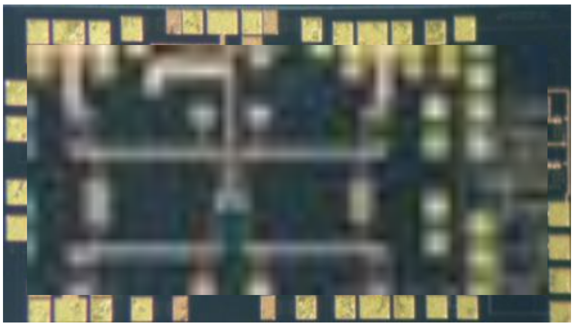
VRFS0003-BD

DC-20GHz GaAs SP4T MMIC Switch

Preliminary Datasheet v2

Features

- Frequency Range: DC-20GHz
- Non-reflective SP4T architecture
- Low Insertion Loss: 2.2dB @10GHz typical
- High Isolation: 50dB @ 10GHz
- 50Ω matched RF ports
- Size: 1.5mm x 3mm x 0.1mm



Description

The VRFS0003-BD is a DC – 20GHz non-reflective single-pole four-throw switch for Defence and Instrumentation markets. The circuit demonstrates over 38 dB isolation across the band with a low insertion loss of 2.7dB @ 20GHz typical. The RF ports are DC blocked and matched to 50Ω.

Electrical Specifications

T=+25°C baseplate, V_{ctrl} = 0/-5V

Parameter	Specification			Unit	Condition
	Typ @ 1GHz	Typ @ 10GHz	Typ @ 20GHz		
Insertion Loss	-1.5	-2.2	-2.7	dB	f_0= DC-20GHz
Isolation	-62	-52	-38	dB	f_0= DC-20GHz
I/P Return Loss	-18	-12	-14	dB	f_0= DC-20GHz Any arm, ON state
O/P Return Loss	-18	-21	-13	dB	f_0= DC-20GHz RF1, RF2, ON state
Input power for 1dB compression		23		dBm	f_0= 0.5-20GHz

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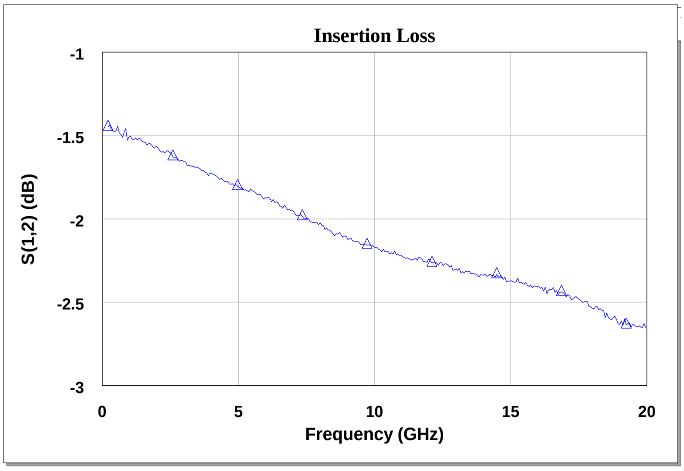
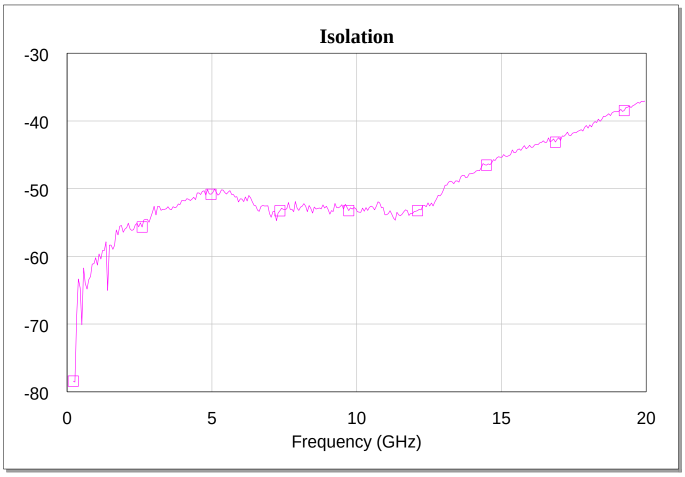
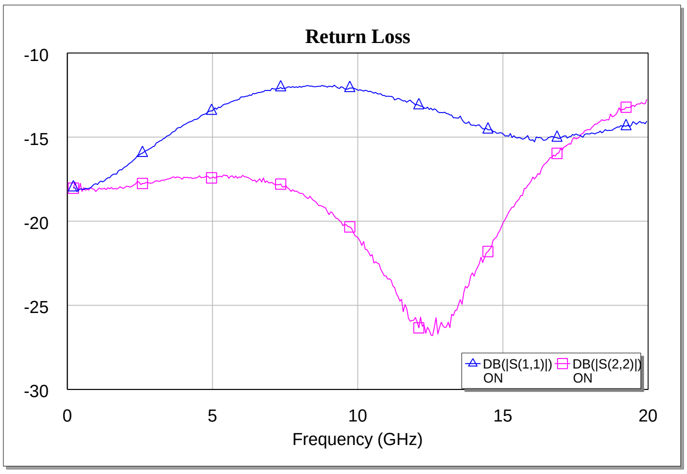
Measured Performance (On-wafer)

T=+25°C baseplate, V_{ctrl} = 0/-5V







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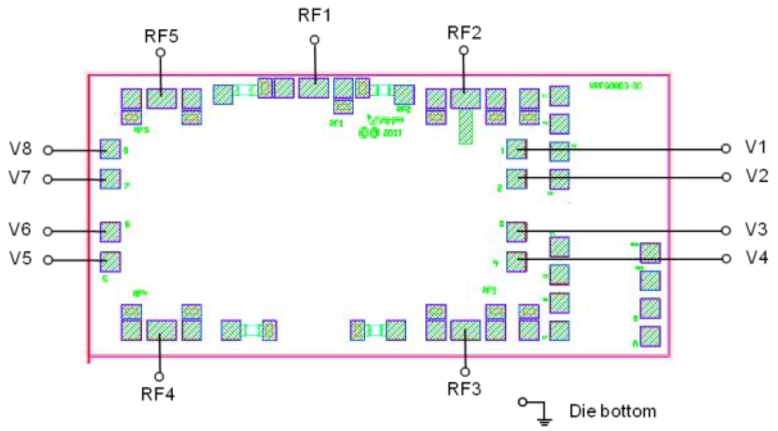
Recommended Absolute Maximum Ratings [1]

Parameter	Symbol	Value	Notes
Control Voltage (+)	V_{ctrl+}	+0.5V	
Control Voltage (-)	V_{ctrl-}	-7V	
Control Current	I_{ctrl}	10uA	
RF input power	RF_{in}	+21dBm	
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



Low Loss State	V1 (V)	V2 (V)	V3 (V)	V4 (V)	V5 (V)	V6 (V)	V7 (V)	V8 (V)
RF1-RF2	0	-5	0	-5	-5	0	0	-5
RF1-RF3	-5	0	-5	0	-5	0	0	-5
RF1-RF4	-5	0	0	-5	0	-5	0	-5
RF1-RF5	-5	0	0	-5	-5	0	-5	0

Die Size	1.5mm x 3mm
Die Thickness	100µm
Minimum Bondpad opening	70µm x 70µm

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.