Agilent HSMP-3880 Surface Mount RF PIN Switch Diode

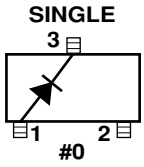
Data Sheet

Description/Applications

The HSMP-3880 switching diode is an ultra low distortion device optimized for higher power applications to 1.5 GHz.

A SPICE model is not available for PIN diodes as SPICE does not provide for a key PIN diode characteristic, carrier lifetime.

Package Lead Code Identification (Top View)



Features

- **Diodes Optimized for: Ultra-Low Distortion Switching**
- **Surface Mount SOT-23 Package**
  Tape and Reel Options Available
- **Low Failure in Time (FIT) Rate[1]**
- **Lead-free Option Available**

Note:

1. For more information see the Surface Mount PIN Reliability Data Sheet.

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Absolute Maximum Ratings[1] T_C = 25°C

Symbol	Parameter	Units	Absolute Maximum
I_f	Forward Current (1 ms Pulse)	Amp	1
P_t	Total Device Dissipation	mW[2]	250
P_{iv}	Peak Inverse Voltage	—	Same as V_{BR}
T_j	Junction Temperature	°C	150
T_{STG}	Storage Temperature	°C	-65 to 150

Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to this device.
2. CW Power Dissipation at T_{LEAD} = 25°C. Derate to zero at maximum rated temperature.

Typical Parameters at T_C = 25°C

Part Number HSMP-	Series Resistance R_S (Ω)	Carrier Lifetime τ (ns)	Reverse Recovery Time T_{rr} (ns)	Total Capacitance C_T (pF)
3880	3.8	2500	550	0.30 @ 50 V
Test Conditions	I_F = 10 mA f = 100 MHz	I_F = 50 mA I_R = 250 mA	V_R = 10 V I_F = 20 mA 90% Recovery	

Electrical Specifications T_C = 25°C

Part Number HSMP-	Package Marking Code	Lead Code	Configuration	Minimum Breakdown Voltage V_{BR} (V)	Maximum Series Resistance R_S (Ω)	Maximum Total Capacitance C_T (pF)	Maximum Shunt Mode Harmonic Distortion Hmd (dBc)
3880	S0	0	Single	100	6.5	0.40	-55
Test Conditions				V_R = V_{BR} Measure I_R ≤ 10 µA	I_F = 5 mA f = 100 MHz	V_R = 50 V f = 1 MHz	2f_o, Z_o = 50 W f_o = 400 MHz P_{in} = +30 dBm 0 V bias

Typical Parameters at T_C = 25°C (unless otherwise noted), Single Diode

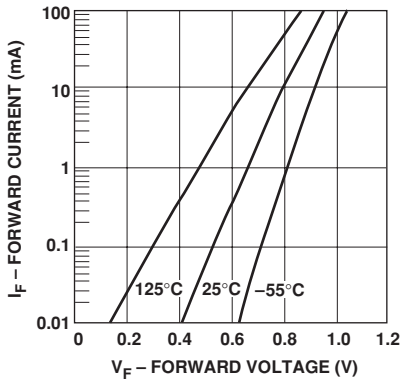


Figure 1. Forward Current vs. Forward Voltage.

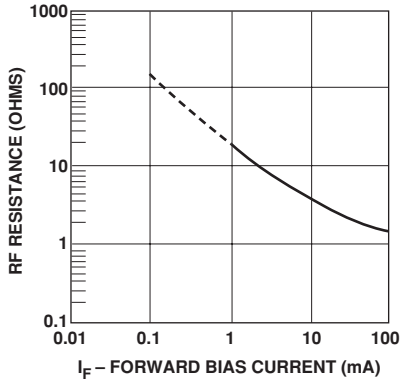


Figure 2. RF Resistance at 25°C vs. Forward Bias Current.

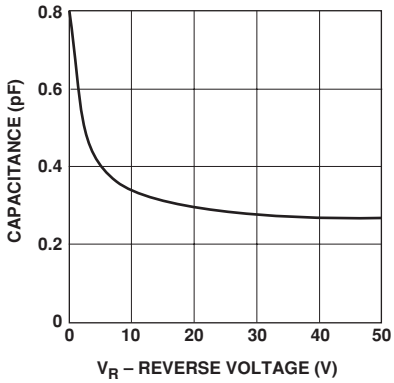


Figure 3. Capacitance vs. Reverse Voltage.

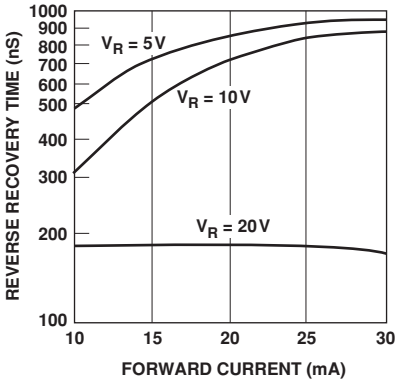


Figure 4. Typical Reverse Recovery Time vs. Reverse Voltage.

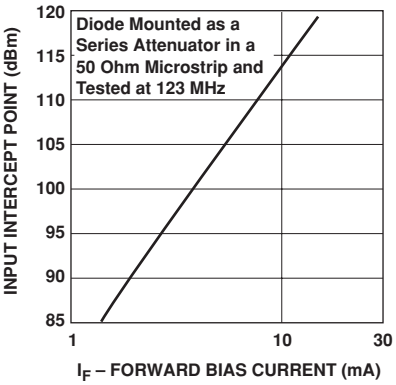
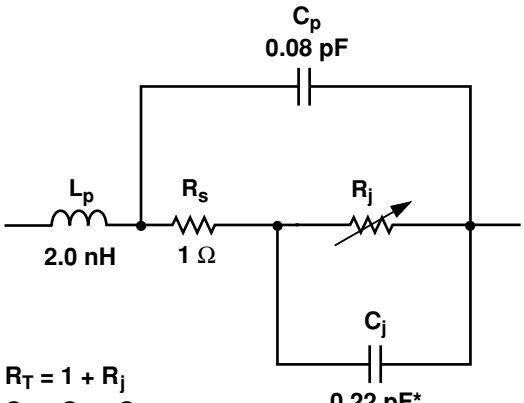


Figure 5. 2nd Harmonic Input Intercept Point vs. Forward Bias Current.

Equivalent Circuit Model

HSMP-3880



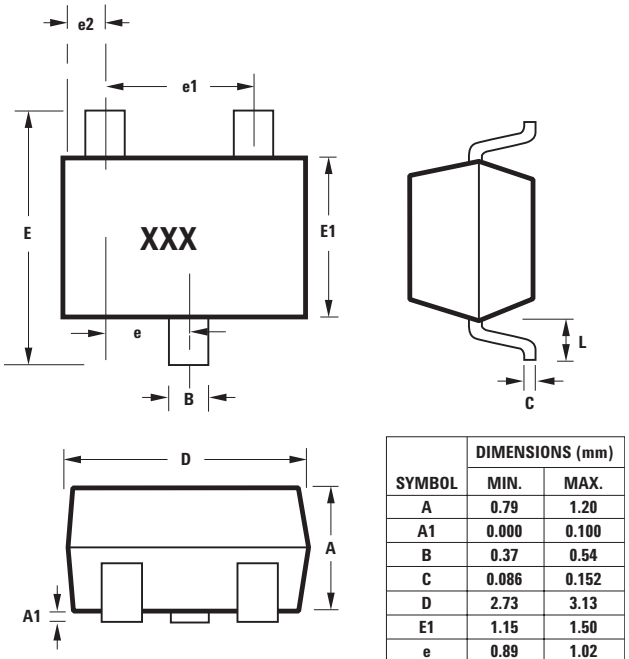
$R_T = 1 + R_j$

$C_T = C_P + C_j$

$R_j = \frac{49}{I^{0.9}}\ \Omega$

I = Forward Bias Current in mA

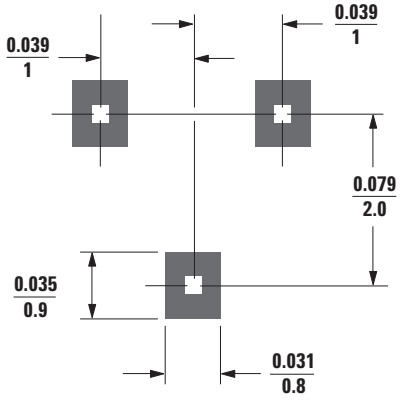
Package Dimensions
Outline 23 (SOT-23)



SYMBOL	DIMENSIONS (mm) MIN.	MAX.
A	0.79	1.20
A1	0.000	0.100
B	0.37	0.54
C	0.086	0.152
D	2.73	3.13
E1	1.15	1.50
e	0.89	1.02
e1	1.78	2.04
e2	0.45	0.60
E	2.10	2.70
L	0.45	0.69

Notes:
XXX-package marking
Drawings are not to scale

Recommended PCB Pad Layout for Agilent's SOT-23 Products



Dimensions in inches / mm

Package Characteristics

Lead Material ..... Alloy 42
Lead Finish ..... Tin-Lead 85-15% (Non lead-free option)
or Tin 100% (Lead-free option)
Maximum Soldering Temperature ..... 260°C for 5 seconds
Minimum Lead Strength ..... 2 pounds pull
Typical Package Inductance ..... 2 nH
Typical Package Capacitance ..... 0.08 pF (opposite leads)

Profile Option Descriptions

-BLK = Bulk
-TR1 = 3K pc. Tape and Reel, Device Orientation; See Figure 6
-TR2 = 10K pc. Tape and Reel, Device Orientation; See Figure 6

Tape and Reeling conforms to Electronic Industries RS-481, “Taping of Surface Mounted Components for Automated Placement.”
For lead-free option, the part number will have the character "G" at the end, e.g., TR2G for a 10K pc lead-free reel.

Ordering Information

Specify part number followed by option under. For example:

HSMP - 3880 - XXX

- XXX: Bulk or Tape and Reel Option
- 3880: Part Number
- HSMP: Surface Mount PIN Diode

Device Orientation

For Outline SOT-23

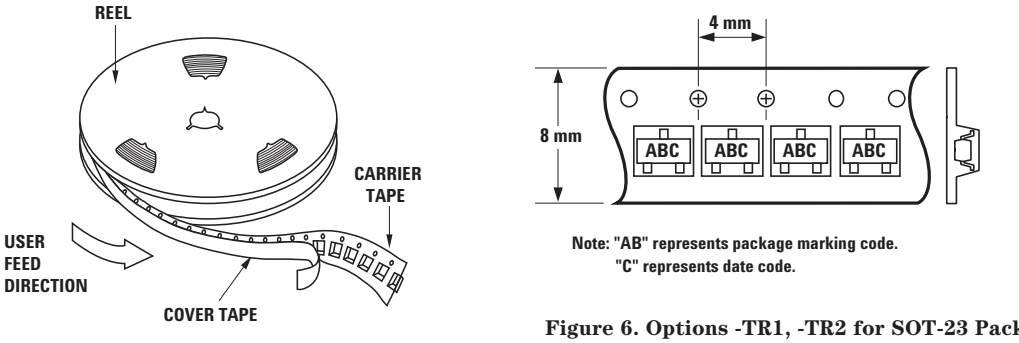
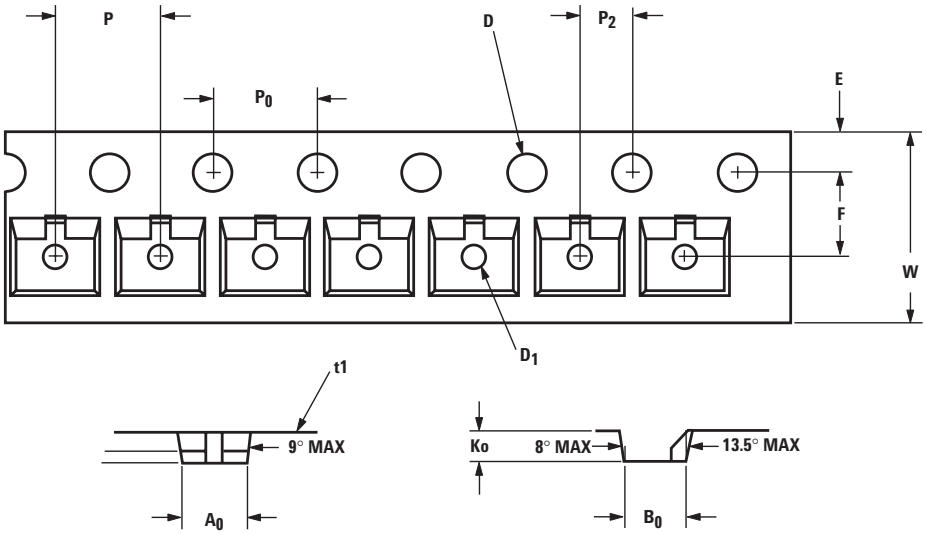


Figure 6. Options -TR1, -TR2 for SOT-23 Package.

Tape Dimensions and Product Orientation
For Outline SOT-23



DESCRIPTION		SYMBOL	SIZE (mm)	SIZE (INCHES)
CAVITY	LENGTH	A_0	3.15 ± 0.10	0.124 ± 0.004
	WIDTH	B_0	2.77 ± 0.10	0.109 ± 0.004
	DEPTH	K_0	1.22 ± 0.10	0.048 ± 0.004
	PITCH	P	4.00 ± 0.10	0.157 ± 0.004
	BOTTOM HOLE DIAMETER	D_1	1.00 + 0.05	0.039 ± 0.002
PERFORATION	DIAMETER	D	1.50 + 0.10	0.059 + 0.004
	PITCH	P_0	4.00 ± 0.10	0.157 ± 0.004
	POSITION	E	1.75 ± 0.10	0.069 ± 0.004
CARRIER TAPE	WIDTH	W	8.00 +0.30 –0.10	0.315 +0.012 –0.004
	THICKNESS	t1	0.229 ± 0.013	0.009 ± 0.0005
DISTANCE BETWEEN CENTERLINE	CAVITY TO PERFORATION (WIDTH DIRECTION)	F	3.50 ± 0.05	0.138 ± 0.002
	CAVITY TO PERFORATION (LENGTH DIRECTION)	P_2	2.00 ± 0.05	0.079 ± 0.002

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Data subject to change.

Obsoletes 5988-2502EN
September 28, 2005
5989-4029EN

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