

DATA SHEET

PIN Diode Chips Supplied on Film Frame

Applications

- Switches
- Attenuators

Features

- Preferred device for module applications
- PIN diodes supplied are 100% tested, saw cut, and mounted on film frame
- Low cost



NEW Skyworks Green™ products are RoHS (Restriction of Hazardous Substances)-compliant, conform to the EIA/EICTA/JEITA Joint Industry Guide (JIG) Level A guidelines, are halogen free according to IEC-61249-2-21, and contain <1,000 ppm antimony trioxide in polymeric materials.



Description

The PIN diodes that comprise this 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. Low capacitance, low resistance PIN diodes designed primarily for RF switching applications:

SMP1320-099
SMP1321-099
SMP1322-099
SMP1340-099
SMP1353-099

2. PIN diodes with thick I-layers designed for low distortion RF variable attenuator applications:

SMP1302-099
SMP1304-099
SMP1307-099

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 6. Figure 7 describes the wafer film frame.

Table 1. PIN Diode Chips Absolute Maximum Ratings

| Parameter | Symbol | Minimum | Maximum | Units |
|---------------------------------------------------|------------------|---------|----------------|-------|
| Reverse voltage | V _R | | Voltage rating | V |
| Power dissipation @ 25 °C at the base of the chip | P _d | | 250 | mW |
| Operating temperature | T _{OP} | -65 | +150 | °C |
| Storage temperature | T _{STG} | -65 | +150 | °C |

Note: 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.

CAUTION: Although these devices are designed to be as robust as possible, Electrostatic Discharge (ESD) can damage them. These devices must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times. PIN diode chips supplied on film frames are Class 1C ESD devices.

Table 2. PIN Diode Chips Electrical Specifications (Note 1)

(T_{OP} = 25 °C)

| Part Number | Voltage Rating (V) | Max 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 |
|--------------------------------|--------------------|----------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------|
| Switching Applications | | | | | | |
| SMP1320-099 | 50 | 0.175 | 850 | 2 typ | 0.9 | 400 |
| SMP1321-099 | 100 | 0.150 | 860 | 3 typ | 2.0 | 400 |
| SMP1322-099 | 50 | 0.850 | 825 | 1.5 | 0.45 typ | 400 |
| SMP1340-099 | 50 | 0.15 @ 10 V | 880 | 1.7 typ | 1.2 | 100 |
| SMP1353-099 | 200 | 0.13 @ 20 V | 825 | 15 | 2.8 | 1000 |
| Attenuator Applications | | | | | | |
| SMP1302-099 | 200 | 0.15 | 800 | 20 | 3 | 700 |
| SMP1304-099 | 200 | 0.15 | 800 | 50 | 7 | 1000 |
| SMP1307-099 | 200 | 0.20 | 850 | 75 typ | 1.5 | 1500 |

Note 1: Performance is guaranteed 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.

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 | | | |
| SMP1320-099 | 40000 | 46000 | 0.0135 ± 0.001 | 0.005 ± 0.001 | 0.0030 ± 0.0003 |
| SMP1321-099 | 40000 | 46000 | 0.0135 ± 0.001 | 0.005 ± 0.001 | 0.0030 ± 0.0003 |
| SMP1322-099 | 40000 | 46000 | 0.0135 ± 0.001 | 0.005 ± 0.001 | 0.0075 ± 0.0003 |
| SMP1340-099 | 65000 | 72000 | 0.0110 ± 0.001 | 0.005 ± 0.001 | 0.0030 ± 0.0003 |
| SMP1353-099 | 65000 | 72000 | 0.0110 ± 0.001 | 0.005 ± 0.001 | 0.0080 ± 0.0005 |
| SMP1302-099 | 40000 | 46000 | 0.0135 ± 0.001 | 0.005 ± 0.001 | 0.0085 ± 0.0005 |
| SMP1304-099 | 40000 | 46000 | 0.0135 ± 0.001 | 0.009 ± 0.001 | 0.0085 ± 0.0005 |
| SMP1307-099 | 20000 | 25000 | 0.0185 ± 0.001 | 0.009 ± 0.001 | 0.0110 ± 0.0005 |

Typical Performance Characteristics

($T_{OP} = 25\text{ }^{\circ}\text{C}$)

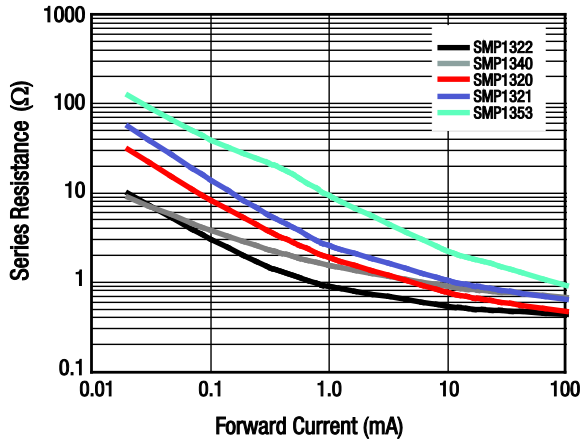


Figure 1. Series Resistance vs Forward Current @ 100 MHz

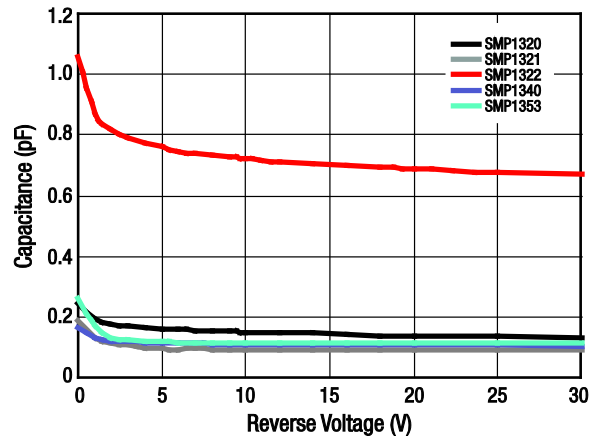


Figure 2. Capacitance vs Reverse Voltage

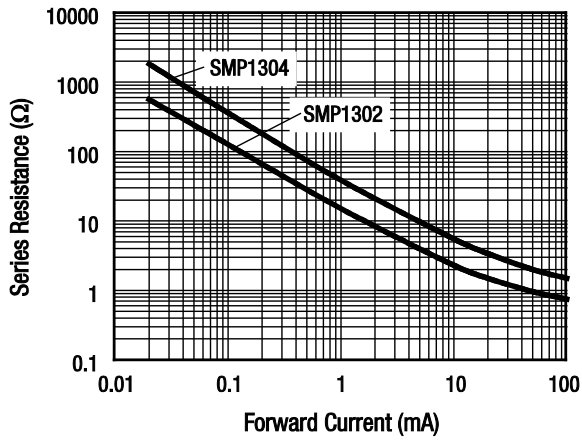


Figure 3. Series Resistance vs Forward Current @ 100 MHz

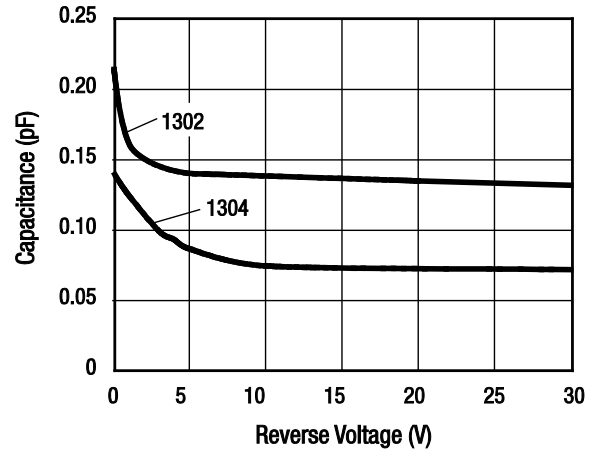


Figure 4. Capacitance vs Reverse Voltage

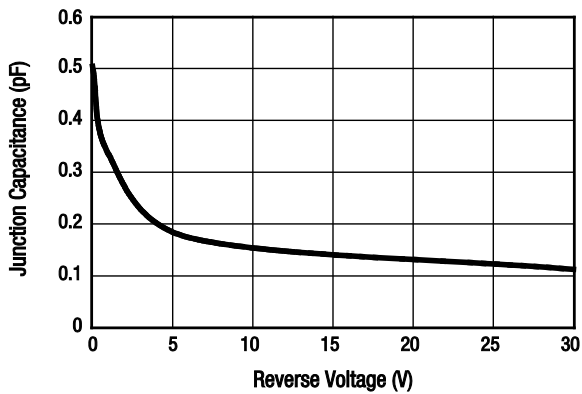


Figure 5. Capacitance vs Reverse Voltage (SMP1307-099)

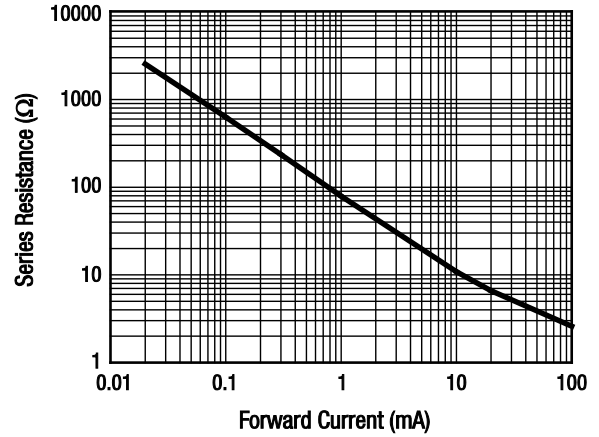


Figure 6. Series Resistance vs Forward Current (SMP1307-099)

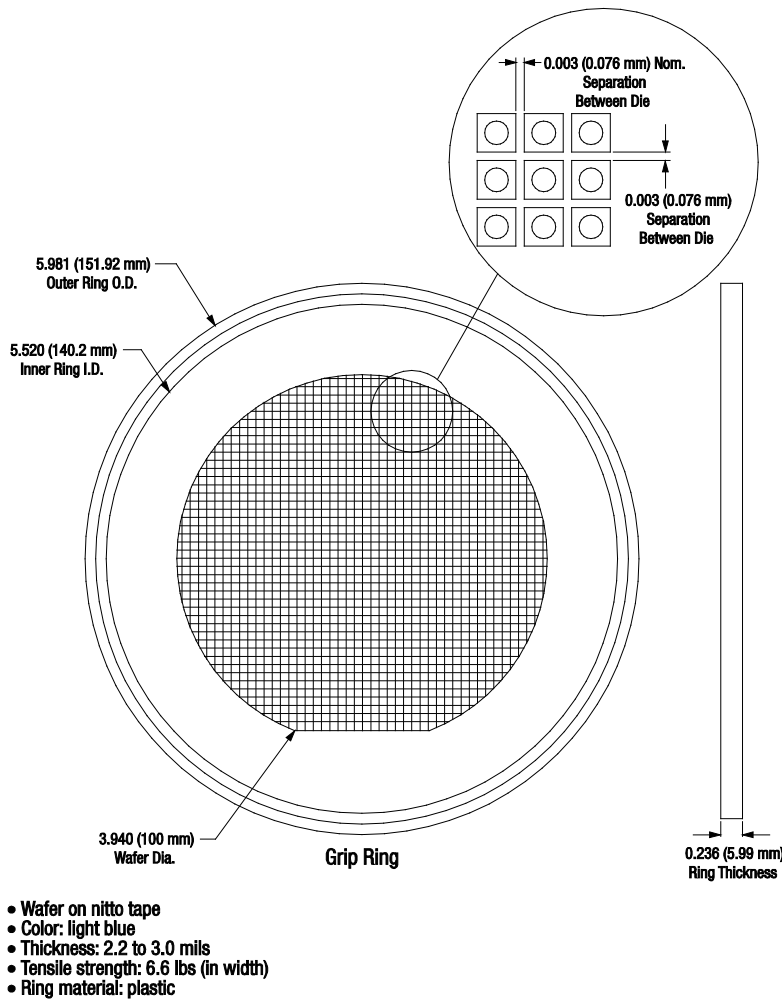


Figure 7. Wafer Film Frame Description

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