

GaAs SP4T Switch, Absorptive DC - 3.0 GHz

Rev. V7

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.

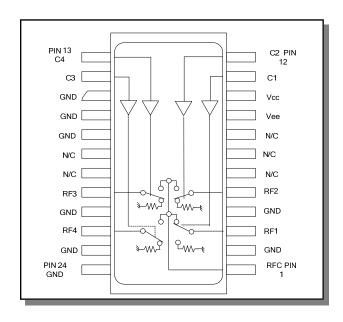
Ordering Information

Commitment to produce in volume is not g

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

Note: Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

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

NC = No Connection

^{*} Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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Electrical Specifications: $T_A = 25$ °C

Parameter	Test Conditions	Units	Min	Тур	Max
Insertion Loss	DC - 2.0 GHz DC - 3.0 GHz	dB dB	_	1.2 1.3	1.8 2.5
Isolation	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
$\begin{array}{cc} \text{Switching Speed}^1 \\ & T_{\text{rise}} & T_{\text{fall}} \\ & T_{\text{on}} & T_{\text{off}} \\ & T_{\text{ransients}} \end{array}$	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 ₃	Two tone inputs 0.05 GHz up to +5 dBm 0.5 - 3.0 GHz	dBm dBm	_	+35 +46	_
V _{CC}	_	V	+4.5	+5.0	+5.5
V _{EE}		V	-8.0	-5.0	-4.75
V _{IL} V _{IH}	LOW-level input voltage HIGH-level input voltage	V	0.0 2.0	_	0.8 5.0
lin (Input Leakage Current)	Vin = V _{CC} or GND	uA	-1.0	_	1.0
Icc (Quiescent Supply Current)	Vcntrl = V _{CC} or GND	uA	_	250	400
Δlcc (Additional Supply Current Per TTL Input Pin)	V _{CC} = Max, Vcntrl = V _{CC} - 2.1 V	mA	_	_	1.0
lee	VEE min to max, Vin = V_{IL} or V_{IH}	mA	-1.0	-0.2	_

Absolute Maximum Ratings ^{2,3,4}

Parameter	Absolute Maximum		
Max. Input Power 0.05 GHz 0.5 - 3.0 GHz	+27 dBm +34 dBm		
V _{CC}	-0.5V ≤ V _{CC} ≤ +7.0V		
V _{EE}	-8.5V ≤ V _{EE} ≤ +0.5V		
V _{CC} - V _{EE}	$-0.5V \le V_{CC} - V_{EE} \le 14.5V$		
Vin ⁵	-0.5V ≤ Vin ≤ V _{CC} + 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.
- 4. When the RF input is applied to the terminated port, the absolute maximum power is +30 dBm.

typical. Mechanical outline has been fixed. Engineering samples in Commitment to produce in volume is not guaranteed.

 Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

1. Decoupling capacitors (0.1 $\mu\text{F})$ are required on the power supply lines.

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

Solutions has under development. Performance is based on engineering tests. Specifications are

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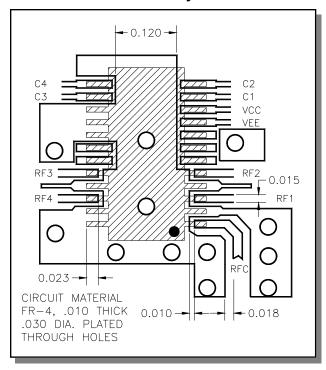
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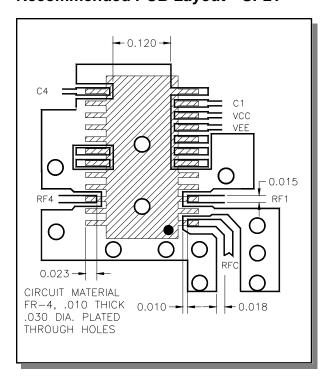
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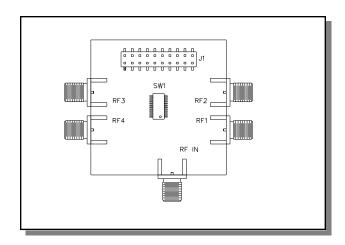
Recommended PCB Layout—SP4T



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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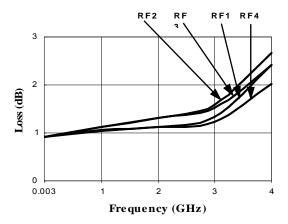


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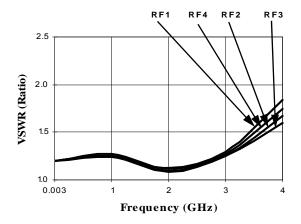
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Typical Performance Curves

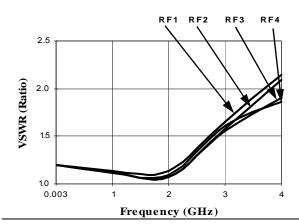
Insertion Loss (dB) @ +25°C



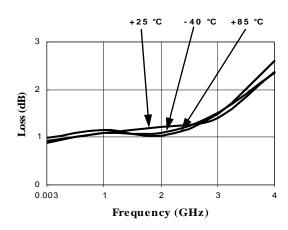
RF1 - RF4 On VSWR @ +25°C



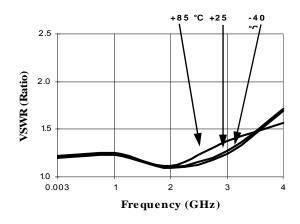
RFC On VSWR @ +25°C



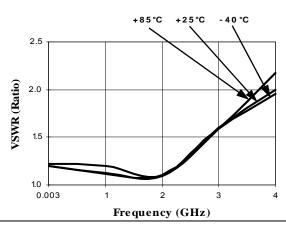
Loss Variation Over Temp. (dB)



RF1 - RF4 On VSWR Temp. Variation



RFC On VSWR Temp. Variation



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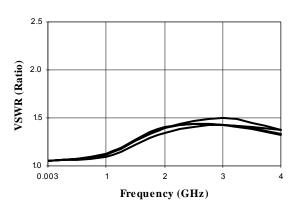


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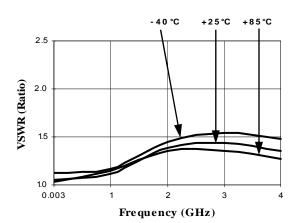
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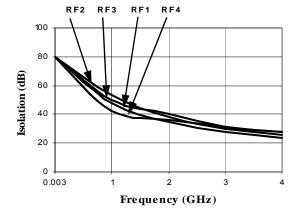
RF1 - RF4 Off VSWR @ +25°C



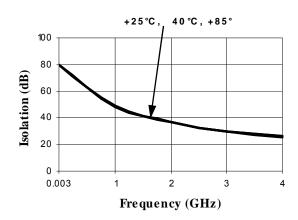
RF1 - RF4 Off VSWR Temp. Variation



Isolation (dB) @ +25°C



Isolation Temp. Variation (dB)



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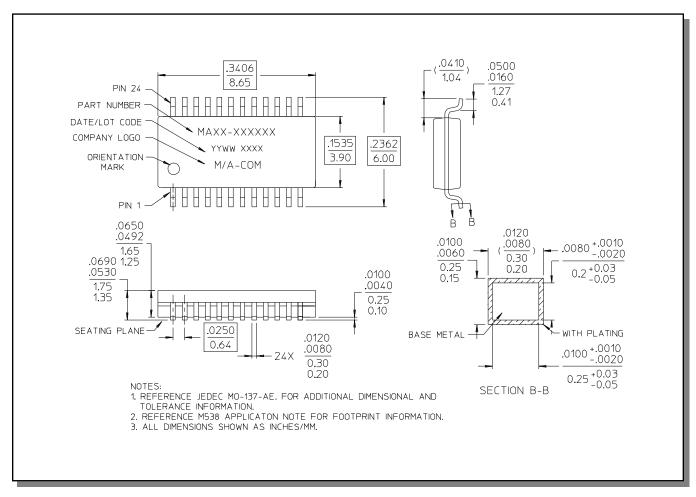
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Lead-Free, QSOP-24[†]



[†] Reference Application Note M538 for lead-free solder reflow recommendations.