



MASWSS0201 V1

GaAs Broadband 75 Ohm Default-On, SPDT Terminated Switch DC - 2.5 GHz

Features

- Ideal for CATV, DTV, DVR, STB Applications
- Default-On in Unpowered State (RFC-RF1 Path)
- Broadband Performance: DC-2.5 GHz
- Low Insertion Loss: 1.1 dB at 1 GHz
- High Isolation: > 60dB @ 100MHz
- Single Control Operation
- Power Handling: > 20 dBm P1dB
- Lead-Free 3 mm 12-lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible
- Configurable for Non-terminated Operation

Description

M/A-COM's MASWSS0201 is a broadband GaAs PHEMT MMIC SPDT terminated switch in a low cost, lead-free 3 mm 12-lead PQFN package. The MASWSS0201 is ideally suited for applications where an unpowered on state is critical in a single control line SPDT terminated switch. The unpowered condition is the same as the $V_{\text{C}}\!=\!0$ condition. This part can also be configured as a reflective switch with minimal impact to the RF performance.

The MASWSS0201 delivers high isolation, low insertion loss and high linearity up to 2.5 GHz.

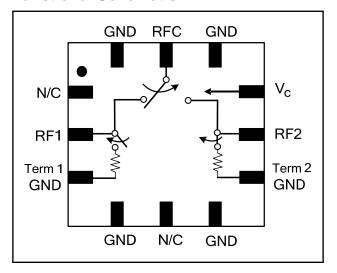
The MASWSS0201 is fabricated using a 0.5 micron gate length GaAs E/D PHEMT process. The process features full passivation for performance and reliability.

Ordering Information ¹

Part Number	Package
MASWSS0201TR-3000	3000 piece reel
MASWSS0201SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration²

Pin No.	Pin Name	Description	
1	N/C	No Connection	
2	RF1	RF Port 1	
3	Term 1 GND ³	Termination 1 Ground	
4	GND	Ground	
5	N/C	No Connection	
6	GND	Ground	
7	Term 2 GND ³	Termination 2 Ground	
8	RF2	RF Port 2	
9	VC	Control	
10	GND	Ground	
11	RFC	RF Input	
12	GND	Ground	
13	Paddle ⁴	RF and DC Ground	

- M/A-COM recommends that all unused (N/C) pins be connected to ground. All data on this datasheet was taken with N/C pins connected to ground.
- Terminated grounds require DC blocking capacitors; see application schematic.
- The exposed pad centered on the package bottom must be connected to RF and DC ground.

^{*} Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

[•] North America Tel: 800.366.2266 / Fax: 978.366.2266

[•] Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300

Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298





GaAs Broadband 75 Ohm Default-On, SPDT Terminated Switch DC - 2.5 GHz

MASWSS0201 V1

Electrical Specifications: $T_A = 25$ °C, $Z_0 = 75 \Omega$, $V_C = 0 \text{ V/3 V}$, $P_{IN} = 0 \text{ dBm}^5$

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Insertion Loss RFC to RF1 (V _C = 0V)	100 MHz 1.0 GHz 2.0 GHz	dB dB dB	_ _ _	0.9 1.0 1.3	1.75 1.85 —
Insertion Loss RFC to RF2 (V _C = 3V)	100 MHz 1.0 GHz 2.0 GHz	dB dB dB		1.0 1.2 1.5	1.65 1.85 —
Isolation	100 MHz 1.0 GHz 2.0 GHz (RFC - RF1) 2.0 GHz (RFC - RF2)	dB dB dB dB	60 40 —	65 45 38 43	
Return Loss	DC - 2.0 GHz	dB	_	25	_
IIP2 (V _C = 0V / 3V / 5V)	Two Tone, +5 dBm/Tone, 10 MHz Spacing 100 MHz 1.0 GHz	dBm dBm		54 / 51 / 53 72 / 70 / 70	_
IIP3 (V _C = 0V / 3V / 5V)	Two Tone, +5 dBm/Tone, 10 MHz Spacing 100 MHz 1.0 GHz	dBm dBm		38 / 38 / 39 41 / 44 / 44	_
Input P1dB (V _C = 0V / 3V / 5V)	100 MHz 1.0 GHz	dBm dBm	_ _	21 / 21 / 22 29 / 28 / 29	_
T-rise T-fall	10% to 90% RF 90% to 10% RF	μS nS	1 1	1.4 12	
Ton Toff	50% control to 90% RF 50% control to 10% RF	μS nS	_ _	1.6 12	_ _
Transients	-	mV	_	550	_
Control Current	V _C = 3V	μА	_	250	500

^{5.} Electrical specifications apply to terminated configuration only.

Absolute Maximum Ratings ^{6,7}

Parameter	Absolute Maximum
Input Power @ 100 MHz	+22 dBm
Input Power @ 1 GHz	+29 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

^{6.} Exceeding any one or combination of these limits may cause permanent damage to this device.

Truth Table 8,9,10

Control V _C	RFC-RF1	RFC-RF2
0	On	Off
1	Off	On

^{8.} External DC blocking capacitors are required on all RF ports.

M/A-COM does not recommend sustained operation near these survivability limits.

^{9.} $0 = 0 \pm 0.1 \text{ V}$, 1 = +2.9 V to +5 V.

^{10.} The unpowered on state is the same as $V_C=0$.

[•] Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300

Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298



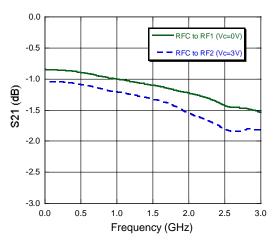


MASWSS0201 V1

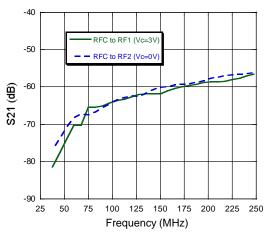
GaAs Broadband 75 Ohm Default-On, SPDT Terminated Switch DC - 2.5 GHz

Typical Performance Curves: $T_A = 25^{\circ}C$, $Z_0 = 75 \Omega$, Components per Application Schematic

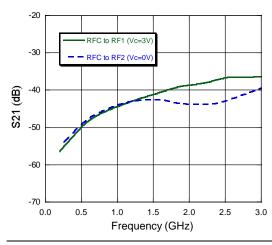
Insertion Loss



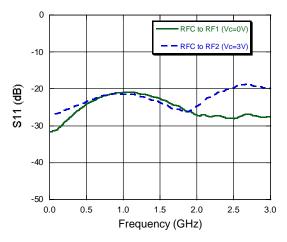
Isolation (Below 200 MHz)



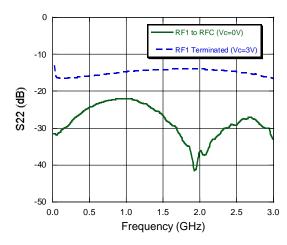
Isolation (Above 200 MHz)



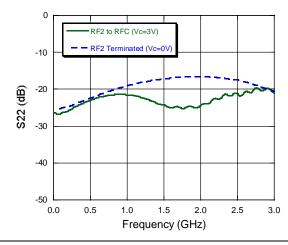
RFC Return Loss



RF1 Return Loss



RF2 Return Loss



- North America Tel: 800.366.2266 / Fax: 978.366.2266
- Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298

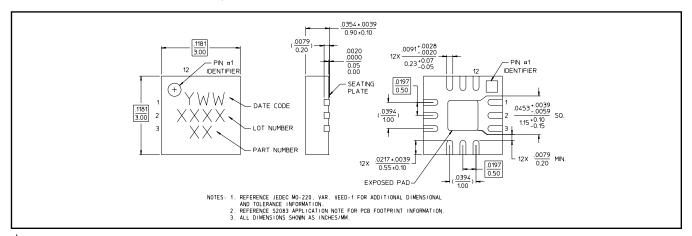




MASWSS0201

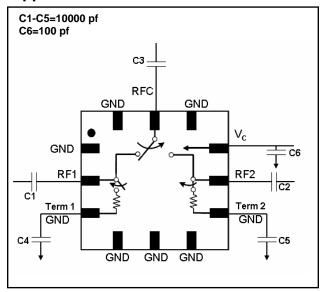
GaAs Broadband 75 Ohm Default-On, SPDT Terminated Switch DC - 2.5 GHz

Lead-Free 3 mm 12-lead PQFN[†]



Reference Application Note M538 for lead-free solder reflow recommendations. Meets JEDEC moisture sensitivity level 1 requirements.

Application Schematic 11,12



- 11. Non-connected pins (P1 and P5) are shown connected to ground as recommended. All data on this datasheet was taken with N/C pins connected to ground.
- 12. Application schematic shown is for terminated configuration. For non-terminated operation Term 1 and Term 2 ground pins are left open. See application section for data in unterminated configuration.

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.

M/A-COM's AN3007 Application Note outlines a method for ESD sensitivity mitigation. It can be the Tech/Apps found at section MACOM.COM website.

M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice. M/A-COM makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does M/A-COM assume any liability whatsoever arising out of the use or application of any product(s) or information.

[•] North America Tel: 800.366.2266 / Fax: 978.366.2266

[•] Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300

Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298





MASWSS0201 V1

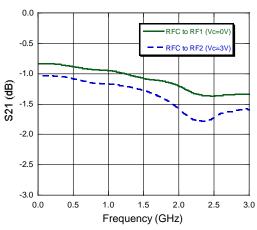
GaAs Broadband 75 Ohm Default-On, SPDT Terminated Switch DC - 2.5 GHz

Application Section

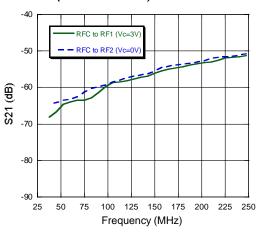
Typical Performance Curves:

 $T_A = 25$ °C, $Z_0 = 75 \Omega$, Unterminated Configuration (Term 1&2 GND pins open)

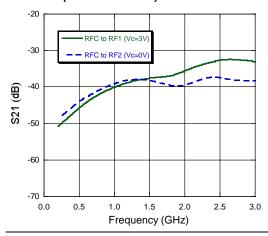
Insertion Loss



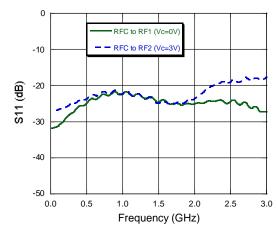
Isolation (Below 200 MHz)



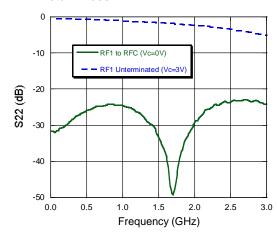
Isolation (Above 200 MHz)



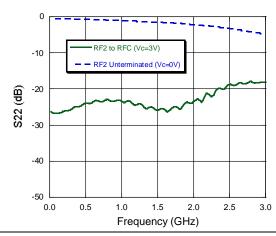
RFC Return Loss



RF1 Return Loss



RF2 Return Loss



- North America Tel: 800.366.2266 / Fax: 978.366.2266
- Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298



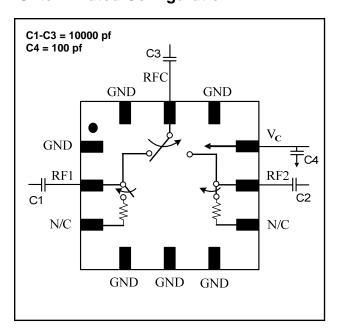


GaAs Broadband 75 Ohm Default-On, SPDT Terminated Switch DC - 2.5 GHz

MASWSS0201 V1

Application Section

Application Schematic – Unterminated Configuration



information.

M/A-COM Inc. and its affiliates reserve the right to make changes to the