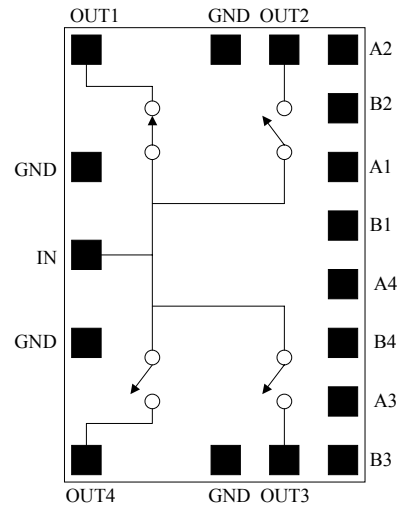


## DC-4 GHz MMIC SP4T Absorptive Switch

### Features:

- ◆ Available in die form
- ◆ Suitable for WLAN Applications
- ◆ Low Insertion loss <1.3 dB at 4 GHz typical
- ◆ High isolation >30 dB at 4 GHz typical
- ◆ Absorptive

### Functional Schematic



### Description and Applications:

The FMS2022 is a low loss high isolation DC-4GHz single pole four throw Gallium Arsenide absorptive switch designed for use in WLAN Applications. The die is fabricated using the Filtronics FL05 0.5 $\mu$ m switch process technology that offers leading edge performance optimised for switch applications.

### Simulated Electrical Specifications: ( $T_{\text{AMBIENT}} = 25^{\circ}\text{C}$ , $V_{\text{ctrl}} = 0\text{V}/-5\text{V}$ , $Z_{\text{IN}} = Z_{\text{OUT}} = 50\Omega$ )

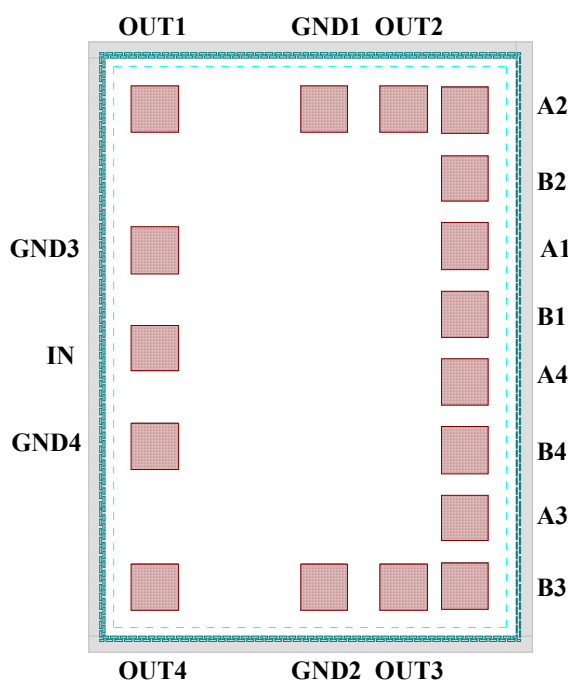
Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	(DC-2) GHz		1		dB
Insertion Loss	(2-4) GHz		1.3		dB
Isolation	(DC-2) GHz		45		dB
Isolation	(2-4) GHz		30		dB
Return Loss (On state)	(DC-4) GHz		17		dB
Return Loss (Off state)	(DC-4) GHz		12		dB
Switching speed	50% control to 10% / 90% RF		25		ns
P1dB	(1-100) MHz		17		dBm
P1dB	(100-500) MHz		24		dBm
P1dB	(0.5-40) GHz		28		dBm

**Note:** External DC decoupling capacitors are required on all DC lines (typ: 47pF)

**Truth Table:**

Control Lines								RF Path			
A1	B1	A2	B2	A3	B3	A4	B4	IN-OUT1	IN-OUT2	IN-OUT3	IN-OUT4
-5V	0V	0V	-5V	0V	-5V	0V	-5V	ON	OFF	OFF	OFF
0V	-5V	-5V	0V	0V	-5V	0V	-5V	OFF	ON	OFF	OFF
0V	-5V	0V	-5V	-5V	0V	0V	-5V	OFF	OFF	ON	OFF
0V	-5V	0V	-5V	0V	-5V	-5V	0V	OFF	OFF	OFF	ON

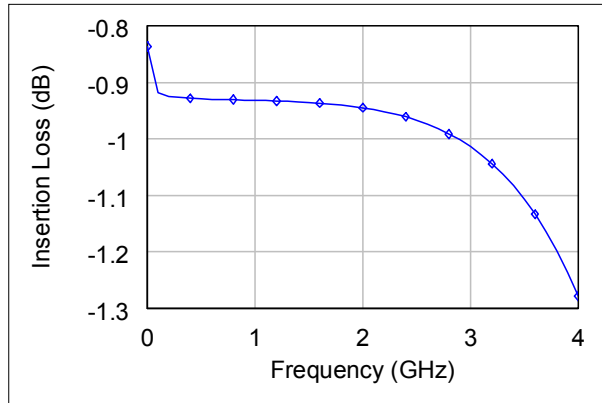
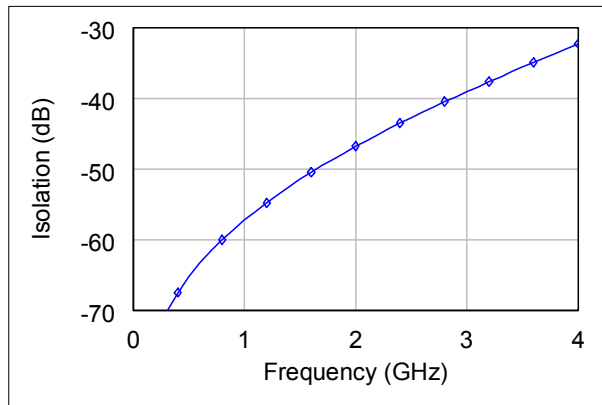
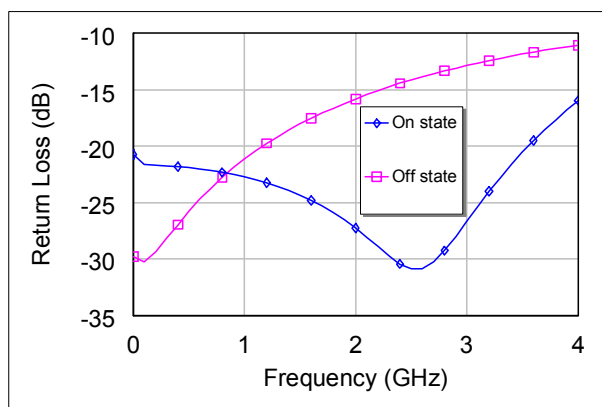
Note: -5V  $\pm$  0.5V, 0V+0.5V

**Pad Layout:**

Pad Reference	Description	Pin Coordinates ( $\mu\text{m}$ )
IN	RFIN	142,657.5
OUT1	RFOUT1	142,1174
OUT2	RFOUT2	675,1174
OUT3	RFOUT3	675,141
OUT4	RFOUT4	142,141
A1	A1	805,878
B1	B1	805,731
A2	A2	805,1172
B2	B2	805,1025
A3	A3	805,290
B3	B3	805,143
A4	A4	805,584
B4	B4	805,437
GND1	GND	504,1174
GND2	GND	504,141
GND3	GND	142,869
GND4	GND	142,446

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

Die Size ( $\mu\text{m} \times \mu\text{m}$ )	Die Thickness ( $\mu\text{m}$ )	Min. Bond Pad Pitch ( $\mu\text{m}$ )	Min. Bond pad Opening ( $\mu\text{m} \times \mu\text{m}$ )
950 x 1320	150	130	94 x 94

**Simulated Performance:****Insertion Loss****Isolation****Return Loss**

### **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.