GaAs SP2T 2.5V High Power Switch DC - 3 GHz

MASWSS0006

Jan 17 2002

Preliminary

Features

- Low Voltage Operation 2.5V
- Low Harmonics > 65 dBc at +34 dBm & 1 GHz
- Low Insertion Loss 0.45 dB at 1 GHz
- High Isolation 18.5 dB at 2 GHz
- Miniature SOT-26 Package
- 0.5 micron GaAs pHEMT Process

Description

M/A-COM's MASWSS0006 is a GaAs PHEMT MMIC single pole two throw (SP2T) high power switch in a low cost miniature SOT-26 package. The MASWSS0006 is ideally suited for applications where high power, low control voltage, low insertion loss, high isolation, small size and low cost are required. Typical applications are for GSM and DCS handset systems that connect separate transmit and receive functions to a common antenna, as well as other related handset and general purpose applications. This part can be used in all systems operating up to 3 GHz requiring high power at low control voltage.

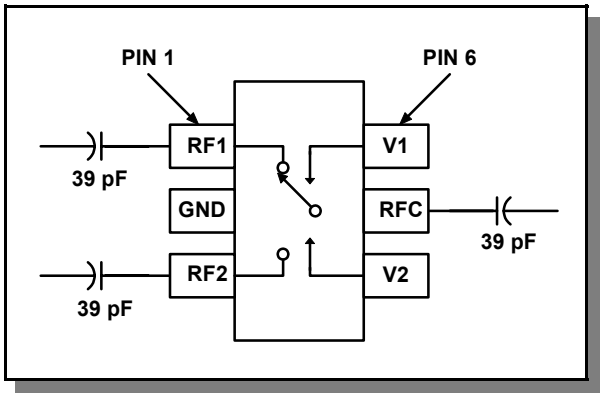
The MASWSS0006 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Absolute Maximum Ratings [1]

Parameter	Absolute Maximum
Max Input Power (0.5 - 3 GHz, 2.5V Control)	+38 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C

1. Exceeding any one or combination of these limits may cause permanent damage.

Functional Schematic



Pin Configuration

PIN No.	PIN Name	Description
1	RF1	RF Port 1
2	GND	RF Ground
3	RF2	RF Port 2
4	V1	Control 1
5	RFC	RF Common Port
6	V2	Control 2

Electrical Specifications: T_A = 25°C, Z_0 = 50Ω [2]

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	DC – 1 GHz 1 – 2 GHz 2 - 3 GHz	dB dB dB		0.45 0.55 0.65	0.65 0.75
Isolation	DC – 1 GHz 1 – 2 GHz 2 - 3 GHz	dB dB dB	23 17.5	24.5 18.5 14	
Return Loss	DC – 2 GHz 2 - 3 GHz	dB dB		20 16	
IP3	Two Tone +21 dBm, 1 MHz Spacing, > 50 MHz Vc = 0V/3V	dBm		64	
P1dB	Vc = 0V/2.5V	dBm		38	
2nd Harmonic	1 GHz, P_{IN} = +34 dBm, Vc = 0V/2.5V	dBc	65		
3rd Harmonic	1 GHz, P_{IN} = +34 dBm, Vc = 0V/2.5V	dBc	65		
Trise, Tfall	10% to 90% RF, 90% to 10% RF	uS		1	
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	uS		1	
Transients	In Band	mV		10	
Gate Leakage	|Vc| = 2.5V	uA			100

2. Insertion Loss can be optimized by varying the DC Blocking Capacitor value, ie. 1000 pF for 100 MHz - 500 MHz, 39 pF for 0.5 GHz - 3 GHz.

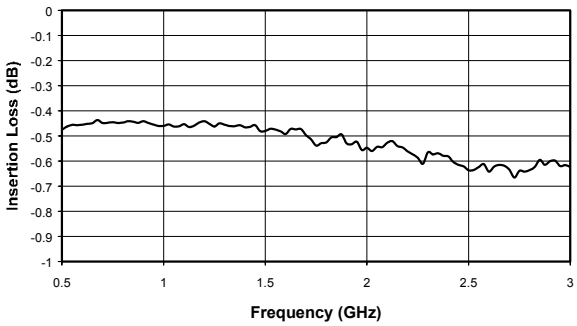
Truth Table [3]

V1	V2	ANT– RF1	ANT - RF2
+2.5 to +5V	0 ± 0.2V	On	Off
0 ± 0.2V	+2.5 to +5V	Off	On

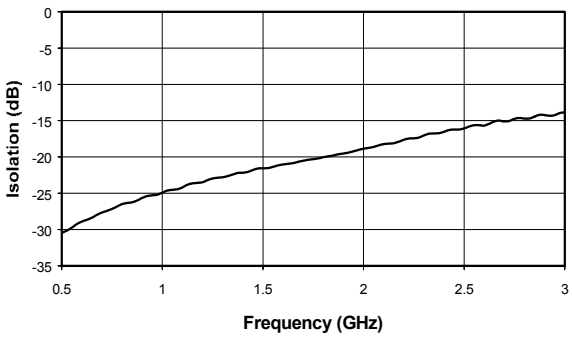
3. External DC blocking capacitors are required on all RF ports

Typical Performance Curves

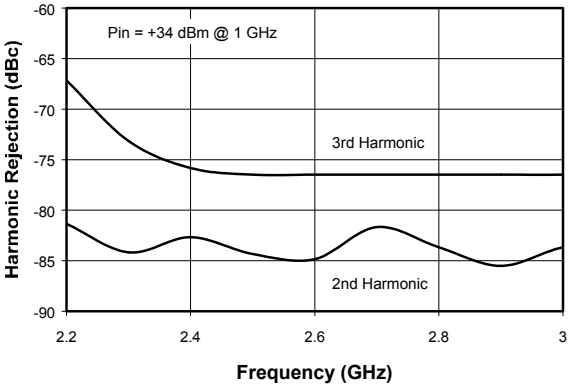
Insertion Loss vs. Frequency, 25 °C, 39 pF



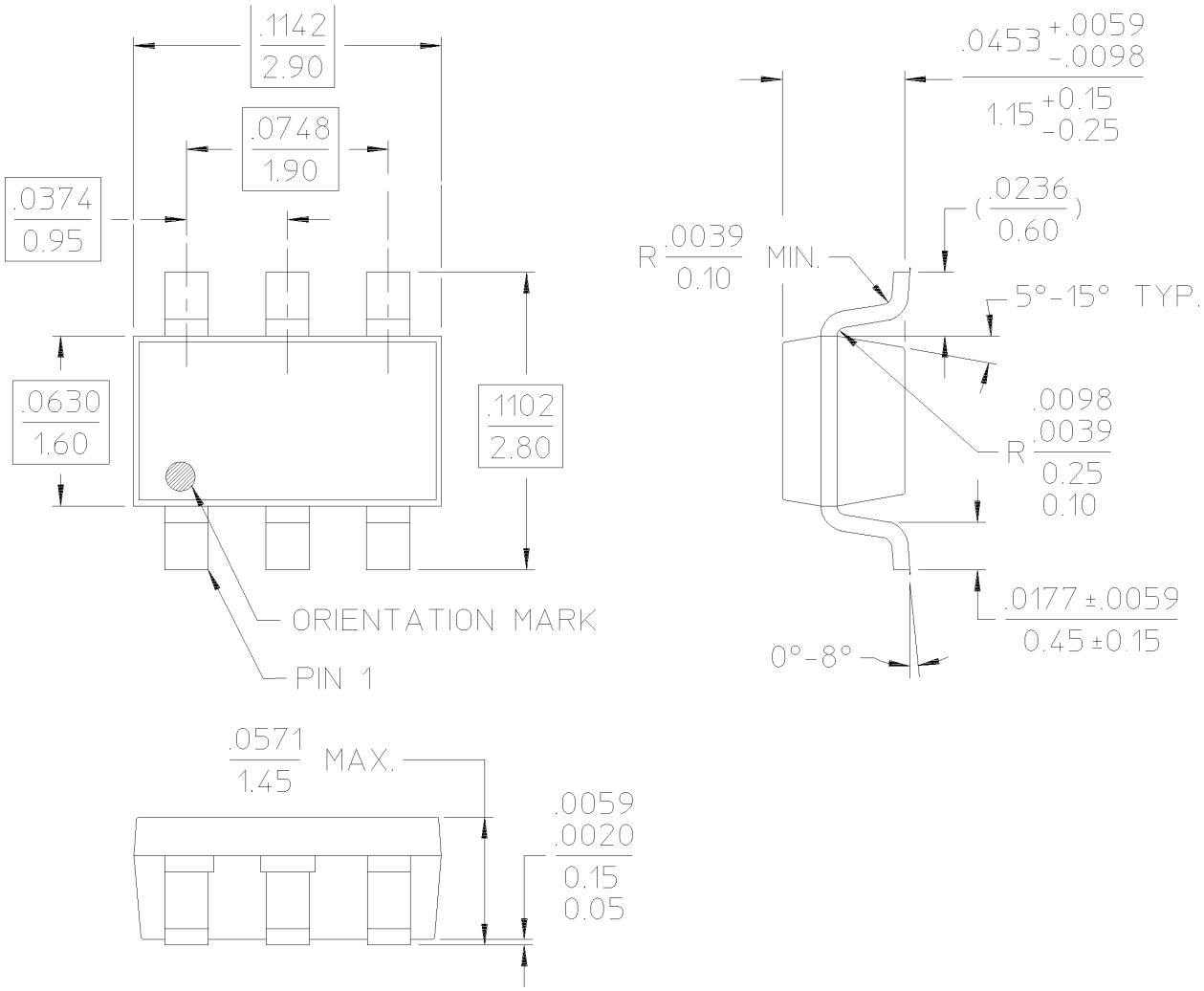
Isolation vs. Frequency, 25 °C, 39 pF



Harmonic Rejection vs. Control Voltage, 25 °C, 39 pF



SOT-26 Plastic Package



Handling Procedures

The following precautions should be observed to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are ESD sensitive and can be damaged by static electricity. Proper ESD techniques should be used when handling these devices.

Ordering Information

Part Number	Package
MASWSS0006	SOT-26 6-lead Plastic Package
MASWSS0006TR	1000 piece reel
MASWSS0006SMB	Sample Test Board