

DATA SHEET

SMPA1320-079LF Series: Low Resistance, Low Capacitance, Plastic-Packaged PIN Diode

Automotive Applications

- Infotainment
- Navigation
- Telematics
- Garage door openers
- Wireless control systems



Features

- AEC-Q101 qualified
- Resistance: 0.75 Ω typical @ 10 mA
- Capacitance: 0.23 pF typical @ 30 V
- Packages rated 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.

Description

The SMPA1320-079LF plastic-packaged, surface-mountable PIN diode is designed for use in high volume switch applications from 10 MHz to more than 10 GHz. The low current performance of this diode (0.9 Ω maximum at 10 mA and 2 Ω typical at 1 mA) makes the SMPA1320-079LF particularly well suited for in-vehicle infotainment applications.

Table 1 describes the SMPA1320-079LF package and marking.

Table 1. Package and Marking

| |
|---|
|  |
| Single |
| SC-79 Green™ |
| SMPA1320-079LF Marking: Cathode and C5 |
| $L_S = 0.7$ nH |



The Pb-free symbol or "LF" in the part number denotes a lead-free, RoHS-compliant package unless otherwise noted as Green™. Tin/lead (Sn/Pb) packaging is not recommended for new designs.

Electrical and Mechanical Specifications

The absolute maximum ratings of the SMPA1320-079LF 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 SMPA1320-079LF are illustrated in Figures 1 to 4.

Table 2. SMPA1320-079LF Absolute Maximum Ratings¹

| Parameter | Symbol | Minimum | Maximum | Units |
|--|-----------|---------|---------|-------|
| Reverse voltage | V_R | | 50 | 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: | ESD | | | |
| Charged Device Model (CDM), Class 3 | | | 1000 | V |
| Human Body Model (HBM), Class 2 | | | 2000 | V |
| Machine Model (MM), Class B | | | 250 | 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. SMPA1320-079LF Electrical Specifications¹
($T_A = +25\text{ °C}$, Unless Otherwise Noted)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|------------------|----------|---|-----|--------------|------|----------------------|
| Reverse current | I_R | $V_R = 50\text{ V}$ | | | 10 | μA |
| Capacitance | C_T | $F = 1\text{ MHz}, V = 30\text{ V}$ | | 0.23 | 0.30 | pF |
| Resistance | R_S | $F = 100\text{ MHz}$ | | | | |
| | | $I = 1\text{ mA}$ $I = 10\text{ mA}$ | | 2.00 0.75 | 0.90 | Ω Ω |
| Forward voltage | V_F | $I_F = 10\text{ mA}$ | | 0.85 | | V |
| Carrier lifetime | τ_I | $I_F = 10\text{ mA}$ | | 0.4 | | μs |
| I region width | | | | 8 | | μm |

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

Table 4. Resistance vs Temperature @ 500 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 | 29.6 | 29.2 | 30.8 | 32.0 | 32.7 |
| 0.10 | 7.2 | 7.7 | 8.3 | 8.8 | 8.8 |
| 0.3 | 3.4 | 3.6 | 3.8 | 4.0 | 4.1 |
| 0.5 | 2.5 | 2.7 | 2.8 | 2.9 | 3.0 |
| 1.0 | 1.7 | 1.8 | 1.9 | 2.0 | 1.9 |
| 10 | 0.84 | 0.85 | 0.76 | 0.76 | 0.67 |
| 20 | 0.73 | 0.73 | 0.64 | 0.64 | 0.56 |
| 100 | 0.59 | 0.57 | 0.47 | 0.48 | 0.40 |

Typical Performance Characteristics

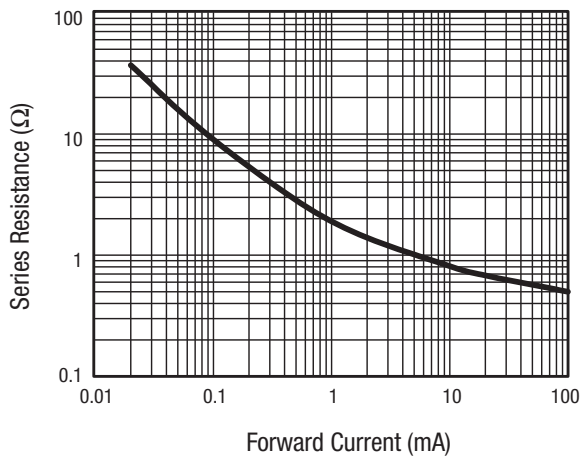


Figure 1. Series Resistance vs Current @ 100 MHz

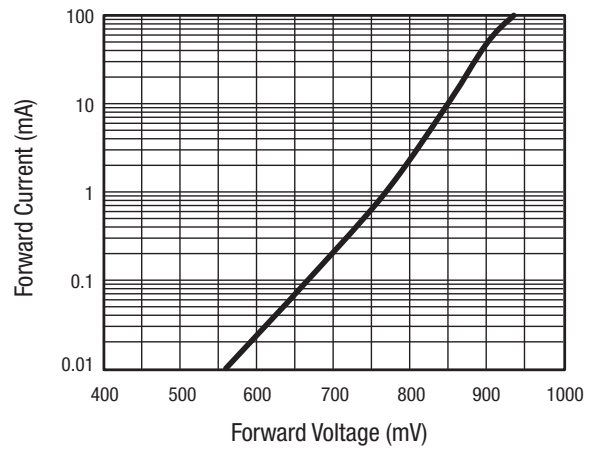


Figure 2. DC Characteristics

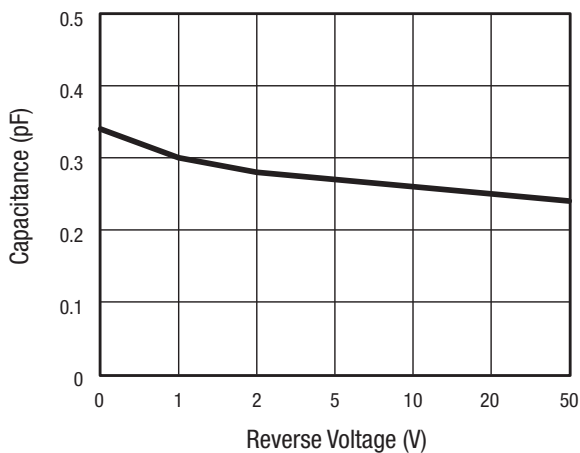


Figure 3. Capacitance vs Reverse Voltage (1 MHz to 1 GHz)

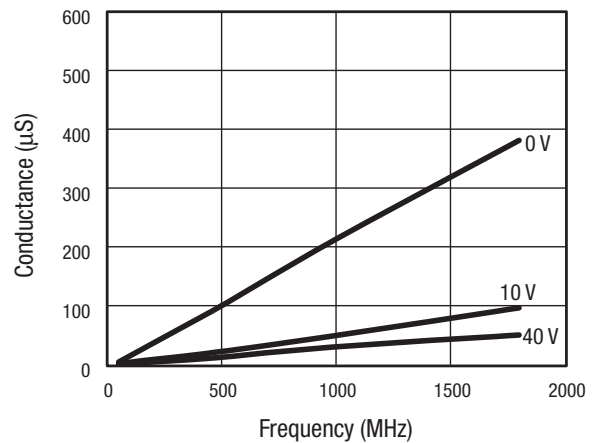


Figure 4. Conductance vs Frequency and Reverse Voltage

Package Dimensions

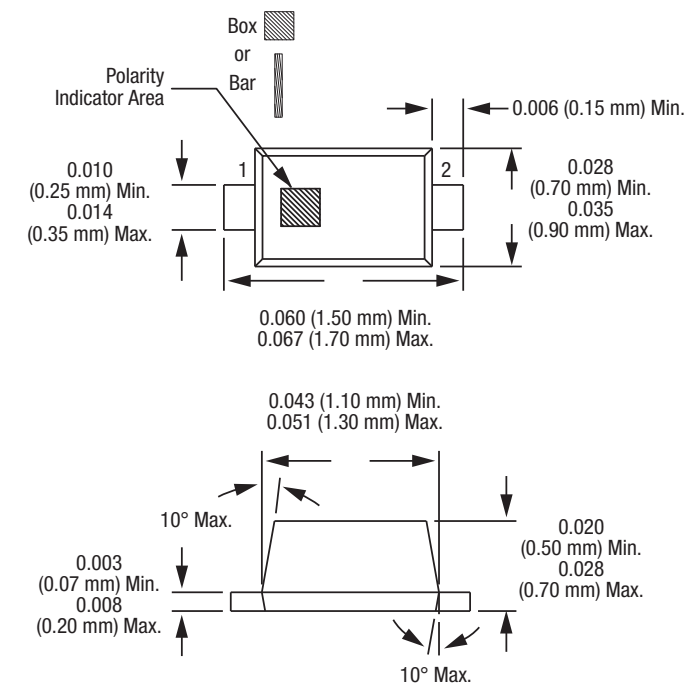
Package dimensions are shown in Figure 5, and tape and reel dimensions are provided in Figure 6.

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 SMPA1320-079LF 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.



Dimensions are in inches (millimeters shown in parentheses)

S1652

Figure 5. SC-79 Package Dimension Drawing

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