Features

- 0.35 dB TX Insertion Loss
- 0.5 dB RX Insertion Loss
- 41 dBm Input P0.1dB on TX Path
- 18 dB Typical Return Loss at Each RF Port
- Compatible with 1.8V CMOS Logic
- 3 mm 16-Lead PQFN Package
- RoHS* Compliant

Applications

- ISM
- Multi Market

Description

The MASW-011184 is a single pole double throw (SPDT) switch with 0.35 dB of insertion loss in the TX path and 0.5 dB insertion loss in the RX path. The TX path is capable of handling 10 W input power. The input and output return losses in the thru path are typically 18 dB. The logic levels are standard 1.8 V CMOS. Only a single positive supply of +5 V is required.

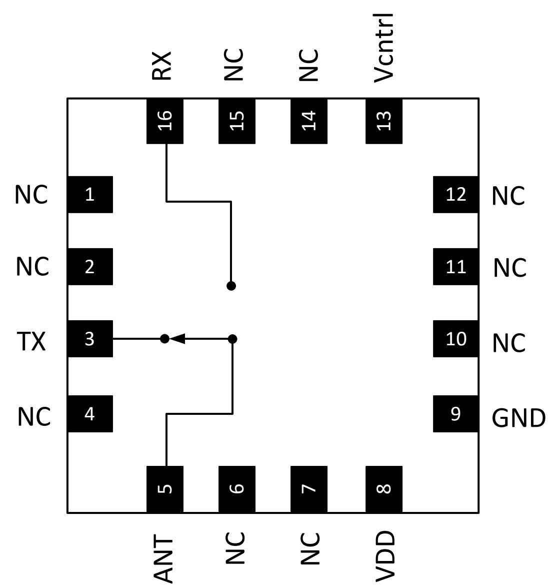
The MASW-011184 is designed for transmit/receive applications between 1 and 5 GHz. The 3 mm PQFN package is lead free and RoHS compliant.

Ordering Information[1,2]

Part Number	Package
MASW-011184-TR1000	1000 piece reel
MASW-011184-TR3000	3000 piece reel
MASW-011184-SMB	Sample Board

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

Functional Schematic



Pin Configuration[3]

Pin #	Pin Name	Description
1,2,4,6,7,10,11, 12,14,15	NC[4]	No Connection
3	TX[5]	TX Input/Output
5	ANT[5]	Common Port
8	VDD	+5V
9	GND	Ground
13	Vcntrl	Control Input
16	RX[6]	RX Input/Output

3. The exposed pad centered on the package bottom must be connected to RF, DC and thermal ground.
4. MACOM recommends connecting No Connection (N/C) pins to ground.
5. There are internal DC blocking capacitors at ANT and TX ports.
6. External DC blocking capacitor is required at RX port.

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

Electrical Specifications: V_{DD} = +5.0 V, T_{BASE} = +25°C, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss, ANT to TX	1.0 GHz 2.5 GHz 5.0 GHz	dB	—	0.38 0.30 0.38	— 0.9 1.0
Insertion Loss, ANT to RX	1.0 GHz 2.5 GHz 5.0 GHz	dB	—	0.57 0.34 0.65	— 1.0 1.3
Isolation, ANT to RX in TX Mode	1.0 GHz 2.5 GHz 5.0 GHz	dB	— 32 24	39 38 29	—
Isolation, TX to RX in TX Mode	1.0 GHz 2.5 GHz 5.0 GHz	dB	—	39 35 27	—
Isolation, ANT to TX in RX Mode	1.0 GHz 2.5 GHz 5.0 GHz	dB	— 23 17	36 27 21	—
Isolation, TX to RX in RX Mode	1.0 GHz 2.5 GHz 5.0 GHz	dB	—	39 34 27	—
ANT Port Return Loss	1.0 - 5.0 GHz	dB	—	18	—
TX Port Return Loss in TX Mode	1.0 - 5.0 GHz	dB	—	18	—
RX Port Return Loss in RX Mode	1.0 - 5.0 GHz	dB	—	18	—
TX Input P0.1dB	1.0 - 5.0 GHz	dBm	—	41	—
RX Input P0.1dB	1.0 - 5.0 GHz	dBm	—	30.5	—
TX Input IP3	+20 dBm per tone, 10 MHz spacing	dBm	—	54.5	—
RX Input IP3	+15 dBm per tone, 10 MHz spacing 1.0 GHz 2.5 GHz 5.0 GHz	dBm	—	49 55 51	—

Electrical Specifications: V_{DD} = +5.0 V, T_{BASE} = +25°C, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Switching Speed, TX Mode T_{ON} T_{OFF} T_{RISE} T_{FALL}	50% control to 90% Voltage 50% control to 10% Voltage 10% to 90% Voltage 90% to 10% Voltage	ns	—	410 135 140 45	—
Switching Speed, RX Mode T_{ON} T_{OFF} T_{RISE} T_{FALL}	50% control to 90% Voltage 50% control to 10% Voltage 10% to 90% Voltage 90% to 10% Voltage	ns	—	190 80 40 26	—
Supply Voltage, VDD	—	V	+4.75	+5.0	+5.25
VDD Quiescent Current	TX Mode RX Mode	mA	—	1.4 6.0	—
Vcntrl Control Voltage	Logic High, V_{IH} Logic Low, V_{IL}	V	+1.17 0	+1.8 0	+1.8 0.63
T/R Logic Input Current	Logic High, V_{IH} Logic Low, V_{IL}	µA	—	40 +/-0.03	—

Maximum Operating Ratings

Parameter	Maximum
Input Power, TX Path[7]	40 dBm
Input Power, RX Path[7]	29 dBm
VDD	-0.25 to +5.25 V
Vcntrl	0 to 1.8 V
Junction Temperature[8]	+125°C
Operating Temperature	-40°C to +105°C

7. Based on testing with input power applied for 30 seconds.
8. Guarantees 10^6 hour lifetime.

Absolute Maximum Ratings[9,10]

Parameter	Absolute Maximum
Input Power, TX Path	41 dBm
Input Power, RX Path	30 dBm
VDD	-0.5 to +5.5 V
Vcntrl	-0.5 to +2.75 V
Storage Temperature	-55°C to +125°C

9. Exceeding any one or combination of these limits may cause permanent damage to this device.
10. MACOM does not recommend sustained operation near these survivability limits.

Truth Table

Control Input	T/R Path	
Vcntrl	RX	TX
V_{IH}	On	Off
V_{IL}	Off	On

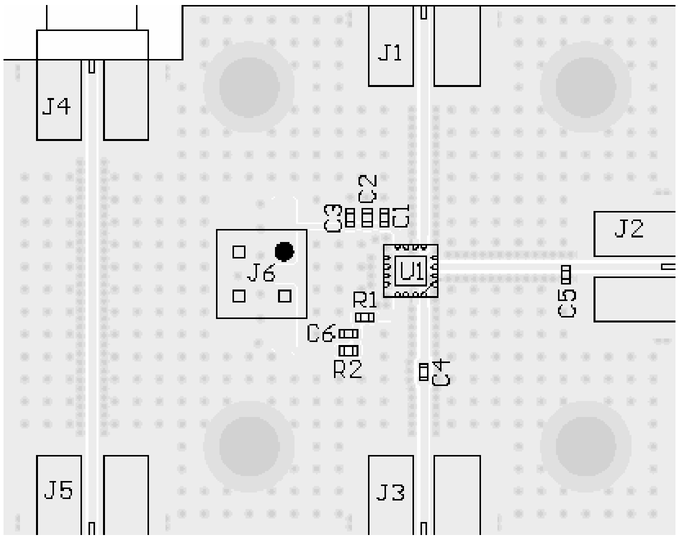
Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these HBM Class 1 B devices.

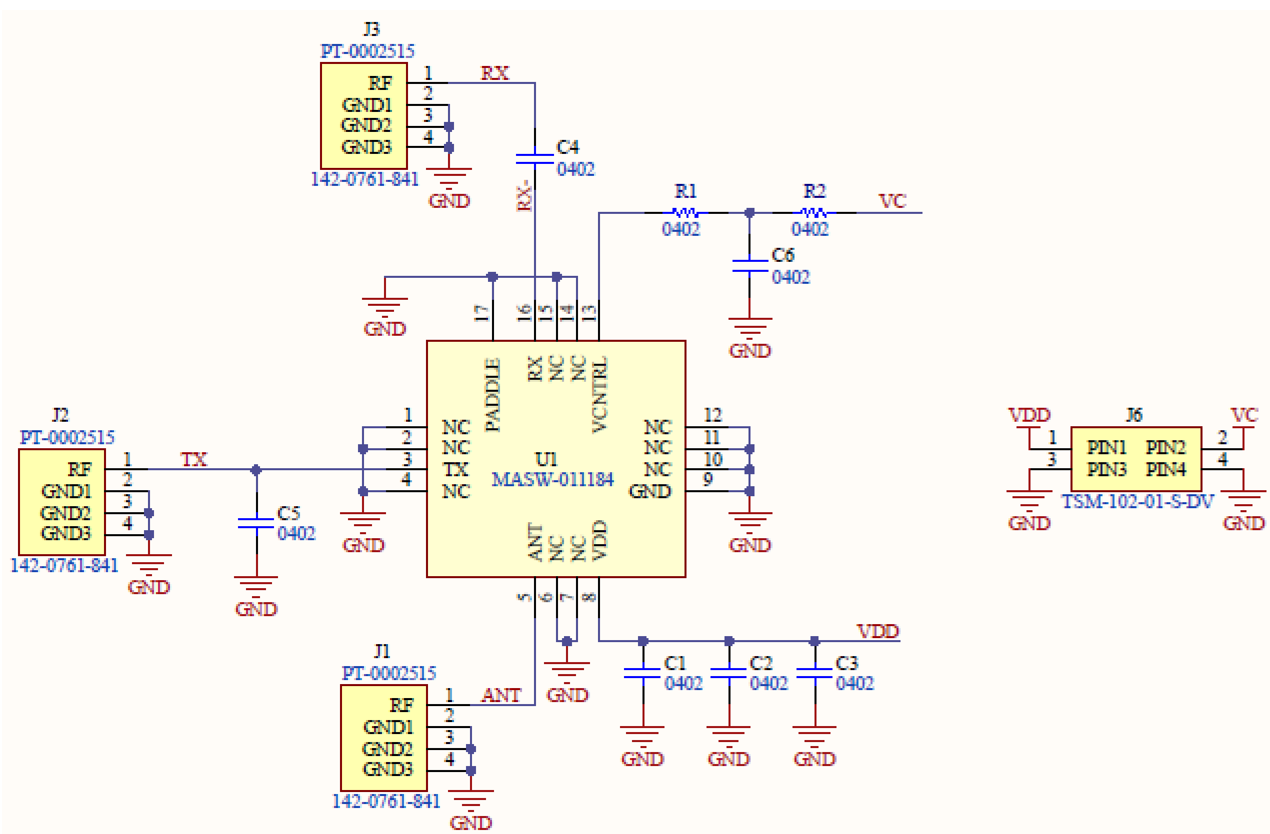
PCB Layout



Parts List

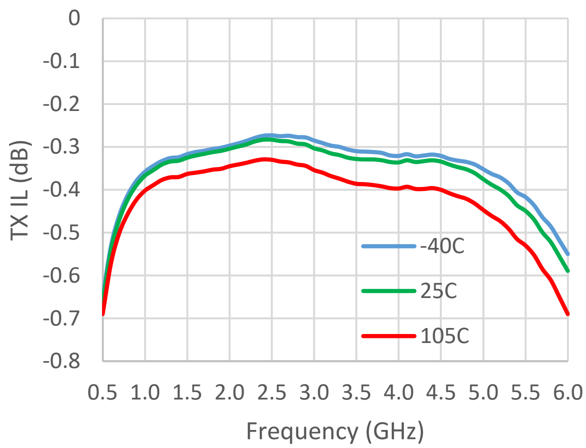
Part	Value	Case Style
C1	10 pF	0402
C2	1000 pF	0402
C3	1 µF	0402
C4	8.2 pF	0402
C5	0.2 pF	0402 (100 V)
C6	5 pF	0402
R1,R2	0 Ω	0402
J1 - J5	142-0761-841	SMA, End Launch

Application Schematic

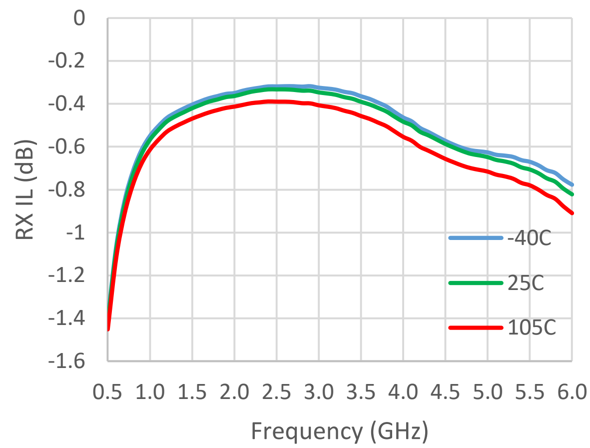


Typical Performance Curves

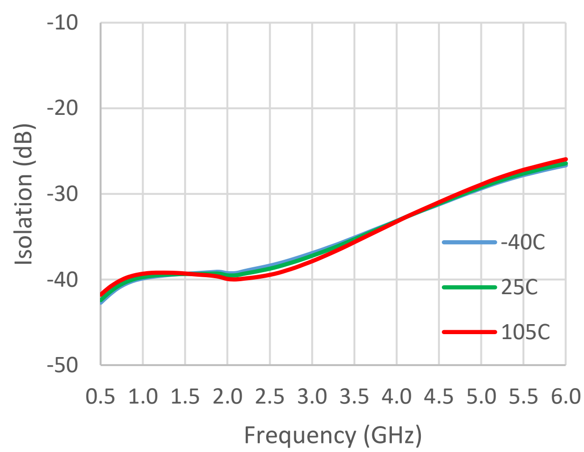
Insertion Loss, ANT to TX



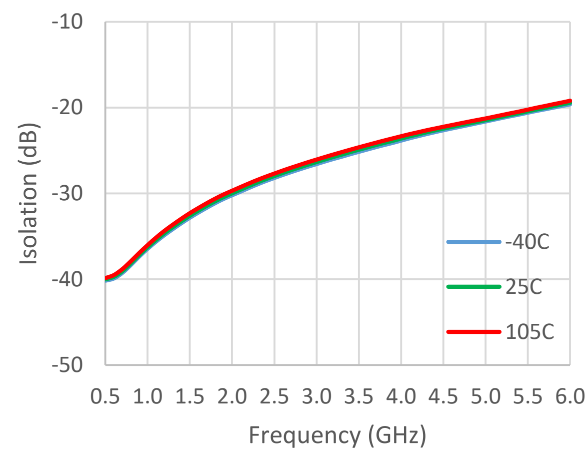
Insertion Loss, ANT to RX



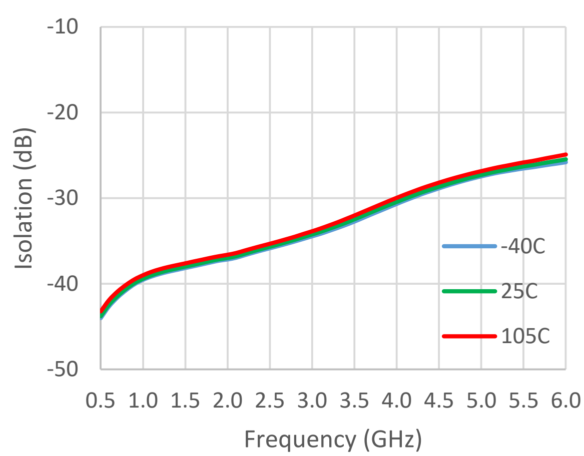
Isolation, ANT to RX in TX Mode



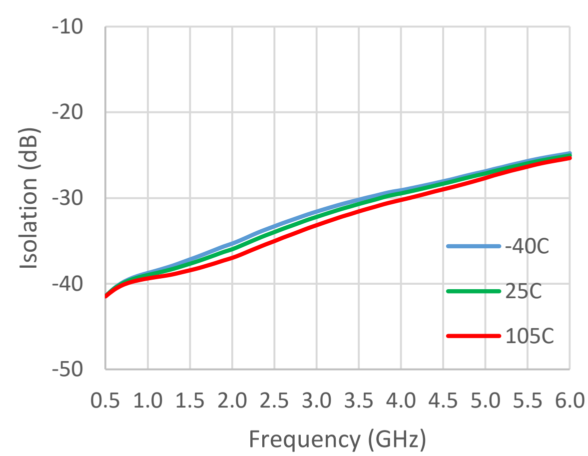
Isolation, ANT to TX in RX Mode



Isolation, TX to RX in TX Mode

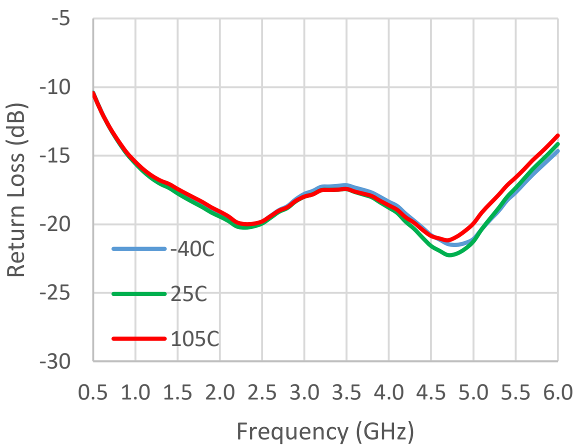


Isolation, TX to RX in RX Mode

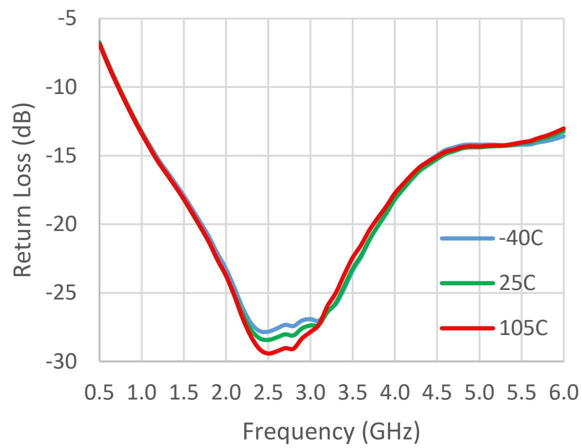


Typical Performance Curves

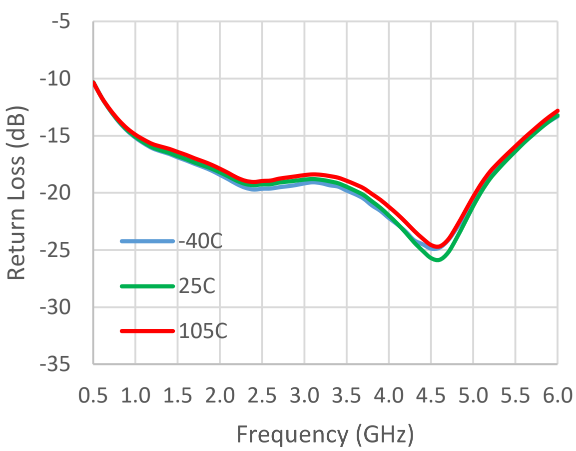
ANT RL in TX Mode



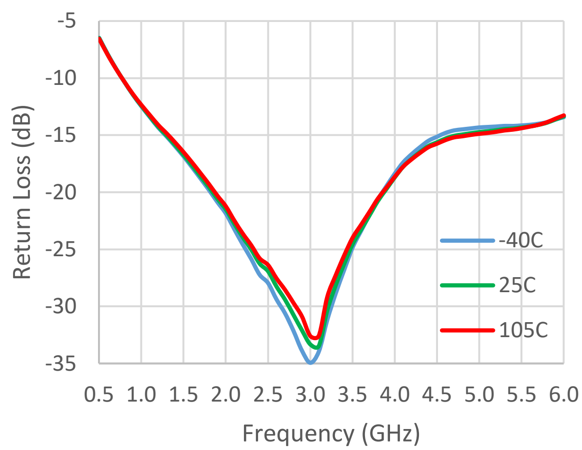
ANT RL in RX Mode



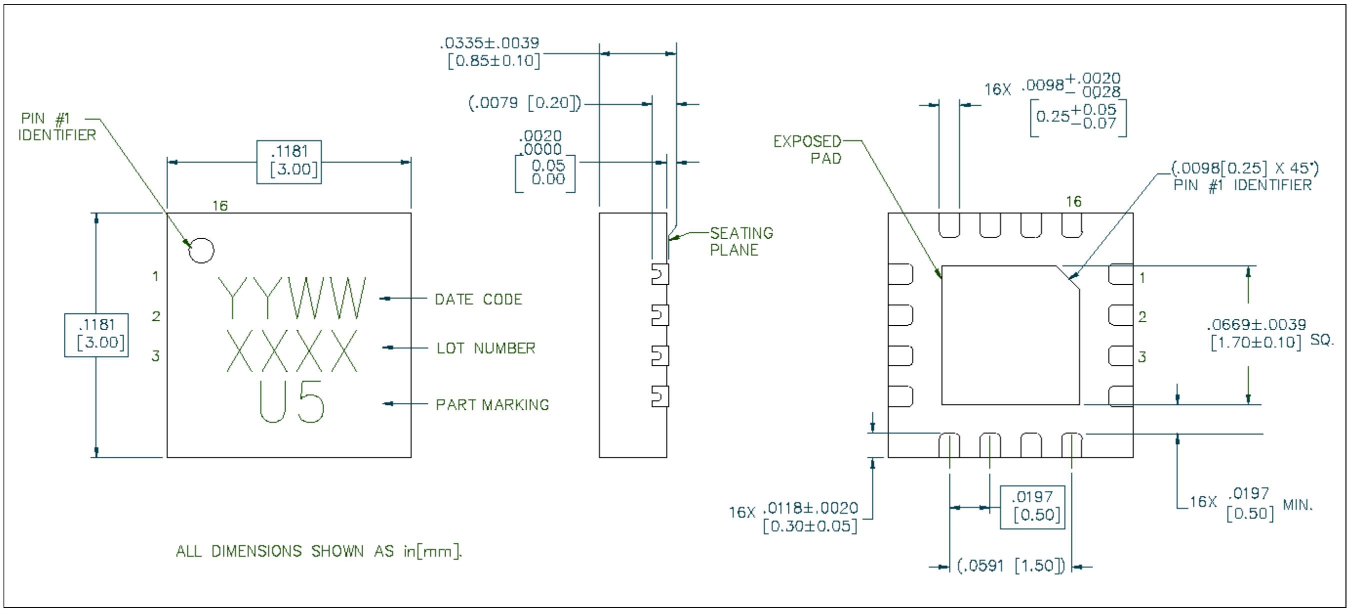
TX RL



RX RL



Lead-Free 3 mm 12-Lead PQFN†



† Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level (MSL) 1 requirements.
Plating is 100% matte tin over copper.