

10W GaAs SPDT Switch

DC-3 GHz

MASW2020G

Features

- Very High Power, 10 Watts @ 1 dB Compression @ -10V
- Low Insertion Loss, 0.4 dB Typical @ 1 GHz
- Very Low Distortion, 33 dBc @ 2.5 W and -5 Vdc

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

Frequency Range	DC-3 GHz	
Insertion Loss	DC-0.5 GHz	0.45 dB Max
	DC-1.0 GHz	0.50 dB Max
	DC-2.0 GHz	0.80 dB Max
	DC-3.0 GHz	1.00 dB Max
Isolation	DC-0.5 GHz	37 dB Min
	DC-1.0 GHz	32 dB Min
	DC-2.0 GHz	24 dB Min
	DC-3.0 GHz	20 dB Min
VSWR	DC-0.5 GHz	1.20:1 Max
	DC-1.0 GHz	1.30:1 Max
	DC-2.0 GHz	1.50:1 Max
	DC-3.0 GHz	1.60:1 Max

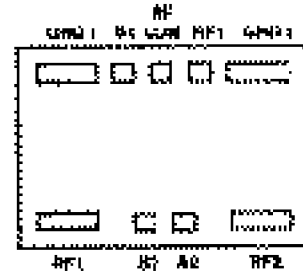
Operating Characteristics

Impedance	50 Ω Nominal		
Switching Characteristics			
Trise, Tfall (10%/90% or 90%/10% RF)	10 ns Typ		
Ton, Toff (50% CTL to 90%/10%)	15 ns Typ		
Transients (in-Band)	20 mV Typ		
Input Power for 1 dB Compression**			
Control Voltages (Vdc)	0/-5	0/-8	0/-10
500-3000 MHz	2.5 Watts	7.5 Watts	10 Watts Typ
Intermodulation Intercept point (for two-tone input power of 20 dBm)			
Intercept Points	IP ₃ @		
	-5V	-8V	-10V
above 500 MHz	+60	+65	+67 dBm Typ
Control Voltages (Complimentary Logic)			
Vin Low	0V to -0.2V @ 50 μA Max		
Vin Hi	-5V @ 40 μA Typ to -10V @ 0.6mA Max		
Die Size	0.048" x 0.039" x 0.010" (1.22mm X 0.99mm X 0.25mm)		

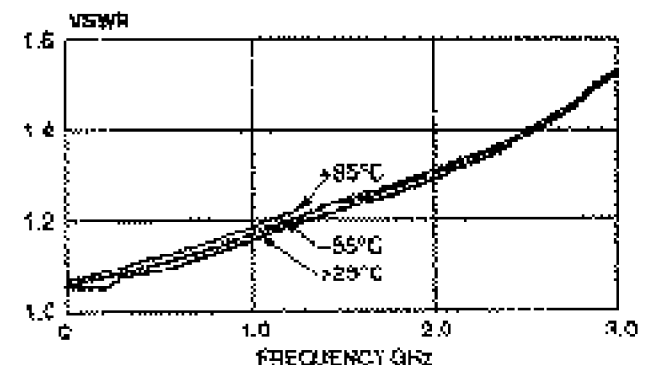
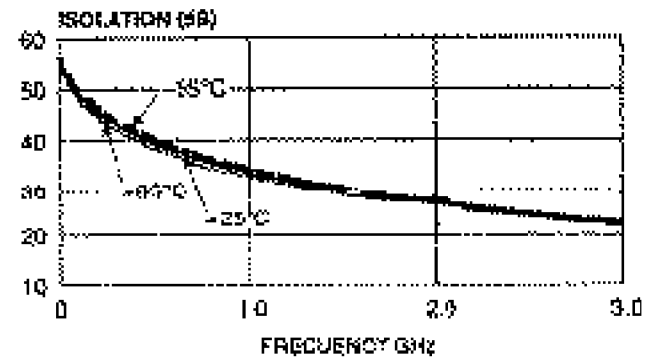
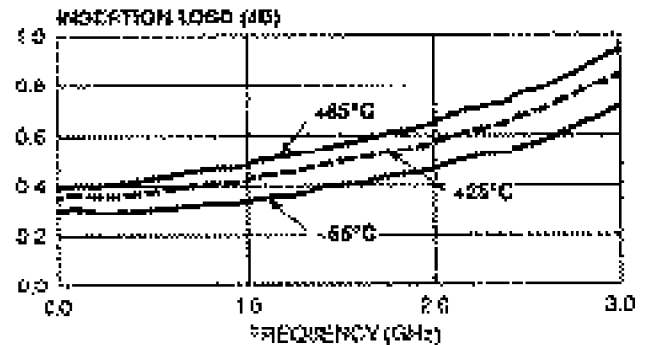
* All specifications apply with a 50 Ω impedance connected to all RF ports, 0 and -5 VDC control voltages.

** Enhanced power performance is achieved at higher control voltages without degradation in small signal performance.

V 2.00



Typical Performance



Handling Precautions

Permanent damage to the MASW2020G may occur if the following precautions are not adhered to:

- Cleanliness** — The MASW2020G should be handled in a clean environment. DO NOT attempt to clean unit after the MASW2020G 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 MASW2020G. Use shielded signal and bias cables to minimize inductive pick-up.
- Bias** — Apply voltage to either of the complementary control portsonly when the other is grounded. No port should be allowed to "float".
- General Handling** — It is recommended that the MASW2020G 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 MASW2020G 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 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 MASW2020G to a temperature greater than 320°C for more than 20 seconds. No more than 3 seconds of scrubbing should be required for attachment.

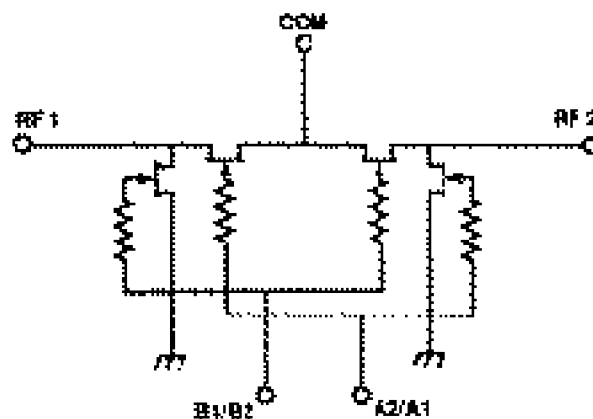
Epoxy Die Attach:

- Apply a minimum amount of epoxy and place the MASW2020G into position. A thin epoxy fillet should be visible around the perimeter of the chip.
- Cure epoxy per manufacturer's recommended schedule.
- Electrically conductive epoxy may be used but is not required.

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. GND bonds should be as short as possible; at least three and no more than four bond wires or two 3-mil ribbons from ground pads to package are recommended.

Schematic



Maximum Ratings	
A. Control Voltage	-10 Vdc
B. Max Input RF Power: (500 MHz-2 GHz)	+44 dBm (CW)
C. Storage Temperature:	-55°C to +175°C
D. Max Operating Temperature:	+175°C

BondPad Dimensions Inches (mm)	
RFIN1, RFOUT:	0.009 x 0.004 (0.240 x 0.100)
A1, A2, B1, B2:	0.004 x 0.004 (0.100 x 0.100)
RF COM:	0.004 x 0.004 (0.100 x 0.100)
GND 1, GND2:	0.012 x 0.004 (0.285 x 0.100)

Truth Table

Control Inputs		Condition Of Switch	
		RF Common to Each RF Port	
A1/A2	B1/B2	RF1	RF2
VINHi	VINLow	Off	On
VINLow	VINHi	On	Off

VINLow 0 to -0.2V
VINHi -5V to -10V