

Features

- Broadband Performance
- Low Insertion Loss: 1.6 dB
- High Isolation: 30 dB
- Fast Switching Speed: 12 ns
- Reflective Configuration
- Ultra Low DC Power Consumption
- Lead-Free 3 mm 14-Lead PQFN Package
- RoHS* Compliant

Applications

- Test & Measurement

Description

The MASW-011105 is a versatile, broadband, high isolation SPDT switch offered in a lead-free 3 mm 14-lead PQFN surface mount plastic package. The combination of broadband performance along with fast switching and excellent settling time make this device ideal for many applications, including test & measurement, EW and broadband communication systems.

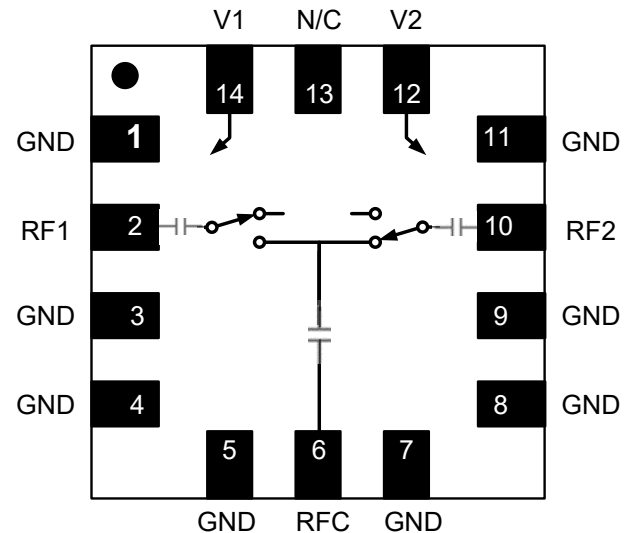
The MASW-011105 is fabricated using MACOM's robust process with full surface passivation for a high performance and high reliability.

Ordering Information^{1,2}

| Part Number | Package |
|--------------------|-----------------|
| MASW-011105-TR0500 | 500 piece reel |
| MASW-011105-TR1000 | 1000 piece reel |
| MASW-011105-SMB | Sample Board |

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

Functional Schematic



Pin Configuration³

| Pin # | Pin Name | Function |
|-----------------|---------------------|-----------------|
| 1, 3-5, 7-9, 11 | GND | Ground |
| 2 | RF1 | RF Port 1 |
| 6 | RFC | RF Common |
| 10 | RF2 | RF Port 2 |
| 12 | V2 | Control Voltage |
| 13 | N/C | No Connection |
| 14 | V1 | Control Voltage |
| 15 | Paddle ⁴ | Ground |

3. MACOM recommends connecting unused package pins to ground.
4. The exposed pad centered on the package bottom must be connected to RF, DC and thermal ground.

Electrical Specifications: Freq. = 17.7 - 31.0 GHz, T_A = +25°C, V_{1,2} = 0/+5 V, Z₀ = 50 Ω

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|---------------------------------------|--|-------|------|----------|------|
| Insertion Loss | — | dB | — | 1.6 | 2.0 |
| Isolation | — | dB | 25 | 30 | — |
| Port Amplitude Imbalance | — | dB | — | 0.1 | — |
| Port Phase Imbalance | — | ° | — | 5 | — |
| Return Loss | RFC RF1, RF2 | dB | — | 15 15 | — |
| Input P _{0.1dB} | @ 24 GHz | dBm | — | 24 | — |
| Input IP ₃ | Two Tone, +7 dBm/Tone, 5 MHz Spacing, 24 GHz | dBm | — | 43 | — |
| T _{RISE} , T _{FALL} | 10% to 90% RF and 90% to 10% RF | ns | — | 6 | — |
| T _{ON} , T _{OFF} | 50% control to 90% RF and 50% control to 10% RF | ns | — | 12 | — |
| Settling Time | 50% V _{ctl} to 0.1 dB of final value | ns | — | 60 | — |
| Control Current (Complementary Logic) | V Low (0 V), V High (5 V) | μA | — | 1 | 2 |

Absolute Maximum Ratings^{5,6}

| Parameter | Absolute Maximum |
|-----------------------|------------------|
| Control Voltage | 8.5 V |
| Input Power | 25 dBm |
| 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.
 6. MACOM does not recommend sustained operation near these survivability limits.

Truth Table⁷

| Control Input | | Condition of Switch | |
|---------------|----|---------------------|-----|
| V1 | V2 | RF1 | RF2 |
| 1 | 0 | On | Off |
| 0 | 1 | Off | On |

7. Logic "0" = 0.0 to 0.2 V, Logic "1" = 5.0 to 5.2 V.

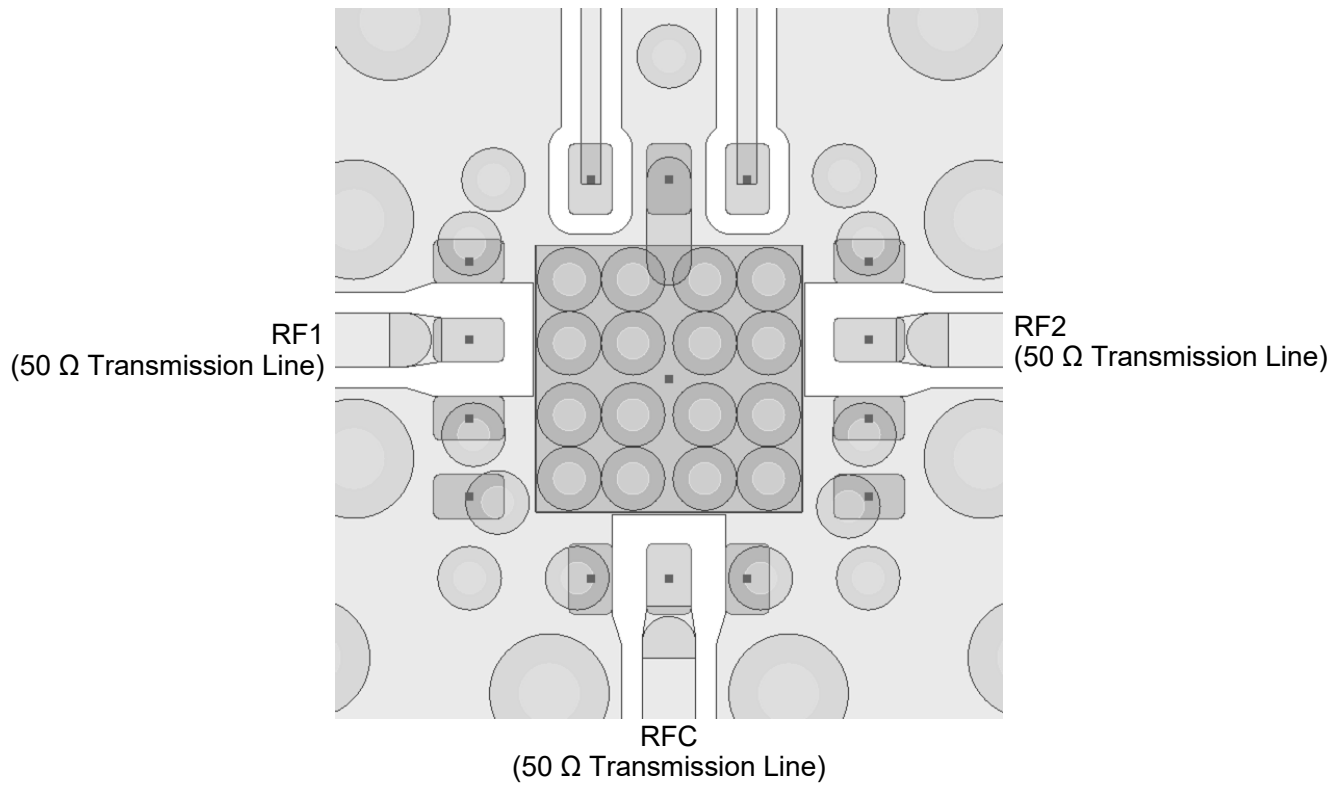
Handling Procedures

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 devices.

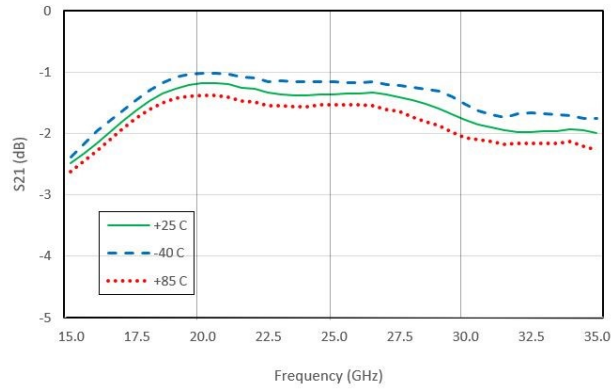
PCB Layout Recommendation



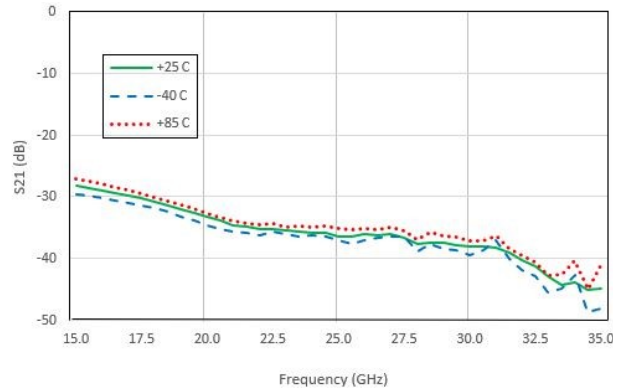
Transmission line grounds should connect to package ground paddle by shortest possible means.

Typical Performance Curves

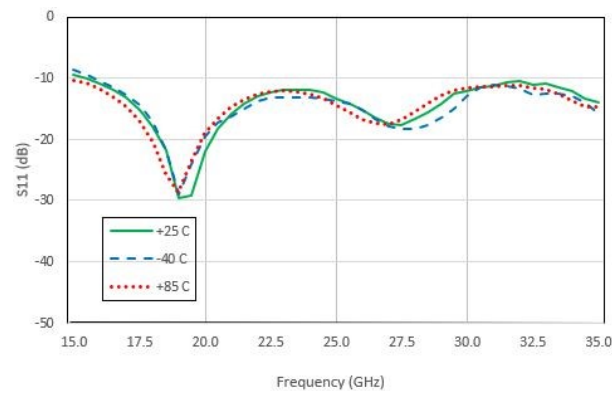
Insertion Loss



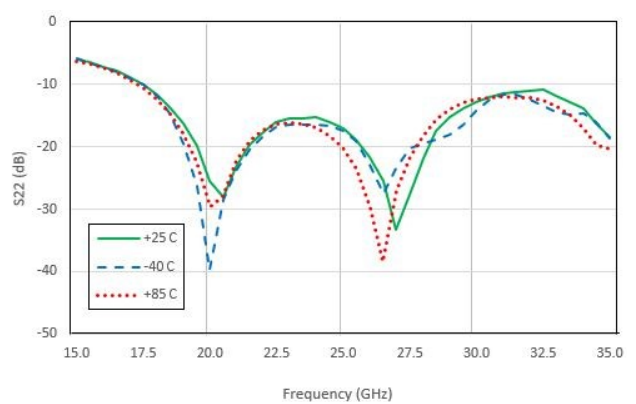
Isolation



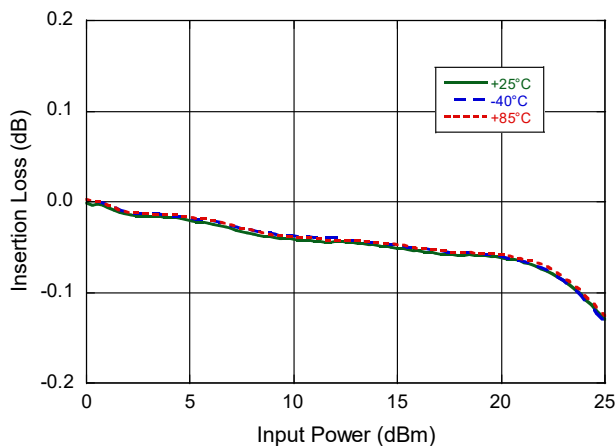
Input Return Loss (RF Common)



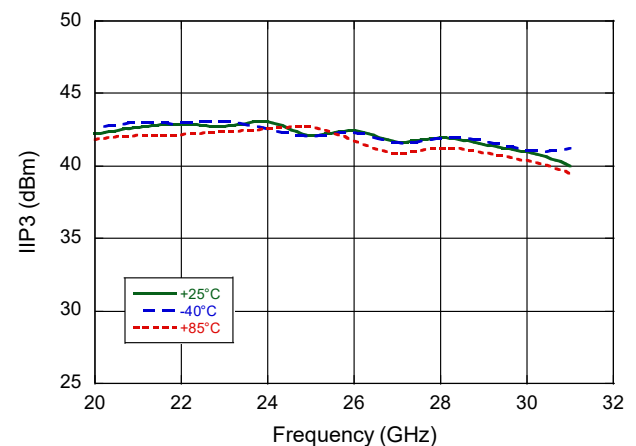
Output Return Loss (On state RF1, RF2)



Gain Compression @ 24 GHz



Input IP3



GaAs SPDT Switch

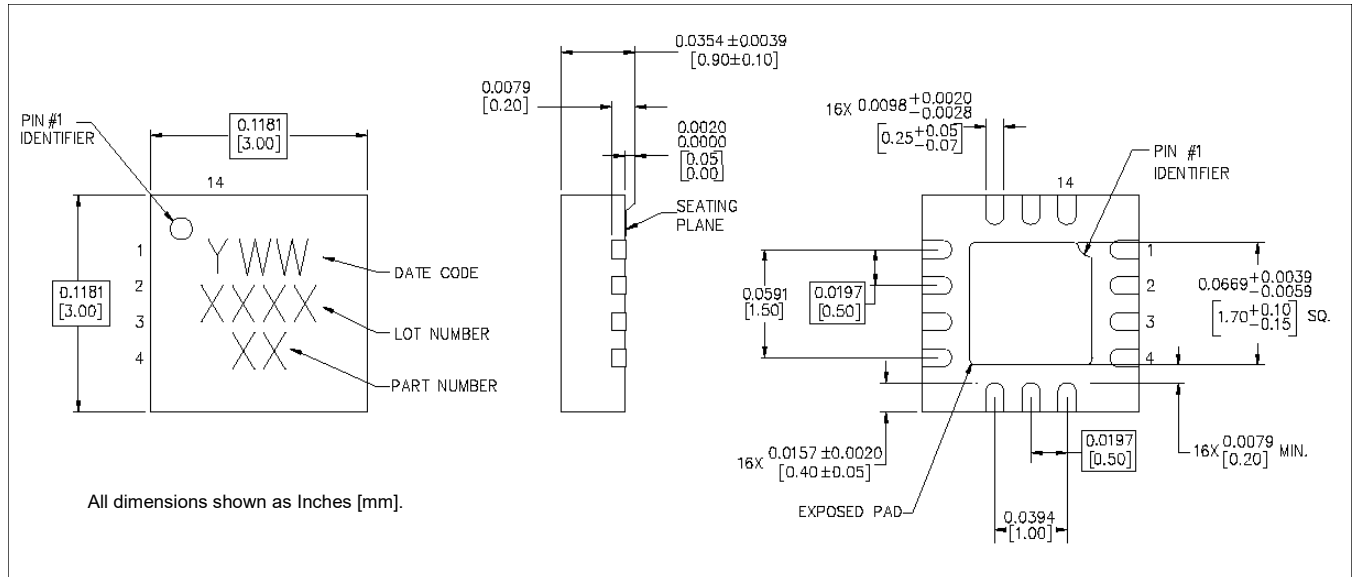
17.7 - 31.0 GHz



MASW-011105

Rev. V4

Lead-Free 3 mm 14-Lead PQFN[†]



[†] Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is NiPdAuAg.

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