DATA SHEET

SMP1352 Series: Large Signal Switching, Plastic-Packaged PIN Diodes

Applications

- Large signal switches in base stations and handsets

Features

- Packages rated MSL1, 260 °C per JEDEC J-STD-020
- For RoHS and other product compliance information, see the Skyworks Certificate of Conformance

Description

The SMP1352 series of plastic packaged, surface mountable low capacitance (0.3 pF) silicon PIN diodes is designed for large signal switch applications from 10 MHz to more than 10 GHz. These diodes have a reverse voltage rating of 200 V and are designed for use in low-distortion switches that are required to hold off large RF voltages.

The nominal 50 µm I-region width, combined with the typical 1.5 µs carrier lifetime, results in a PIN diode with low forward resistance and low distortion characteristics.

Table 1 describes the various packages and marking of the SMP1352 series.

Table 1. SMP1352 Series Packaging and Marking

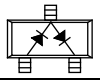
		
Single	Series Pair	Single
SC-79	SOT-23	SOD-882
♦ **SMP1352-079LF** Marking: Cathode and CG	**SMP1352-005LF** Marking: RR2	**SMP1352-040LF** Marking: S
L_S = 0.7 nH	L_S = 1.5 nH	L_S = 0.45 nH

Table 2. SMP1352 Series Absolute Maximum Ratings[1]

Parameter	Symbol	Minimum	Maximum	Units
Reverse voltage	V_R		200	V
Power dissipation @ 25 °C lead temperature	P_D		250	mW
Storage temperature	T_{STG}	-65	+150	°C
Operating temperature	T_A	-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. Exceeding any of the limits listed here may result in permanent damage to the device.

***ESD HANDLING**: Although this device is designed to be as robust as possible, electrostatic discharge (ESD) can damage this device. This device must be protected at all times from ESD when handling or transporting. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD handling precautions should be used at all times.*

Table 3. SMP1352 Series Electrical Specifications[1]
(T_A = +25 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Reverse current	I_R	V_R = 200 V			10	µA
Capacitance	C_T	F = 1 MHz, V = 20 V			0.35	pF
Resistance	R_S	F = 100 MHz I = 1 mA I = 10 mA I = 100 mA		 11 2 1	 15 2.80 1.35	 Ω Ω Ω
Forward voltage	V_F	I_F = 10 mA		0.8		V
Carrier lifetime	TI	I_F = 10 mA		1		µs
I region width				50		µm

1 Performance is guaranteed only under the conditions listed in this table.

Electrical and Mechanical Specifications

The absolute maximum ratings of the SMP1352 series are provided in Table 2. Electrical specifications are provided in Table 3. Resistance versus temperature measurements are provided in Table 4.

Typical performance characteristics of the SMP1352 series are illustrated in Figures 1 to 4. Package dimensions are shown in Figures 5 to 9 (odd numbers), and tape and reel dimensions are provided in Figures 6 to 10 (even numbers).

Package and Handling Information

Instructions on the shipping container label regarding exposure to moisture after the container seal is broken must be followed. Otherwise, problems related to moisture absorption may occur when the part is subjected to high temperature during solder assembly.

The SMP1352 series is rated to Moisture Sensitivity Level 1 (MSL1) at 260 °C. It can be used for lead or lead-free soldering. For additional information, refer to the Skyworks Application Note, *Solder Reflow Information*, document number 200164.

Care must be taken when attaching this product, whether it is done manually or in a production solder reflow environment. Production quantities of this product are shipped in a standard tape and reel format.

Table 4. Resistance vs Temperature @ 100 MHz

I_F (mA)	R_S @ –55 °C (Ω)	R_S @ –15 °C (Ω)	R_S @ +25 °C (Ω)	R_S @ +65 °C (Ω)	R_S @ +100 °C (Ω)
0.02	260	276	302	263	240
0.10	60.9	64.0	70.6	71.0	70.1
0.30	22.4	23.6	26.0	27.8	28.2
1.0	7.9	8.5	9.2	10.3	10.7
10	1.5	1.7	1.9	2.2	2.3
20	1.1	1.2	1.3	1.6	1.7
100	0.55	0.69	0.78	0.98	1.03

Typical Performance Characteristics

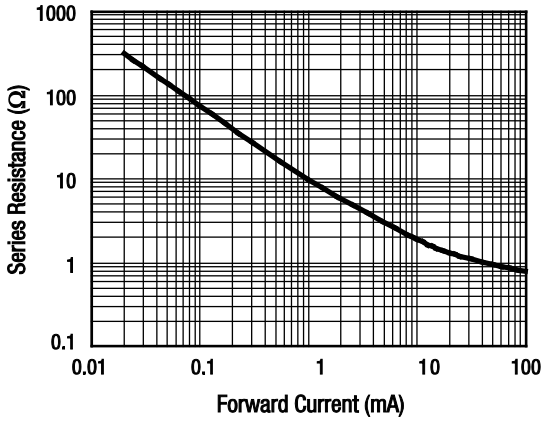


Figure 1. Series Resistance vs Current @ 100 MHz

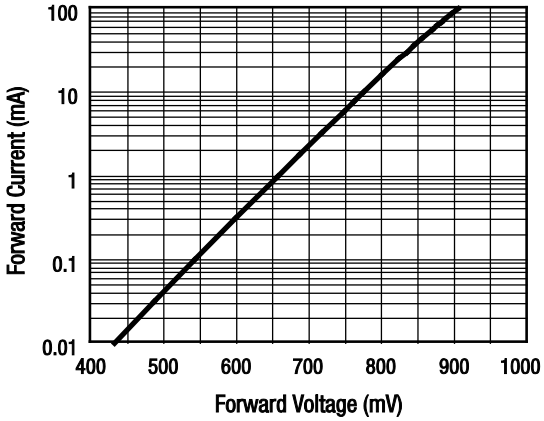


Figure 2. DC Characteristics

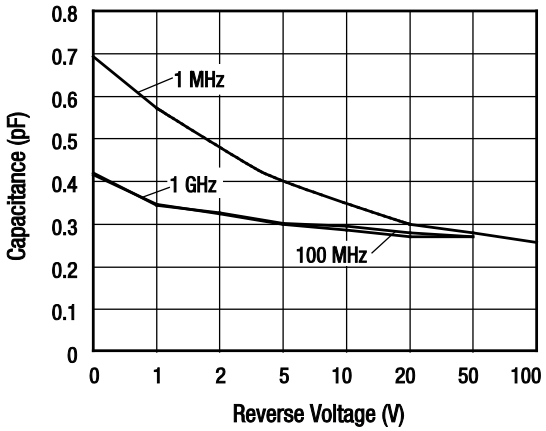


Figure 3. Capacitance vs Reverse Voltage

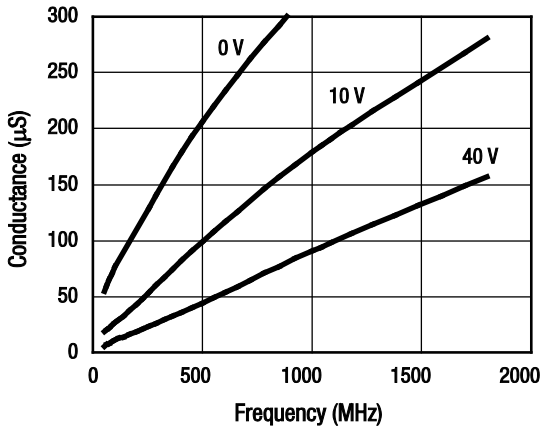


Figure 4. Conductance vs Frequency and Reverse Voltage

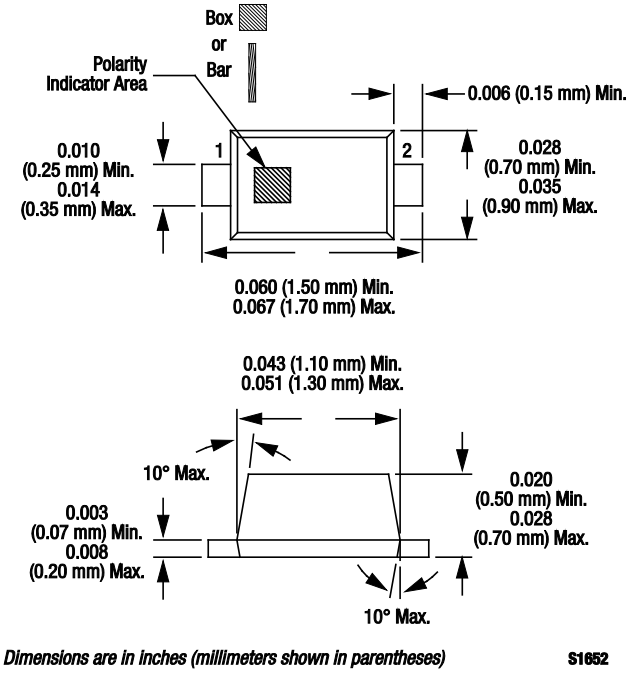


Figure 5. SC-79 Package Dimension Drawing

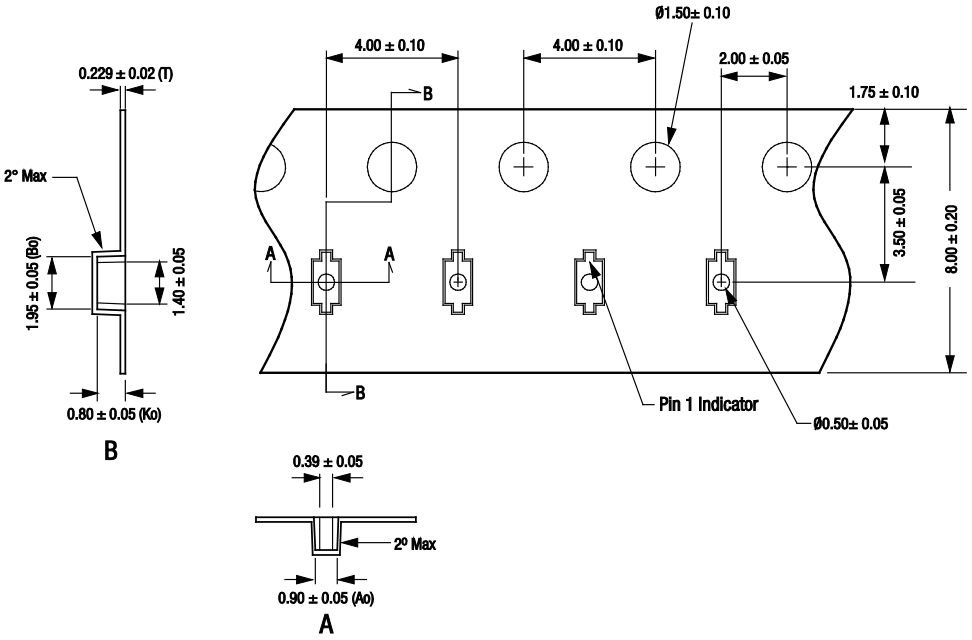


Figure 6. SC-79 Tape and Reel Dimensions

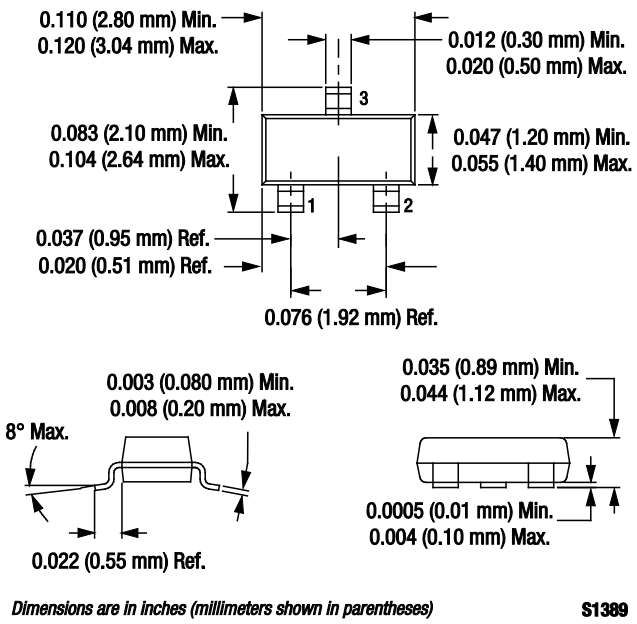
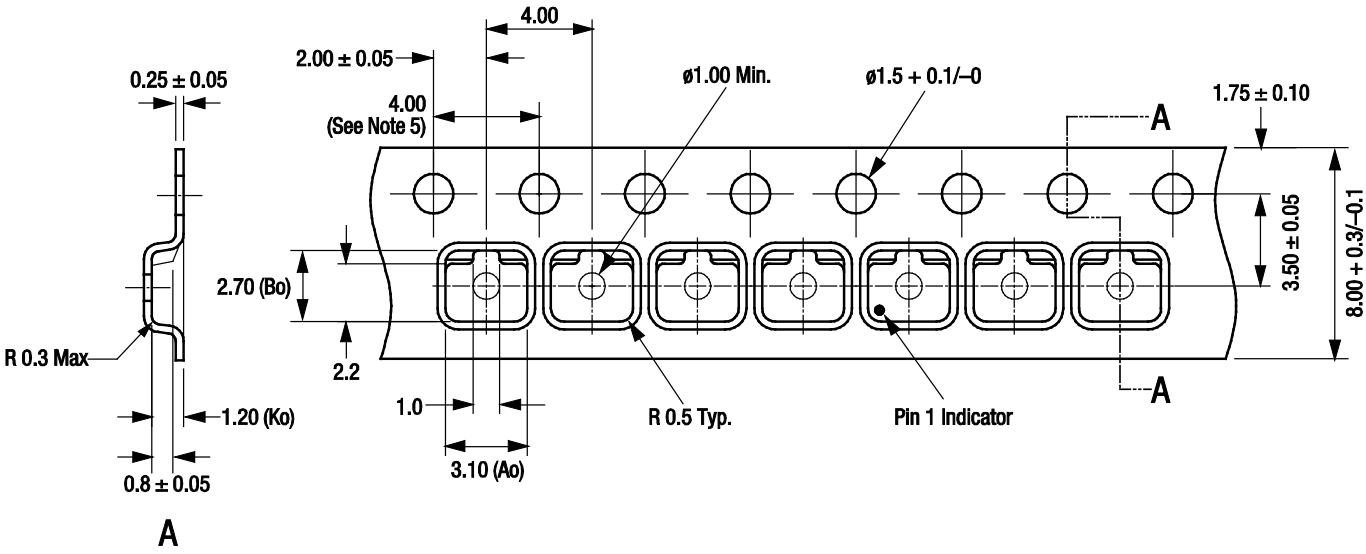


Figure 7. SOT-23 Package Dimension Drawing



Notes:
1. *Carrier tape: black conductive polycarbonate.*
2. *Cover tape material: transparent conductive PSA.*
3. *Cover tape size: 5.40 mm width.*
4. *Tolerance ±0.10 mm.*
5. *Ten sprocket hole pitch cumulative tolerance: ±0.2 mm.*
6. *All measurements are in millimeters.*
7. *Alternative carrier tape dimensions are:*
   Ao = 3.3
   Bo = 2.9
   Ko = 1.22

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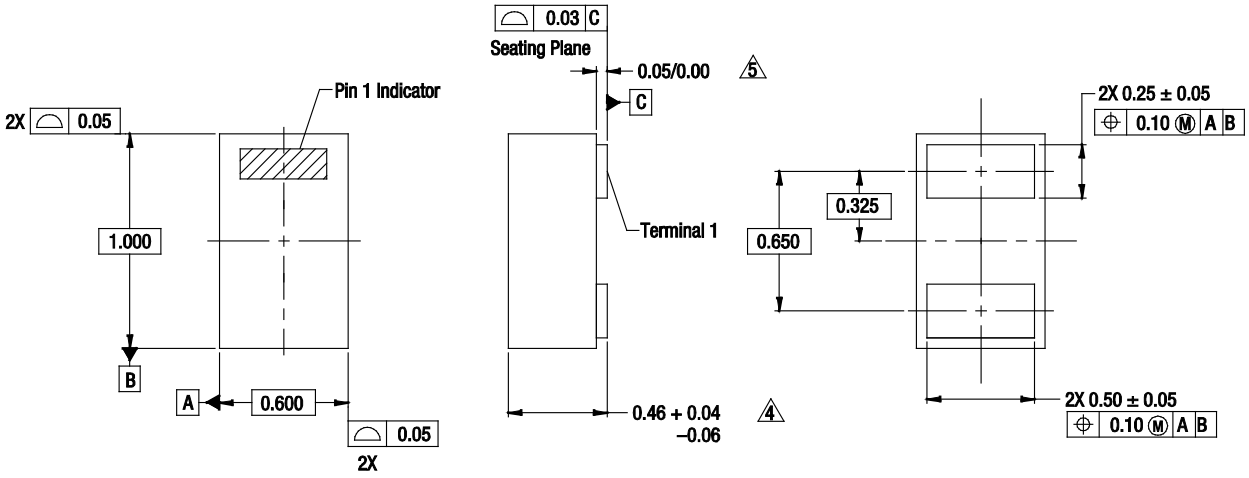
Figure 8. SOT-23 Tape and Reel Dimensions

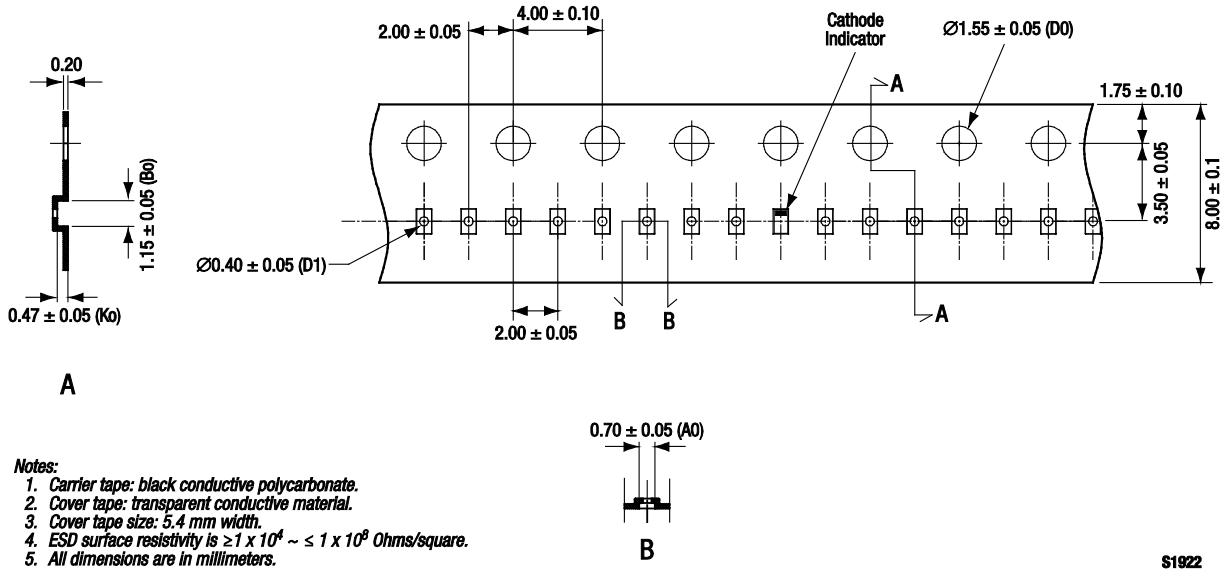


NOTES:

1. *All measurements are in millimeters.*
2. *Dimensions and tolerances according to ASME Y14.5M-1994.*
3. *These packages are used principally for discrete devices.*
4. *This dimension includes stand-off height and package body thickness, but does not include attached features, e.g., external heatsink or chip capacitors. An integral heatslug is not considered an attached feature.*
5. *This dimension is primarily terminal plating, but does not include small metal protrusion.*

Y1410

Figure 9. SOD-882 Package Dimension Drawing



Notes:

1. *Carrier tape: black conductive polycarbonate.*
2. *Cover tape: transparent conductive material.*
3. *Cover tape size: 5.4 mm width.*
4. *ESD surface resistivity is ≥1 x 10^4 ~ ≤ 1 x 10^9 Ohms/square.*
5. *All dimensions are in millimeters.*

S1922

Figure 10. SOD-882 Tape and Reel Dimensions