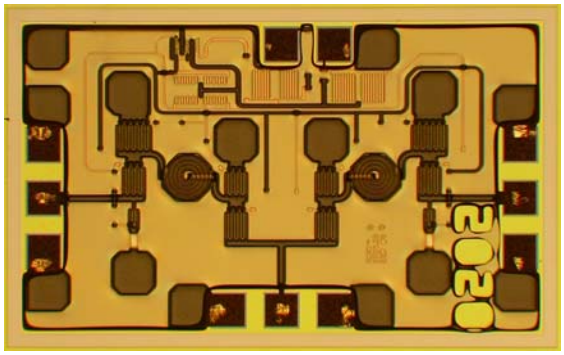
Switch, Single-Pole, Double-Throw DC-5.0 GHz

MASWGM0005-DIE
903219 —
Preliminary Information

Features

- **DC-5.0 GHz Operation**
- **1 dB Insertion Loss**
- **55 dB Isolation**
- **Class I ESD**
- **TTL Control**
- **Excellent Match on Off Port**
- **MSAG™ Process**



Description

The MASWGM0005-Die is a single pole double throw switch that is fully matched to 50 ohms on both the input and output.

Fabricated using M/A-COM's repeatable, high performance and highly reliable GaAs Multifunction Self-Aligned Gate MESFET Process, each device is 100% RF tested on wafer to ensure performance compliance.

M/A-COM's MSAG™ process features robust silicon-like manufacturing processes, planar processing of ion implanted transistors, multiple implant capability enabling power, low-noise, switch and digital FETs on a single chip, and polyimide scratch protection for ease of use with automated manufacturing processes. The use of refractory metals and the absence of platinum in the gate metal formulation prevents hydrogen poisoning when employed in hermetic packaging.

Primary Applications

- Telecom Infrastructure
- Military Radios, Radar
- Space Systems
- Test instrumentation

Electrical Characteristics: T_B = 25°C[1], Z_0 = 50Ω, V_{EE} = -5V

Parameter	Symbol	Typical	Units
Bandwidth	f	DC-5.0	GHz
Insertion Loss @ 1 GHz	IL	0.8	dB
Insertion Loss @ 5 GHz	IL	1.6	dB
Isolation @ 1 GHz	ISO	57	dB
Isolation @ 5 GHz	ISO	58	dB
Out1-Out2 Isolation	ISO	59	dB
Input VSWR (On)	VSWR	1.3:1	
Output VSWR (On)	VSWR	1.3:1	
Output VSWR (Off)	VSWR	1.3:1	
Input Third Order Intercept	ITOI	Under Test	dBm
Input 1-dB Compression Point	P1dB	Under Test	dBm
Video Leakage		Under Test	dB
ESD Capability, HBM, No Damage		300	V

1. T_B = MMIC Base Temperature

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- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

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Maximum Operating Conditions[1]

Parameter	Symbol	Absolute Maximum	Units
Input Power	P_{IN}	31	dBm
Digital Driver Voltage	V_{EE}	-6.0	V
Junction Temperature	T_J	180	°C
Storage Temperature	T_{STG}	-55 to +150	°C

1. Operation outside of these ranges may reduce product reliability. Operation at other than the typical values may result in performance outside the guaranteed limits.

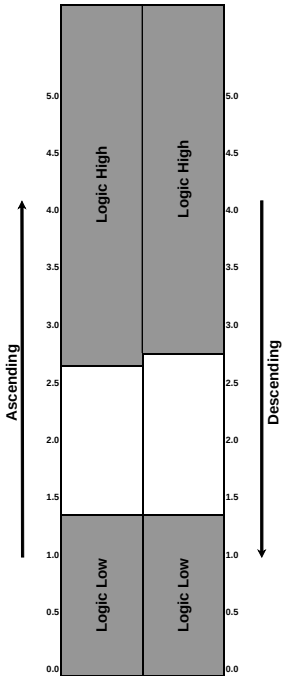
Recommended Operating Conditions

Characteristic	Symbol	Min	Typ	Max	Unit
Digital Driver Voltage	V_{EE}	-5.2	-5	-4.8	V

TTL Path Selection[2]

Characteristic	Logic Level (@ Pad A)	Min	Typ	Max	Unit
Com-Out1	Logic High	2.7	5.0	5.5	V
Com-Out2	Logic Low	0	0	1.2	V

2. Voltage Levels valid from –60ºC to +180º Base Temperature for V_{EE}=-5V.



Operating Instructions

This device is static and light sensitive. Digital circuitry operation can be impaired under high intensity light, e.g. microscope light. Please handle with care. To operate the device, follow these steps.

1. Power Up: Apply V_{EE} = -5 V.
2. Apply Logic Voltages to control Circuits as listed in Recommended Operating Conditions
3. Power Down: Set V_{EE} = 0

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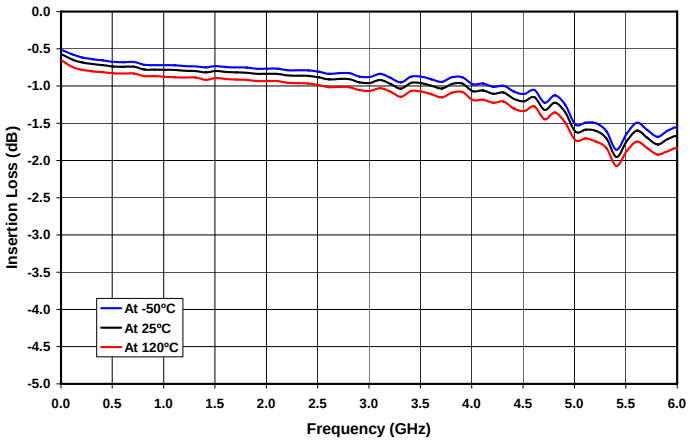

Figure 1. Insertion Loss vs. Frequency per Temperature

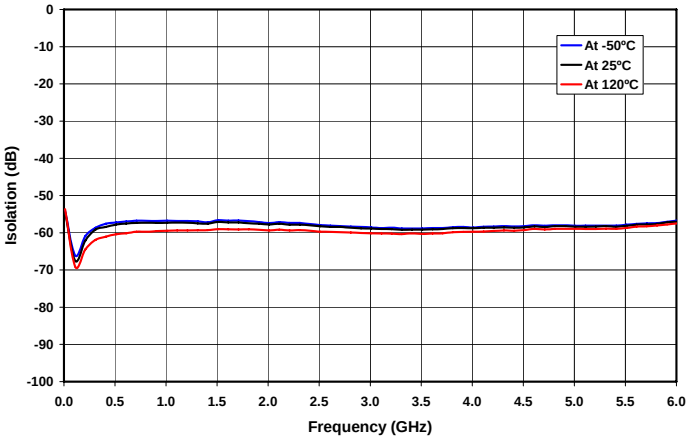

Figure 2. Isolation vs. Frequency per Temperature

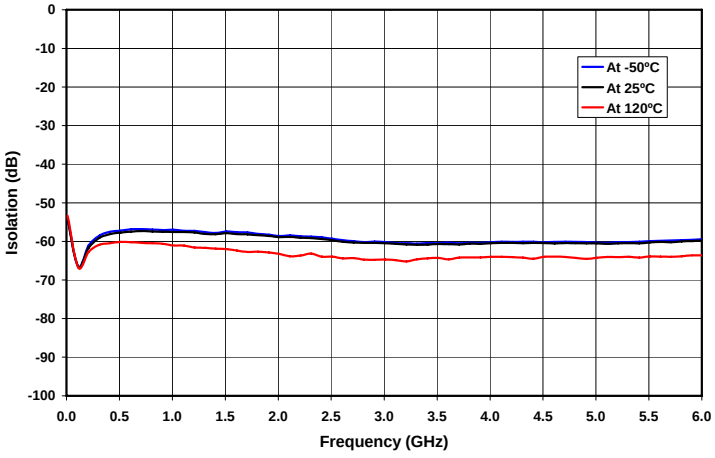

Figure 3. Port-to-Port Isolation vs. Frequency per Temperature

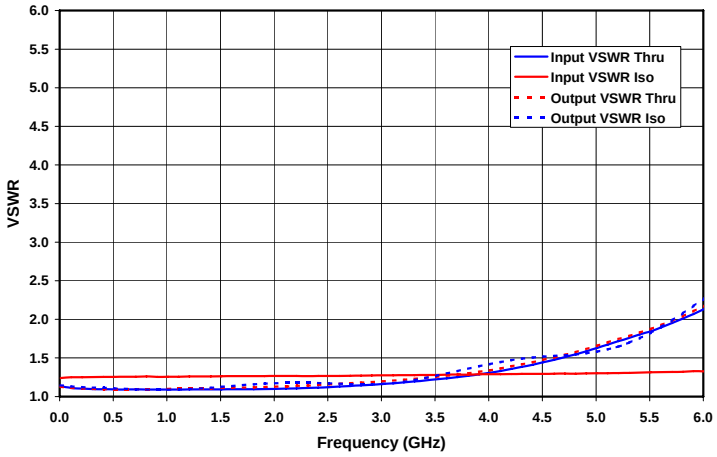

Figure 4. Input and Output Return Loss vs. Frequency

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Mechanical Information

Chip Size: 2.10 x 1.30 x 0.075 mm (83 x 51 x 3 mils)

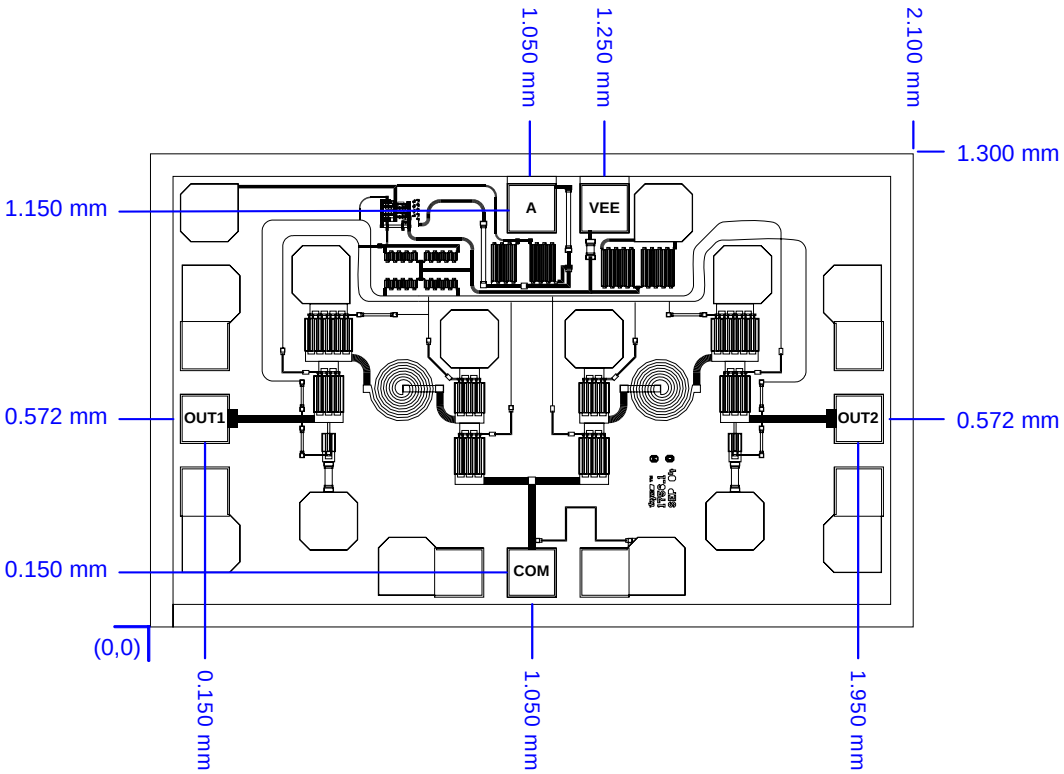

Figure 5. Die Layout

Bond Pad Dimensions

Pad	Size (µm)	Size (mils)
RF: COMMON, OUT1, OUT2	125 x 125	5 x 5
Digital Driver Voltage V_{EE}	125 x 125	5 x 5
A (TTL Control)	125 x 125	5 x 5

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Assembly and Bonding Diagram

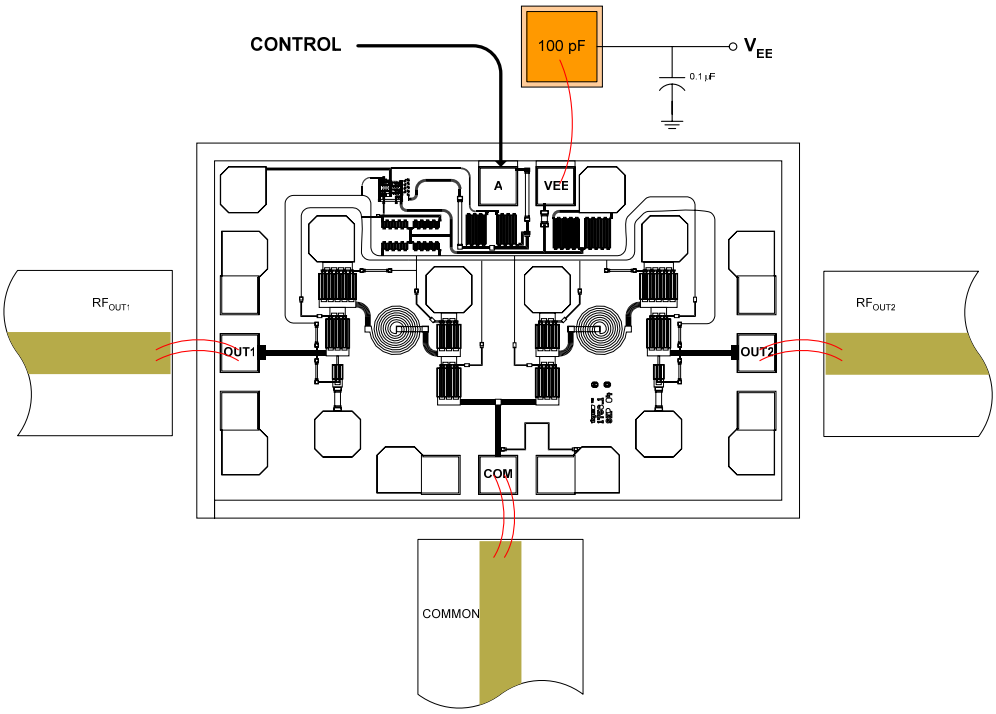

Figure 6. Recommended bonding diagram for pedestal mount. Support circuitry typical of MMIC characterization.

Assembly Instructions:

Die attach: Low thermal conductivity silver epoxies are acceptable for die attach of this MMIC. Follow the manufacturer's instructions. If solder is employed , use AuSn (80/20) 1-2 mil preform solder. Limit time @ 300 °C to less than 5 minutes.

Wirebonding: Bond @ 160 °C using standard ball or thermal compression wedge bond techniques. For DC and RF pad connections, use either ball or wedge bonds. For best performance, especially above 10 GHz, wedge bonds of shortest length employed on the RF interconnects is preferred over ball bonds.

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