

GaAs SPDT 2.5 V High Power Switch DC - 3.0 GHz

Rev. V4

Features

- Low Voltage Operation: 2.5 V
- Excellent Harmonics: <-67 dBc at +34 dBm & 1.0 GHz
- Low Insertion Loss: 0.40 dB at 1.0 GHz
- High Isolation: 20 dB at 2.0 GHz
- SOT-26 Package
- 0.5 micron GaAs PHEMT Process

Description

M/A-COM's MASWSS0006 is a GaAs PHEMT MMIC single pole double throw (SPDT) high power switch in a low cost 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 3.0 GHz requiring high power at low control voltage.

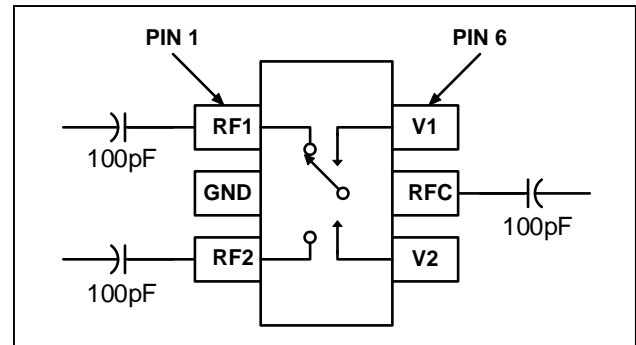
The MASWSS0006 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information¹

Part Number	Package
MASWSS0006	Bulk Packaging
MASWSS0006TR	1000 piece reel
MASWSS0006TR-3000	3000 piece reel
MASWSS0006SMB	Sample Test Board

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

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

Absolute Maximum Ratings^{2,3}

Parameter	Absolute Maximum
Input Power (0.5 - 3.0 GHz, 2.5 V Control)	+38 dBm
Voltage	±8.5 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.

Truth Table^{4,5}

V1	V2	ANT- RF1	ANT - RF2
1	0	On	Off
0	1	Off	On

- Differential voltage, V (state 1) - V (State 0), must be +2.5 V minimum.
- 0 = -5 V to 2.5 V, 1 = -2.5 V to +5 V.

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0\text{ V} / 2.5\text{ V}$, $Z_0 = 50\ \Omega$ ⁶

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss ⁷	DC – 1.0 GHz	dB	—	0.40	0.65
	1.0 – 2.0 GHz	dB	—	0.50	0.75
	2.0 - 3.0 GHz	dB	—	0.75	—
Isolation	DC – 1.0 GHz	dB	23.0	26	—
	1.0 – 2.0 GHz	dB	17.5	20	—
	2.0 - 3.0 GHz	dB	—	16	—
Return Loss	DC – 2.0 GHz	dB	—	20	—
	2.0 - 3.0 GHz	dB	—	16	—
IP3	Two Tone, +26 dBm / tone, 5 MHz Spacing > 50 MHz	dBm	—	57	—
P0.1dB	—	dBm	—	39	—
2 nd Harmonic	1.0 GHz, $P_{IN} = +34\text{ dBm}$	dBc	—	-75	-67
3 rd Harmonic	1.0 GHz, $P_{IN} = +34\text{ dBm}$	dBc	—	-75	-67
Trise, Tfall	10% to 90% RF, 90% to 10% RF	uS	—	0.04	—
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	uS	—	0.06	—
Transients	In Band	mV	—	50	—
Gate Leakage	—	uA	—	—	50

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

7. Insertion Loss can be optimized by varying the DC blocking capacitor value, e.g. 1000 pF for 100 - 500 MHz, 100 pF for 0.5 - 3.0 GHz.

Qualification

Qualified to M/A-COM specification REL-201, Process Flow -2.

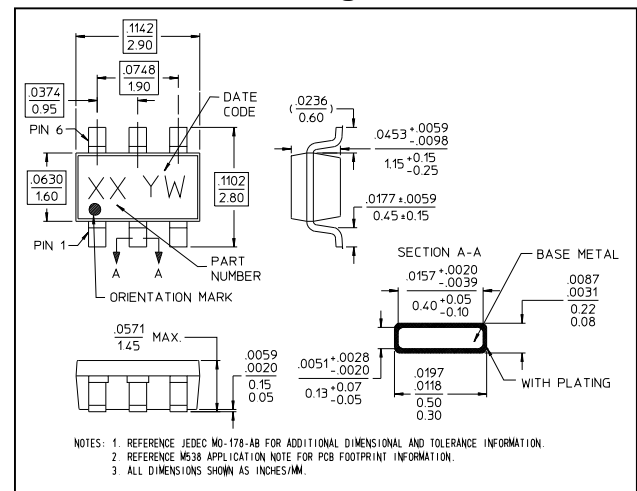
Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

SOT-26 Plastic Package[†]



[†] Meets JEDEC moisture sensitivity level 1 requirements

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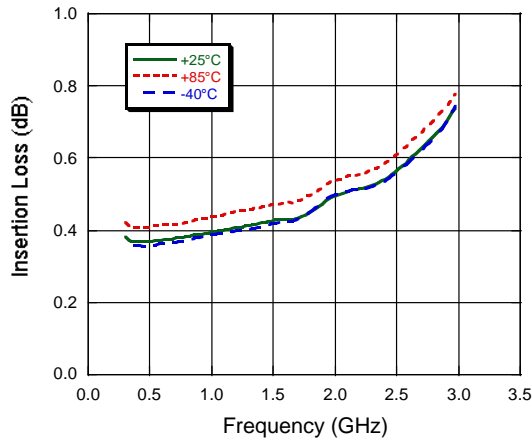
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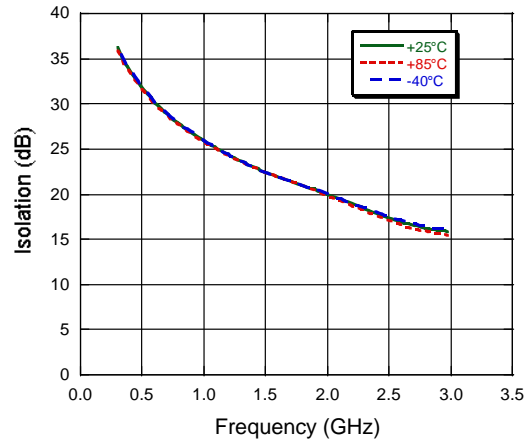
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Typical Performance Curves vs. Temperature, 100 pF blocking capacitors

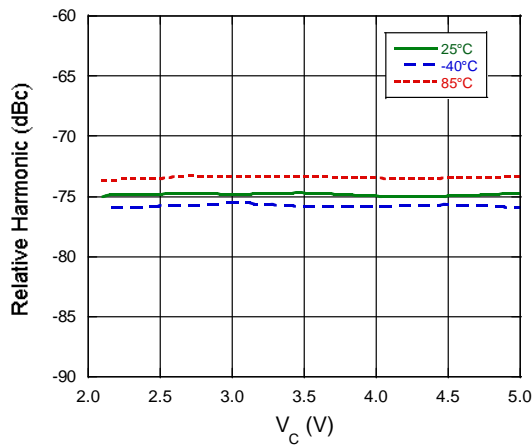
Insertion Loss vs. Frequency



Isolation vs. Frequency



2nd Harmonic vs. Control Voltage, Pin = 34 dBm CW, 1 GHz



3rd Harmonic vs. Control Voltage, Pin = 34 dBm CW, 1 GHz

