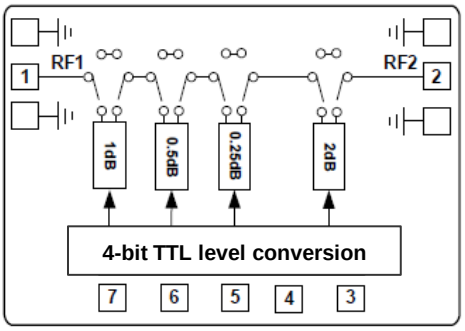
V1.0.0

GaAs pHEMT MMIC
4-Bit Digital Control Attenuator
0.1-18GHz

Features

- Integrated 4-bit TTL level conversion circuit
- Attenuation Range: 0.25dB -3.75dB
- Attenuation Accuracy: ±0.15dB
- Insertion Loss : 1dB
- Attenuation Additional Phase Shift: ±2°
- Power Supply: 5V @ 4mA
- Die Size: 1.0 x 0.91 x 0.1 mm

Functional Block Diagram



Typical Applications

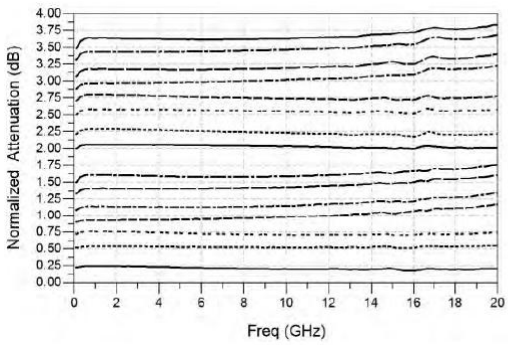
- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

Electrical Specifications

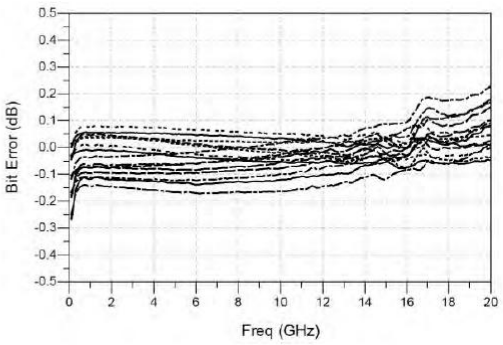
TA = +25ºC, VCTL = 0/+5V, VDD=+5V

Parameters	Min.	Typ.	Max.	Units
Frequency		0.1-18		GHz
Insertion Loss		1	1.3	dB
Attenuation Accuracy		±0.15		dB
Attenuation Additional Phase Shift		±2		°
Return Loss		15		dB
Input power 1dB Compression @1-18GHz		24		dBm
Switching Speed		30		ns

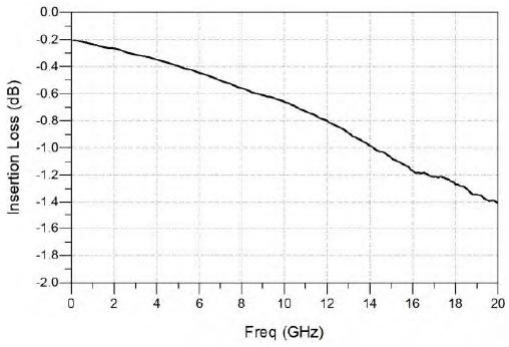
All State Attenuation



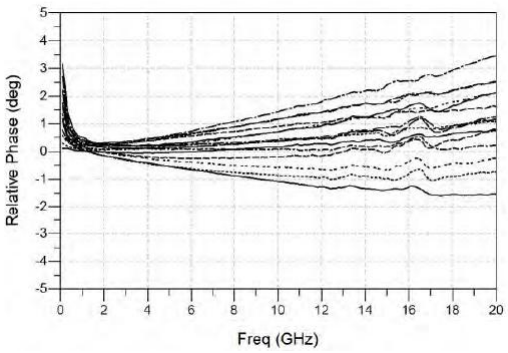
All State Attenuation Accuracy



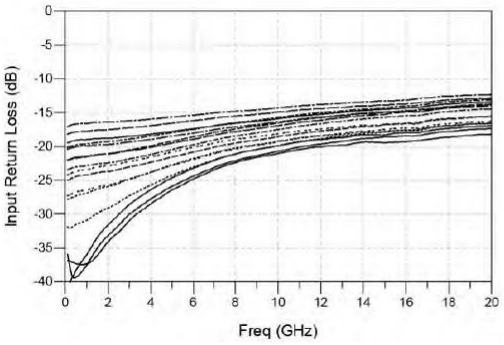
Insertion Loss



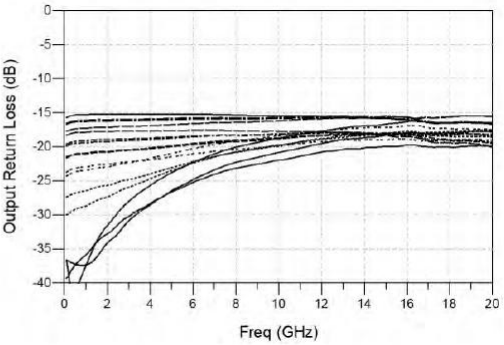
All State Attenuation Additional Phase Shift



Input Return Loss

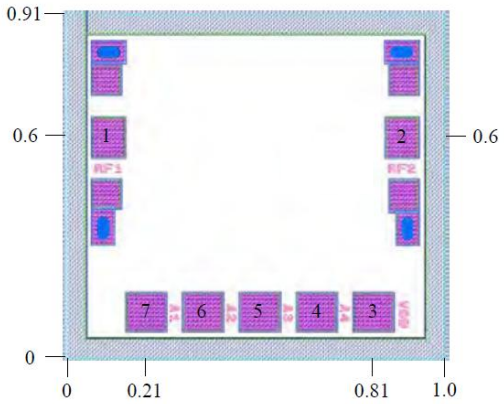


Output Return Loss



Outline Drawing:

All Dimensions in mm



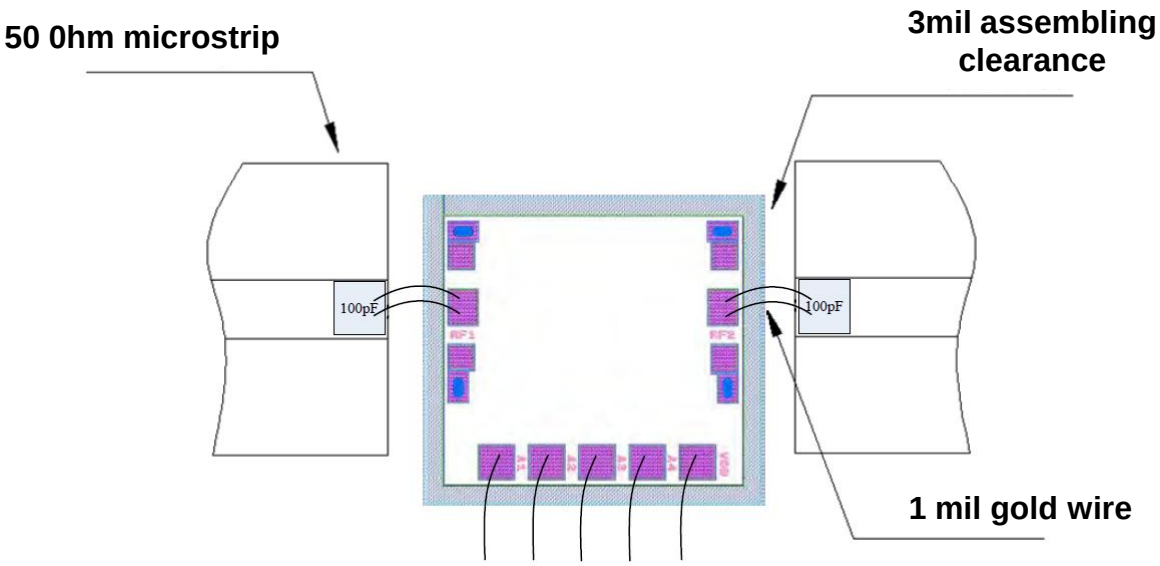
Pad Description

PAD	Function	Description
1, 2	RF1, RF2	This pad is RF port, connected to external DC blocking capacitor.
3	VDD	This pad is TTL level converter power supply, connected to +5V.
4	2dB Attenuation Control Bit A4	When A4=0V, 2dB Attenuator OFF When A4=5V, 2dB Attenuator ON
5	1dB Attenuation Control Bit A3	When A3=0V, 1dB Attenuator OFF When A3=5V, 1dB Attenuator ON
6	0.5dB Attenuation Control Bit A2	When A2=0V, 0.5dB Attenuator OFF When A2=5V, 0.5dB Attenuator ON
7	0.25dB Attenuation Control Bit A1	When A1=0V, 0.25dB Attenuator OFF When A1=5V, 0.25dB Attenuator ON
Die Bottom	GND	Die bottom must be connected to RF/DC ground

True Table

State	0.25dB	0.5dB	1dB	2dB
	A1	A2	A3	A4
Reference State	0	0	0	0
0.25dB	1	0	0	0
0.5dB	0	1	0	0
1dB	0	0	1	0
2dB	0	0	0	1
“0” level range: 0~0.8V, “1” level range: 2.3~5V				

Assembly Drawing



Notes:

1. Die thickness: 100um
2. Typical bond pad is 100*80 μm^2
3. Bond pad metalization: Gold
4. Backside metalization: Gold
5. Backside of the die (GND)
6. No connection required for unlabeled bond pads

Maximum Ratings:

1. Power Supply: +6V
2. RF input power: +27dBm
3. Storage temperature: -65℃ to +150℃
4. Operating temperature: -55℃ to +85℃