GaAs DPDT Switch
DC - 6.0 GHz

MASW6030G
V3

Features

- Low Insertion Loss, 0.5 dB Typical
- Fast Switching Speed, 4 ns Typical
- Ultra Low DC Power Consumption
- RoHS* Compliant

Description

MA/COM's MASW6030G is a GaAs MMIC DPDT switch die. The MASW6030G is ideally used where low power consumption is required.

Typical applications include transmit / receive switching, switch matrices and switched filter banks, WLAN IEEE 802.11a and 802.11 b/g systems. Other applications include cordless phones and base stations.

Ordering Information

Part Number	Package
MASW6030G	DIE [1]

1. Die quantity varies.

Absolute Maximum Rating [2,3]

Parameter	Absolute Maximum
Control Value (A or B)	0/-8 V
Max Input RF Power	+34 dBm (0.5 - 6.0 GHz with 0/-8 V CTL)
Storage Temperature	-65°C to +175°C
Max Operating Temperature	+175°C

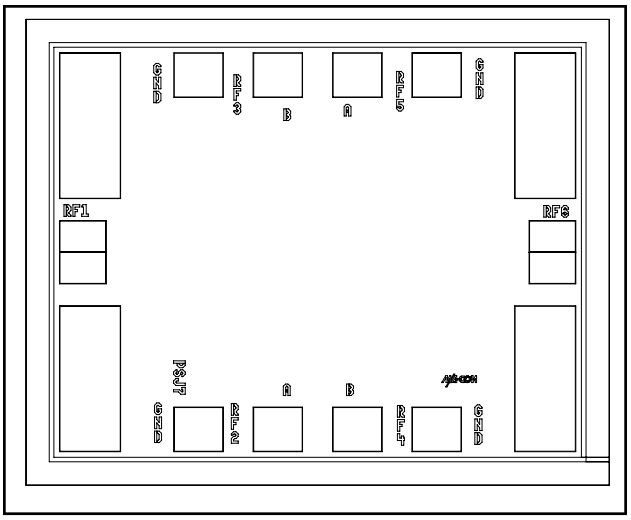
2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. M/A-COM does not recommend sustained operation near these survivability limits.

Truth Table [4,5]

		RF1 to		RF6 to	
A	**B**	**RF2**	**RF3**	**RF4**	**RF5**
1	0	On	Off	On	Off
0	1	Off	On	Off	On

4. 0 = 0 to –0.2 V, 1 = -5 V.
5. When an RF output port is "Off" it is shorted to ground through an "On" shunt MESFET.

Pad Layout



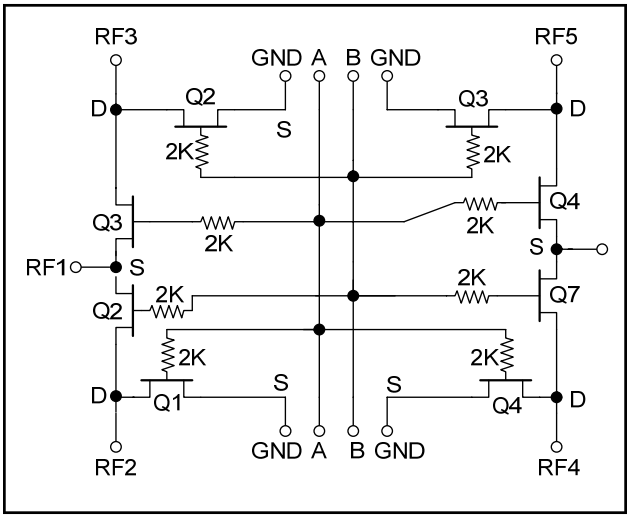
Die Size - Inches (mm)

0.048 x 0.038 x 0.010 (1.220 x 0.970 x 0.250)

Bond Pad Dimensions

Bond Pad	Dimensions - Inches (mm)
RF1, RF6	0.005 x 0.005 (0.130 x 0.150)
RF2, RF3, RF4, RF5, A, B	0.004 x 0.004 (0.100 x 0.100)
GND	0.005 x 0.013 (0.130 x 0.320)

Schematic



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

• **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 for additional data sheets and product information.

Electrical Specifications: +25°C, 0/5 Vdc, 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss [6]	DC - 1.0 GHz DC - 2.0 GHz DC - 4.0 GHz DC - 6.0 GHz	dB dB dB dB	— — — —	— — — —	0.6 0.8 1.0 1.5
Isolation	DC - 1.0 GHz DC - 2.0 GHz DC - 4.0 GHz DC - 6.0 GHz	dB dB dB dB	40 35 25 20	— — — —	— — — —
VSWR	DC - 1.0 GHz DC - 2.0 GHz DC - 4.0 GHz DC - 6.0 GHz	Ratio Ratio Ratio Ratio	— — — —	— — — —	1.2:1 1.4:1 1.5:1 1.8:1
Input P-1dB	0.5 - 6.0 GHz, 0 / -5V, 0 / -8V 0.05 GHz, 0 / -5V, 0 / -8V	dBm dBm	— —	+27 / +33 +21 / +26	— —
IP2	Two Tone Input Power up to +5 dBm 0.5 - 6.0 GHz 0.05 GHz	 dBm dBm	 — —	 +68 +62	 — —
IP3	Two Tone Input Power up to +5 dBm 0.5 - 6.0 GHz 0.05 GHz	 dBm dBm	 — —	 +45 +40	 — —
Control Current	V_{IN} Low (0 to –0.2 V) V_{OUT} High (-5 V @ 10 µA Typ to –8 V)	µA µA	— —	— —	5 100
T-rise, T-fall	10% to 90% RF and 90% to 10% RF	nS	—	2	—
T_{ON}, T_{OFF}	50% control to 90% RF, and 50% control to 10% RF	nS	—	4	—
Transients	In Band	mV	—	15	—

6. Loss changes 0.0025 dB/°C (-55°C to +85°C.)

Handling Procedures

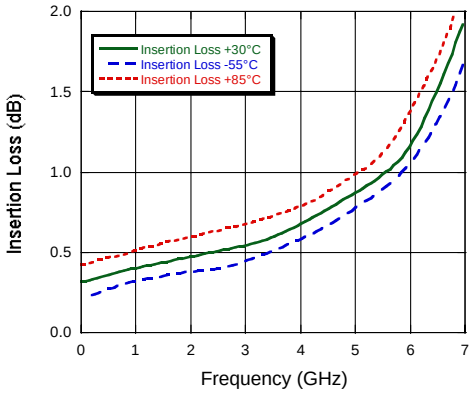
Please observe the following precautions to avoid damage:

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.

Typical Performance

Insertion Loss



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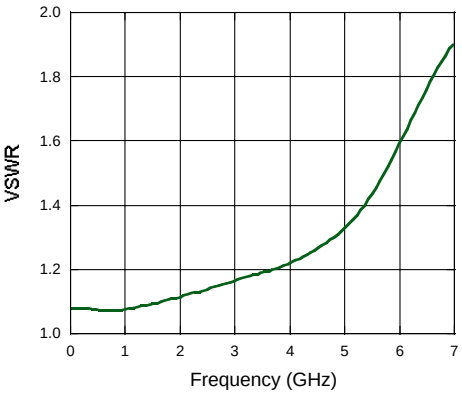
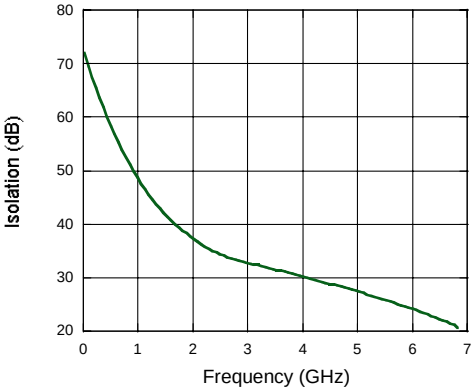
VSWR @ 25°C



Isolation @ 25°C



Handling Precautions

Permanent damage to the MASW6030G may occur if the following precautions are not adhered to:

A. Cleaniness—MASW6030G should be handled in a clean environment. DO NOT attempt to clean unit after the MASW6030G is installed.

B. Static Sensitivity—All chip handling equipment and personnel should be DC grounded.

C. Transient—Avoid instrument and power supply transients while bias is applied to the MASW6030G. Use shielded signal and bias cables to minimize inductive pick-up.

D. Bias—Apply voltage to either of the complementary control ports only when the other is grounded. No port should be allowed to "float".

E. General Handling—It is recommended that the MASW6030G chip be handled along the long side of the die with a sharp pair of bent tweezers. DO NOT touch the surface of the chip with fingers or tweezers.

Mounting

The MASW6030G is back-metallized with Pd/Ni/Au (100/1,000, 10,000 Å) metallization. It can be die-mounted with AuSn eutectic preforms or with thermally conductive epoxy. The package surface should be clean and flat before attachment.

Eutectic Die Attach:

A. A 80/20 gold/tin preform is recommended with a work surface temperature of approximately 255°C and a tool temperature of 265°C. When not 90/10 nitrogen/hydrogen gas is applied, tool tip temperature should be approximately 290°C.

B. DO NOT expose the MASW6030G to a temperature greater than 320°C for more than 20 seconds. No more than 3 seconds for scrubbing should be required for attachment.

Epoxy Die Attach:

A. Apply a minimum amount of epoxy and place the MASW6030G into position. A thin epoxy fillet should be visible around the perimeter of the chip.

B. Cure epoxy per manufacturer's recommended schedule.

C. Electrically conductive epoxy may be used by is not required.

Wire Bonding

A. Ball or wedge with 1.0 mil diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150°C and a ball bonding force of 40 to 50 grams or wedge bonding force o1 18 to 22 grams is recommended. Ultrasonic energy and time should be adjusted to the minimum levels achieve reliable wirebonds.

B. Wirebonds should be started on the chip and terminated on the package.

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