

GaAs DPDT Switch

DC - 6 GHz

MASW6030G

V 2.00

Features

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

Guaranteed Specifications** @ +25°C***

Frequency Range		DC - 6 GHz
Insertion Loss	DC - 1 GHz	0.6 dB Max
	DC - 2 GHz	0.8 dB Max
	DC - 4 GHz	1.0 dB Max
	DC - 6 GHz	1.5 dB Max
VSWR	DC - 1 GHz	1.2:1 Max
	DC - 2 GHz	1.4:1 Max
	DC - 4 GHz	1.5:1 Max
	DC - 6 GHz	1.8:1 Max
Isolation	DC - 1 GHz	40 dB Min
	DC - 2 GHz	35 dB Min
	DC - 4 GHz	25 dB Min
	DC - 6 GHz	20 dB Min

Operating Characteristics

Impedance 50 Ω Nominal

Switching Characteristics***

tRISE, tFALL (10/90% or 90/10% RF)	2 ns Typ
tON, tOFF (50% CTL to 90/10% RF)	4 ns Typ
Transients (In-Band)	15 mV Typ

Input Power for 1dB Compression

Control Voltages (Vdc) 0/-5 0/-8

0.5 - 6 GHz	+27	+33	dBm Typ
0.05 GHz	+21	+26	dBm Typ

Intermodulation Intercept Point (for two-tone input power up to +5 dBm)

Intercept Points	IP ₂	IP ₃	
0.5 - 6 GHz	+68	+45	dBm Typ
0.05 GHz	+62	+40	dBm Typ

Control Voltages (Complementary Logic)

V _{INLow}	0 to -0.2V @ 5 μ A Max
V _{INHl}	-5V @ 10 μ A Typ to -8V @ 100 μ A Max

Die Size 0.036" x 0.046" x 0.010"
(0.91mm x 1.17mm x 0.25mm)

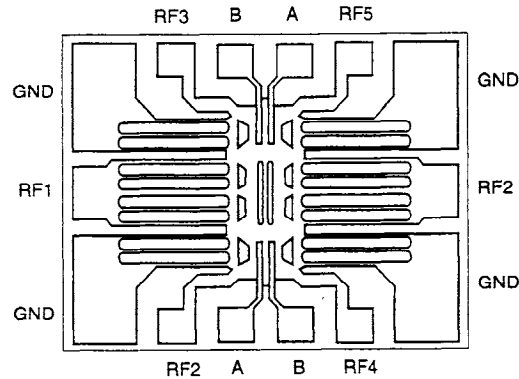
Environmental

These units are designed to meet or exceed the following:
Electrical, 100% probing at 25°C for selected parameters.
Visual, 100% per MIL-STD-883 Method 2010 Condition B.
Lot traceability supplied on request.

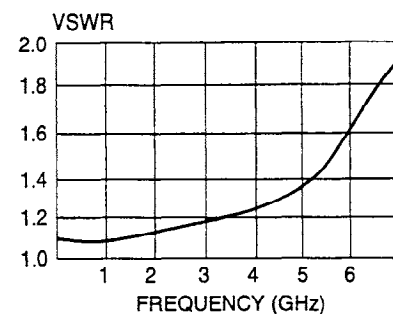
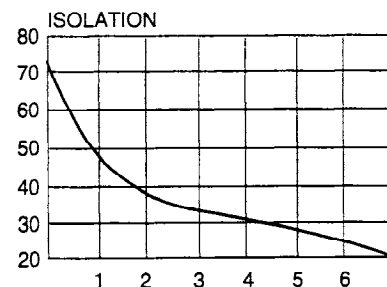
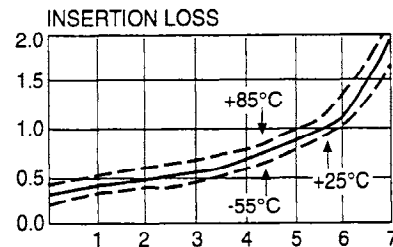
** All specifications apply with 50 Ω impedance connected to all RF ports, 0 and -5 Vdc control voltages and chip interconnections made with 0.001" dia. wirebonds.

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

**** Faster switching speed can be achieved with enhanced driver waveform.



Typical Performance



Specifications Subject to Change Without Notice.

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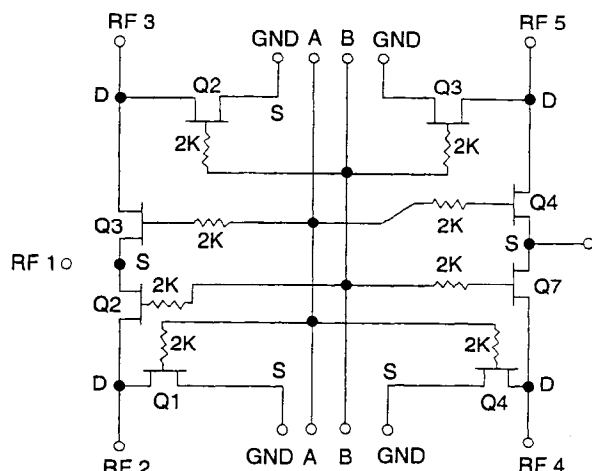
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Schematic



Handling Precautions

Permanent damage to the MASW6030 may occur if the following precautions are not adhered to:

- Cleanliness** — The MASW6030 should be handled in a clean environment. DO NOT attempt to clean unit after the MASW6030 is installed.
- Static Sensitivity** — All chip handling equipment and personnel should be DC grounded.
- Transient** — Avoid instrument and power supply transients while bias is applied to the MASW6030. Use shielded signal and bias cables to minimize inductive pick-up.
- Bias** — Apply voltage to either control port A1/B2 or A2/B1 only when the other is grounded. Neither port should be allowed to "float".
- General Handling** — It is recommended that the MASW6030 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 MASW6030 is back-metallized with Pd/Ni/Au (100/1,000/30,000Å) 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 80/20 gold/tin preform is recommended with a work surface temperature of approximately 255°C and a tool temperature of 265°C. When hot 90/10 nitrogen/hydrogen gas is applied, tool tip temperature should be approximately 290°C.
- DO NOT expose the MASW6030 to a temperature greater than 320°C for more than 20 seconds. No more than 3 seconds of scrubbing should be required for attachment.

Epoxy Die Attach:

- Electrically conductive epoxy may be used.
- Apply a minimum amount of epoxy and place the MASW6030 into position. A thin epoxy fillet should be visible around the perimeter of the chip.
- Cure epoxy per manufacturer's recommended schedule.

Wire Bonding

- Ball or wedge bond 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 of 18 to 22 grams is recommended. Ultrasonic energy and time should be adjusted to the minimum levels to achieve reliable wirebonds.
- Wirebonds should be started on the chip and terminated on the package.

Truth Table*

Control Inputs		Condition Of Switch			
A	B	RF1 to RF2		RF6 to RF5	
		RF2	RF3	RF4	RF5
V _{Hi}	V _{Low}	On	Off	On	Off
V _{Low}	V _{Hi}	Off	On	Off	On

*When an RF output port is "off" it is shorted to ground through an "on" shunt MESFET

Maximum Ratings	
A. Control Voltage (A or B):	-8.5 Vdc
B. Max Input RF Power:	+34 dBm (0.5 - 6.0 GHz with 0/8V CTL)
C. Storage Temperature:	-65°C to +175°C
D. Max Operating Temperature:	+175°C

BondPad Dimensions Inches (mm)	
RF1, RF6:	0.005 x 0.005 (0.130 x 0.150)
RF2, RF5:	0.004 x 0.004 (0.100 x 0.100)
GND:	0.005 x 0.013 (0.130 x 0.320)

Die Size Inches (mm)	
0.036 x 0.046 x 0.010 (0.91 x 1.17 x 0.25)	

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