

Two-Way Radio Antenna Switch Diode Powermite 1 Package

UPP1001–UPP1004e3

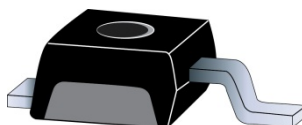


Product Overview

This Microchip Powermite 1 PIN diode is perfect for two-way radio antenna switch applications where size and power handling capability are critical with its high isolation, low loss and low distortion characteristics. Its advantages also include the low forward bias resistance and high zero bias impedance that are essential for low loss, high isolation and wide bandwidth antenna switch performance. They offer high current/power capabilities previously only found in much larger packages.

In addition to its size advantages, Powermite 1 package features include a full metallic bottom that eliminates possibility of solder flux entrapment during assembly and a unique locking tab acts as an efficient heat path from die to mounting plane for external heat sinking with very low thermal resistance junction to case (bottom). Its innovative design makes this device ideal for use with automatic insertion equipment. RoHS compliant versions are available.

Figure 1. DO-216 Package



Features

- Low thermal resistance DO-216AA package for higher current operation. High power capabilities
- Specified low distortion
- Low bias current requirements
- High zero bias impedance
- Full metallic bottom eliminates flux entrapment
- Efficient heat path with Integral heatsink locking bottom metal tab
- Low profile-maximum height of 1.14 mm
- RoHS compliant versions available

Applications/Benefits

- Two-way radio antenna switch
- Low forward bias resistance
- High zero bias resistance
- Low loss high isolation for wide bandwidth performance
- Compatible with automatic insertion equipment
- Very low inductance and capacitance

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1. Maximum Ratings

Table 1-1. Maximum Ratings

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-55 to +150	°C
Thermal Resistance Junction-to-Tab 1	$R_{\theta JL}$	30	°C/W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	10	°C/W
Steady-State Power Dissipation at $T_{TAB1} = 75\text{ °C}$ ¹	P_D	2.5	W
Reverse Voltage at $I_R = 10\text{ }\mu\text{A}$	V_R	UPP1001(e3) 100	V
		UPP1002(e3) 200	
		UPP1004(e3) 400	
Solder Temperature at 10 seconds	T_{SP}	260	°C

Note:

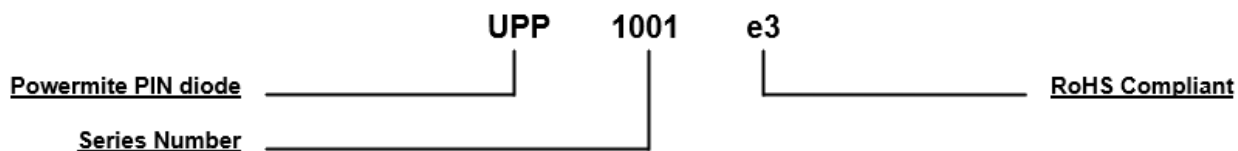
- When mounted on a PC board with 1 oz copper.

1.1 Mechanical Packaging

- Case: Void-free transfer molded thermosetting epoxy compound meeting UL94V-0
- Terminals: Annealed matte-tin over copper and readily solderable per MIL-STD-750, method 2026
- Marking: P11• for UPP1001, P02• for UPP1002, and P04• for UPP1004 (dot indicates “e3” designation). Date Code
- Polarity: Cathode designated by TAB 2
- Tape and Reel Option: 16 mm tape per standard EIA-481-B. Consult factory for quantities.
- Weight: Approximately 0.016 gram
- See [Package Dimensions](#)

2. Part Nomenclature

Figure 2-1. Part Nomenclature



2.1 Symbols and Definitions

Table 2-1. Symbols and Definitions

Symbol	Definition
C_T	Total Capacitance: The total small signal capacitance between the diode terminals of a complete device.
I_F	Forward Current: The dc current flowing from the external circuit into the anode terminal.
I_R	Reverse Current: The dc current flowing from the external circuit into the cathode terminal at the specified voltage V_R .
V_F	Forward Voltage: A positive dc anode-cathode voltage the device will exhibit at a specified forward current.
V_R	Reverse Voltage: A positive dc cathode-anode voltage below the breakdown region.

2.2 Electrical Characteristics

Table 2-2. Electrical Characteristics at $T_A = 25\text{ }^{\circ}\text{C}$ Unless Otherwise Noted

Part Numbers (1)	Series Resistance R_S at $f = 100\text{ MHz}$ $I_F = 10\text{ mA}$ (see Figure 3-1)		Series Resistance R_S at $f = 100\text{ MHz}$ $I_F = 50\text{ mA}$		Capacitance C_T at $f = 1\text{ MHz}$ $V_R = 0\text{ V}$ (see Figure 3-2)		Parallel Resistance R_P at $f = 100\text{ MHz}$ $V = 0\text{ V}$ (see Figure 3-3)		Carrier Lifetime τ at $I_F = 10\text{ mA}$		Reverse Current I_R at V_R		Forward Voltage V_F at $I_F = 50\text{ mA}$ (see Figure 3-4)	
	Ω		Ω		pF		k Ω		μS		μA		Volts	
	TYP	MAX	TYP	MAX	TYP	MAX	MIN	TYP	MIN	TYP	TYP	MAX	TYP	MAX
UPP1001 UPP1002 UPP1004	0.75	1.0	0.35	0.45	1.2	1.6	5	8	2.0	3.5	0.1	10	0.75	1.0

Note:

1. Include e3 in Part Number for RoHS compliant parts (for example, UPP1001e3).

3. Graphs

Figure 3-1. Series Resistance (Typical)

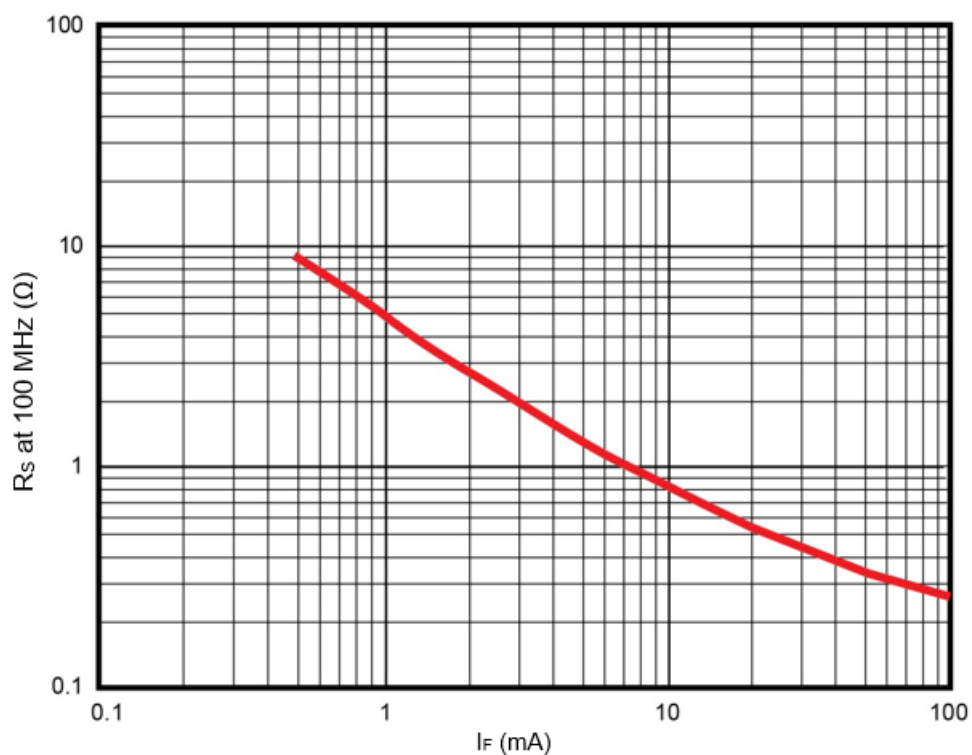


Figure 3-2. Capacitance (Typical)

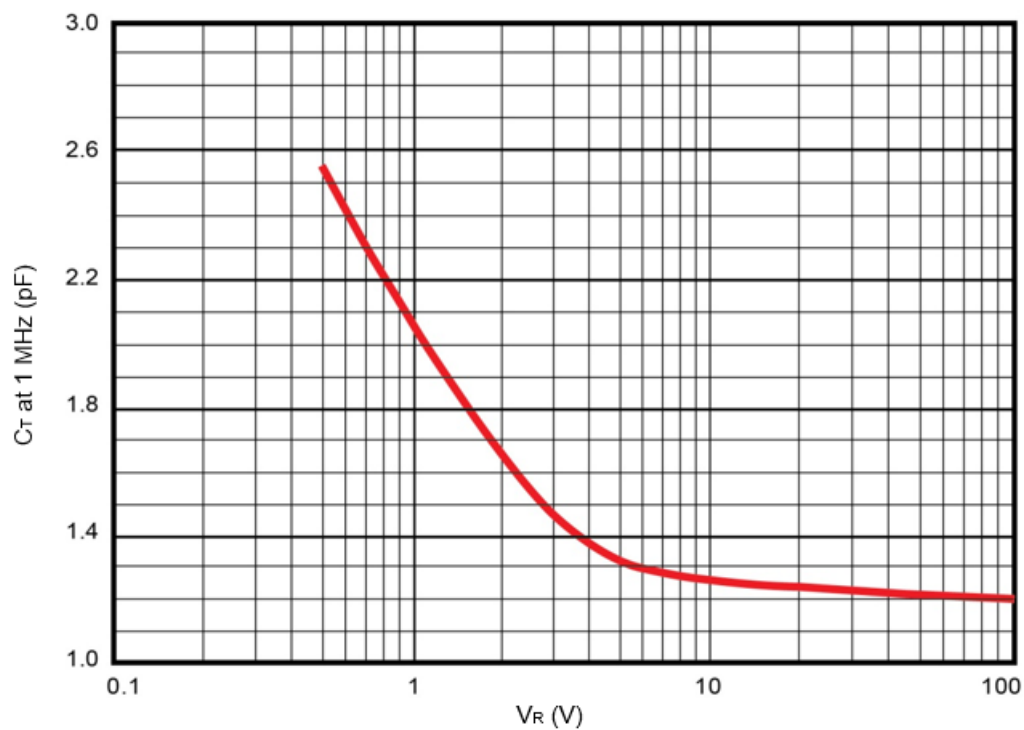
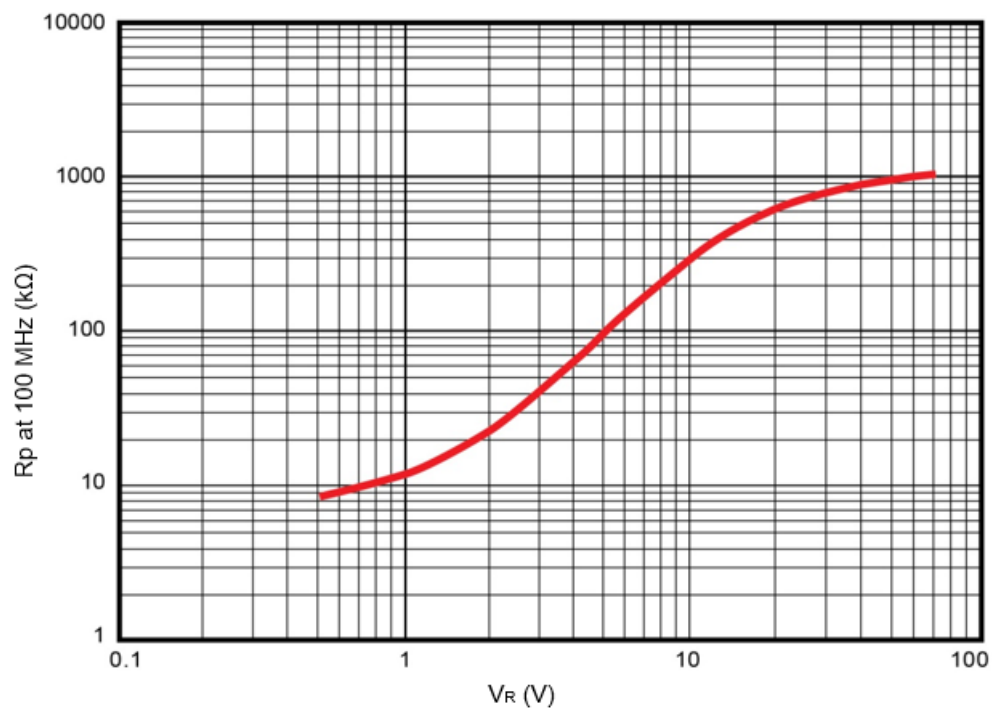
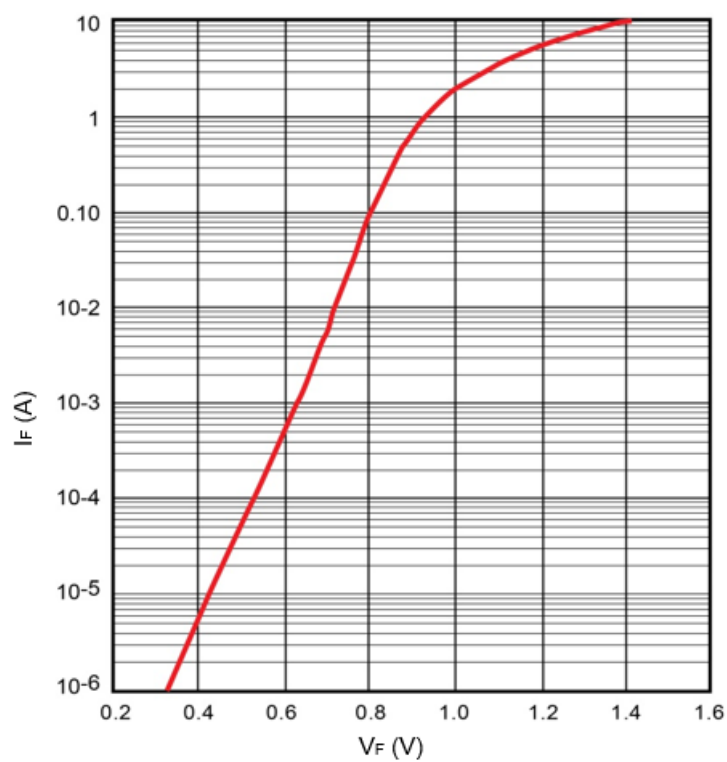
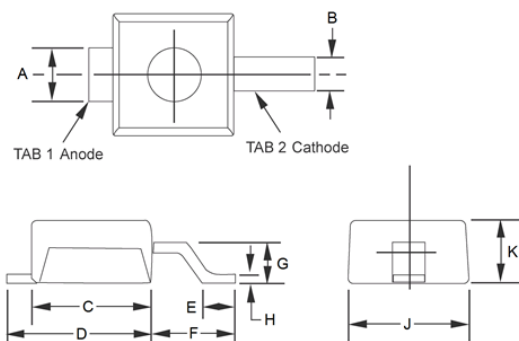


Figure 3-3. Parallel Resistance (Typical)**Figure 3-4. Forward Current Vs. Forward Voltage (Typical)**

4. Package Dimensions

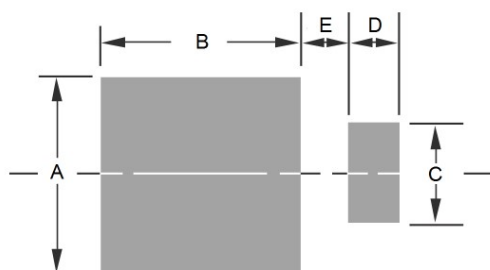
Figure 4-1. Package Dimensions



Ltr	Dimensions			
	Inch		Millimeters	
	Min.	Max.	Min .	Max.
A	0.029	0.039	0.73	0.99
B	0.016	0.026	0.40	0.66
C	0.070	0.080	1.77	2.03
D	0.087	0.097	2.21	2.46
E	0.020	0.030	0.50	0.76
F	0.051	0.061	1.29	1.54
G	0.021	0.031	0.53	0.78
H	0.004	0.008	0.10	0.20
J	0.070	0.080	1.77	2.03
K	0.035	0.045	0.89	1.14

4.1 Mounting Pad Dimensions

Figure 4-2. Mounting Pad Dimensions



Ltr	Dimensions	
	Inch	Millimeters
A	0.100	2.54
B	0.105	2.67
C	0.050	1.27
D	0.030	0.76
E	0.025	0.64

5. Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Revision	Date	Description
A	04/2025	Document was converted to Microchip template and assigned literature number
Rev. D	01/2025	Microsemi document was created and assigned literature number RF01104.

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