GaAs SP3T 2.6 V CDMA-GPS Switch DC - 2.5 GHz

Features

- Unbalanced (asymmetric) RF Paths
- Low Cross Modulation
- Low Insertion Loss: 0.5 dB at 1.0 GHz
- High Isolation: 20 dB at 2.0 GHz
- 3 mm 12-lead PQFN Package
- 0.5 micron GaAs PHEMT Process

Description

M/A-COM's MASWSS0065 is an industry leading GaAs PHEMT MMIC single pole three throw (SP3T) CDMA-GPS switch in a 3 mm 12-lead PQFN package.

The MASWSS0065 is uniquely configured to enable switching from a common antenna port to CDMA cellular, CDMA PCS, or GPS ports. The design is asymmetric and has been fully optimized for excellent cross modulation performance in CELL and PCS paths while still maintaining excellent insertion loss and isolation.

The MASWSS0065 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

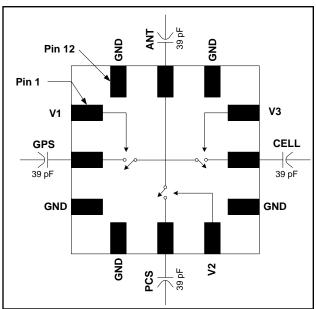
Ordering Information¹

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Part Number	Number Package		
MASWSS0065TR-3000	3000 Piece Reel		
MASWSS0065SMB	Sample Test Board		

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Description	
1	V1	Control 1	
2	GPS	GPS Receive	
3	GND	RF Ground	
4	GND	RF Ground	
5	PCS	PCS Transmit/Receive	
6	V2	Control 2	
7	GND	RF Ground	
8	CELL	Cellular Transmit/Receive	
9	V3	Control 3	
10	GND	RF Ground	
11	ANT	Antenna Port	
12	GND	RF Ground	
13	GND (paddle) ²	RF Ground	

2. The exposed pad centered on the package bottom must be connected to RF and DC ground.

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MASWSS0065



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Electrical Specifications: $T_A = 25^{\circ}C$, $V_C = 0 V/2.6 V$, $Z_0 = 50 Ohms^3$

	Test Conditions	Units	Min.	Тур.	Max.
Insertion Loss 4					
CELL Path	820 MHz	dB	—	0.5	0.7
GPS Path PCS Path	1.5 GHz	dB dB	_	0.75	0.95
PCS Path	1.9 GHz	aв	_	0.5	0.7
	820 MHz	dB	27	30	
Isolation (CELL Path)	1.5 GHz	dB		26	
	1.9 GHz	dB		24	—
	820 MHz	dB	29	32	— —
Isolation (GPS Path)	1.5 GHz	dB	—	27	
	1.9 GHz	dB		25	
	820 MHz	dB	25	27	— —
Isolation (PCS Path)	1.5 GHz	dB	_	22	I —
	1.9 GHz	dB	—	20	
Return Loss	All RF ports, DC – 2.5 GHz	dB	_	20	_
IP3					
CELL Path	Two Tones, +22 dBm / tone, 1 MHz Spacing, 820 MHz	dBm	_	58	I —
PCS Path	Two Tones, +22 dBm / tone, 1 MHz Spacing, 1880 MHz	dBm	—	59	I —
0 M L L #	Cell Band: Two-tone signal input: Tx1 = +22 dBm @ 820 MHz,				
Cross Modulation CELL Path	Tx2 = +22 dBm @ 821 MHz,	dBm		-113	1
GELL Pain	RX interfere = -30 dBm @ 869 MHz.	ubm	_	-113	. —
	PCS Band: Two-tone signal input: Tx1 = +18 dBm @ 1880 MHz,				
Cross Modulation	Tx2 = +18 dBm @ 1881 MHz,	ID		445	1
PCS Path	RX interfere = -30 dBm @ 1960 MHz.	dBm		-115	
P0.1 dB					
CELL Path	820 MHz	dBm	_	37	— —
GPS Path	1.5 GHz	dBm	_	35	—
PCS Path	1.9 GHz	dBm	—	35	I —
Trise, Tfall	10% to 90% RF, 90% to 10% RF	μS	_	0.05	_
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	μS	_	0.07	
Transients	In Band	mV		50	_
Control Current	Vc = 2.6 V	μA		5	20

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

4. 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.

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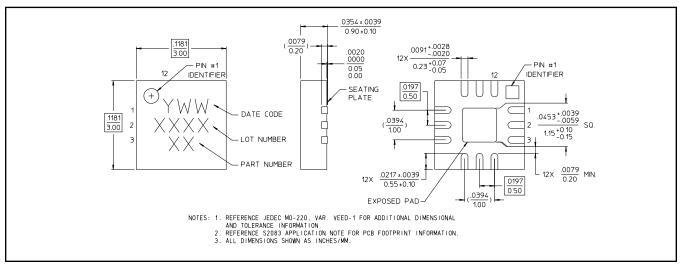
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3 mm 12-Lead PQFN



Absolute Maximum Ratings ^{5,6}

Parameter	Absolute Maximum		
Input Power (0.5 - 2.5 GHz, 2.6 V Control)	+35 dBm		
Operating Voltage	+8.5 volts		
Operating Temperature	-40°C to +85°C		
Storage Temperature	-65°C to +150°C		

5. 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.

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 7,8,9

V1	V2	V3	ANT- GPS	ANT - PCS	ANT - CELL
1	0	0	On	Off	Off
0	1	0	Off	On	Off
0	0	1	Off	Off	On

- 7. For positive voltage control, external DC blocking capacitors are required on all RF ports.
- 8. Differential voltage, V(state 1) V(state 0), must be +2.6 V minimum, but must not exceed +8.5 V.
- 9. 0 = -5 V to +2.4 V, 1 = -2.4 V to +5 V.

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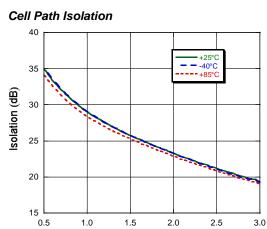
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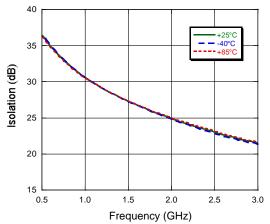
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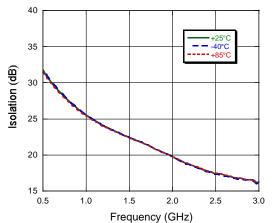


Frequency (GHz)

GPS Path Isolation



PCS Path Isolation

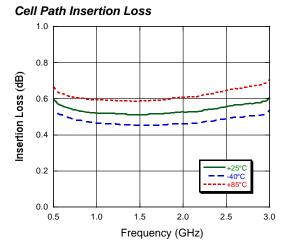




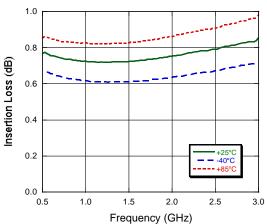
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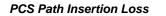


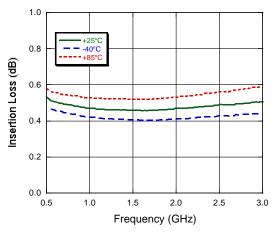




GPS Path Insertion Loss







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