PRELIMINARY DATA SHEET

SMP1304-087LF: Surface Mount PIN Diode

Applications

- Los loss, high power switches
- Low distortion attenuators

Features

- Low-series resistance: 2.0 Ω maximum @ 100 mA
- Low total capacitance: 0.3 pF maximum @ 30 V
- QFN (2 x 2 mm) package (MSL1, 260 °C per JEDEC J-STD-020)

Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04-0074.

DISCONTINUED

Description

The SMP1304-087LF is a surface mountable PIN diode suitable for use in an RF switch or attenuator circuit.

Maximum resistance at 100 mA is 2.0 Ω and maximum capacitance at 30 V is 0.3 pF. The combination of low capacitance, low parasitic inductance, and nominal 100 µm I-region width, makes the SMP1304-087LF useful in large signal switches and attenuator applications.

The device has a 1 W dissipation power rating, which makes it capable of handling up to 25 W @ 25 °C Continuous Wave (CW) in a series-connected transmit/receive (T/R) switch.

Design information for high power switches may be found in the Skyworks Application Note, *Design With PIN Diodes* (document number 200312).

Table 1. SMP1304-087LF Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Forward current	I_F		200	mA
Reverse voltage	V_R		200	V
Dissipated power @ 85 °C	P_D		1	W
Operating temperature	T_A	–55	+85	°C
Storage temperature	T_{STG}	–55	+200	°C
Junction temperature	T_J	–55	+175	°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. Exceeding any of the limits listed here may result in permanent damage to the device.

***CAUTION**: 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. 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.*

Table 2. SMP1304-087LF Electrical Specifications (Note 1)
(T_A = +25 °C, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Forward voltage	V_F	I_F = 10 mA		0.80		V
Reverse leakage current	I_R	V_R = 200 V			10	µA
Series resistance	R_{S1}	I_F = 1 mA, f = 100 MHz		40.00	50.00	Ω
	R_{S10}	I_F = 10 mA, f = 100 MHz		5.50	7.00	Ω
	R_{S100}	I_F = 100 mA, f = 100 MHz		1.22	2.00	Ω
Total capacitance	C_{T30}	V_R = 30 V, f = 1 MHz		0.2	0.3	pF
Series inductance	L_S			0.65		nH
Minority carrier lifetime	T_L	I_F = 10 mA		1		µs
I region width	W			100		µm
Thermal resistance (Note 2)	Θ_{JC}	CW		112		°C/W

Note 1: Performance is guaranteed only under the conditions listed in this Table.

Note 2: Assume a thermal resistance of 90 °C/W for the junction-to-bottom of the circuit board.

Electrical and Mechanical Specifications

The absolute maximum ratings of the SMP1304-087LF are provided in Table 1. Electrical specifications are provided in Table 2.

Typical performance characteristics of the SMP1304-087LF are illustrated in Figures 1, 2, and 3.

Package Dimensions

The PCB layout footprint for the SMP1304-087LF is provided in Figure 4. Typical case markings are shown in Figure 5. Package dimensions for the SMP1304-087LF are provided in Figure 6, and tape and reel dimensions are provided in Figure 7.

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 SMP1304-087LF 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.


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Typical Performance Characteristics

(T_A = 25 °C, Unless Otherwise Noted)

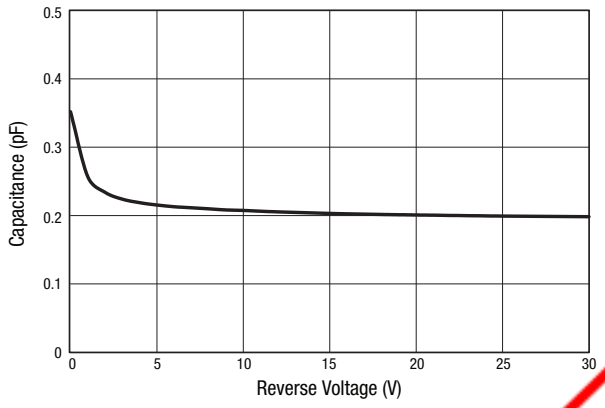


Figure 1. Capacitance vs Reverse Voltage @ 1 MHz

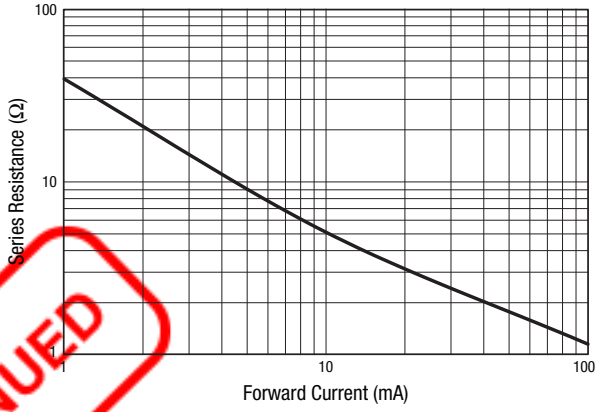


Figure 2. Series Resistance vs Forward Current @ 100 MHz

Figure 3. Forward Voltage vs Forward Current

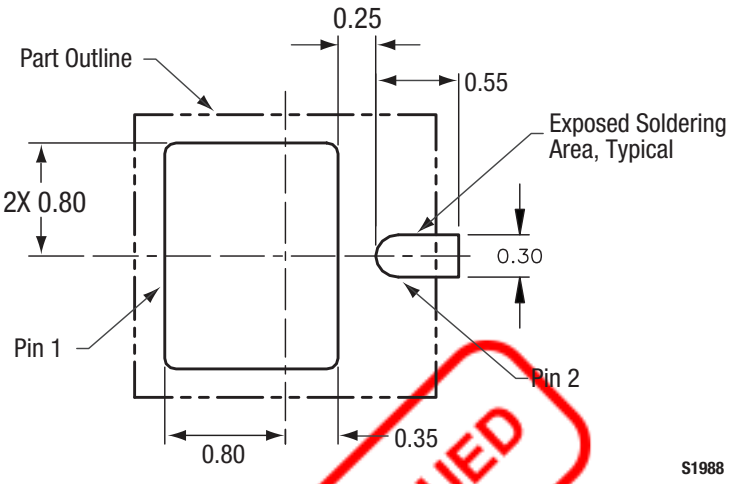


Figure 4. SMP1304-087LF PCB Layout Footprint (Top View)

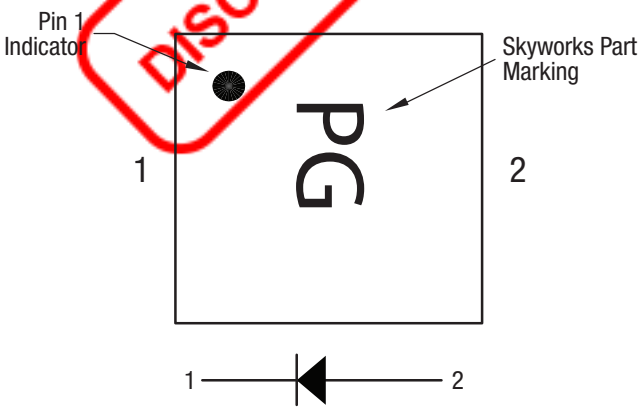
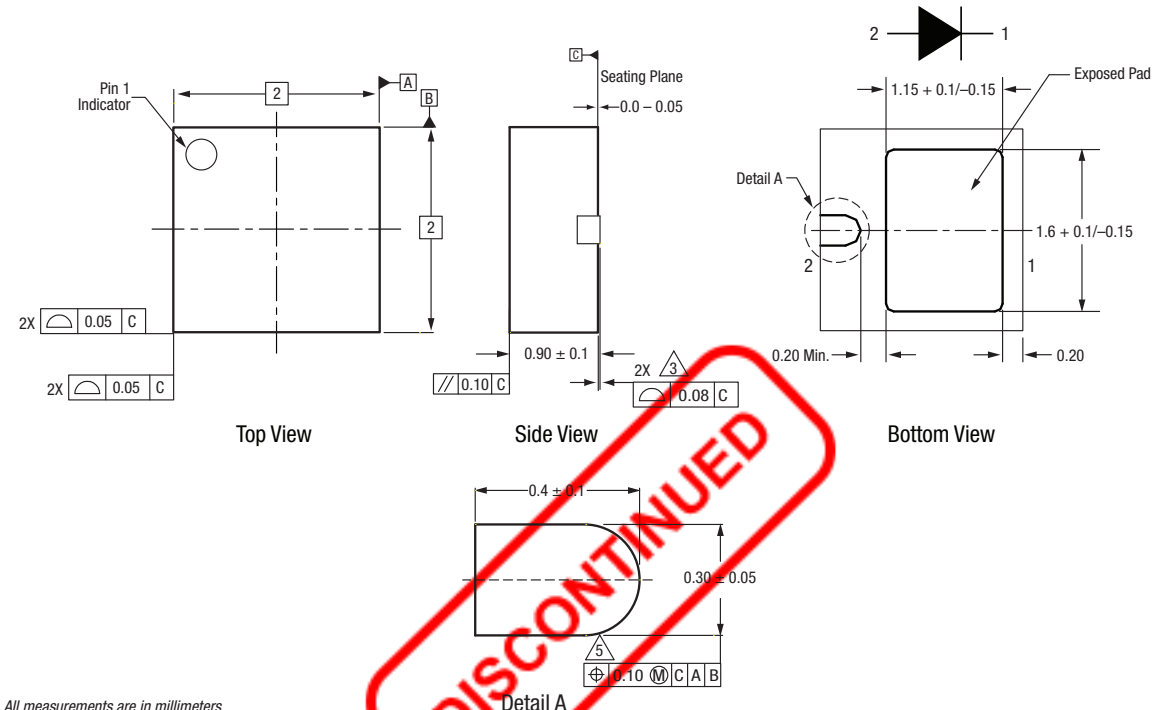


Figure 5. Typical Case Markings (Top View)



All measurements are in millimeters.
Dimensioning and tolerancing according to ASME Y14.5M-1994.
Coplanarity applies to the exposed heat sink slug as well as the terminals..
Dimension applies to metalized terminal and is measured between 0.10 mm and 0.30 mm from terminal tip.

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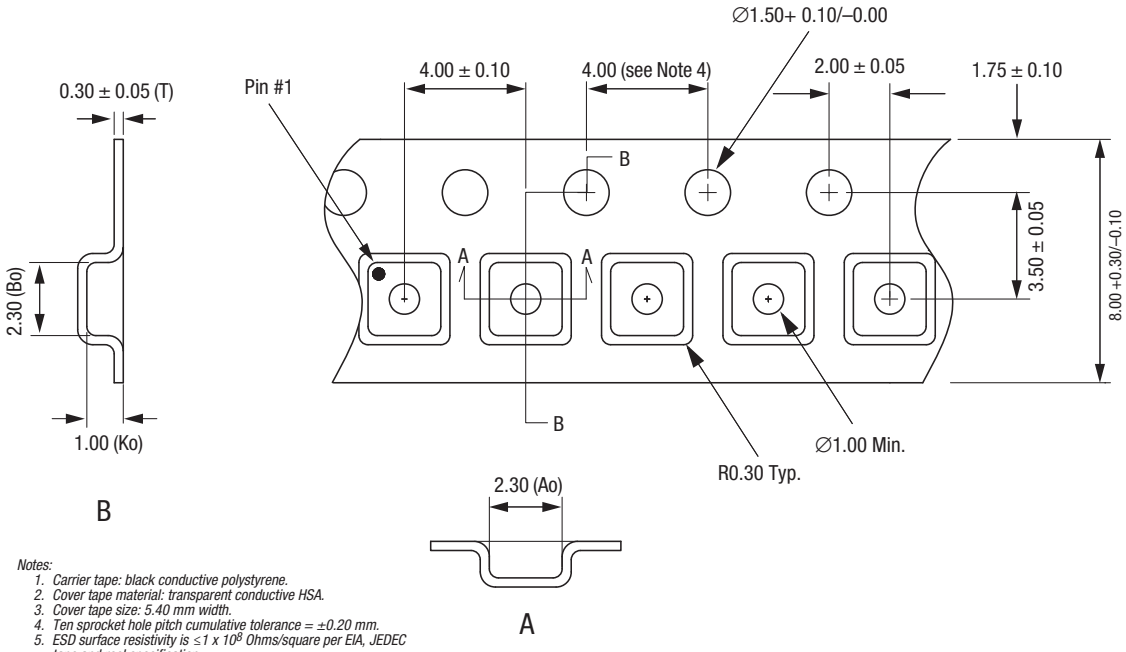
Figure 6. SMP1304-087LF Package Dimensions



Notes:
1. *Carrier tape: black conductive polystyrene.*
2. *Cover tape material: transparent conductive HSA.*
3. *Cover tape size: 5.40 mm width.*
4. *Ten sprocket hole pitch cumulative tolerance = ±0.20 mm.*
5. *ESD surface resistivity is ≤1 x 10^8 Ohms/square per EIA, JEDEC tape and reel specification.*
6. *Ao and Bo measurement point to be 0.30 mm from bottom pocket.*
7. *All measurements are in millimeters.*

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Figure 7. SMP1304-087LF Tape and Reel Dimensions

Ordering Information

Model Name	Manufacturing Part Number
SMP1304-087LF Surface Mount PIN Diode	SMP1304-087LF

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