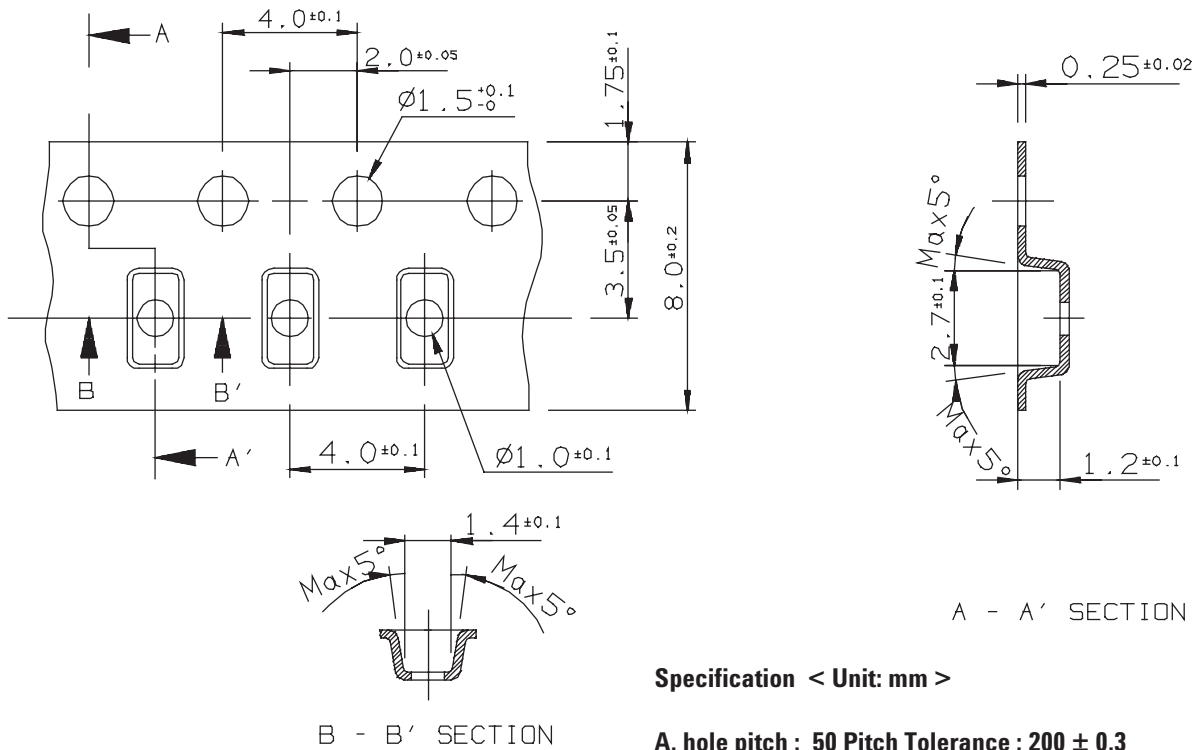
DIM	MILLIMETERS
A	2.50±0.2
B	1.25±0.05
C	0.90±0.05
D	0.30+0.06/-0.04
E	1.70±0.05
F	MIN 0.17
G	0.126±0.03
H	0~0.1
I	1.0 MAX
J	0.15±0.05
K	0.4
L	2°+4/-2
M4	~6°

## Device Orientation



Note: "K" represents package marking code  
"?" represents date code

## Tape Dimensions



## Part Number Ordering Information

Part number	No. of Units	Container
HSMP-381Z-BLKG	100	Anti-static bag
HSMP-381Z-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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