GaAs SPDT 2.7 V High Power Switch DC - 5.0 GHz

Features

- Low Voltage Operation: 2.7 V
- High Power: +38dBm (typ) P0.1dB
- High IP3: +56 dBm
- Low Insertion Loss: 0.25 dB @ 1 GHz
- High Isolation: 25 dB @ 1 GHz
- Lead-Free SC70 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

M/A-COM's MASW-008853 is a GaAs PHEMT MMIC single pole double throw (SPDT) high power switch in a low cost SC70 six lead package. The MASW-008853 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 CDMA handset systems that connect separate transceiver and/or GPS functions to a common antenna, as well as other related handset and general purpose applications. The MASW-008853 can be used in all systems operating up to 5.0 GHz requiring high power at low control voltage.

The MASW-008853 is fabricated using a 0.5 micron gate length GaAs pHEMT process. The process features full passivation for performance and reliability.

Ordering Information^{1,2}

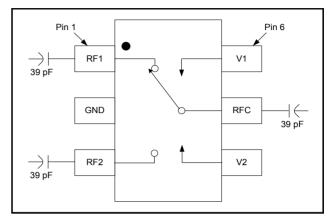
Part Number	Package		
MASW-008853-000000	Bulk Packaging		
MASW-008853-TR3000	3000 piece reel		
MASW-008853-001SMB	Sample Test Board		

1. Reference Application Note M513 for reel size information.

2. All sample boards include 5 loose parts.

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Functional Block Diagram



Pin Configuration

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

Absolute Maximum Ratings ^{3,4}

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

3. 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.

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

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Parameter	Test Conditions	Units	Min.	Тур.	Max.
	1 GHz	dB	_	0.30	0.65
0	2 GHz	dB dB	—	0.36	
Insertion Loss ⁶	3 GHz		—	0.45	
	4 GHz	dB	—	0.70	
	5 GHz	dB	_	1.10	
	1 GHz	dB	23	25	
	2 GHz	dB	_	19	
Isolation	3 GHz	dB	_	15	
	4 GHz	dB	_	13	
	5 GHz		—	11	
Return Loss	DC – 3 GHz	dB	_	20	
IP3	825 MHz	dBm		56	
IP3	Two Tone, +24 dBm Total Pin, 5 MHz Spacing	UDIII		50	
Cross Modulation	Two-tone signal input: Tx1 = +22 dBm @ 820 MHz, Tx2 = +22 dBm @ 821 MHz, R _x interfere = -23 dBm @ 869 MHz	dBm	_	-99	
	Two-tone signal input: Tx1 = +18 dBm @ 1880 MHz, Tx2 = +18 dBm @ 1881 MHz, R _x interfere = -23 dBm @ 1960 MHz	dBm	_	-94	
P0.1dB	1 GHz	dBm		38	
Trise, Tfall	10% to 90% RF, 90% to 10% RF	nS	_	70	
Ton, Toff	50% control to 90% RF, 50% control to 10% RF	nS	_	100	
Transients	In Band	mV	—	25	
Control Current	V _C = 2.7 V	μA	_	5	20

 -25° (1) -21° (2) (2

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

6. 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 7,8,9

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

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

 Differential voltage, V(state 1) - V(state 0), must be +2.7 V minimum, but must not exceed 8.5 V.

9. 0 = -5 V to +2.3 V, 1 = -2.3 V to +5 V.

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.

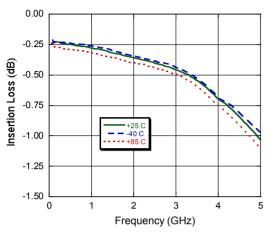
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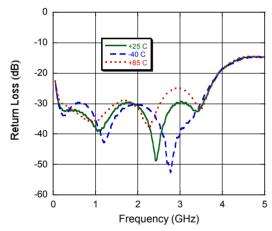
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Typical Performance Curves, 1000 pF

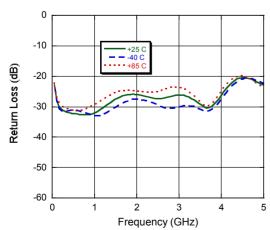
Insertion Loss

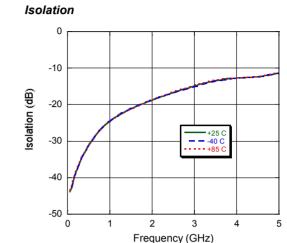


RFC Return Loss

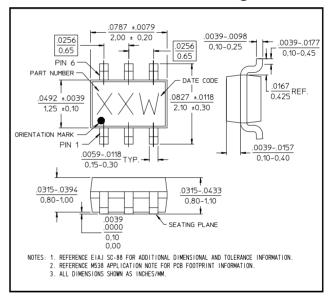


RF1/RF2 Return Loss





Lead-Free SC70 Plastic Package[†]



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

Meets JEDEC moisture sensitivity level 1 requirements.

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