

MASWSS0176TR-3000-HX GaAs SPDT Switch 0.05 - 3 GHz

Description

The MASWSS0176TR-3000-HX is a GaAs PHEMT MMIC single-pole, double-throw (SPDT) switch housed in a low-cost, lead-free SOT-26 surface-mount plastic package. Its compact footprint and cost-effective design make it ideally suited for applications demanding minimal board space and economical component solutions.

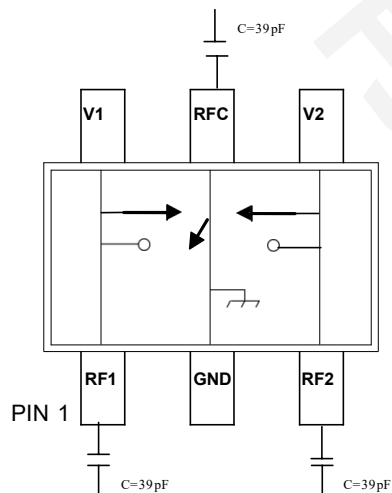
Typical applications include dual-band systems requiring signal routing between small-signal components—such as filter banks, single-band LNAs, and frequency converters. This device is optimized for low-power, low-loss operation across all systems operating up to 3 GHz, including PCS, GSM, DCS, satellite radio, Bluetooth®, and other receive-chain applications.

The MASWSS0176TR-3000-HX is fabricated using a 0.5- μm -gate-length GaAs PHEMT process, featuring full passivation to ensure robust performance and long-term reliability.

Features

- ★ Low Insertion Loss: 0.35 dB @ 2.4 GHz
- ★ Moderate Isolation: 21 dB @ 2.4 GHz
- ★ Low Current Consumption: 5 μA @ 2.5 V
- ★ Lead-Free SOT-26 Package
- ★ 100% Matte Tin Plating over Copper
- ★ Halogen-Free “Green” Mold Compound
- ★ 260 °C Reflow Compatible
- ★ RoHS* Compliant Version of MASWSS0005-HX

Functional Schematic



Pin Configuration

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

Absolute Maximum Ratings ^{1,2}

Parameter	Absolute Maximum
Input Power @ 2.5 V Control	+26 dBm
Operating 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: $T_A = 25^{\circ}\text{C}$, $V_c = 0\text{ V} / +2.5\text{ V}$, $Z_0 = 50\text{ Ohms}$ ^{1, 2}

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	0.05 - 1.0 GHz	dB	—	0.3	0.4
	1.0 - 3.0 GHz	dB	—	0.35	0.55
Isolation	0.05 - 1.0 GHz	dB	20	24	—
	1.0 - 3.0 GHz	dB	—	21	—
Return Loss	0.05 - 3.0 GHz	dB	—	20	—
IP2	Two Tone +5 dBm, 5 MHz Spacing	dBm	—	62	—
IP3	Two Tone +5 dBm, 5 MHz Spacing	dBm	—	45	—
P1dB	—	dBm	—	21	—
Trise, Tfall	10% to 90% RF and 90% to 10% RF	nS	—	35	—
Ton, Toff	50% Vc to 10% RF, 50% Vc to 90% RF	nS	—	40	—
Transients	In-Band	mV	—	10	—
Control Current	$I_{vd} = 2.5\text{ V}$	μA	—	5	20

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 MHz - 1 GHz, 39 pF for 0.5 GHz - 3 GHz.

Truth Table ¹

Control V1	Control V2	RFC-RF1	RFC-RF2
0	1	On	Off
1	0	Off	On

1. 0 = 0 V to 0.2 V, 1 = +2.5 V to 5 V

Handling Procedures

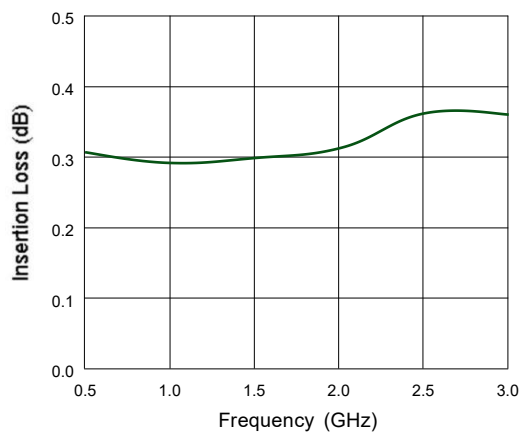
Please observe the following precautions to avoid damage:

Static Sensitivity

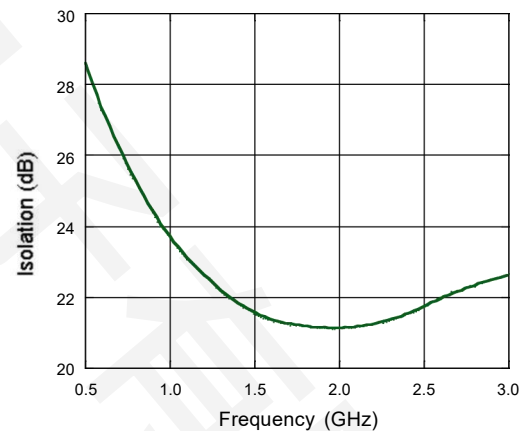
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

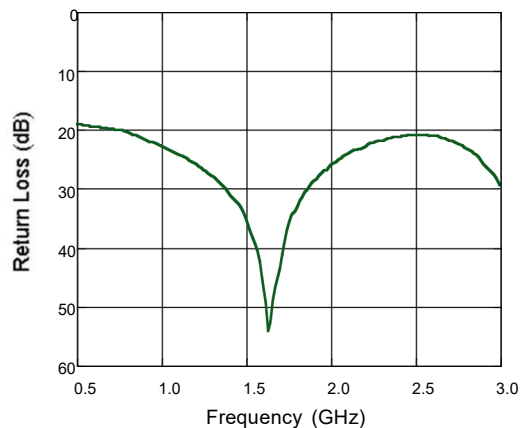
Insertion Loss



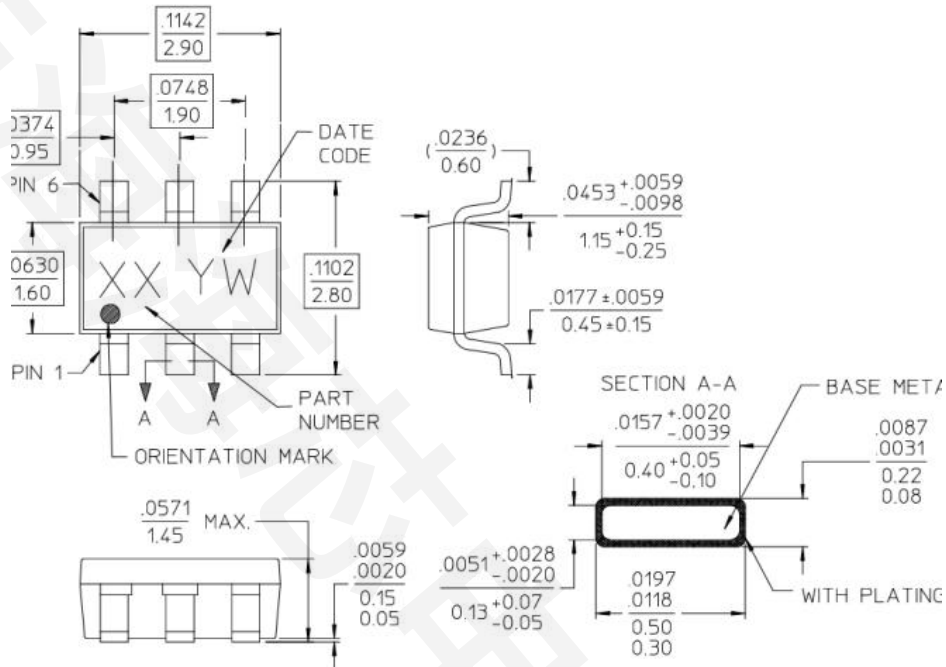
Isolation



Return Loss



Lead-Free SOT-26¹



- NOTES: 1. REFERENCE JEDEC MO-178-AB FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
2. REFERENCE M538 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.
3. ALL DIMENSIONS SHOWN AS INCHES/MM.

1. Reference Application Note M538 for lead-free solder reflow recommendations.

Ordering Information ¹

Part Number	Package
MASWSS0176TR-3000-HX	3000 piece reel

1. Reference Application Note M513 for reel size information.