

GaAs Broadband SPDT Switch DC - 6.0 GHz

Rev. V1

Features

- UNII, Hiperlan, and 802.11a+b/g Applications
- Broadband Performance: DC-6 GHz
- Low Insertion Loss: 0.9 dB at 6 GHz
- High Isolation: 28 dB Typical
- Fast Switching Speed: 0.5 μ m GaAs PHEMT
- High Power: 36 dBm P1dB
- Fast Settling for Low Gate Lag Requirements
- Lead-Free 3 mm 12-lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

M/A-COM's MASW-007588 is a broadband GaAs PHEMT MMIC SPDT switch in a low cost, lead-free 3 mm 12-lead PQFN package. The MASW-007588 is ideally suited for applications where very small size and low cost are required.

The MASW-007588, with its small size and low height, is ideal for 802.11a and 802.11b/g PC card and access point applications.

The MASW-007588 delivers high isolation, low insertion loss and high linearity up to 6 GHz.

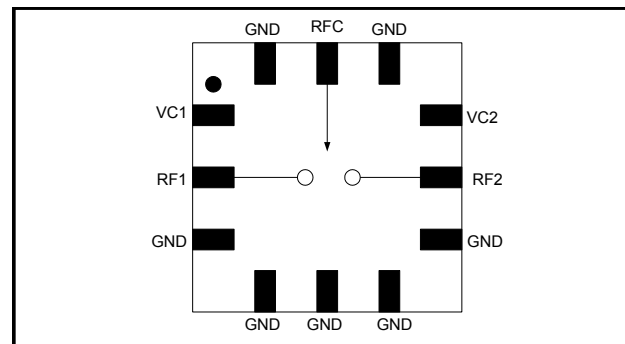
The MASW-007588 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information¹

Part Number	Package
MASW-007588-TR3000	3000 piece reel
MASW-007588-000SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

PIN No.	PIN Name	Description
1	VC1	Control 1
2	RF1	RF Port 1
3	GND	Ground
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	RF2	RF Port 2
9	VC2	Control 2
10	GND	Ground
11	RFC	RF Input
12	GND	Ground
13	Paddle ²	RF and DC Ground

2. The exposed pad centered on the package bottom must be connected to RF and DC ground.

Absolute Maximum Ratings^{3,4}

Parameter	Absolute Maximum
Input Power @ 3 V Control	+37 dBm
Input Power @ 5 V Control	+39 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM does not recommend sustained operation near these survivability limits.

* Restrictions on Hazardous Substances, European Union Directive 002/95/EC.

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Electrical Specifications⁵: $T_A = 25^\circ\text{C}$, $Z_0 = 50\Omega$, $V_c = 0 \text{ V}/3 \text{ V}$, $\text{Pin} = 0 \text{ dBm}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	2.4 GHz	dB	—	0.70	1.05
	5.3 GHz	dB	—	0.85	1.2
	5.8 GHz	dB	—	0.85	1.2
Isolation	2.4 GHz	dB	24	29	—
	5.3 GHz	dB	23	28	—
	5.8 GHz	dB	21	26	—
Return Loss	DC - 6 GHz	dB	—	20	—
IP2	Two Tone, +15 dBm/Tone, 5 MHz Spacing, >50 MHz				
	2.4 GHz, $V_c = 3.0 \text{ V}$	dBm	—	98	—
	5.8 GHz, $V_c = 3.0 \text{ V}$	dBm	—	81	—
	2.4 GHz, $V_c = 5.0 \text{ V}$	dBm	—	107	—
IIP3	Two Tone, +15 dBm/Tone, 5 MHz Spacing, >50 MHz				
	2.4 GHz, $V_c = 3.0 \text{ V}$	dBm	—	57	—
	5.8 GHz, $V_c = 3.0 \text{ V}$	dBm	—	53	—
	2.4 GHz, $V_c = 5.0 \text{ V}$	dBm	—	57	—
Input P-1dB	2.4 GHz	dBm	—	40	—
	5.3 GHz	dBm	—	36	—
	5.8 GHz	dBm	—	37	—
2nd Harmonic	2.4 GHz, $\text{Pin} = +20 \text{ dBm}$	dBm	—	-72	—
	5.8 GHz, $\text{Pin} = +20 \text{ dBm}$	dBm	—	-69	—
3rd Harmonic	2.4 GHz, $\text{Pin} = +20 \text{ dBm}$	dBm	—	-85	—
	5.8 GHz, $\text{Pin} = +20 \text{ dBm}$	dBm	—	-75	—
T-rise, T-fall	10% to 90% RF and 90% to 10% RF	nS	—	55	—
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	nS	—	80	—
Transients	—	mV	—	14	—
Control Current	$ V_c = 3 \text{ V}$	μA	—	15	25

Truth Table^{5,6,7}

Control V1	Control V2	RFC—RF1	RFC—RF2
1	0	On	Off
0	1	Off	On

- For positive voltage control, external DC blocking capacitors are required on all RF ports.
- Differential voltage, $V(\text{state } 1) - V(\text{state } 0)$, must be +2.7 V minimum and must not exceed +5 V.
- $0 = 0 \pm 0.2 \text{ V}$, $1 = +2.9 \text{ V}$ to +5 V.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

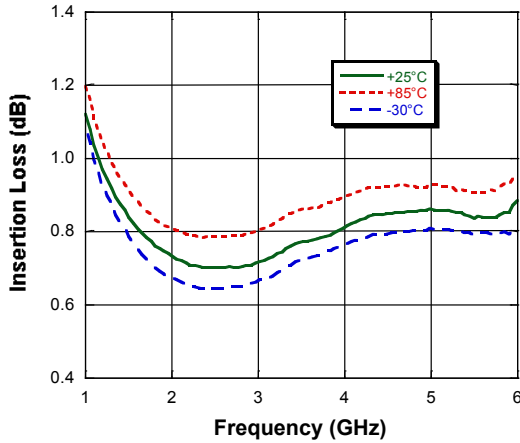
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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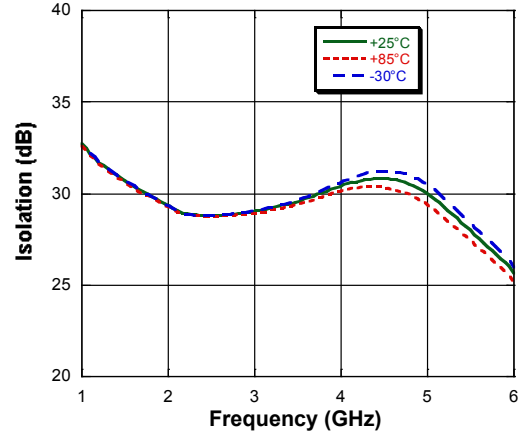
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Typical Performance Curves

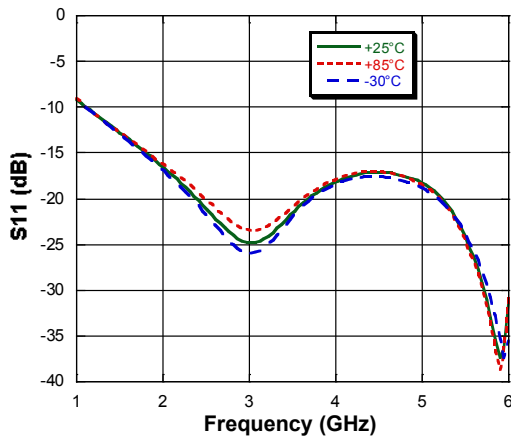
Insertion Loss



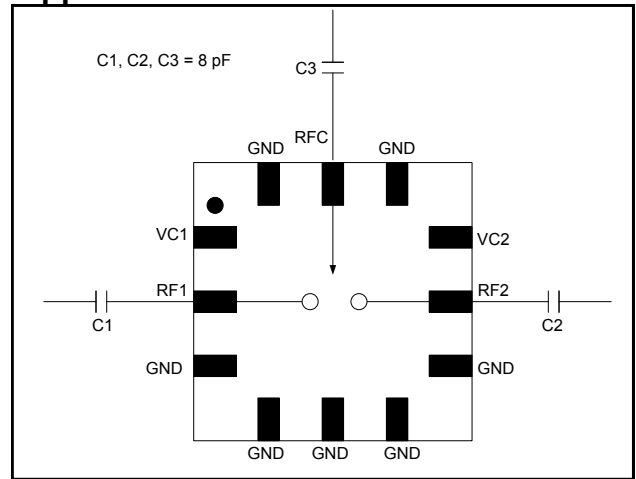
Isolation



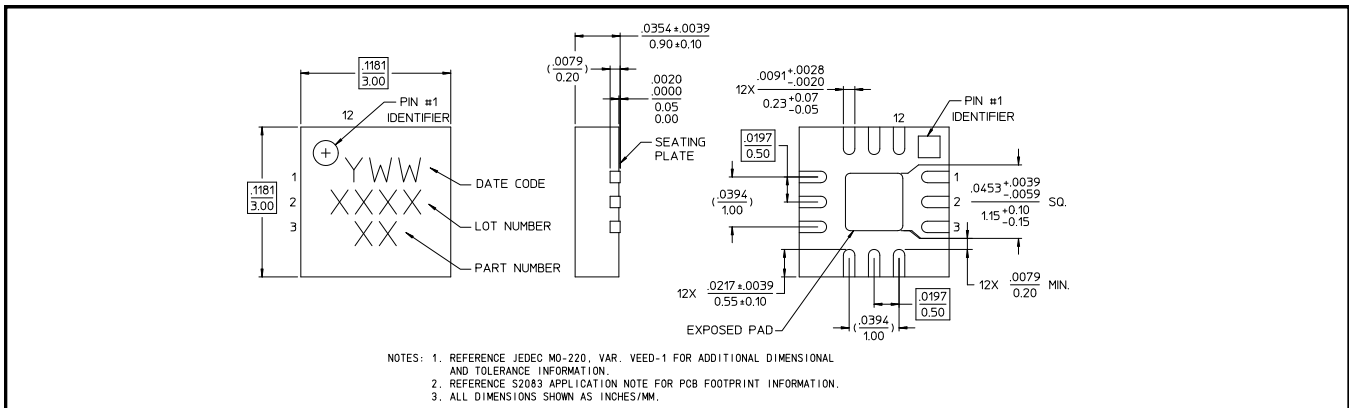
Return Loss



Application Schematic



Lead-Free 3 mm 12-lead PQFN†



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

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