

SMP1302, SMP1331, and SMP1307 PIN Diode Chips Supplied on Film Frames

Applications

- Switches
- Attenuators

Features

- Preferred device for module applications
- PIN diodes supplied are 100% tested, saw cut, and mounted on a film frame
- Low cost
- For RoHS and other product compliance information, see the [Skyworks Certificate of Conformance](#).



Description

This Skyworks family of diodes supplied on film frames are designed for high-volume applications from 10 MHz to over 3 GHz.

This family contains two groups of PIN diodes:

1. SMP1302-099 and SMP1331-099 PIN diodes with mid-range I-layers and resistance designed for either RF switching or attenuator applications.
2. The SMP1307-099 PIN diode with thick I-layers for low-distortion RF variable attenuator applications.

These PIN diodes are provided as 100 percent tested, diced wafers mounted on film frames for optimal compatibility with high-volume pick-and-place assembly techniques.

Absolute maximum ratings are provided in Table 1. Electrical specifications are provided in Table 2. Chip dimensions are shown in Table 3. Typical performance characteristics are illustrated in Figures 1 through 4. Figure 5 describes the wafer film frame.

Table 1. PIN Diode Chips Absolute Maximum Ratings¹

Parameter	Symbol	Minimum	Maximum	Units
Reverse voltage	V _R		Voltage rating	V
Maximum junction temperature	T _J		+175	°C
Operating temperature	T _{OP}	–65	+150	°C
Storage temperature	T _{STG}	–65	+150	°C
Electrostatic discharge: Human Body Model (HBM), Class 1C	ESD		1000	V

1. Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value.

ESD Handling: Industry-standard ESD handling precautions must be adhered to at all times to avoid damage to this device.

Table 2. Electrical Specifications (T_{OP} = 25 °C)¹

Part Number	I Region (μm) Nominal	Voltage Rating (V)	C _J (pF) V _R = 30 V, f = 1 MHz	Typ V _F (mV) @ I _F = 10 mA	Max R _S (Ω) I _F = 1 mA, f = 100 MHz	Max R _S (Ω) I _F = 10 mA, f = 100 MHz	Typ T _L (ns) I _F = 10 mA	Application
SMP1302-099	50	200	0.12 typ 0.15 max	800	13.5 min 17 typ 21.5 max	3	700	Switch and attenuator
SMP1307-099	175	200	0.08 typ 0.20 max	850	60 min 75 typ 100 max	15	1500	Attenuator
SMP1331-099	30	200	0.13 typ 0.16 max	800	14.5	1.7 typ	600	Switch and attenuator

1. Performance is assured only under the conditions listed in this table.
Reverse current is specified @ 10 μA maximum at the voltage rating. This voltage should not be exceeded.
The PIN diodes listed here are processed on 100 mm silicon wafers, 100% DC tested, saw cut, and shipped on 6-inch film frame hoops.
Electrical rejects are identified with black ink on the film frame.
Attenuators are 100% series resistance tested @ 1 mA/100 MHz.

Typical Performance Characteristics, $T_{OP} = 25\text{ }^{\circ}\text{C}$

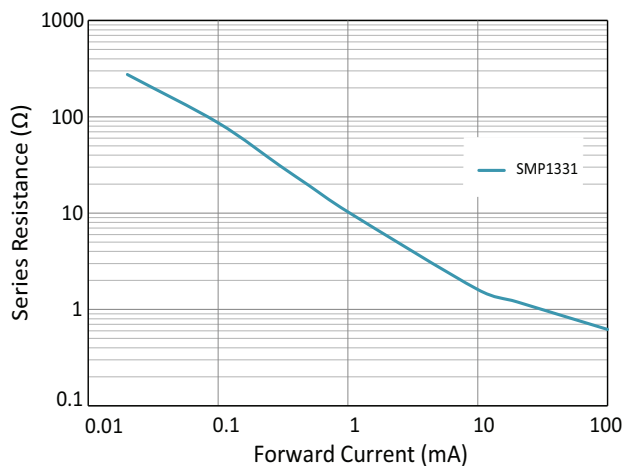


Figure 1. Series Resistance vs Forward Current @ 1 MHz

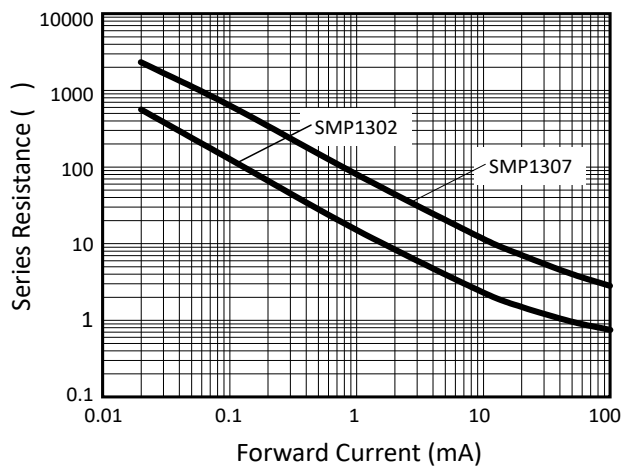


Figure 2. Series Resistance vs Forward Current @ 100 MHz

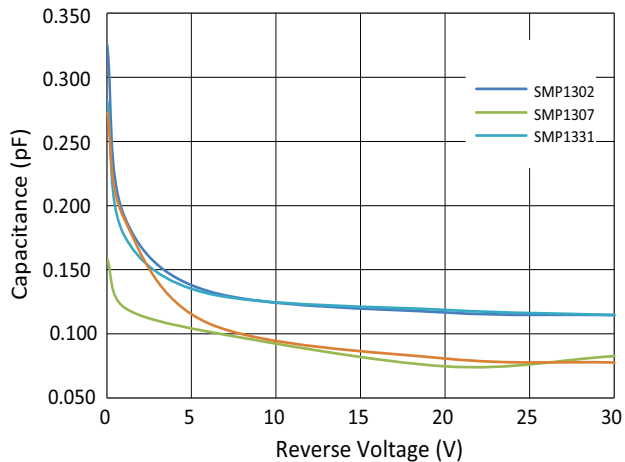


Figure 3. Capacitance vs Reverse Voltage @ 1 MHz

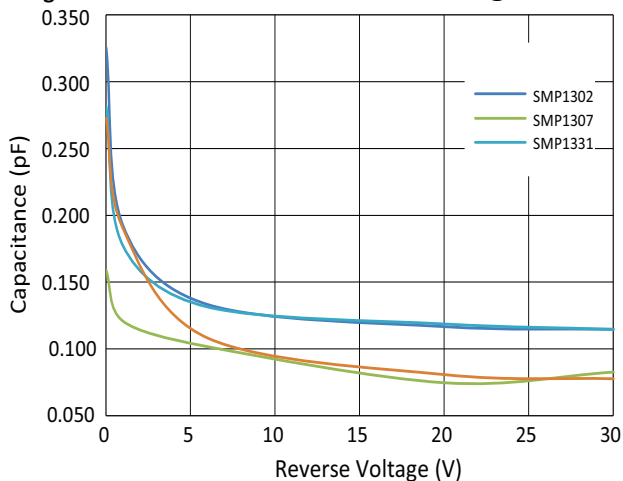
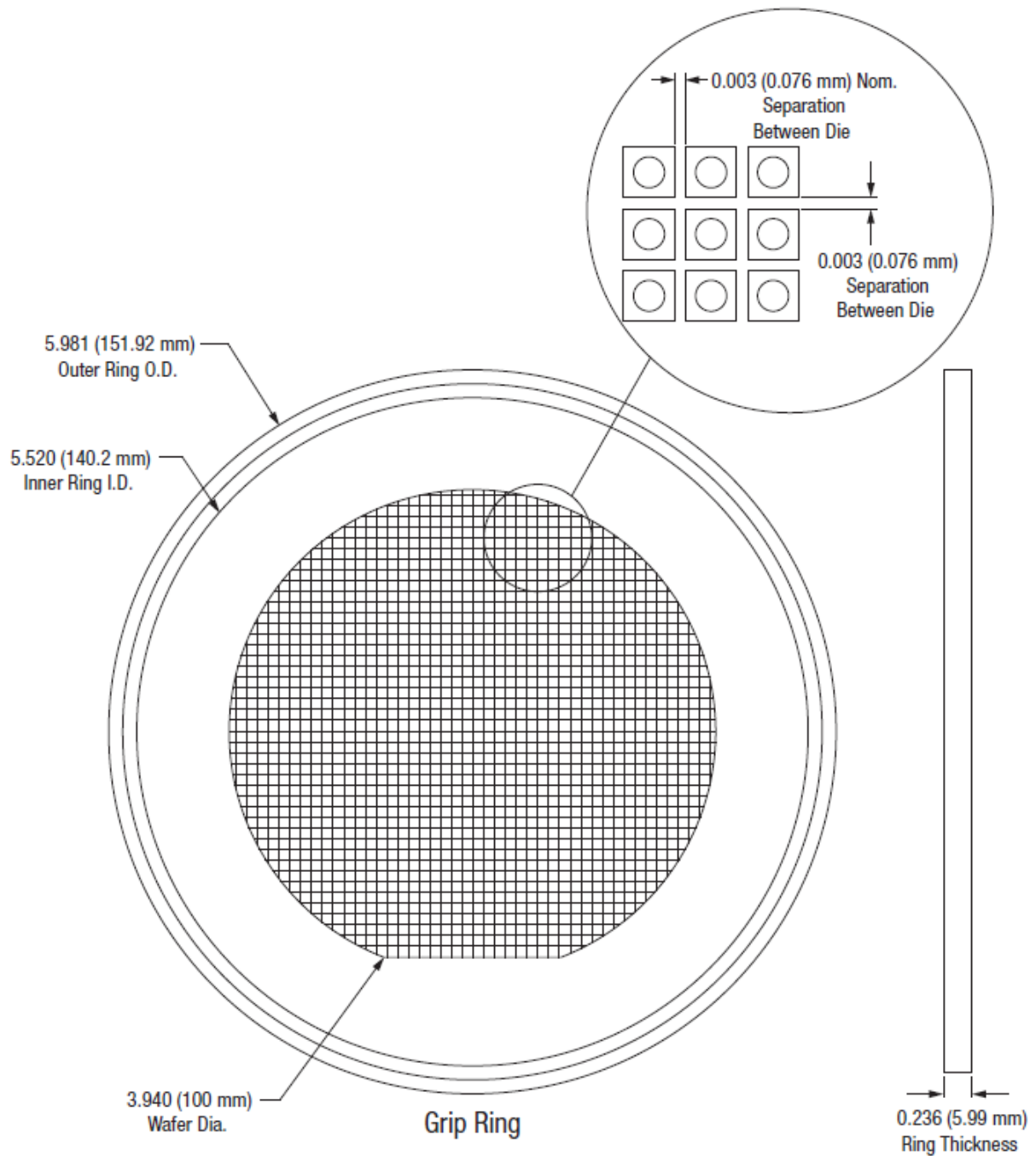


Figure 4. Capacitance vs. Reverse Voltage @ 1 MHz



- Wafer on nitto tape
- Color: light blue
- Thickness: 2.2 to 3.0 mils
- Tensile strength: 6.6 lbs (in width)
- Ring material: plastic

Figure 5. Wafer Film Frame Description

Table 3. PIN Diode Chip Dimensions

Part Number	Quantity of Good Diodes Per Wafer		Chip Size (In)	Chip Height (In)	Anode Contact (In)
	Minimum	Nominal			
SMP1302-099	40000	46000	0.0135 ± 0.001	0.005 ± 0.001	0.0085 ± 0.0005
SMP1307-099	20000	25000	0.0185 ± 0.001	0.009 ± 0.001	0.0110 ± 0.0005
SMP1331-099	40000	46000	0.0135 ± 0.001	0.005 ± 0.001	0.0075 ± 0.0005

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