

## GaAs SP6T Switch, Absorptive, Single Supply DC - 3.0 GHz

MASWCC0009

V3

### 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.

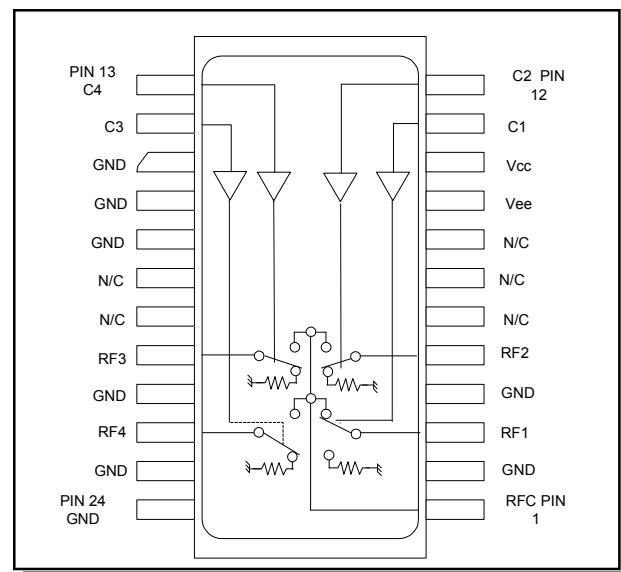
### Ordering Information

Part Number	Package
MASWCC0009	Bulk Packaging
MASWCC0009-TR	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	N/C	18	N/C
7	N/C	19	N/C
8	N/C	20	RF3
9	V <sub>EE</sub>	21	GND
10	V <sub>CC</sub>	22	RF4
11	C1	23	GND
12	C2	24	GND

N/C = 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.

1

M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. M/A-COM makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does M/A-COM assume any liability whatsoever arising out of the use or application of any product(s) or information.

• **North America** Tel: 800.366.2266 / Fax: 978.366.2266  
 • **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300  
 • **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

GaAs SP6T Switch, Absorptive, Single Supply  
DC - 3.0 GHz

MASWCC0009

V3

Electrical Specifications:  $T_A = 25^\circ\text{C}$ 

Parameter		Test Conditions	Units	Min	Typ	Max
Insertion Loss		DC - 2.0 GHz DC - 3.0 GHz	dB dB	— —	1.2 1.3	1.8 2.5
Isolation (All arms off)		DC - 2.0 GHz DC - 3.0 GHz	dB dB	32 25	35 29	— —
VSWR	RF1-RF4 On RF1- RF4 Off RFC RFC	DC - 3.0 GHz DC - 3.0 GHz DC - 2.0 GHz DC - 3.0 GHz	Ratio Ratio Ratio Ratio	— — — —	1.2:1 1.4:1 1.2:1 1.6:1	1.6:1 1.8:1 1.5:1 2.2:1
Switching Speed <sup>1</sup>	$T_{\text{rise}}$ $T_{\text{fall}}$ $T_{\text{on}}$ $T_{\text{off}}$ Transients	10%/90%, 90%/10% 50% TTL to 90%/10% RF In-band (peak to peak)	nS nS mV	- - -	15 50 50	50 150 150
1 dB Compression		.05 GHz .5 - 3.0 GHz	dBm dBm	- -	+20 +27	- -
Input IP <sub>3</sub>		Two tone inputs up to +5 dBm	0.05 GHz 0.5 - 3.0 GHz	dBm dBm	- -	+35 +46
$V_{\text{CC}}$		-	V	+4.5	+5.0	+5.5
$V_{\text{EE}}$		-	V	-8.0	-5.0	-4.75
$I_{\text{CC}}$		$V_{\text{CC}} = +5.0\text{V}$	mA	-	-	4
$I_{\text{EE}}$		$V_{\text{EE}} = -5.0\text{V}$	mA	-	-	-1
Logic "0"		$I_{\text{in}} = 20\mu\text{A}$ max	V	0.0	-	0.8
Logic "1"		$I_{\text{in}} = 20\mu\text{A}$ max	V	2.0	-	5.0

1. Decoupling capacitors (.1  $\mu\text{F}$ ) 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
Bias Voltages $V_{\text{EE}}$ $V_{\text{CC}}$	-8.5V +5.5V
Control Voltage <sup>5</sup>	-0.5V to $V_{\text{CC}}$ +0.5V
Storage Temperature	-65°C to +125°C
Operating Temperature	-40°C to +85°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

- North America Tel: 800.366.2266 / Fax: 978.366.2266
- Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298

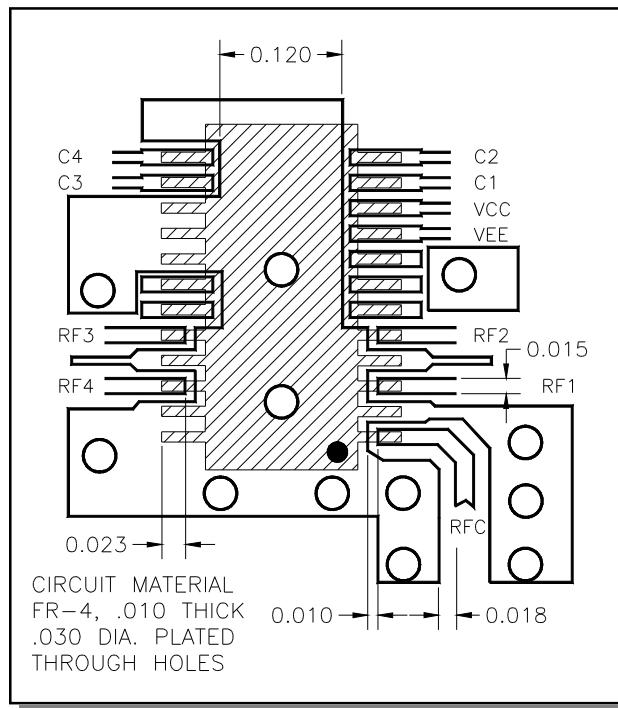
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

GaAs SP6T Switch, Absorptive, Single Supply  
DC - 3.0 GHz

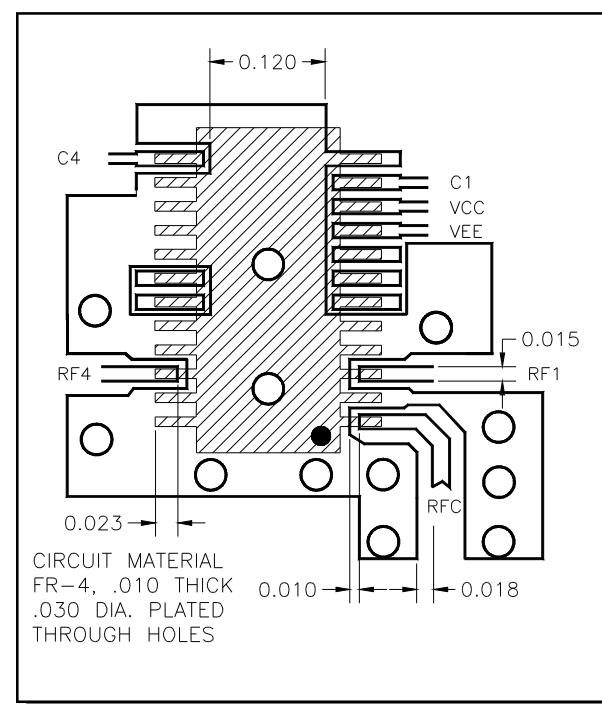
MASWCC0009

V3

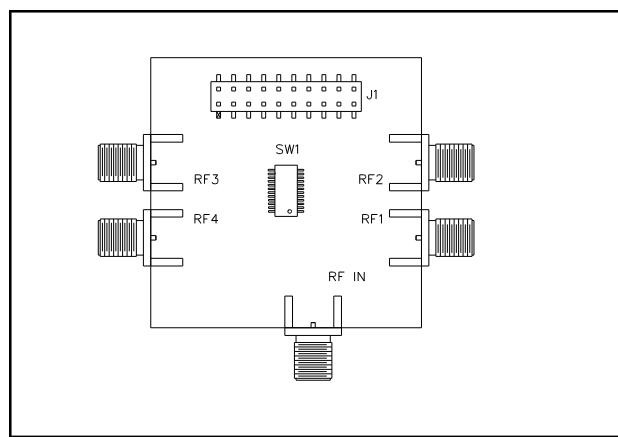
## Recommended PCB Layout—SP4T



## 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.

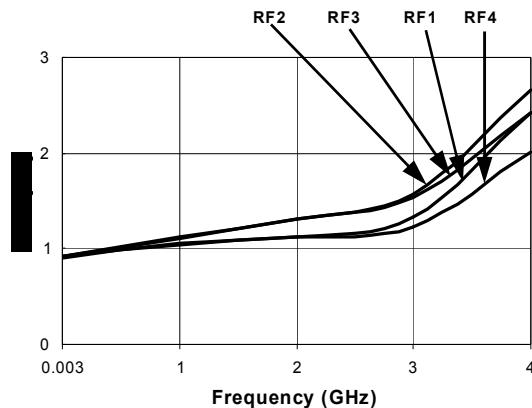
GaAs SP6T Switch, Absorptive, Single Supply  
DC - 3.0 GHz

MASWCC0009

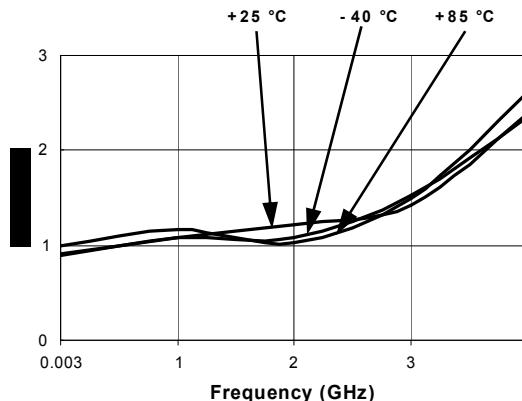
V3

### Typical Performance Curves

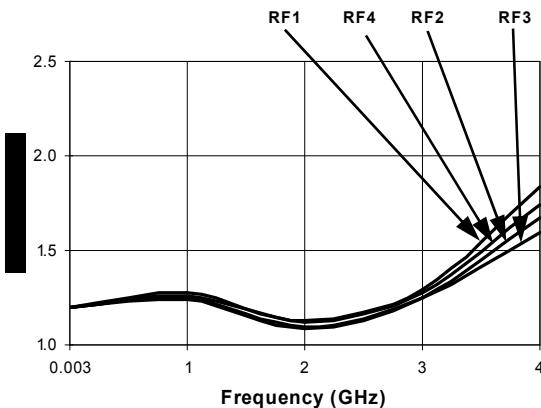
Insertion Loss (dB) @ +25°C



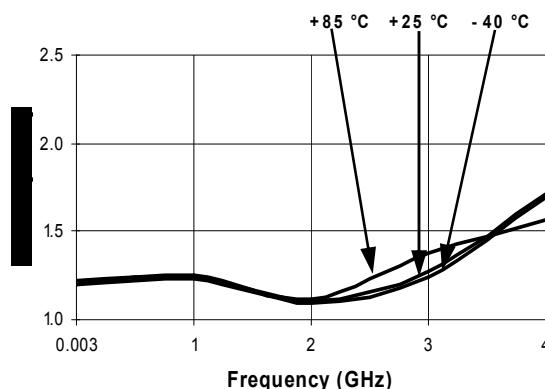
Loss Variation Over Temp. (dB)



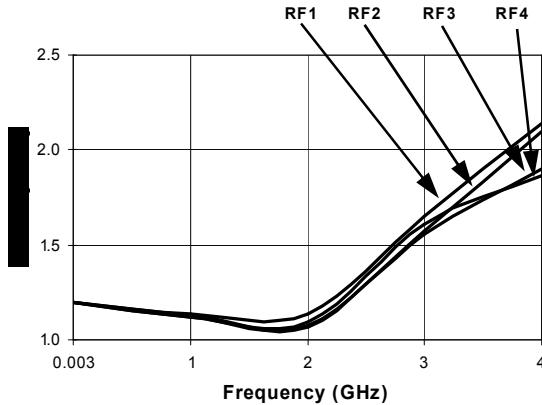
RF1 - RF4 On VSWR @ +25°C



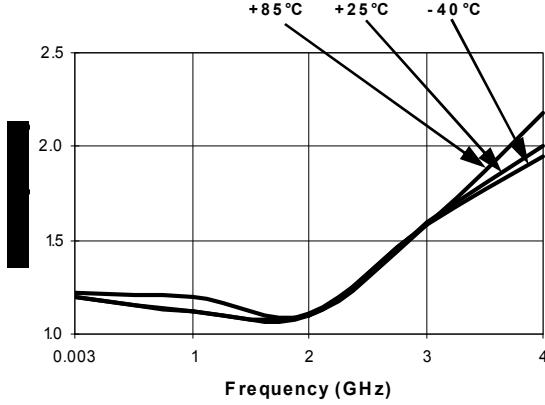
RF1 - RF4 On VSWR Temp. Variation



RFC On VSWR @ +25°C



RFC On VSWR Temp. Variation

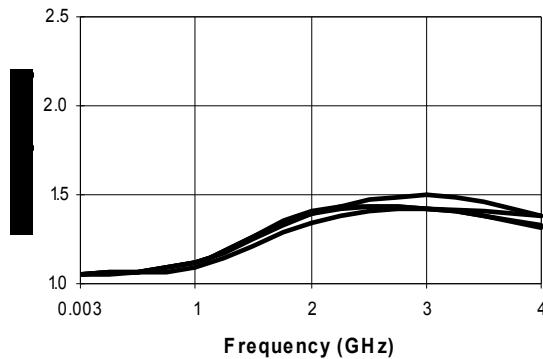


GaAs SP6T Switch, Absorptive, Single Supply  
DC - 3.0 GHz

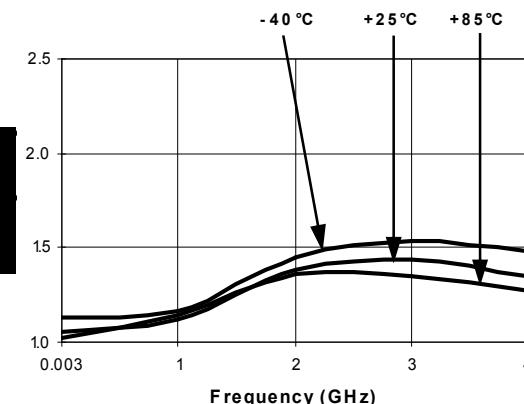
MASWCC0009  
V3

### Typical Performance Curves

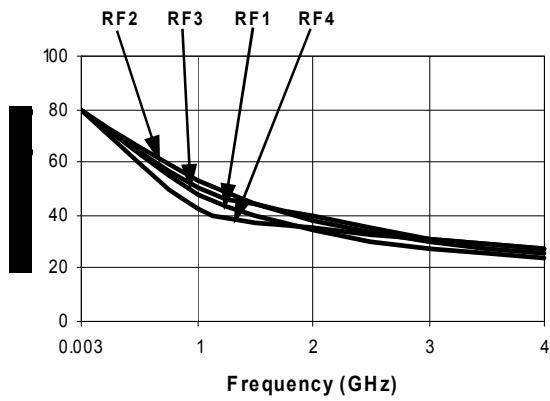
*RF1 - RF4 Off VSWR @ +25°C*



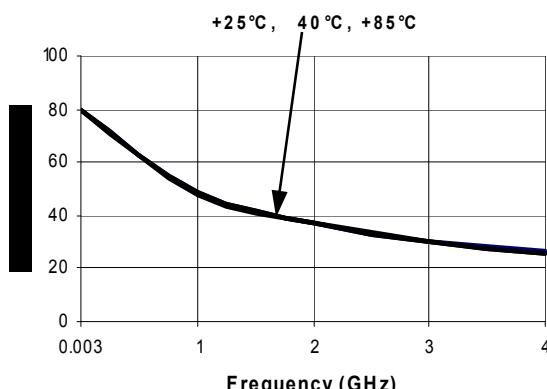
*RF1 - RF4 Off VSWR Temp. Variation*



*Isolation (dB) @ +25°C*



*Isolation Temp. Variation (dB)*

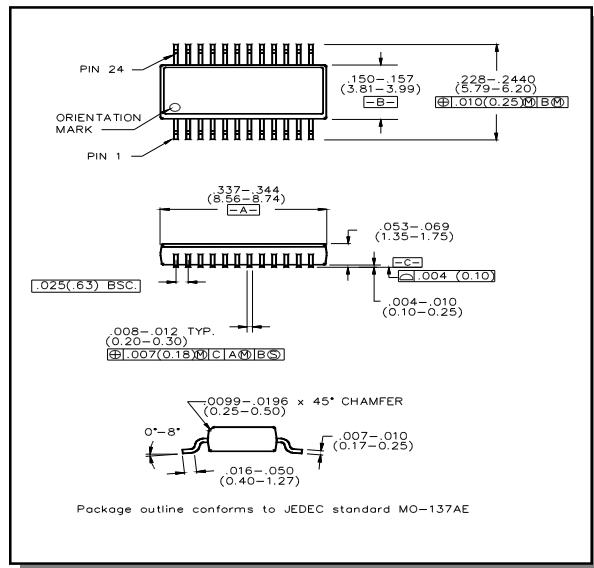


# **GaAs SP6T Switch, Absorptive, Single Supply DC - 3.0 GHz**

MASWCC0009

V3

## Lead-Free, QSOP-24<sup>†</sup>



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