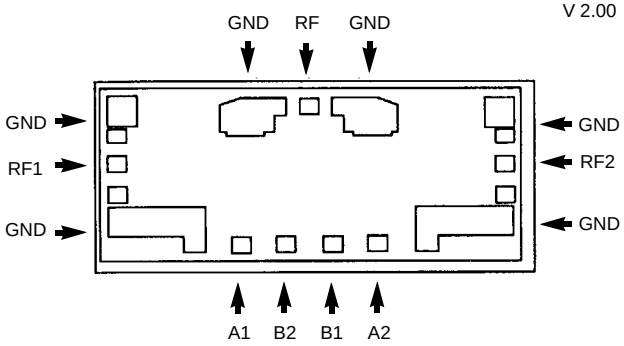
GaAs SPDT Switch
DC - 20 GHz

MASW20000

V 2.00

Features

- Very Broadband Performance
- Low Insertion Loss, 1.75 dB Typical @ 18 GHz
- High Isolation, 50 dB Typical @ 18 GHz
- Fast Switching Time, 2 nS Typical
- Reflective Configuration
- Ultra Low DC Power Consumption
- Via Hole Grounding



Guaranteed Specifications* @ +25°C**

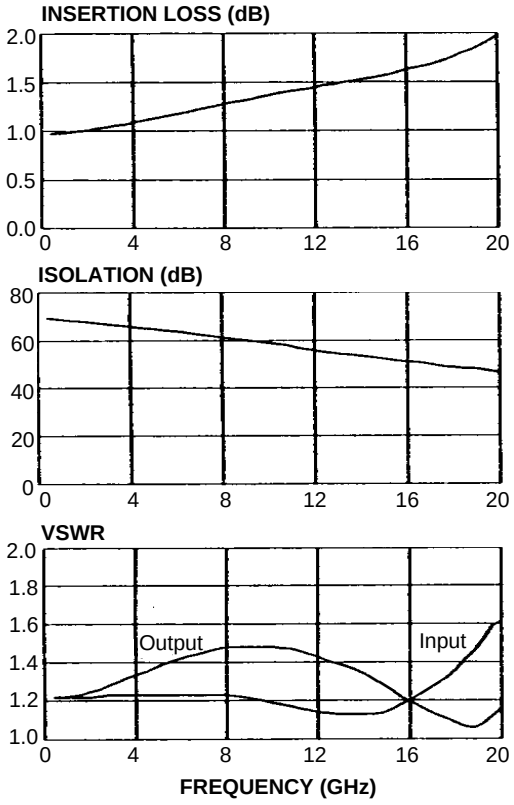
Frequency Range		DC-20.0 GHz
Insertion Loss	DC-10.0 GHz	1.7 dB Max
	DC-18.0 GHz	2.1 dB Max
	DC-20.0 GHz	2.5 dB Max
VSWR	DC-10.0 GHz	1.60:1 Max
	DC-18.0 GHz	1.80:1 Max
	DC-20.0 GHz	2.00:1 Max
Isolation	DC-10.0 GHz	50 dB Min
	DC-18.0 GHz	42 dB Min
	DC-20.0 GHz	40 dB Min

Operating Characteristics

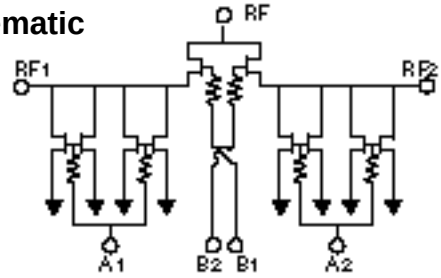
Impedance		50 Ω Nominal
Switching Characteristics		
T_{rise}, T_{fall} (10/90% or 90/10% RF) 2 ns Typ		
T_{on}, T_{off} (50% CTL to 90/10% RF)		3 ns Typ
Transients (in-Band)		20 mV Typ
Input Power for 1 dB Compression		
Control Voltages (Vdc)		0/-5
0.5-20 GHz		+25 dBm Typ
0.05 GHz		+18 dBm Typ
Intermodulation Intercept point (for two-tone input power up to +5 dBm)		
Intercept Points	IP_2	IP_3
0.5-20 GHz	+59 dBm	+43 dBm Typ
0.05 GHz		+27 dBm Typ
Control Voltages (Complimentary Logic)		
V_{in} Low		0 to -0.2 V @ 5 µA Max
V_{in} Hi		-5 V @50 µA Max
Die Size		0.083"x 0.035"X 0.004" (2.10mm X 0.89mm X 0.10mm)

* Wafer level data.All specifications apply with 50 Ω impedance connected to all RF ports, 0 and -5 Vdc control voltages.
** Loss change 0.0025 dB/°C. (From -55°C to +85°C)

Typical Performance



Schematic



Handling Precautions

Permanent damage to the MASW20000 may occur if the following precautions are not adhered to:

A. Cleanliness — The MASW20000 should be handled in a clean environment. DO NOT attempt to clean unit after the MASW20000 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 MASW20000. 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 MASW20000 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 MASW20000 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. 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 MASW20000 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. Gold ribbon (3.0 mil X 0.5 mil) may also be used.Thermosonic wire bonding 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.

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

VinLow 0 to -0.2V
VinHi -5V

***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. Max Operating Temperature:	+175°C

BondPad Dimensions Inches (mm)	
RF, RF1, RF2:	0.004 x 0.004 (0.100 x 0.100)
A1, A2, B1, B2:	0.004 x 0.004 (0.100 x 0.100)

Die Size Inches (mm)
0.083 x 0.035 x 0.004 (2.10 x 0.89x 0.10)