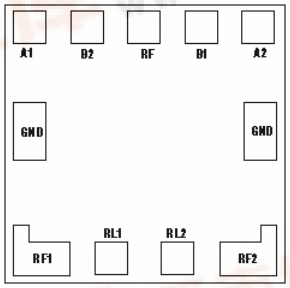
GaAs SPDT Switch
DC - 3 GHz

MASW2000

V 2.00

Features

- Low Insertion Loss, 0.5 dB Typical @ 2 GHz
- Fast Switching Speed, 22 ns Typical
- Reflective/Absorptive Configuration
- Ultra Low DC Power Consumption



Guaranteed Specifications** (-55°C to +85°C)

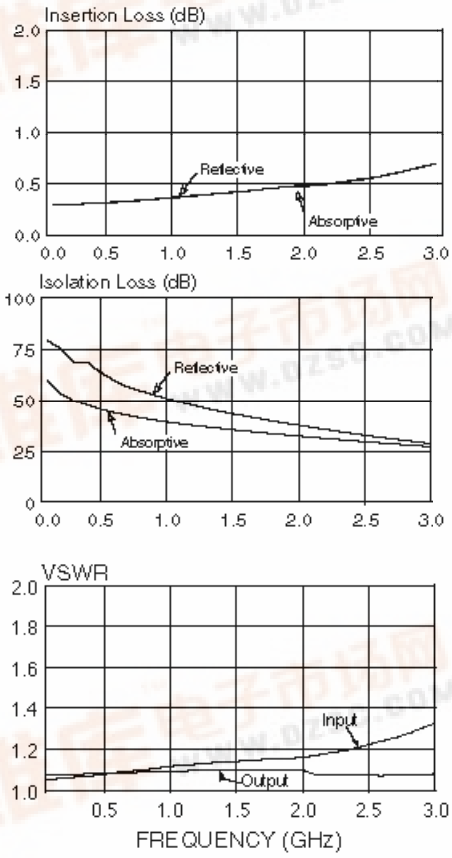
Frequency Range			DC - 3.0 GHz
Insertion Loss		DC–0.5 GHz	0.5 dB Max
		DC–1.0 GHz	0.6 dB Max
		DC–2.0 GHz	0.8 dB Max
		DC–3.0 GHz	1.0 dB Max
VSWR	Relective◊	DC–0.5 GHz	1.20:1 Max
		DC–1.0 GHz	1.20:1 Max
		DC–2.0 GHz	1.20:1 Max
		DC–3.0 GHz	1.40:1 Max
	Absorptive◊◊	DC–2.0 GHz	1.20:1 Max
		DC–3.0 GHz	1.40:1 Max
Isolation		DC–0.5 GHz	43 dB Min
		DC–1.0 GHz	35 dB Min
		DC–2.0 GHz	27 dB Min
		DC–3.0 GHz	24 dB Min

Operating Characteristics

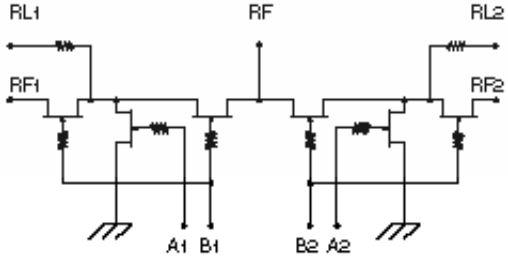
Impedance			50 Ω Nominal
Switching Characteristics			
t_{RISE}, t_{FALL} (10/90% or 90/10% RF)			22 ns Typ
t_{ON}, t_{OFF} (50% CTL to 90/10% RF)			27 ns Typ
Transients (In-Band)			25 mV Typ
Input Power for 1dB Compression			
Control Voltages (Vdc)		0/-5	0/-8
0.05 GHz		+24 dBm	+26 dBm Typ
0.5–3.0 GHz		+26 dBm	+32 dBm Typ
Intermodulation Intercept Point (for two-tone input power up to +5 dBm)			
Intercept Points		IP_2	IP_3
0.05 GHz		+63	+43 dBm Typ
0.5–3.0 GHz		+80	+53 dBm Typ
Control Voltage (Complementary Logic)			
V_{IN}Low			0 to -0.2 V @ 5 uA Max
V_{IN}Hi			
-5 V @ 60 uA Typ to -8 V @500 uA Max			
Die Size			0.056" x 0.056" x 0.010" 1.40mm x 1.40mm x 0.25mm)

** All specifications apply with 50 Ω impedance connected to all RF ports, 0 and 0 and -5 Vdc control voltages.
*** Loss changes 0.0025 dB/°C (From -55°C to +85°C)
◊ For relective operation RL1/RL2 are unconnected.
◊◊ For absorptive operation RL1 connects to RF1 and RL2 connects to RF2.

Typical Performance @ +25°C***



Schematic



Handling Precautions

Permanent damage to the MASW2000 may occur if the following precautions are not adhered to:

A. Cleanliness — The MASW2000 should be handled in a clean environment. DO NOT attempt to clean unit after the MASW2000 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 MASW2000. Use shielded signal and bias cables to minimize inductive pick-up.

D. 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”.

E. General Handling — It is recommended that the MASW2000 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 MASW2000 is back-metallized with Pd/Ni/Au (100/1,000/10,000Å) 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. 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.

B. DO NOT expose the MASW2000 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:

A. Apply a minimum amount of epoxy and place the MASW2000 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 but is not required.

Wire Bonding

A. 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.

B. Wirebonds should be started on the chip and terminated on the package. GND bonds should be as short as possible; at least three and no more than four bond wires from ground pads to package are recommended.

Truth Table***

Control Inputs		Condition Of Switch	
A1/B2	**A2/B1**	**RF1**	**RF2**
V_{IN}Hi	V_{IN}Low	On	Off
V_{IN}Low	V_{IN}Hi	Off	On

*** For normal SPDT operation A1 is connected to B2 and A2 is connected to B1.

Maximum Ratings
A.Control Voltage (A1/B2 or A2/B1):-8.5 Vdc
B. Max Input RF Power: +34 dBm
C. Storage Temperature:-65°C to +175°C
D. Maximum Operating Temperature:+175°C

BondPad Dimensions Inches (mm)
RF:0.004 x 0.004 (0.100 x 0.100)
RF1, RF2:0.009 x 0.009 (0.225 x 0.225)
A1, A2, B1, B2:0.004 x 0.004 (0.100 x 0.100)
GND1, GND2:0.009 x 0.004 (0.225 x 0.105)
RL1, RL2:0.004 x 0.005 (0.100 x 0.125)

Die Size Inches (mm)
0.056 x 0.056 x 0.010 (1.40 x 1.40 x 0.25)