

**GaAs SP4T Switch, Absorptive, Single Supply  
DC - 3.0 GHz**

**MASWCC0009  
V5**

**Features**

- Typical Isolation: 35 dB (2.0 GHz)
- Typical Insertion Loss: 1.2 dB (2.0 GHz)
- Integral ASIC/CMOS Driver
- 50 Ohm Nominal Impedance
- Low DC Power Consumption
- Test Boards Available
- Lead-Free QSOP-24 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible
- RoHS\* Compliant Version of SW65-0440

**Description**

M/A-COM's MASWCC0009 is a GaAs MMIC absorptive SP4T switch with an integral silicon ASIC driver. This device is in a 24-lead plastic package. This switch offers excellent broadband performance and repeatability from DC to 3 GHz, while maintaining low DC power dissipation. The MASWCC0009 is ideally suited for wireless infrastructure applications.

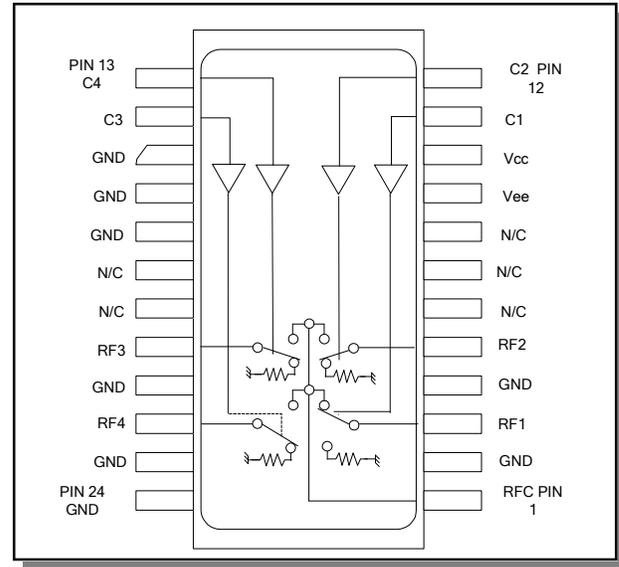
**Ordering Information**

Part Number	Package
MASWCC0009	Bulk Packaging
MASWCC0009TR	1000 piece reel
MASWCC0009-TB	Sample Test Board

Note: Reference Application Note M513 for reel size information.

Note: Die quantity varies.

**Functional Schematic**



**Pin Configuration**

Pin No.	Function	Pin No.	Function
1	RFC	13	C4
2	GND	14	C3
3	RF1	15	GND
4	GND	16	GND
5	RF2	17	GND
6	NC	18	NC
7	NC	19	NC
8	NC	20	RF3
9	V <sub>EE</sub>	21	GND
10	V <sub>CC</sub>	22	RF4
11	C1	23	GND
12	C2	24	GND

NC = No Connection

The exposed pad centered on the package bottom must be connected to RF and DC ground. (For MLF Packages)

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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**Electrical Specifications: T<sub>A</sub> = 25°C**

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	DC - 2.0 GHz	dB	—	1.2	1.8
	DC - 3.0 GHz	dB	—	1.3	2.5
Isolation	DC - 2.0 GHz	dB	32	35	—
	DC - 3.0 GHz	dB	25	29	—
VSWR	RF1-RF4 On	DC - 3.0 GHz	—	1.2:1	1.6:1
	RF1- RF4 Off	DC - 3.0 GHz	—	1.4:1	1.8:1
	RFC	DC - 2.0 GHz	—	1.2:1	1.5:1
	RFC	DC - 3.0 GHz	—	1.6:1	2.2:1
Switching Speed <sup>1</sup>	T <sub>rise</sub> T <sub>fall</sub>	10%/90%, 90%/10%	—	15	50
	T <sub>on</sub> T <sub>off</sub>	50% TTL to 90%/10% RF	—	50	150
	Transients	In-band (peak to peak)	—	50	150
1 dB Compression	.05 GHz	dBm	—	+20	—
	.5 - 3.0 GHz	dBm	—	+27	—
Input IP <sub>3</sub>	Two tone inputs 0.05 GHz	dBm	—	+35	—
	up to +5 dBm 0.5 - 3.0 GHz	dBm	—	+46	—
V <sub>CC</sub>	—	V	+4.5	+5.0	+5.5
V <sub>EE</sub>	—	V	-8.0	-5.0	-4.75
V <sub>IL</sub> V <sub>IH</sub>	LOW-level input voltage	V	0.0	—	0.8
	HIGH-level input voltage	V	2.0	—	5.0
I <sub>in</sub> (Input Leakage Current)	V <sub>in</sub> = V <sub>CC</sub> or GND	uA	-1.0	—	1.0
I <sub>cc</sub> (Quiescent Supply Current)	V <sub>cntrl</sub> = V <sub>CC</sub> or GND	uA	—	250	400
ΔI <sub>cc</sub> (Additional Supply Current Per TTL Input Pin)	V <sub>CC</sub> = Max, V <sub>cntrl</sub> = V <sub>CC</sub> - 2.1 V	mA	—	—	1.0
I <sub>EE</sub>	V <sub>EE</sub> min to max, V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub>	mA	-1.0	-0.2	—

1. Decoupling capacitors (.1 μF) are required on the power supply lines.

**Absolute Maximum Ratings** <sup>2,3,4</sup>

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 3.0 GHz	+27 dBm +34 dBm
V <sub>CC</sub>	-0.5V ≤ V <sub>CC</sub> ≤ +7.0V
V <sub>EE</sub>	-8.5V ≤ V <sub>EE</sub> ≤ +0.5V
V <sub>CC</sub> - V <sub>EE</sub>	-0.5V ≤ V <sub>CC</sub> - V <sub>EE</sub> ≤ 14.5V
V <sub>in</sub> <sup>5</sup>	-0.5V ≤ V <sub>in</sub> ≤ V <sub>CC</sub> + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.
- When the RF input is applied to the terminated port, the absolute maximum power is +30 dBm.
- Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

**Truth Table (Switch)**

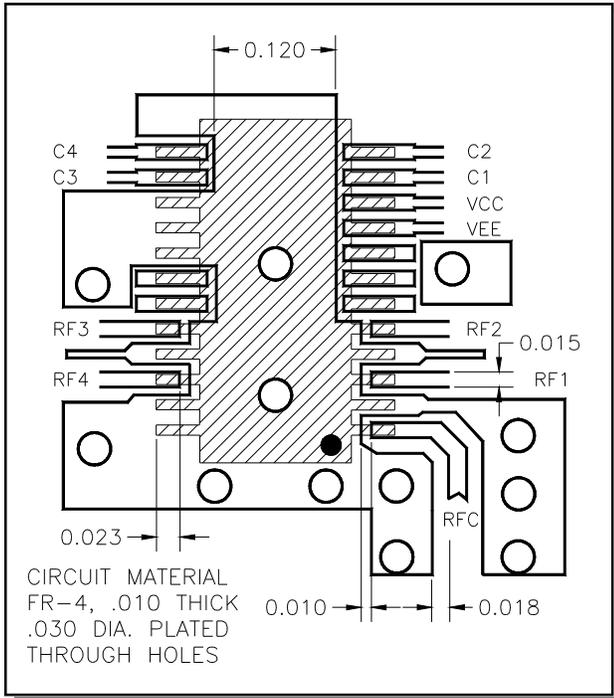
TTL				RF Common To:			
C1	C2	C3	C4	RF1	RF2	RF3	RF4
1	0	0	0	On	Off	Off	Off
0	1	0	0	Off	On	Off	Off
0	0	1	0	Off	Off	On	Off
0	0	0	1	Off	Off	Off	On

0 = TTL Low; 1 = TTL High

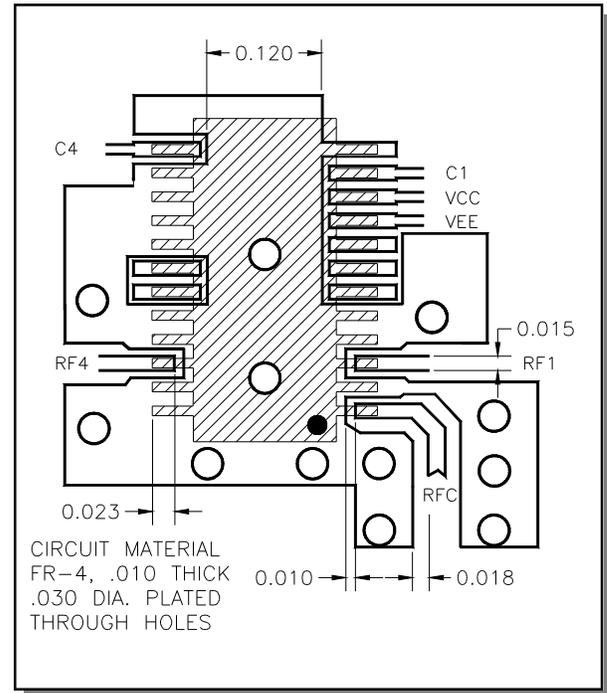
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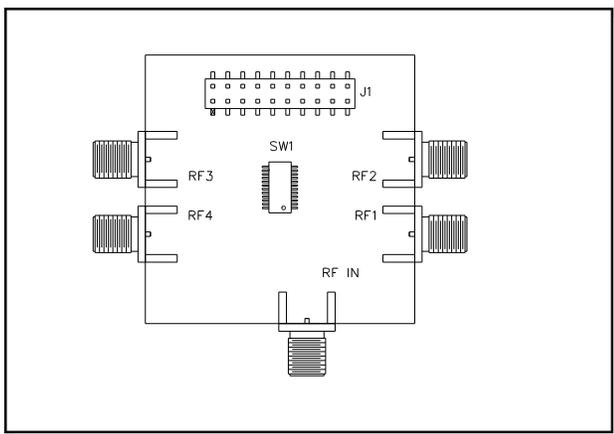
**Recommended PCB Layout—SP4T**



**Recommended PCB Layout—SP2T**



**Evaluation Board - SW65-0440-TB**



**Handling Procedures**

Please observe the following precautions to avoid damage:

**Static Sensitivity**

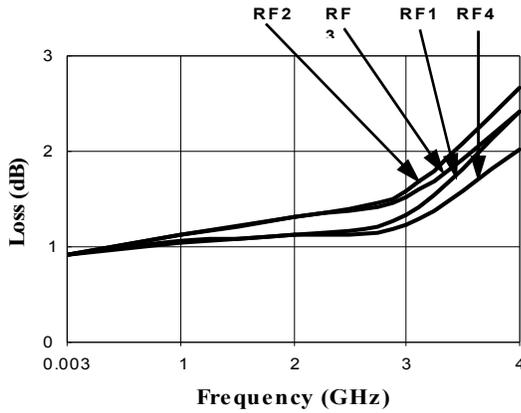
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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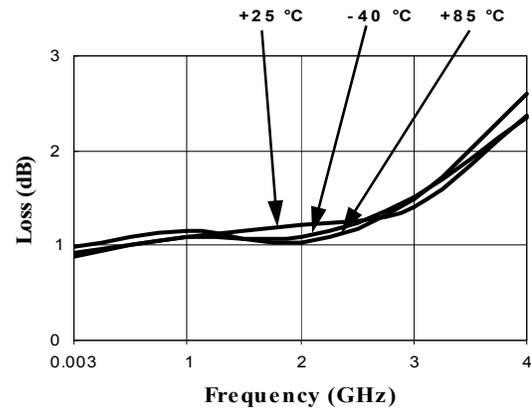
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**Typical Performance Curves**

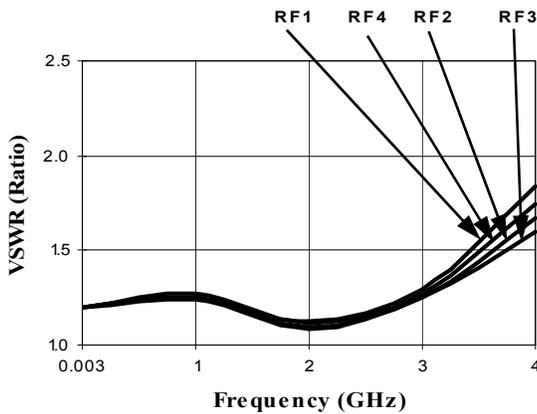
*Insertion Loss (dB) @ +25°C*



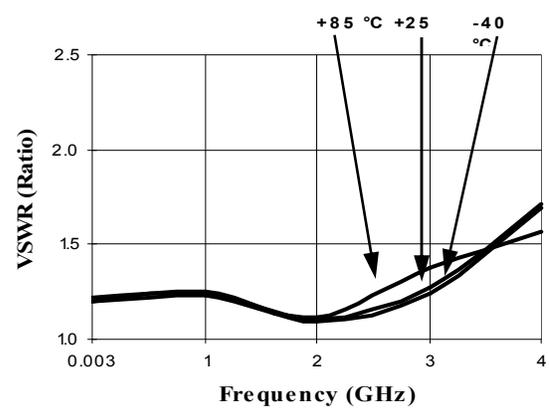
*Loss Variation Over Temp. (dB)*



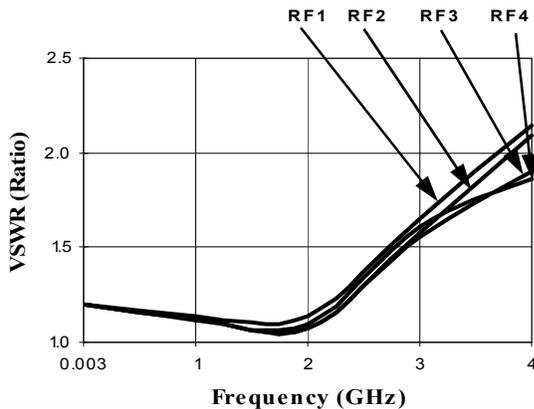
*RF1 - RF4 On VSWR @ +25°C*



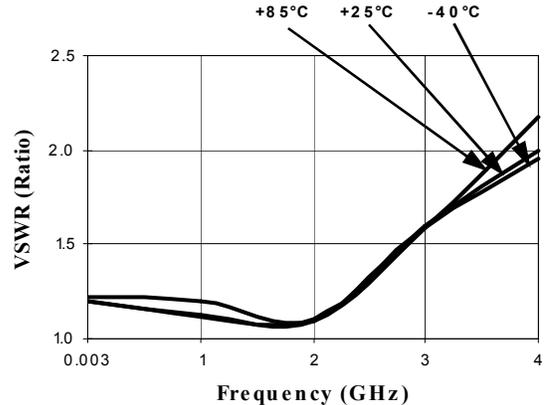
*RF1 - RF4 On VSWR Temp. Variation*



*RFC On VSWR @ +25°C*



*RFC On VSWR Temp. Variation*

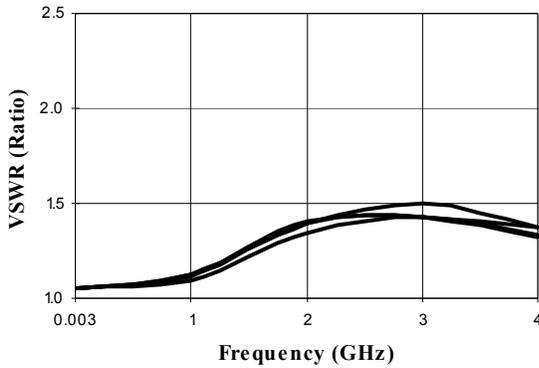


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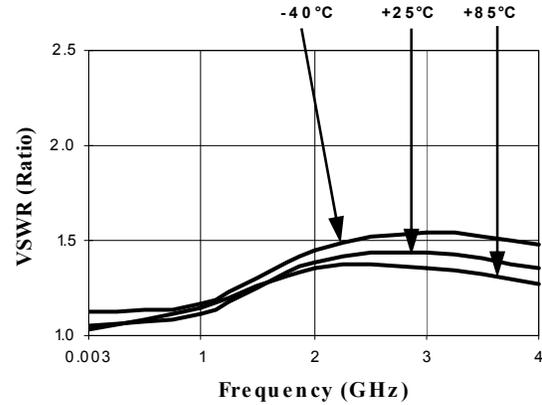
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**Typical Performance Curves**

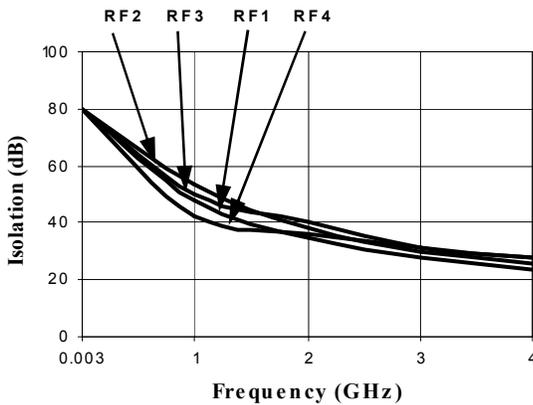
*RF1 - RF4 Off VSWR @ +25°C*



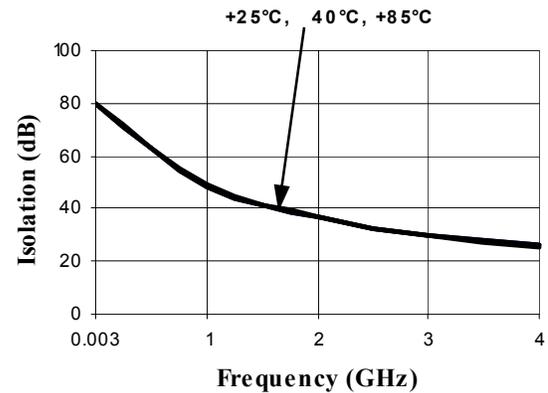
*RF1 - RF4 Off VSWR Temp. Variation*



*Isolation (dB) @ +25°C*



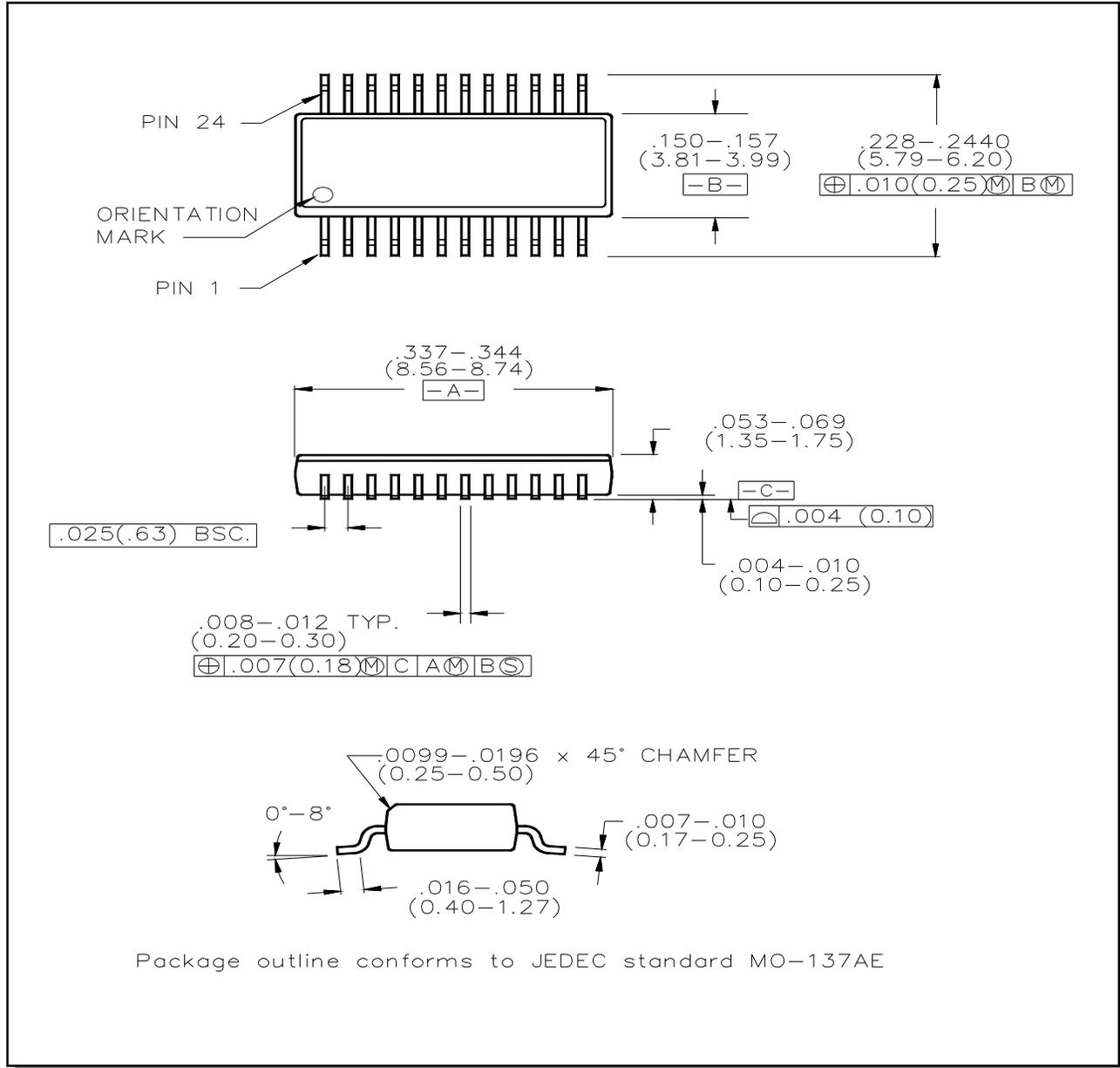
*Isolation Temp. Variation (dB)*



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**Lead-Free, QSOP-24<sup>†</sup>**



<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.