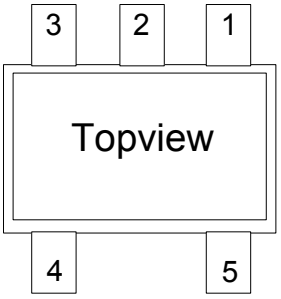
MADP-007167-12250T

PIN Diode π Quad Attenuator

Rev. V4

Features

- 4 PIN diodes in a SOT-25 Plastic Package
- Externally Selectable Bias and RF Matching Network
- 5 - 3000 MHz Useable Frequency Band
- 45 dBm IIP3 @ 1 GHz (50 Ω)
- 2.8 dB Loss @ 1 GHz (50 Ω)
- 36 dB Attenuation @ 1 GHz (50 Ω)
- Lead-Free
- RoHS*



Description and Applications

The MADP-007167-12250T is a wideband, moderate insertion loss, high IP3, PIN diode quad diode in a low-cost, surface mount SOT-25 package. Four PIN Diodes in one package reduce circuit parasitics and improve circuit density.

These PIN diode attenuators perform well where variable RF amplitude control is required in 50 Ω and 75 Ω circuit applications.

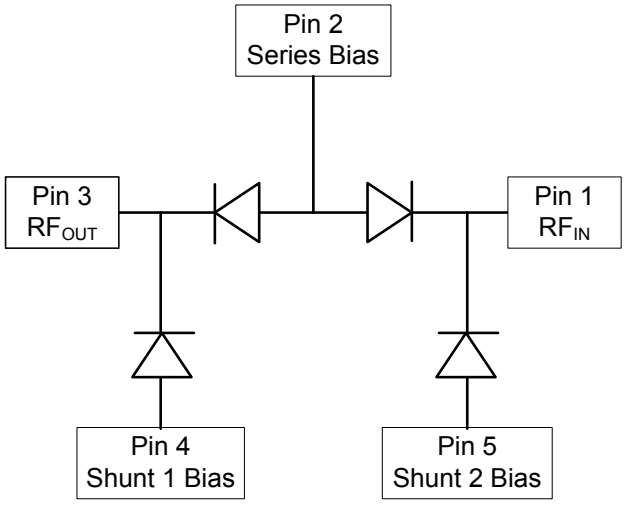
Wideband attenuation range, frequency flatness, and input IP3 make these devices suitable for better power level control in RF amplifiers.

Pin Configuration[2]

Plin #	Function
1	RF Input
2	Series Bias
3	RF Output
4	Shunt 1 Bias
5	Shunt 2 Bias

2. RF input and RF output are functionally symmetrical.

Functional Schematic



Ordering Information[1]

Part Number	Package
MADP-007167-12250T	3000 piece reel

1. Reference Application Note M513 for reel size information.

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

Electrical Specifications @ +25°C

Parameter	Condition	Unit	Typical	Max.
Reverse Current (I_R)	V_R = 200 V	mA	—	10
Capacitance (C_T)	F = 1 MHz, V = 50 V	pF	.20	.30
Resistance (R_S)	F = 100 MHz, I = 1 mA F = 100 MHz, I = 10 mA F = 100 MHz, I = 100 mA	Ω	85 11 3	— 16 —
Minority Carrier Lifetime (T_L)	I_F = 10 mA	ms	2.7	—
I Region Width	—	mm	175	—

Typical 50 Ω SOT-25 RF Performance: Freq. = 50 - 3000 MHz, T_A = +25°C using Wide Band RF Circuit Design (Values Shown include Through Loss Calibrated Out of RF Test Circuit)

Parameter	Test Conditions	Units	Typ.
Insertion Loss	13 mA / Series Diode and 3.7 V Shunt 1 and 2 Bias, F = 1 GHz	dB	-2.8
Return Loss	13 mA / Series Diode and 3.7 V Shunt 1 and 2 Bias, F = 1 GHz	dB	-15
Attenuation	0 mA / Series Diode and 3.7 V Shunt 1 and 2 Bias, F = 1 GHz	dB	-36
Input IP3	0 V / Series Diode and 3.7 V Shunt 1 and 2 Bias, F1 = 1010 MHz, F2 = 1020 MHz	dBm	45
Input IP3	+ 10 V / Series Diode and 3.7 V Shunt 1 and 2 Bias, F1 = 1010 MHz, F2 = 1020 MHz	dBm	43.5
Input IP3	0 V / Series Diode and 3.7 V Shunt 1 and 2 Bias, F1 = 110 MHz, F2 = 120 MHz	dBm	43.5
Input IP3	+ 10 V / Series Diode and 3.7 V Shunt 1 and 2 Bias, F1 = 110 MHz, F2 = 120 MHz	dBm	39
Settling Time	Within 1 dB of Final Attenuation Value, F = 1 GHz	µs	10
RF C.W. Incident Power	0 - 20 V Series Diode Bias and 3.7 V Shunt 1 and 2 Bias	dBm	+ 20

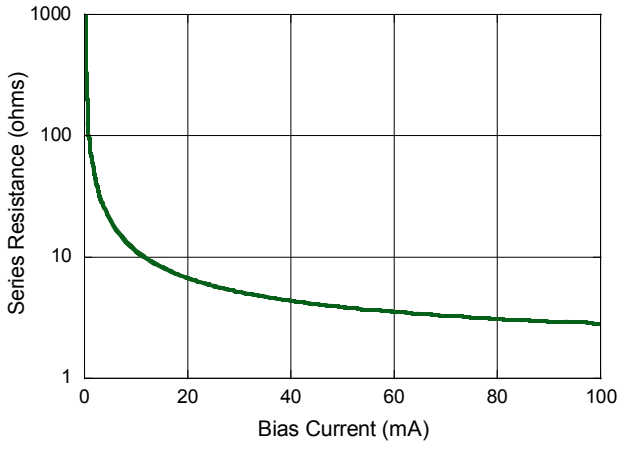
Absolute Maximum Ratings @ +25°C[3]

Parameter	Absolute Maximum
Operating Temperature	-65°C to +125°C
Storage Temperature (0 mW Dissipated Power)	-65°C to +150°C
Junction Temperature	+175°C
DC Voltage @ Temperature Extremes	I -200 V I
DC Current per diode	200 mA
Mounting Temperature	+235°C for 10 seconds

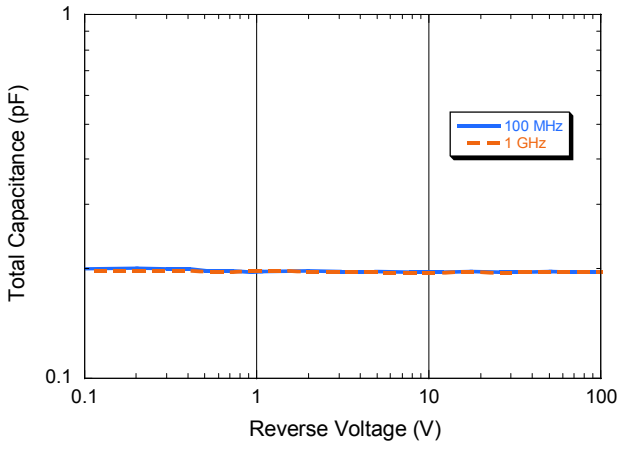
3. Exceeding these limits may cause permanent damage.

Typical Diode Performance Curves

Series Resistance

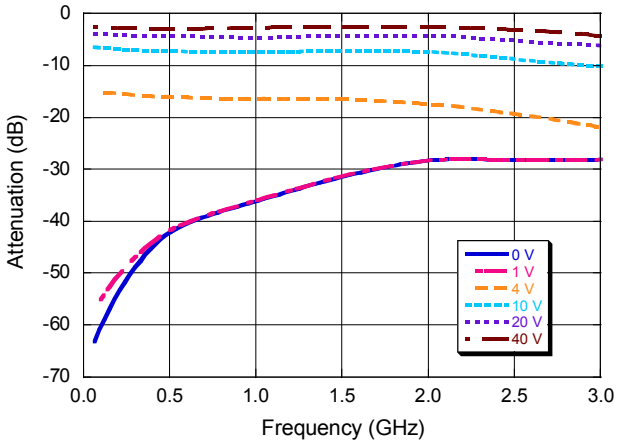


Total Capacitance

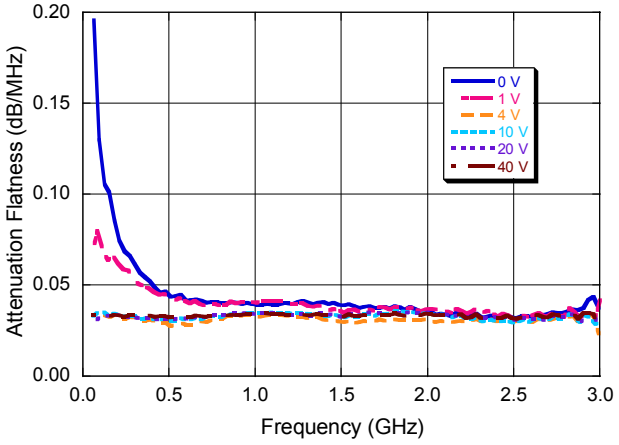


Typical Attenuator Performance

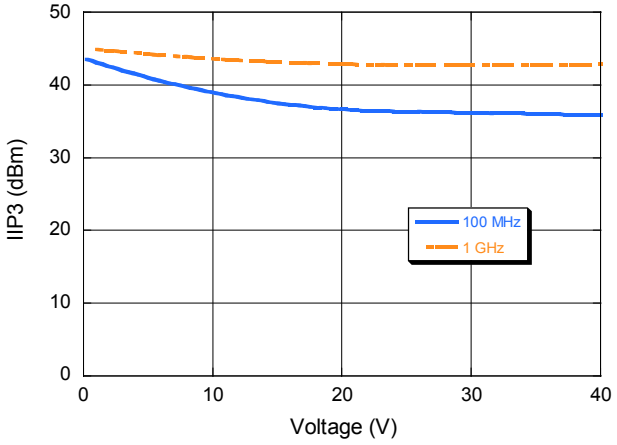
Attenuation



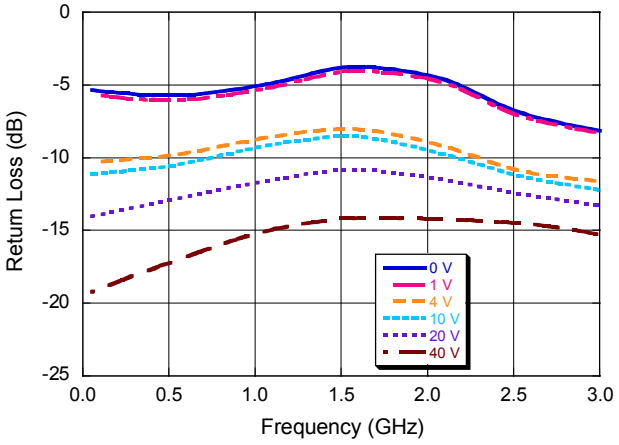
Attenuation Flatness



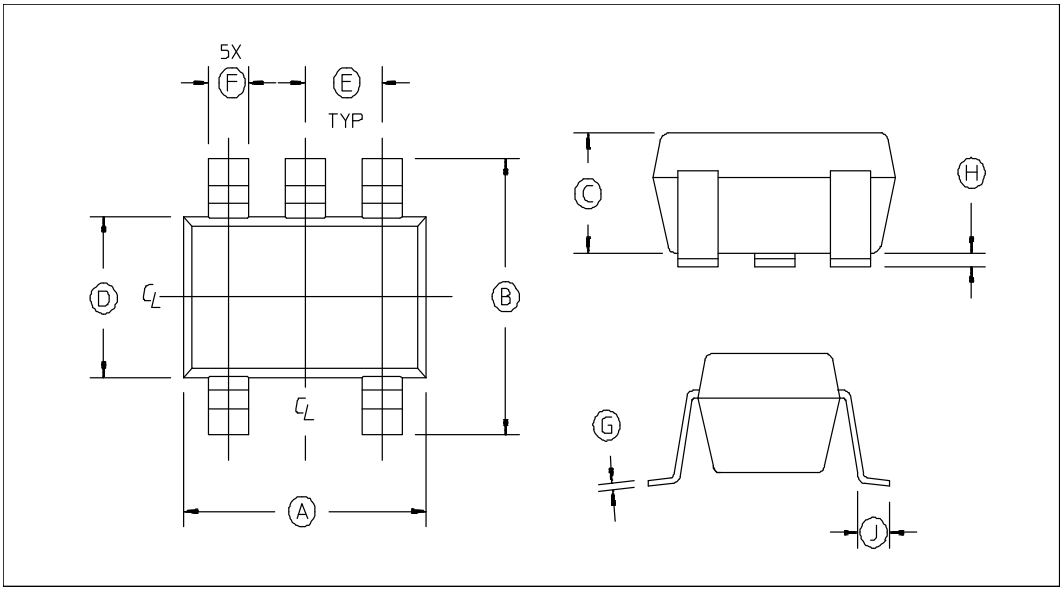
Input IP3



Return Loss



SOT-25 (Case Style 1225)



Dim	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	.1103	.1181	2.80	3.10
B	.1023	.1181	2.6	3.00
C	0.0355	.0512	0.9	1.30
D	0.0591	.0669	1.5	1.70
E	.0374 REF.		0.95 REF.	
F	.0138	.0197	.35	.50
G	.0031	0.0079	.08	0.2
H	.0002	.0059	.05	.15
J	.0138	.0216	.35	.55