MASW-009590-000DIE

Bumped GaAs SPDT Switch
DC - 8.0 GHz

Rev. V1

Features

- 802.11a + b/g and MIMO Applications
- Test and Measurement and Low/Medium Power Telecommunication Applications up to 8.0 GHz
- Broadband Performance: DC - 8.0 GHz
- Low Insertion Loss: 0.5 dB from 2.0 - 6.0 GHz
- Ultra-Small Form Factor: 0.605 x 0.485 mm
- Fast Settling for Low Gate Lag Requirements
- RoHS* Compliant

Description

The MASW-009590-000DIE is a broadband bumped GaAs pHEMT MMIC SPDT switch. Typical applications are for WLAN IEEE 802.11a + b/g, and MIMO. This switch is designed specifically for dual band wireless LAN modules where size constraints are critical. Designed for low insertion loss, this SPDT switch maintains low loss up to 8.0 GHz.

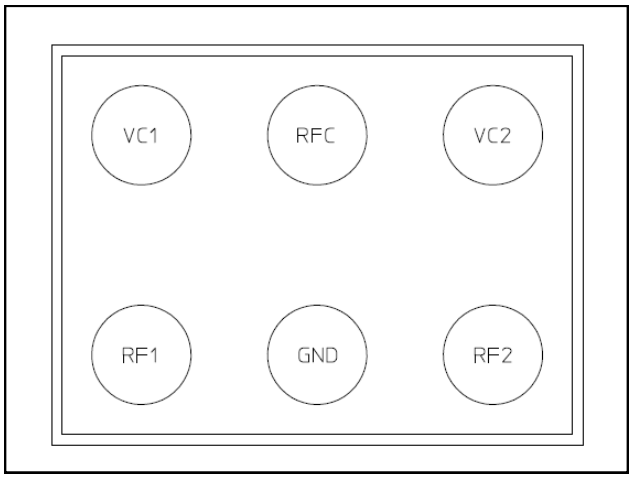
The MASW-009590-000DIE is fabricated using M/A-COM Technology Solutions' proprietary GaAs pHEMT process, designed for ultra-fast high linearity switching applications. The process features full passivation for performance and reliability.

Ordering Information

Part Number	Package
MASW-009590-000DIE[1]	Separated Die on Grip Ring
MASW-009590-000D3K[2]	Die in 3000 piece reel

1. Die quantity varies.
2. Reference Application Note M513 for reel size information.

Die Bump Pad Layout (bump side up)



Die Bump Pad Configuration

Name	Description
V_C1	Voltage Control 1
RFC	RF Common
V_C2	Voltage Control 2
RF2	RF Output 2
GND	Ground
RF1	RF Output 1

Absolute Maximum Ratings [3,4]

Parameter	Absolute Maximum
Input Power @ 3 V Control	+32 dBm
Input Power @ 5 V Control	+33 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 Technology Solutions does not recommend sustained operation near these survivability limits.

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

Bumped GaAs SPDT Switch
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Electrical Specifications: T_A = 25°C, Z_0 = 50 Ω, V_C = 0 V / 3 V, 22 pF Capacitor [5,6]

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss [7]	2.0 - 6.0 GHz 6.0 - 8.0 GHz	dB	— —	0.50 0.55	0.80 —
Isolation	2.4 GHz 5.3 GHz 5.8 GHz 6.0 - 8.0 GHz	dB	26.5 21 20 —	27.5 22 21 18	— — — —
Return Loss	DC - 8.0 GHz	dB	—	18	—
Input IP2	Two Tone, +15 dBm / Tone, 10 MHz Spacing 6.0 GHz	dBm	—	85	—
Input IP3	Two Tone, +15 dBm / Tone, 10 MHz Spacing 6.0 GHz	dBm	—	52	—
Input P0.1dB	2.4 - 5.8 GHz	dBm	—	26	—
Input P1dB	2.4 - 5.8 GHz	dBm	—	30	—
T-rise, T-fall	10% to 90% RF and 90% to 10% RF	ns	—	13	—
Ton, Toff	50% control to 90% RF and 50% control to 10% RF	ns	—	18	—
Transients		mV	—	24	—
Gate Lag	10% RF to 97.5% RF	ns	—	27	—
Control Current	$\|V_C\|$ = 3 V	µA	—	1	5

5. For positive voltage control, external DC blocking capacitors are required on all RF ports.
6. Electrical minimum and maximum specifications are guaranteed in final package assembly only.
7. Insertion loss can be optimized by varying the DC blocking capacitor value.

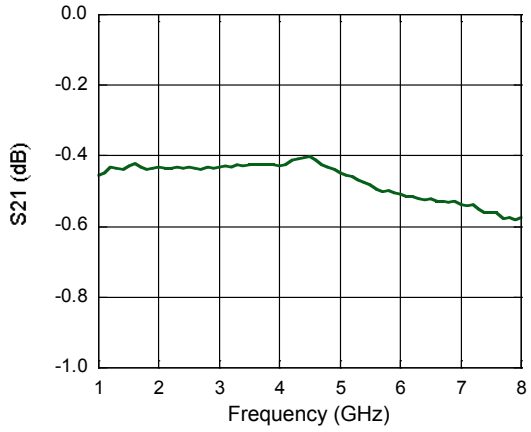
Truth Table [8]

Control V_C1	Control V_C2	RFC– RF1	RFC—RF2
1	0	On	Off
0	1	Off	On

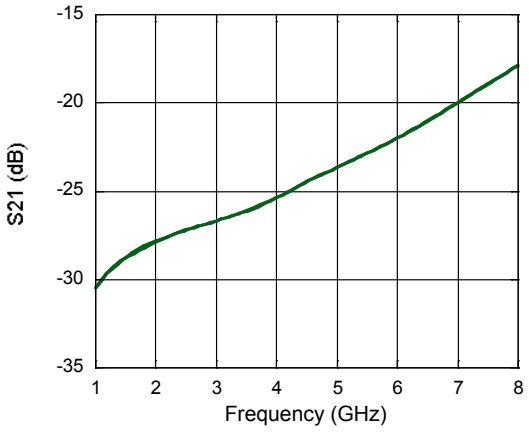
8. 1 = +1.8 V (for (Vhi-Vlo) < 1.8V, add a 20K Ω pull up resistor from RFC to Vhi) to +5 V, 0 = 0 V ± 0.2 V.

Typical Performance Curves (plots = chip on board assembly)

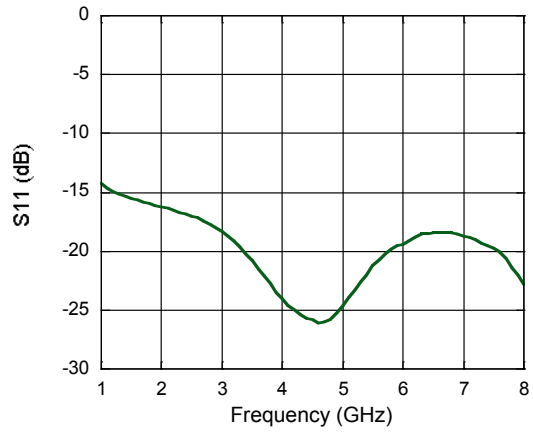
Insertion Loss



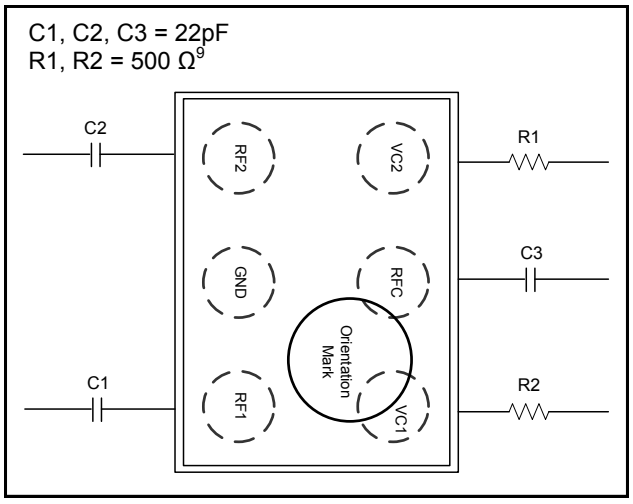
Isolation



Input Return Loss



Application Schematic



9. Resistors R1 and R2 are optional, acting to improve 8 GHz Insertion Loss.

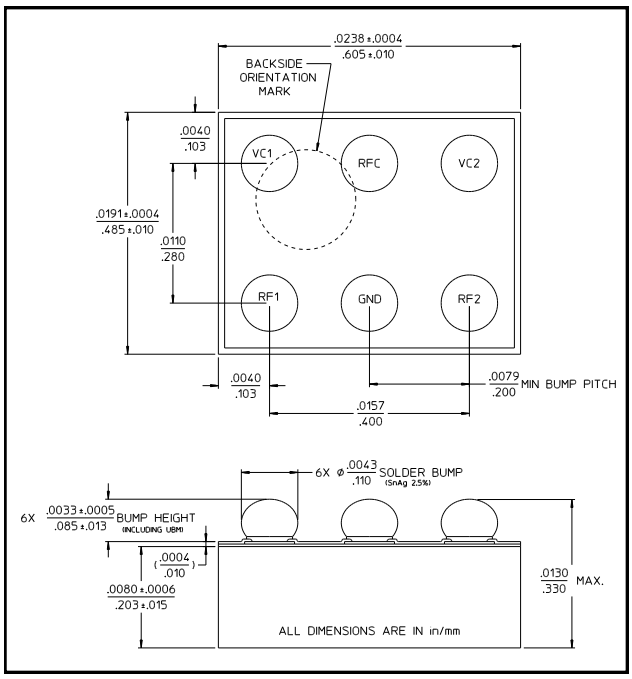
Handling Procedures

Please observe the following precautions to avoid damage:

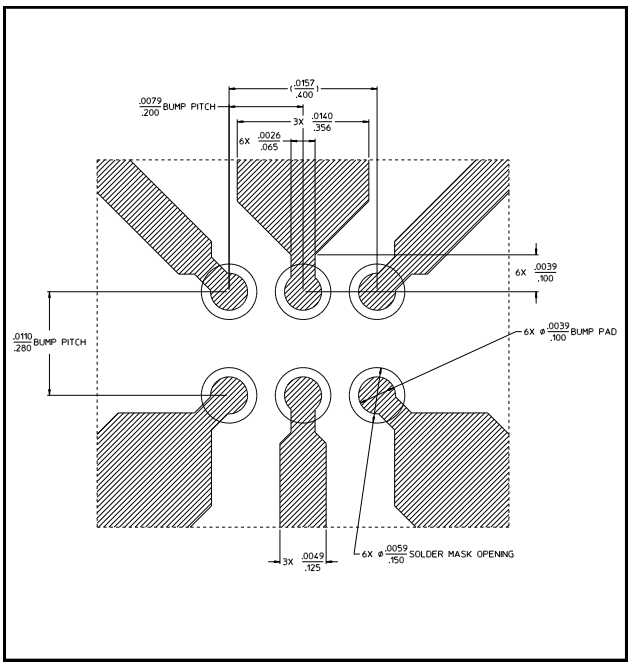
Static Sensitivity

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.

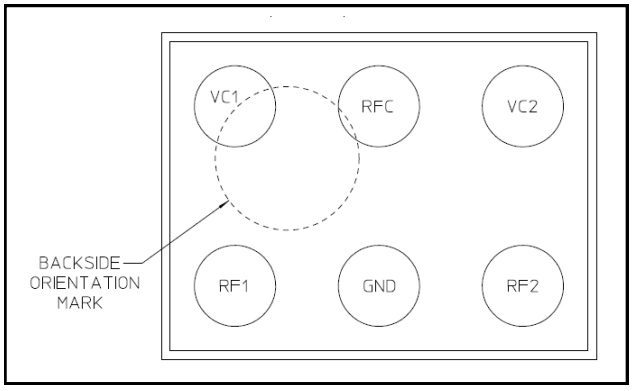
Die Dimensions (Top and Side Views)



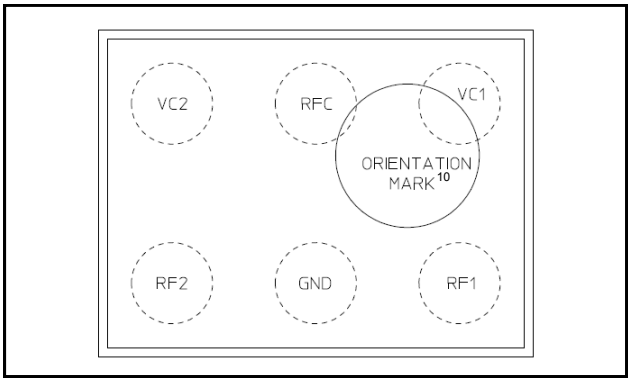
PCB Top Metal / Solder Mask



Die Bump Pad Layout - Top View (bump side up)



Die Bump Pad Layout - Bottom View (bump side down - as installed on board)



10. Orientation mark is only on material that is shipped in tape and reel. The mark is not available on die shipped on grip ring.