

HSMP-3812

Low distortion PIN attenuator diode

Description



Lifecycle status: **Active**



Features

The HSMP-381x family of PIN diodes are the ideal solution for low distortion attenuators.
 $C_t=0.35\text{pF}$, $R_s@100\text{mA}=2.5\text{Ohms}$, $\text{Tau}=1800\text{nSec}$, $F_c=88\text{kHz}$

HSMP-381x, 481x

Surface Mount RF PIN

Low Distortion Attenuator Diodes



Data Sheet

Description/Applications

The HSMP-381x series is specifically designed for low distortion attenuator applications. The HSMP-481x products feature ultra low parasitic inductance in the SOT-23 and SOT-323 packages. They are specifically designed for use at frequencies which are much higher than the upper limit for conventional diodes.

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

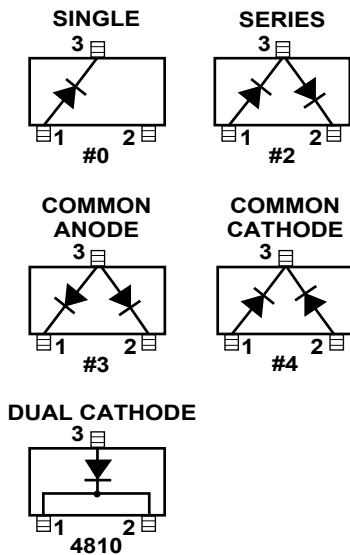
Features

- Diodes Optimized for:
 - Low Distortion Attenuating
 - Microwave Frequency Operation
- Surface Mount Packages
 - Single and Dual Versions
 - Tape and Reel Options Available
- Low Failure in Time (FIT) Rate^[1]

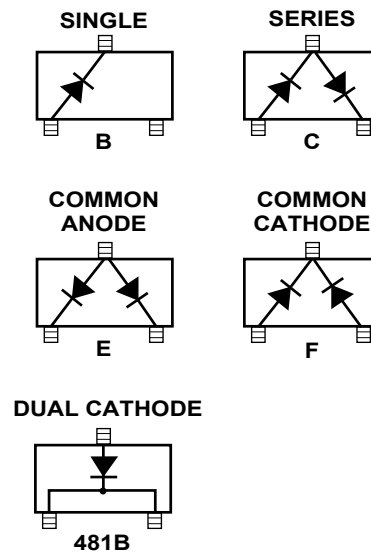
Note:

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

Package Lead Code Identification, SOT-23 (Top View)



Package Lead Code Identification, SOT-323 (Top View)



Absolute Maximum Ratings^[1] $T_c = +25^\circ\text{C}$

| Symbol | Parameter | Unit | SOT-23 | SOT-323 |
|---------------|---|---------------------------|------------------|------------------|
| I_f | Forward Current (1 μs Pulse) | Amp | 1 | 1 |
| P_{IV} | Peak Inverse Voltage | V | Same as V_{BR} | Same as V_{BR} |
| T_j | Junction Temperature | $^\circ\text{C}$ | 150 | 150 |
| T_{stg} | Storage Temperature | $^\circ\text{C}$ | -65 to 150 | -65 to 150 |
| θ_{jc} | Thermal Resistance ^[2] | $^\circ\text{C}/\text{W}$ | 500 | 150 |

Notes:

1. Operation in excess of any one of these conditions may result in permanent damage to the device.
2. $T_c = +25^\circ\text{C}$, where T_c is defined to be the temperature at the package pins where contact is made to the circuit board.

Electrical Specifications $T_c = +25^\circ\text{C}$ (Each Diode)

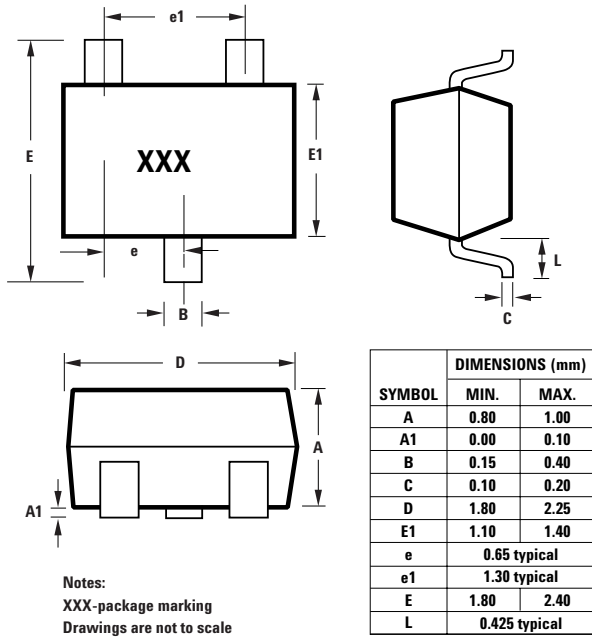
Conventional Diodes

| Part Number HSMP- | Package Marking Code | Lead Code | Configuration | Minimum Breakdown Voltage V_{BR} (V) | Maximum Total Capacitance C_T (pF) | Minimum Resistance at $I_F = 0.01\text{mA}$, R_H (Ω) | Maximum Resistance at $I_F = 20\text{mA}$, R_L (Ω) | Maximum Resistance at $I_F = 100\text{mA}$, R_T (Ω) | Resistance at $I_F = 1\text{mA}$, R_M (Ω) |
|----------------------|----------------------|-----------|----------------|---|---|--|--|---|---|
| 3810 | E0 | 0 | Single | 100 | 0.35 | 1500 | 10 | 3.0 | 48 to 70 |
| 3812 | E2 | 2 | Series | | | | | | |
| 3813 | E3 | 3 | Common Anode | | | | | | |
| 3814 | E4 | 4 | Common Cathode | | | | | | |
| 381B | E0 | B | Single | | | | | | |
| 381C | E2 | C | Series | | | | | | |
| 381E | E3 | E | Common Anode | | | | | | |
| 381F | E4 | F | Common Cathode | | | | | | |
| Test Conditions | | | | $V_R = V_{BR}$ Measure $I_R \leq 10\mu\text{A}$ | $V_R = 50\text{V}$ $f = 1\text{MHz}$ | $I_F = 0.01\text{mA}$ $f = 100\text{MHz}$ | $I_F = 20\text{mA}$ $f = 100\text{MHz}$ | $I_F = 100\text{mA}$ $f = 100\text{MHz}$ | $I_F = 1\text{mA}$ $f = 100\text{MHz}$ |

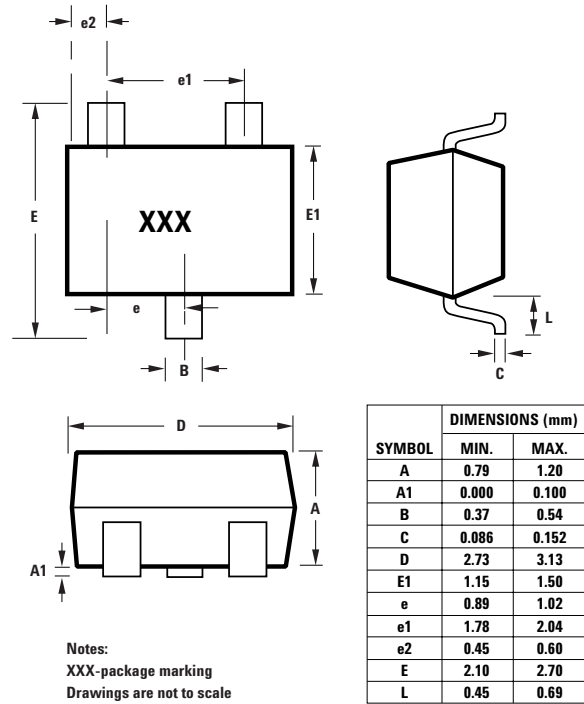
High Frequency (Low Inductance, 500 MHz – 3 GHz) PIN Diodes

| Part Number HSMP- | Package Marking Code | Lead Code | Configuration | Minimum Breakdown Voltage V_{BR} (V) | Maximum Series Resistance R_S (Ω) | Series Resistance $I_F = 1\text{mA}$, R_M (Ω) | Typical Total Capacitance C_T (pF) | Maximum Total Capacitance C_T (pF) | Typical Total Inductance L_T (nH) |
|----------------------|----------------------|-----------|---------------|---|--|---|---|---|-------------------------------------|
| 4810 | EB | B | Dual Cathode | 100 | 3 | 48 - 70 | 0.35 | 0.4 | 1 |
| 481B | EB | B | Dual Cathode | | | | | | |
| Test Conditions | | | | $V_R = V_{BR}$ Measure $I_R \leq 10\mu\text{A}$ | $I_F = 100\text{mA}$ $f = 100\text{MHz}$ | $I_F = 1\text{mA}$ $f = 100\text{MHz}$ | $V_R = 50\text{V}$ $f = 1\text{MHz}$ | $V_R = 50\text{V}$ $f = 1\text{MHz}$ | $f = 500\text{MHz}$ - 3GHz |

Package Dimensions Outline SOT-323 (SC-70)



Outline 23 (SOT-23)

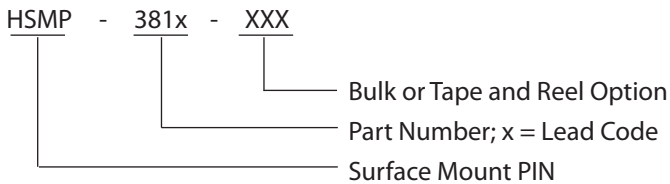


Package Characteristics

Lead Material Copper (SOT-323); Alloy 42 (SOT-23)
 Lead Finish 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)

Ordering Information

Specify part number followed by option. For example:



Option Descriptions

-BLKG = Bulk, 100 pcs. per antistatic bag
 -TR1G = Tape and Reel, 3000 devices per 7" reel
 -TR2G = Tape and Reel, 10,000 devices per 13" reel

Tape and Reeling conforms to Electronic Industries RS-481, "Taping of Surface Mounted Components for Automated Placement."