DATA SHEET

SMP1302 Series: Switch and Attenuator Plastic Packaged PIN Diodes

Features

- Designed for base station and handset applications
- Low-distortion design
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C[1] per JEDEC J-STD-020
- Available in tape and reel packaging

Description

The SMP1302 series of plastic packaged, surface mountable, low capacitance (0.3 pF) silicon PIN diodes is designed for high-volume switch and attenuator applications from 10 MHz to beyond 2 GHz. These diodes are designed for use in low-distortion PI and TEE attenuators with low drive current (maximum resistance at 1 mA is 10 Ω) commonly used in TV distribution and cellular base station applications. The nominal 50 μm I region width, combined with a maximum resistance of 3 Ω at 10 mA, makes these diodes useful in large signal switch applications. Available as single and dual diodes in a selection of plastic packages including SOT-23, SOD-323, small footprint SC-79, an ultralow inductance (0.2 nH) SOT-143 (SMP1302-017) and miniature SC-70. Available in a SOT-5 (SMP1302-027) package as a four-diode array designed for insertion in the commonly used four-diode PI attenuator circuit.

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.

Absolute Maximum Ratings

Characteristic	Value
Reverse voltage (V_R)	200 V
Power dissipation @ 25 °C lead temperature (P_D)	250 mW
Storage temperature (T_{ST})	-65 °C to +150 °C
Operating temperature (T_{OP})	-65 °C to +150 °C
ESD human body model	Class 1C

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: *Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device 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 must be employed at all times.*

1. SOT-5 (-027) MSL to be defined.

							
Single	Common Anode	Common Cathode	Series Pair	Single	Ultralow Inductance	PI	Single
SOT-23	SOT-23	SOT-23	SOT-23	SOD-323	SOT-143	SOT-5	SC-79
SMP1302-001 Marking: PF1	**SMP1302-003** Marking: PF9	**SMP1302-004** Marking: PF3	**SMP1302-005** Marking: PF2	**SMP1302-011** Marking: PF	**SMP1302-017** Marking: PFF	**SMP1302-027** Marking: PFM	**♦SMP1302-079**
SMP1302-001LF Marking: RF1	**SMP1302-003LF** Marking: RF9	**SMP1302-004LF** Marking: RF3	**SMP1302-005LF** Marking: RF2	**SMP1302-011LF** Marking: RF	**SMP1302-017LF** Marking: RFF	**SMP1302-027LF** Marking: RFM	**♦SMV1302-079LF**
L_S = 1.5 nH	L_S = 1.5 nH	L_S = 1.5 nH	L_S = 1.5 nH	L_S = 1.5 nH	L_S = 0.2 nH		L_S = 0.7 nH
		SC-70	SC-70				
		SMP1302-074 Marking: PF3					
		SMP1302-074LF Marking: RF3	**SMP1302-075LF** Marking: RF2				
		L_S = 1.4 nH	L_S = 1.4 nH				

LF denotes lead (Pb)-free, RoHS-compliant packaging option as an alternative to our standard tin/lead (Sn/Pb) packaging.

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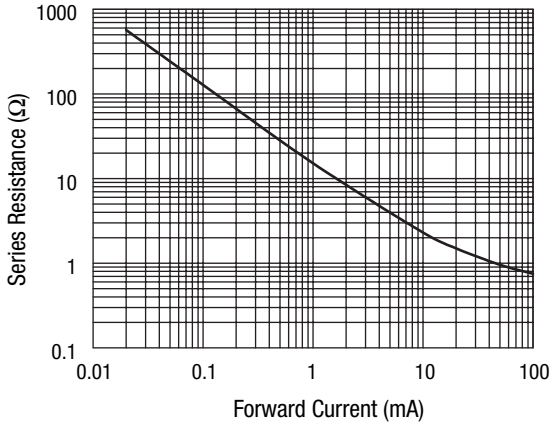
Electrical Specifications at 25 °C

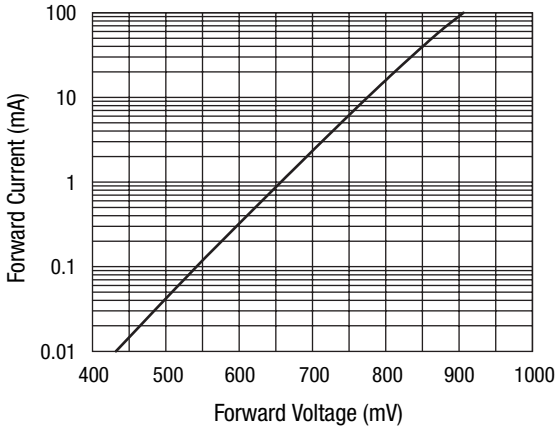
Parameter	Condition	Typ.	Max.	Unit
Reverse current (I_R)	V_R = 200 V		10	µA
Capacitance (C_T)[1]	F = 1 MHz, V = 30 V		0.3	pF
Resistance (R_S)	F = 100 MHz, I = 1 mA	15	20	Ω
Resistance (R_S)	F = 100 MHz, I = 10 mA		3	Ω
Resistance (R_S)	F = 100 MHz, I = 100 mA		1.5	Ω
Forward voltage (V_F)	I_F = 10 mA	0.8		V
Carrier lifetime (TI)	I_F = 10 mA	0.7		µs
I region width		50		µm

1. The SMP1302-017 and SMP1302-027 maximum capacitance is 0.45 pF.

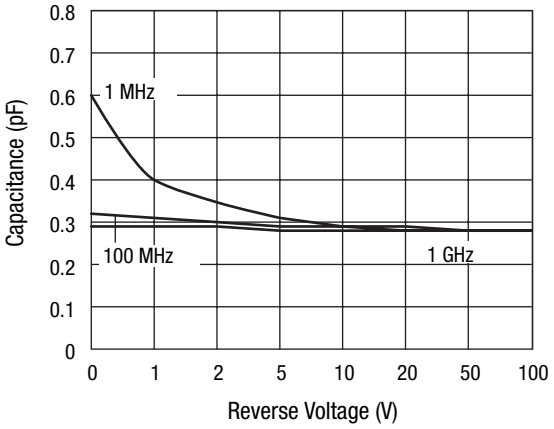
Typical Performance Data



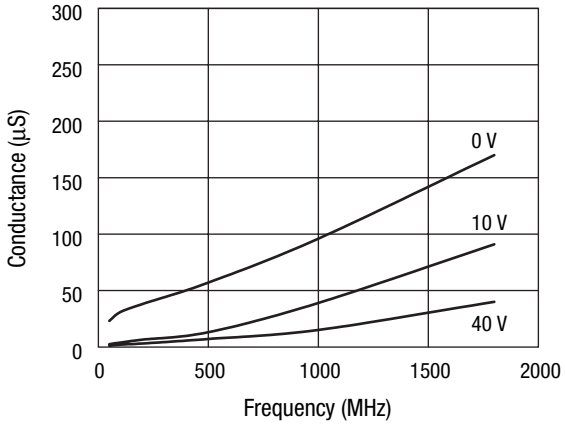
Series Resistance vs. Current @ 100 MHz



DC Characteristic



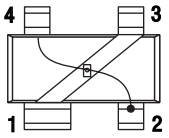
Capacitance vs. Reverse Voltage



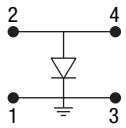
Conductance vs. Frequency and Reverse Voltage

SMP1302-017: Low Inductance PIN Diode in SOT-143 Package

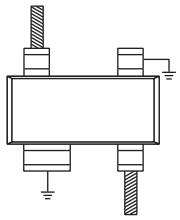
The SMP1302-017 utilizes the SMP1302 PIN diode chip in a customized SOT-143 plastic package designed for high performance in high-frequency applications. Its effective inductance, based on the 3 GHz isolation, is less than 0.2 nH.



Lead Configuration



Schematic



Switch Connection

Resistance vs. Temperature @ 100 MHz

I_F (mA)	R -55 °C (Ω)	R -15 °C (Ω)	R 25 °C (Ω)	R 65 °C (Ω)	R 100 °C (Ω)
	-55	-15	25	65	100
0.02	599	653	692	715	722
0.1	123	135	143	154	161
0.3	42.2	46.6	49.7	54.3	56.8
1	13.5	15	16.2	17.9	18.8
10	2	2.3	2.6	2.9	3
20	1.34	1.5	1.7	2	2
100	0.6	0.74	1	1.1	1.1

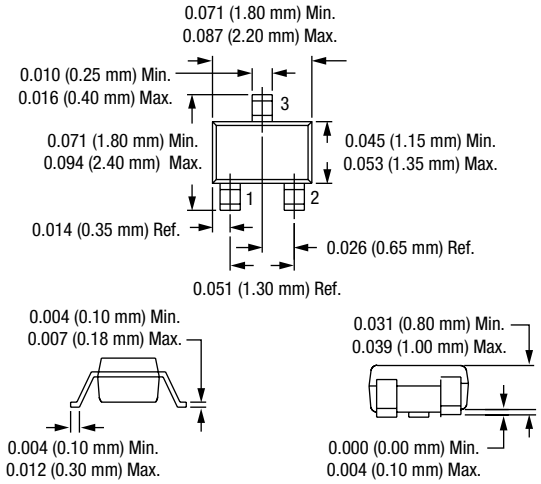
Recommended Solder Reflow Profiles

Refer to the *"Recommended Solder Reflow Profile"* Application Note.

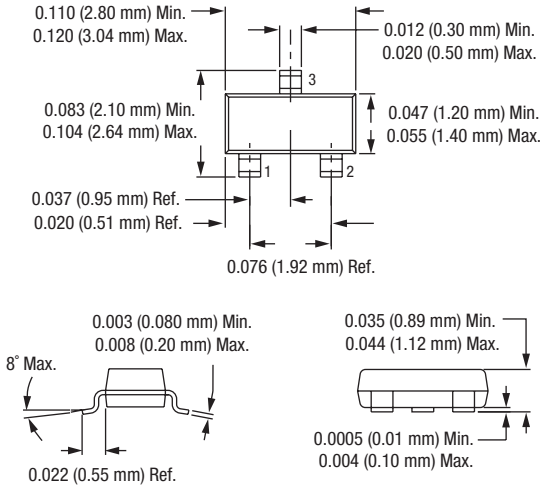
Tape and Reel Information

Refer to the *"Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation"* Application Note.

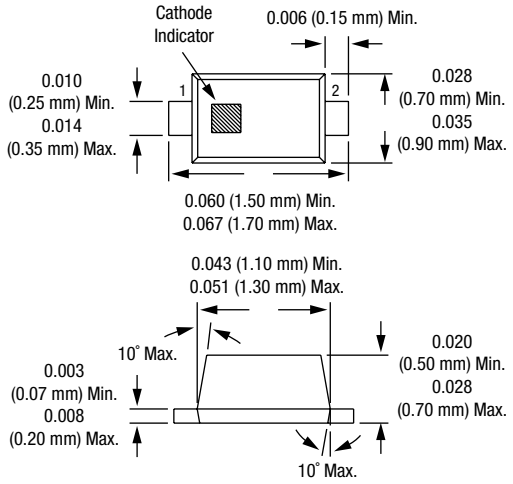
SC-70



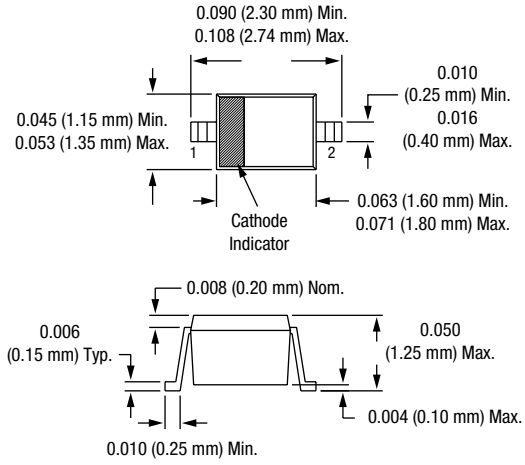
SOT-23



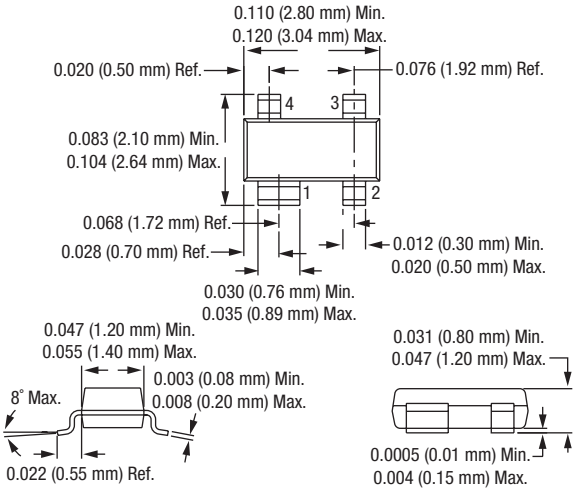
SC-79



SOD-323



SOT-143



SOT-5