

VRFC0006-BD

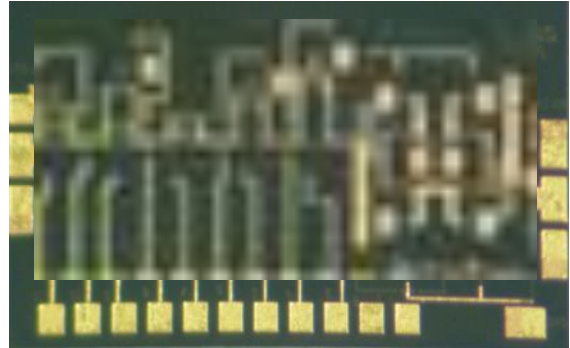


DC-13 GHz 6 Bit GaAs MMIC Attenuator

Preliminary Datasheet v2

Features

- Frequency Range: DC-13GHz
- 6 - bit Resolution
- Typical Insertion Loss: 6.5dB @10GHz
- Dynamic Range: 31.5dB
- Attenuation Step: 0.5dB
- 50Ω Matched RF Ports
- Engineering Die Size: 2.5mm x 1.5mm x 0.1mm



Description

The VRFC0006-BD is a DC-13GHz digital 6-bit attenuator. The circuit demonstrates a typical insertion loss of 3dB and a dynamic range of 31.5dB in 0.5dB steps with low phase error. The RF ports are DC blocked and matched to 50 Ω. Typical applications include Defence and Instrumentation markets.

Electrical Specifications

$T=+25^{\circ}\text{C}$ baseplate, $V_{ctrl}=0/-5\text{V}$

Parameter	Specification			Unit
	Typ. @2GHz	Typ. @10GHz	Typ. @13GHz	
Resolution		6		bit
Insertion Loss	-4.5	-6.5	-7.7	dB
Dynamic Range		31.5		dB
Attenuation Error (RMS)	0.35	0.45	0.6	dB
Phase Error (RMS)	1.8	4.7	4.5	deg
I/P Return Loss	-9	-10	-11.5	dB
O/P Return Loss	-10	-11.5	-12.5	dB

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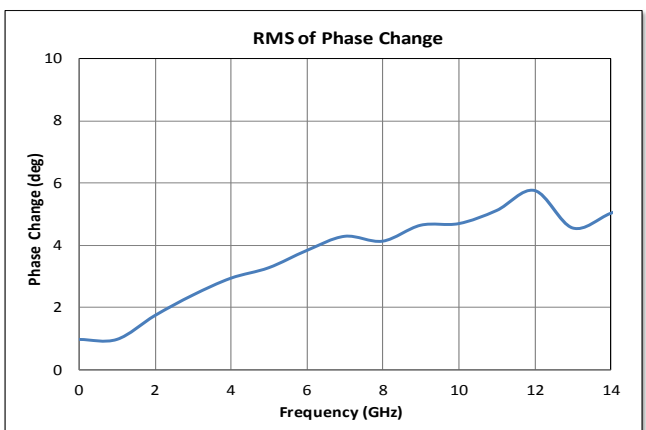
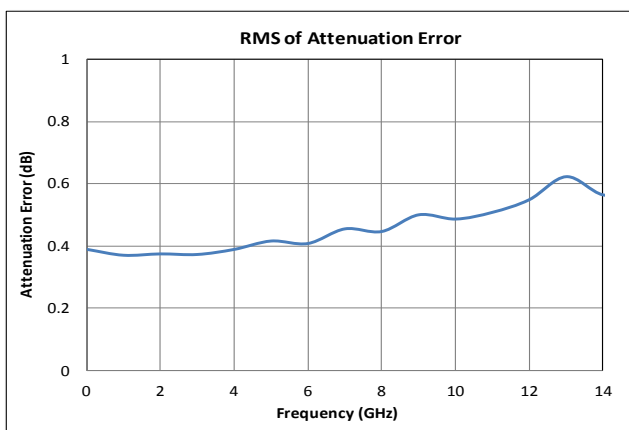
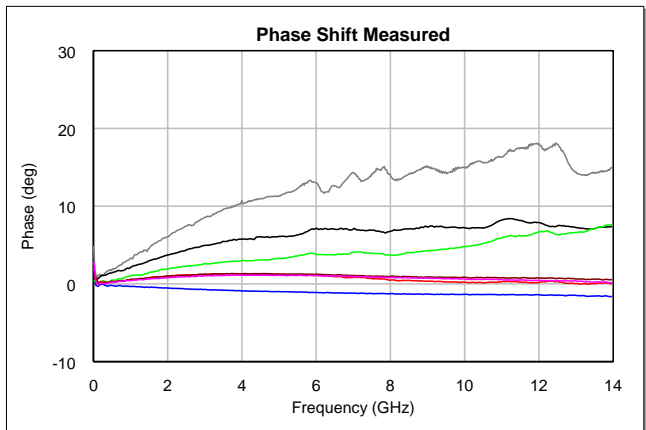
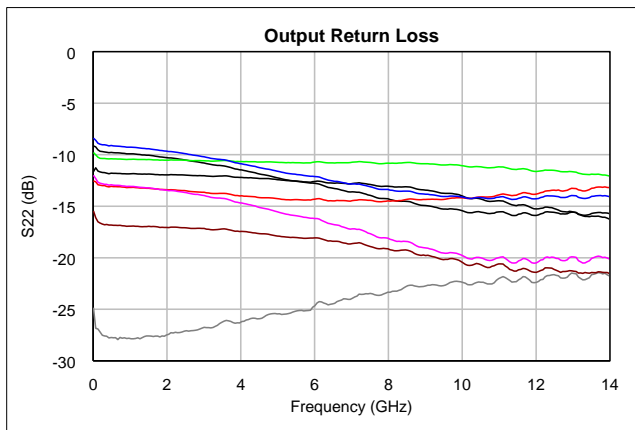
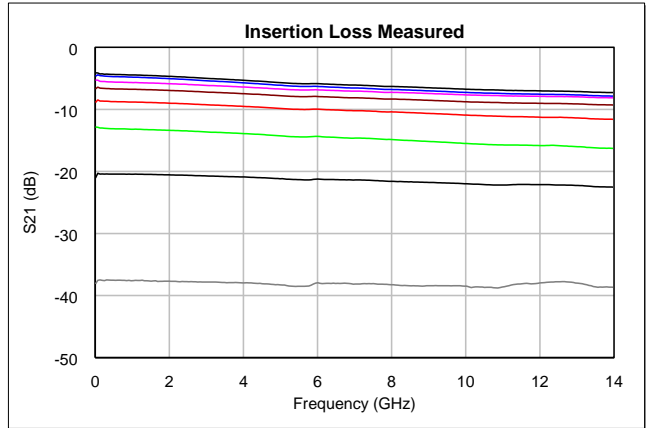
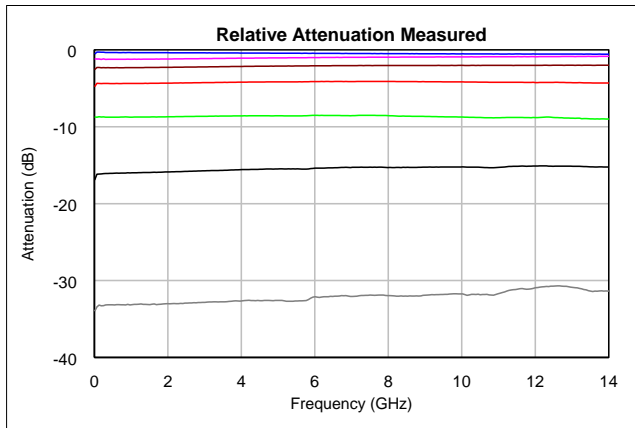


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Measured Performance (On-wafer)

$T=+25^{\circ}\text{C}$ baseplate, $V_{\text{ctrl}}=0/-5\text{V}$



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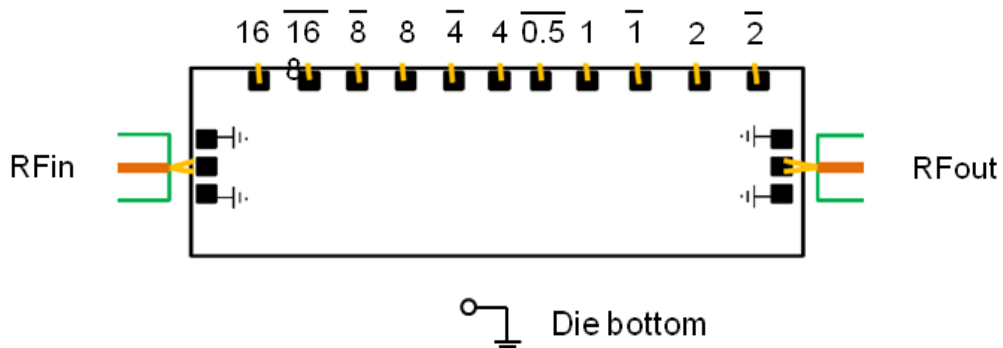
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Recommended Absolute Maximum Ratings ^[1]

Parameter	Symbol	Value	Notes
Control Voltage (+)	V_{ctrl+}	+0.5 V	
Control Voltage (-)	V_{ctrl-}	-7 V	
Control Current	I_{ctrl}	100 μ A	
RF Input Power	RF_{in}	TBC	
Junction Temperature	T_j	175°C	For maximum median device lifetime, T_j should be minimised
Storage Temperature	$T_{storage}$	-55 to 150°C	

^[1] Operation outside these conditions may cause permanent damage to the device. Combination of maximum rating conditions may reduce the values. Device performance at these ratings is not implied.

Assembly & Bonding Diagram



Attenuation, dB	Control Input Voltages, V										
	0.5	1	1	2	2	4	4	8	8	16	16
Reference	0	-5	0	-5	0	-5	0	-5	0	-5	0
0.5	-5	-5	0	-5	0	-5	0	-5	0	-5	0
1	0	0	-5	-5	0	-5	0	-5	0	-5	0
2	0	-5	0	0	-5	-5	0	-5	0	-5	0
4	0	-5	0	-5	0	0	-5	-5	0	-5	0
8	0	-5	0	-5	0	-5	0	0	-5	-5	0
16	0	-5	0	-5	0	-5	0	-5	0	0	-5
31.5	-5	0	-5	0	-5	0	-5	0	-5	0	-5

Engineering Die Size	2.5mm x 1.5mm
Die Thickness	100 μ m
Minimum Bondpad Opening	70 μ m x 70 μ m

Minimal length (0.15nH) are recommended for RF bondwires. The RF input and output ports are DC blocked.

GaAs devices are ESD sensitive and precautions should be observed during storage, handling, assembly and testing.

