MASWSS0181TR-3000-HX GaAs SPDT 2.5 V High Power Switch DC - 3.0 GHz

Description

The MASWSS0181TR-3000-HX is a GaAs PHEMT MMIC single pole two throw (SPDT) high power switch, housed in a lead-free SOT-26 package. This component is ideally suited for applications that demand high power, low control voltage, minimal insertion loss, excellent isolation, compact size, and cost-effectiveness.

Typical applications include 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 uses. The MASWSS0181TR-3000-HX can be utilized in all systems operating up to 3 GHz that require high power with low control voltage.

This device is fabricated using a 0.5-micron gate length GaAs pHEMT process. The manufacturing process incorporates full passivation to enhance both performance and reliability.

Features

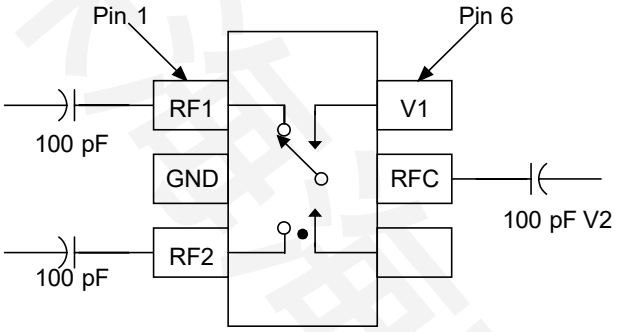
- ★ Low Voltage Operation: 2.5 V
- ★ Harmonics: <-67 dBc @ +34 dBm & 1 GHz
- ★ Low Insertion Loss: 0.40 dB @ 1 GHz
- ★ High Isolation: 20 dB @ 2 GHz
- ★ 0.5 micron GaAs pHEMT Process
- ★ Lead-Free SOT-26 Package
- ★ 100% Matte Tin Plating over Copper
- ★ Halogen-Free “Green” Mold Compound
- ★ 260°C Reflow Compatible
- ★ RoHS* Compliant Version of MASWSS0006

Ordering Information

Part Number	Package
MASWSS0181TR-3000-HX	3000 piece reel

1.Reference Application Note for reel size information.

Functional Schematic



Pin Configuration

Pin #	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

Parameter	Absolute Maximum
Input Power (0.5 - 3 GHz, 2.5 V Control)	38 dBm
Voltage	±8.5 V
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 to this device.
2.Does not recommend sustained operation near these survivability limits.

Electrical Specifications: TA = 25°C, VC = 0 V / 2.5 V, Z0 = 50 Ω4

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss[5]	DC - 1 GHz 1 - 2 GHz 2 - 3 GHz	dB	—	0.40 0.50 0.75	0.65 — —
Isolation	DC - 1 GHz 1 - 2 GHz 2 - 3 GHz	dB	23.0 — —	26 20 16	—
Return Loss	DC - 2 GHz 2 - 3 GHz	dB	—	20 16	—
IP3	Two Tone, +26 dBm / tone, 5 MHz Spacing, >50 MHz	dBm	—	57	—
P0.1dB	—	dBm	—	39	—
2nd Harmonic	1 GHz, P_{IN} = 34 dBm	dBc	—	-75	—
3rd Harmonic	1 GHz, P_{IN} = 34 dBm	dBc	—	-75	-67
T_{RISE}, T_{FALL}	10% to 90% RF, 90% to 10% RF	µs	—	0.04	—
T_{ON}, T_{OFF}	50% control to 90% RF, and 50% control to 10% RF	µs	—	0.06	—
Transients	In Band	mV	—	50	—
Control Current	—	µA	—	—	50

1.For positive voltage control, external DC blocking capacitors are required on all RF ports.
2.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 GHz.

Qualification
Qualified to specification REL-201, Process

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.

Truth Table

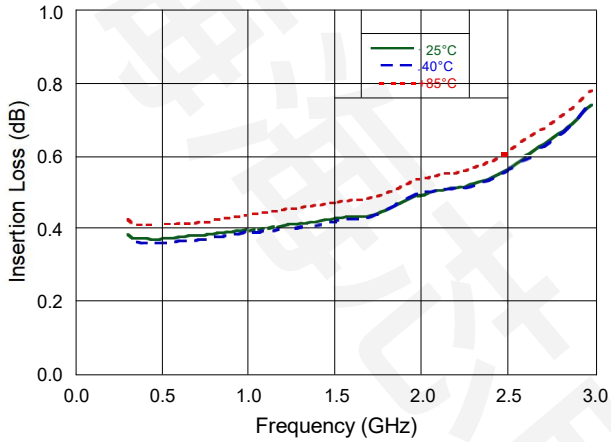
V1	V2	ANT-RF1	ANT-RF2
1	0	On	Off
0	1	Off	On

1.Differential voltage, V (state 1) - V (state 0), must be +2.5 V minimum and must not exceed +8 V.

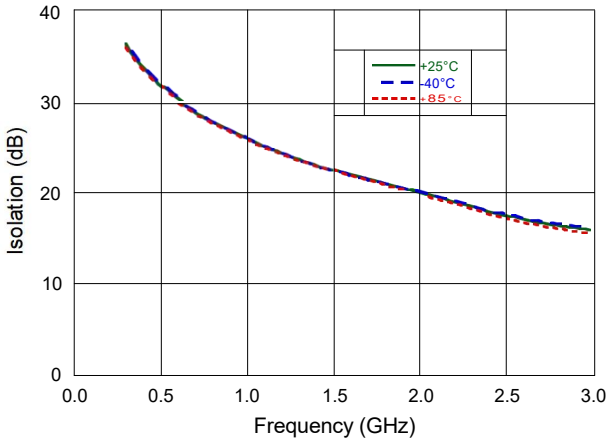
2.0 = -5 V to 2.5 V, 1 = -2.5 V to +5 V.

Typical Performance Curves vs. Temperature, 100 pF blocking capacitors

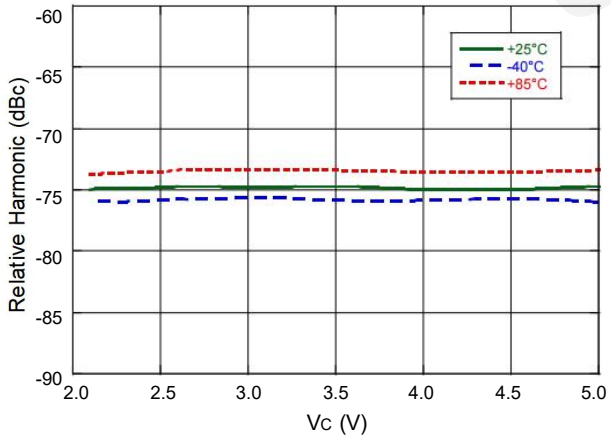
Insertion Loss vs. Frequency



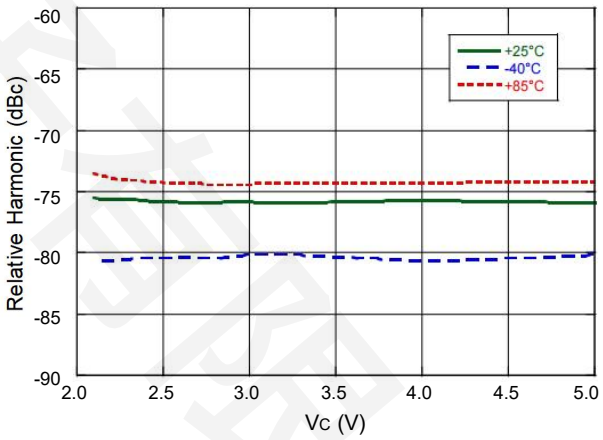
Isolation vs. Frequency



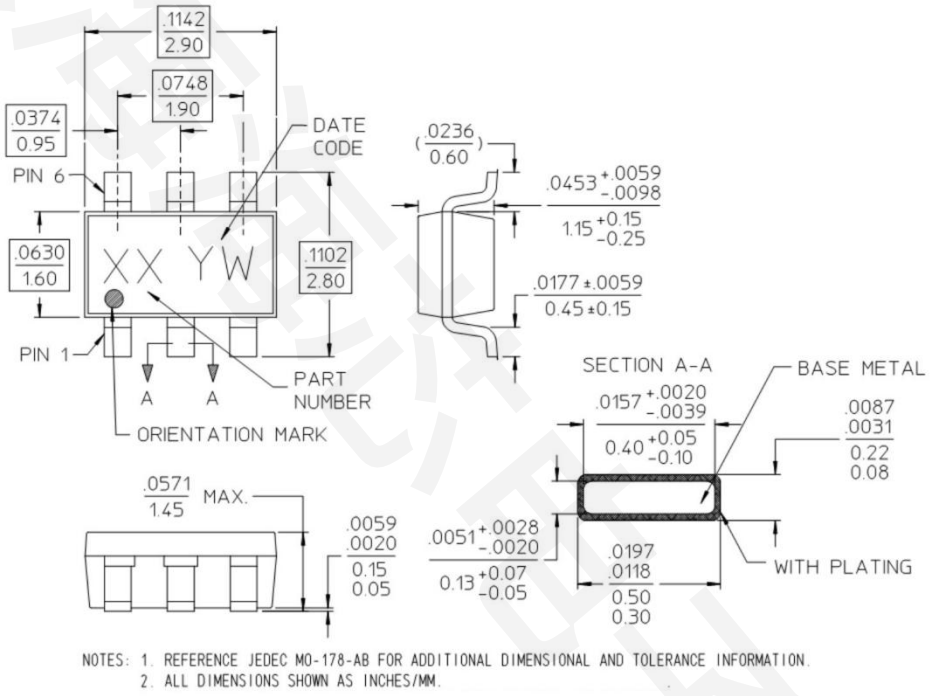
2nd Harmonic vs. Control Voltage, P_{IN} = 34 dBm CW, 1



3rd Harmonic vs. Control Voltage, P_{IN} = 34 dBm CW, 1 GHz



Lead-Free SOT-26 Plastic Package



NOTES: 1. REFERENCE JEDEC MO-178-AB FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
2. ALL DIMENSIONS SHOWN AS INCHES/MM.