

Package: 3mmx3mm QFN

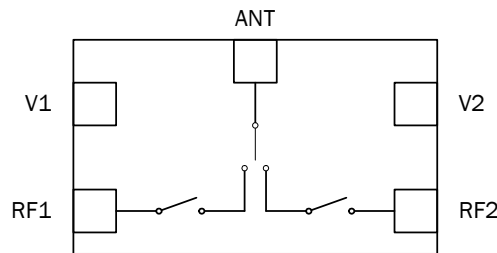


### Product Description

The FMS2031-001 is a 10-Watt, low loss, single-pole, dual-throw, Gallium Arsenide antenna switch. The die is fabricated using the RFMD FL05 0.5µm switch process technology, which offers leading edge performance optimized for switch applications. The FMS2031-001 is designed for use in WiMax, L-, S-, and C-band wireless applications and WLAN access points where high linearity switching is required.

#### Optimum Technology Matching® Applied

- GaAs HBT
- GaAs MESFET
- InGaP HBT
- SiGe BiCMOS
- Si BiCMOS
- SiGe HBT
- GaAs pHEMT
- Si CMOS
- Si BJT
- GaN HEMT
- InP HBT
- RF MEMS
- LDMOS



### Features

- High Isolation: 36dB Typ. at 3.5GHz
- Low Insertion Loss: 0.5dB Typ. at 2.5GHz
- Low Insertion Loss: 0.96dB Typ. at 6GHz
- P<sub>1dB</sub> 42dBm at 5GHz
- Operates from a Single Positive Voltage
- Less than 10µA Control Current at 35dBm Input Power

### Applications

- WiMax
- L-, S-, and C-band Digital Cellular
- WLAN Applications

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Electrical Specifications</b>					
<i>T<sub>AMBIENT</sub> = 25 °C, V<sub>CTRL</sub> = 0V/2.7V, Z<sub>IN</sub> = Z<sub>OUT</sub> = 50Ω</i>					
Insertion Loss		0.5	0.6	dB	2.3GHz to 2.7GHz
		0.55	0.7	dB	3.3GHz to 3.8GHz
		0.9		dB	4.9GHz to 5.9GHz
Return Loss		27.5		dB	2.3GHz to 2.7GHz
		21.5		dB	3.3GHz to 3.8GHz
		TBD		dB	4.9GHz to 5.9GHz
Isolation	30	32.5		dB	2.3GHz to 2.7GHz
	30	35		dB	3.3GHz to 3.8GHz
		23		dB	4.9GHz to 5.9GHz
P <sub>IN</sub> at 0.1dB Compression Point		39.5		dBm	2.3GHz to 2.7GHz
		38.5		dBm	3.3GHz to 3.8GHz
		38		dBm	4.9GHz to 5.9GHz
P <sub>IN</sub> at 0.5dB Compression Point		41		dBm	2.3GHz to 2.7GHz
		41		dBm	3.3GHz to 3.8GHz
		41		dBm	4.9GHz to 5.9GHz
EVM (Contribution Due to Switch)		Δ0.5		%	35dBm at 5.9GHz (OFDM WLAN 54)
OIP3		65		dBm	+15dBm 1980MHz, +15dBm 1940MHz
Switching Speed: T <sub>RISE</sub> , T <sub>FALL</sub>		<300		ns	10% to 90% RF and 90% to 10% RF
Switching Speed: T <sub>ON</sub> , T <sub>OFF</sub>		<800		ns	50% control to 90% RF and 50% control to 10% RF
Control Current		<5	10	µA	+35dBm RF input @ 0.96GHz

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## Absolute Maximum Ratings<sup>1</sup>

Parameter	Rating	Unit
Max Input Power	+41	dBm
Control Voltage	+6	V
Operating Temperature	-40 to 85	°C
Maximum Junction Temperature	125	°C
Storage Temperature	-55 to 150	°C

### Notes:

At high powers, the dissipation in the switch can be significant and the resulting thermal effects need to be taken in to account. The device should be mounted with appropriate heat sinking to take this into account.

The maximum allowable junction temperature is  $T_{JMAX}=125^{\circ}C$  and for the thermal calculation, the dissipation within the switch should be taken as  $\eta = 5.5\%$ . This should include the power input to the switch and anything reflected back from an external mismatch.

The thermal resistance of the FET should be taken as  $R_{TH}=70^{\circ}C/W$ .

$$T_J = T_{OP} + P_{IN} \cdot \eta \cdot R_{TH}, \text{ where } T_J < T_{JMAX}$$



Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

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## Truth Table

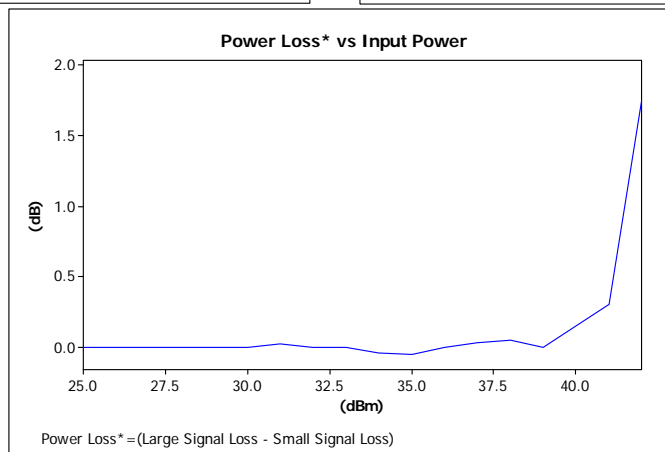
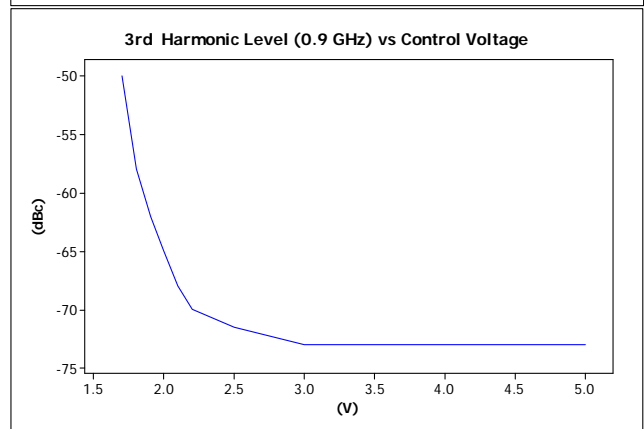
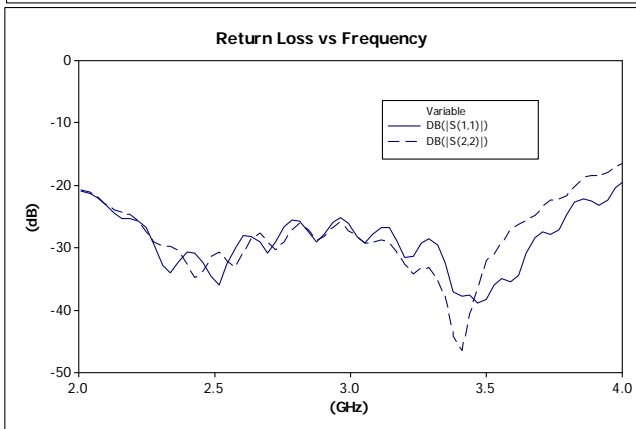
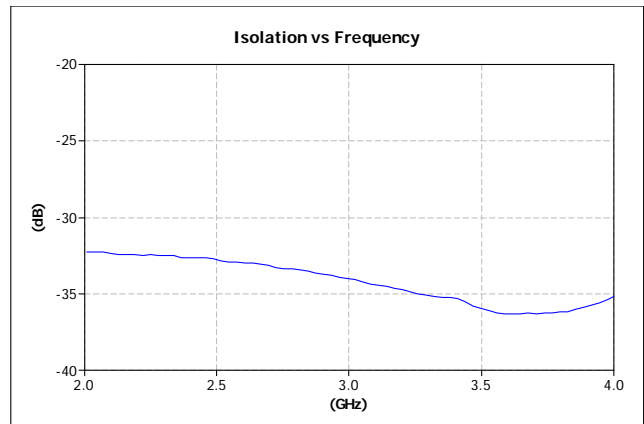
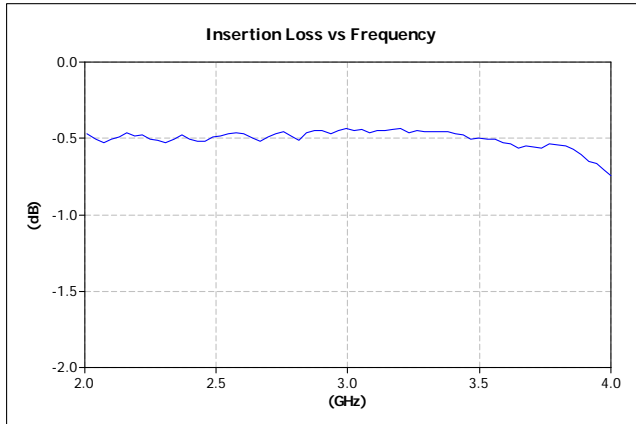
Switch State	VC1	VC2	ANT - RF1	ANT - RF2
A	High	Low	Insertion loss	Isolation
B	Low	High	Isolation	Insertion Loss

Note: External DC blocking capacitors are required on all RF ports (typ: 9pF). All unused ports terminated in 50Ω.

High: +2.7V to +6V. Low: +0V to +0.2V.

**Typical Measured Performance on Evaluation Board (De-embedded)**

Measurement Conditions:  $V_{CTRL} = 2.7V$  (high) and  $0V$  (low),  $T_{AMBIENT} = 25^{\circ}C$  unless otherwise stated.



## Part Identification

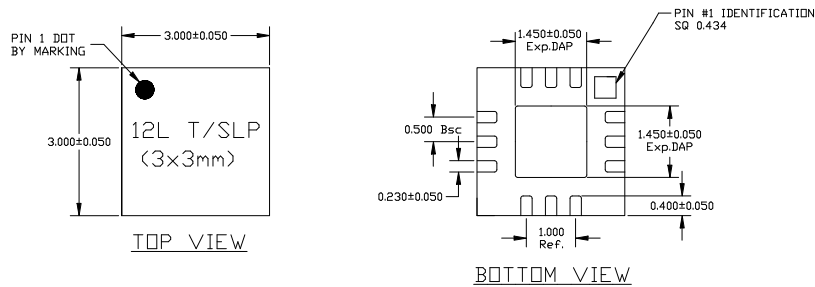
Pin 1  
Mark



First row: Device code “2031”. Second row: Trace Code, to be assigned by SubCon.

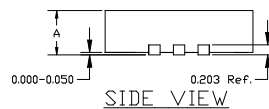
## Package Drawing

### QFN 12-Lead 3mmx3mm

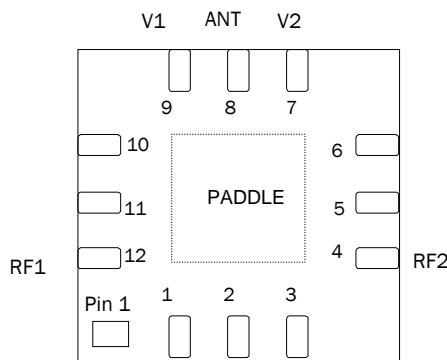


**NOTE:**  
1) TSLP AND SLP SHARE THE SAME EXPOSE OUTLINE BUT WITH DIFFERENT THICKNESS:

A	TSLP		SLP
	MAX.	0.800	0.900
NOM.	0.750	0.850	
MIN.	0.700	0.800	



## Pad Layout

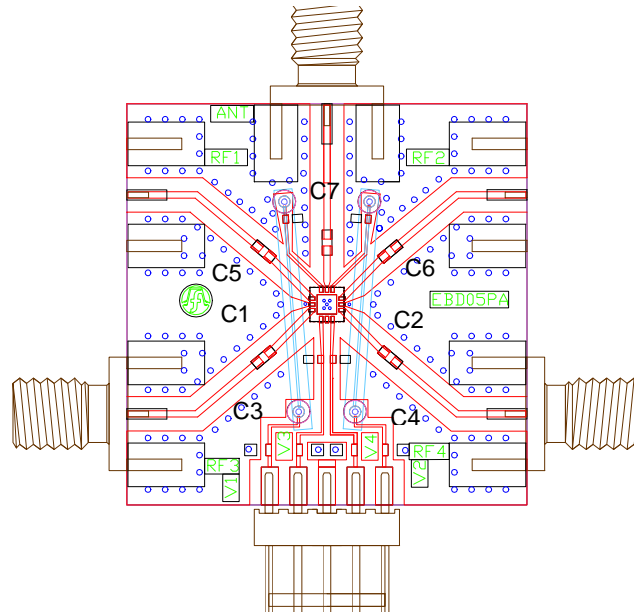


Pin	Function	Description
1	NC	No connect.
2	NC	No connect.
3	NC	No connect.
4	RF2	
5	NC	No connect.
6	NC	No connect.
7	V2	
8	ANT RF	
9	V1	
10	NC	No connect.
11	NC	No connect.
12	RF1	
	Paddle	Ground.

## Tape and Reel Specification

Tape and reel information on this material is in accordance with EIA-481-1 except where exceptions are identified.

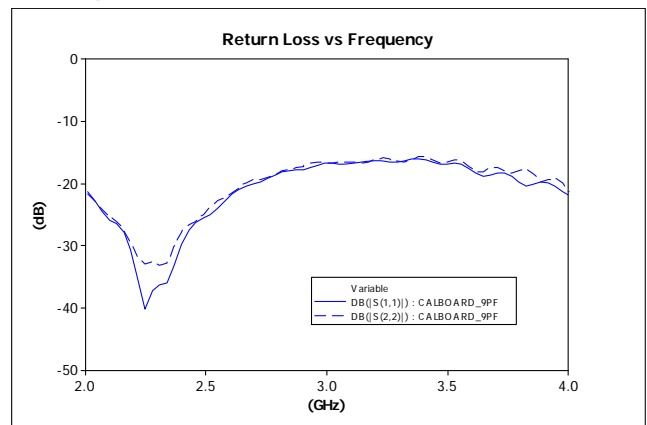
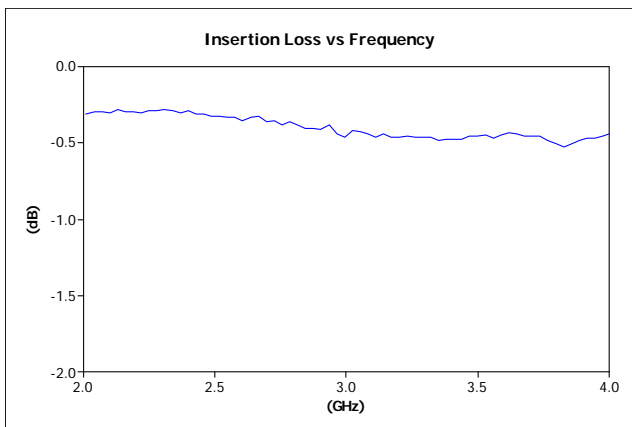
**Evaluation Board Layout**



**Bill of Materials**

Label	Component
C3, C4	Capacitor, 470 pF, 0603
C1, C2, C7	Capacitor, 9 pF, 0402
C5, C6	Capacitor, 47 pF, 0402
Board	Preferred evaluation board material is 0.25mm thick ROGERS RT4350. All RF tracks should be 50Ω characteristic impedance.

**Evaluation Board De-embedding Data (Measured)**



## Preferred Assembly Instructions

This package is compatible with both lead free and leaded solder reflow processes as defined within IPC/JEDEC J-STD-020C. The maximum package temperature should not exceed 260 °C.

## Handling Precautions



To avoid damage to the devices, care should be exercised during handling. Proper Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing.

## ESD Rating

These devices should be treated as Class 1A (250V to 500V), using the Human Body Model, as defined in JEDEC Standard No. 22-A114. Further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263.

## MSL Rating

The device has an MSL rating of Level 1. To determine this rating, preconditioning was performed to the device per the Pb-free solder profile defined within IPC/JEDEC J-STD-020, Moisture/Reflow sensitivity classification for non-hermetic solid state surface mount devices.

## Application Notes and Design Data

Application Notes and design data including S-parameters are available on request at [www.RFMD.com](http://www.RFMD.com).

## Reliability

An MTF of in excess of nine million hours at a channel temperature 150 °C is achieved for the process used to manufacture this device.

## Disclaimers

This product is not designed for use in any space-based or life-sustaining/supporting equipment.

## Ordering Information

Delivery Quantity	Ordering Code
Reel of 1000	FMS2031-001
Reel of 100	FMS2031-001SR
Bag of 25	FMS2031-001SQ
Bag of 5	FMS2031-001SB
Evaluation Board	FMS2031-001-EB