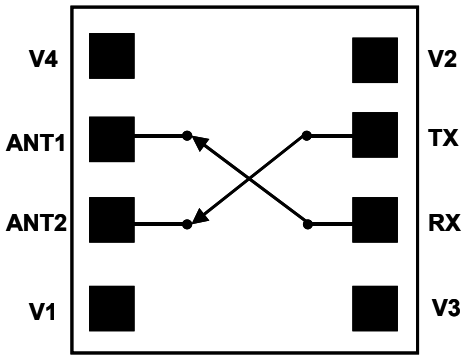
DC- 6 GHz SPDT WLAN GaAs Low Loss Switch

Features:

- Suitable for Multi-band WLAN Applications
- Excellent low control voltage performance
- Very low Insertion loss <0.7 dB at 6GHz typical
- High isolation >25 dB at 6GHz typical

Functional Schematic



Description and Applications:

The FMS2021 is a low loss, multi-band single pole double throw Gallium Arsenide antenna switch designed for use in Wireless LAN applications. The die is fabricated using the Filtronic FL05 0.5μm switch process technology that offers leading edge performance, optimised for switch applications.

Simulated Electrical Specifications: ($T_{AMBIENT}$ = 25°C,V_{ctrl} = 0V/(2.4V,+3.3V), Z_{IN} = Z_{OUT} = 50Ω)

Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss (All Paths)	(0.5-6) GHz, Small Signal		0.7		dB
Isolation (All Paths)	(0.5-6) GHz, Small Signal		25		dB
Return Loss	(0.5-6) GHz, Small Signal		20		dB
2nd Harmonic Level	3 GHz, Pin = 20dBm, Vctrl =2.4V		-70		dBc
3rd Harmonic Level	3 GHz, Pin = 20dBm, Vctrl =2.4V		-70		dBc
Switching speed	Vctrl=2.4V, Pin=20dBm		30		ns
P1dB	Measured at 2.4V control		30		dBm

Note: External DC blocking capacitors are required on all RF ports (typ: 47pF)

Preliminary specifications subject to change without notice
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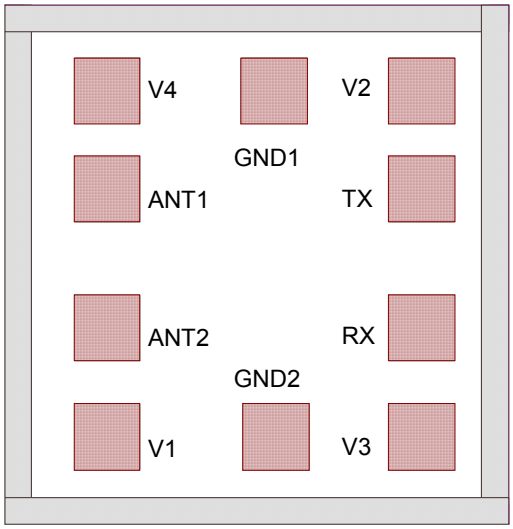
Truth Table:

State	Vctrl1	Vctrl2	Vctrl3	Vctrl4	ON PATH(S)
1	HIGH	LOW	LOW	LOW	ANT1-RX
2	LOW	HIGH	LOW	LOW	ANT2-RX
3	LOW	LOW	HIGH	LOW	ANT2-TX
4	LOW	LOW	LOW	HIGH	ANT1-TX
5	LOW	HIGH	LOW	HIGH	ANT1-TX and ANT2-RX
6	HIGH	LOW	HIGH	LOW	ANT1-RX and ANT2-TX

Note: 'High' = +2.4V to +3.3V
'Low' = 0V to +0.2V

Pad and Die Layout:



Pad Name	Description	Pin Coordinates (x µm, y µm)
V4	Vctrl4	134 , 568
ANT1	Antenna 1	134 , 439
ANT2	Antenna 2	134 , 257
V1	Vcrtl1	134 , 114
GND2	Ground 2	355.5 , 114
V3	Vctrl3	547 , 114
RX	Receive	547 , 257
TX	Transmit	547 , 439
V2	Vctrl2	547 , 568
GND1	Ground 1	353 , 568

Note: Co-ordinates are referenced from the bottom left hand corner of the die to the centre of the bond pad opening

Die Size (µm x µm)	Die Thickness (µm)	Min. Bond Pad Pitch(µm)	Min. Bond pad opening (µm x µm)
660 x 680	150	129	80 x 80

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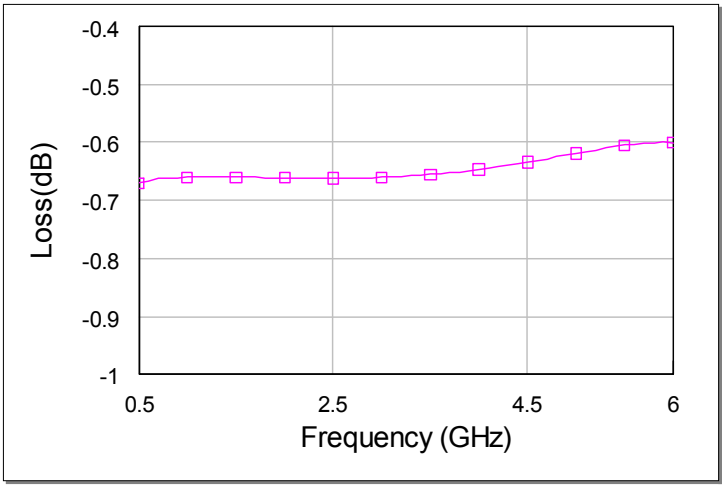
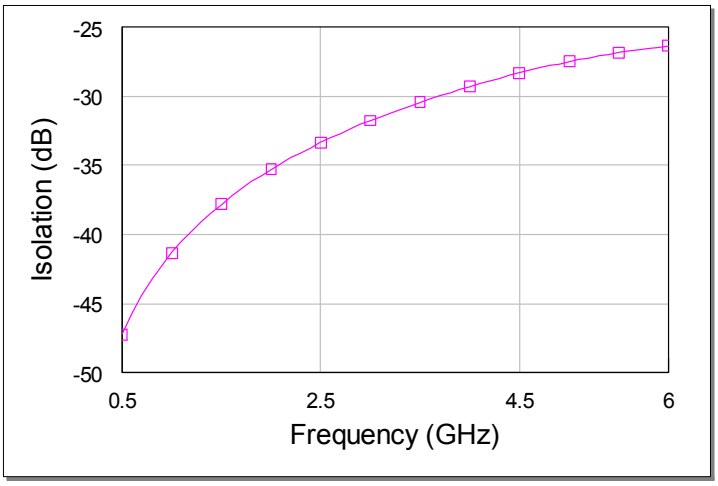
Simulated Performance:

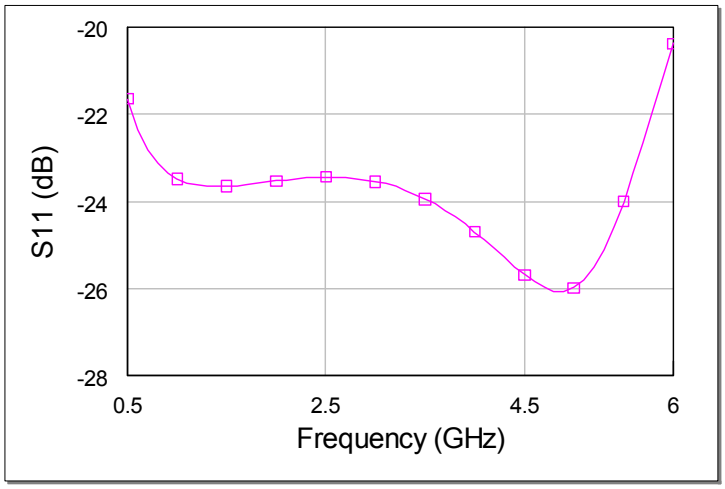
Insertion Loss



Isolation



Return Loss



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Preferred Assembly Instructions:

GaAs devices are fragile and should be handled with great care. Specially designed collets should be used where possible.

The back of the die is not metallised and the recommended mounting method is by the use of conductive epoxy. Epoxy should be applied to the attachment surface uniformly and sparingly to avoid encroachment of epoxy on to the top face of the die and ideally should not exceed half the chip height. For automated dispense Ablestick LMISR4 is recommended and for manual dispense Ablestick 84-1 LMI or 84-1 LMIT are recommended. These should be cured at a temperature of 150°C for 1 hour in an oven especially set aside for epoxy curing only. If possible the curing oven should be flushed with dry nitrogen.

This part has gold (Au) bond pads requiring the use of gold (99.99% pure) bondwire. It is recommended that 25.4μm diameter gold wire is used. Thermosonic ball bonding is preferred. A nominal stage temperature of 150°C and a bonding force of 40g has been shown to give effective results for 25μm wire. Ultrasonic energy shall be kept to a minimum. For this bonding technique, stage temperature should not be raised above 200°C and bond force should not be raised above 60g. Thermosonic wedge bonding and thermocompression wedge bonding can also be used to achieve good wire bonds.

Bonds should be made from the die first and then to the mounting substrate or package. The physical length of the bondwires should be minimised especially when making RF or ground connections.

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. These devices should be treated as Class 1A (0-500 V) as defined in JEDEC Standard No. 22-A114-B. Further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263.

Disclaimers:

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

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