

# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz



MASW-011135-CS02xx

Rev. V4

## Features

- Hermetic SP2T Reflective Switch
- 2.4 mm Field Replaceable RF Connectors
- Unique Dual RF Port Isolation State
- +5 V, -10 V, TTL Driver
- 3.3 dB Insertion Loss @ 26 GHz
- 27 dB Isolation @ 26 GHz
- 2:1 VSWR @ 26 GHz
- 70 ns  $T_{ON}$  Switching Speed
- Weight: 31 grams (CS0292) / 32 grams (CS0240)
- Non-RoHS Part



## Applications

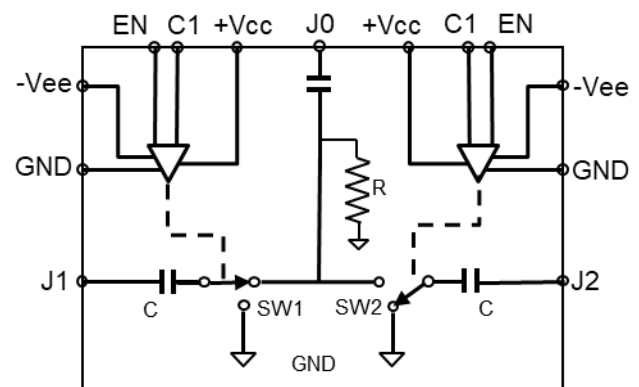
- Aerospace and Defense
- Space

## Description

The MASW-011135 is a 2 - 26 GHz reflective SP2T that uses 2.4 mm RF replaceable connectors with an integrated TTL driver operating with +5 VDC and -10 VDC. The additional enable logic control provides for a unique state where both RF ports can be placed into simultaneous isolation. This product provides an exceptional isolation to insertion loss ratio, with 70 ns switching speed in a compact, 1.2" x 1.0" x 0.5" metal housing. It is ideally suited for applications requiring hermetic hardware enclosures.

Upon request available as a fully RoHS compliant module for commercial applications.

## Functional Schematic



## Port Configuration<sup>1</sup>

Port Description	Function
J0	RF Input
J1	RF Output 1
J2	RF Output 2
C1	TTL Logic Control
EN	TTL Enable Logic Control
+V <sub>CC</sub>	+5 VDC
-V <sub>EE</sub>	-10 VDC
GND	RF & DC Voltage Ground Return

1. The RF ground is provided through the RF connectors and the metal housing. The driver ground is provided through the DC feedthrus and the metal housing.

## Ordering Information

Part Number	Package
MASW-011135-CS0292	bulk
MASW-011135-CS0240	bulk

# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz



MASW-011135-CS02xx

Rev. V4

**Electrical Specifications:  $T_A = 25^\circ\text{C}$ ,  $P_{IN} = 0 \text{ dBm}$  (unless otherwise defined),  $Z_0 = 50 \Omega$ , DC Power = +5V @ +20 mA, -10 V @ -15 mA**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
J0-J1 and J0-J2 Insertion Loss	2 - 26 GHz	dB	—	2.6	4.0
J0-J1 and J0-J2 Return Loss	2 - 26 GHz	dB	—	14	—
J0-J1 and J0-J2 Isolation	2 - 26 GHz, 1 port in Insertion Loss	dB	23	30	—
J0-J1 and J0-J2 Isolation	2 - 26 GHz, both ports in Isolation	dB	—	25	—
Switching Speed ( $T_{ON}$ )	F = 7 GHz, 100 kHz TTL repetition rate (50% Control Voltage - 90% RF Voltage)	ns	—	70	—
Switching Speed ( $T_{OFF}$ )	F = 7 GHz, 100 kHz TTL repetition rate (50% Control Voltage - 10% RF Voltage)	ns	—	25	—
CW Incident Power <sup>2</sup>	12 GHz	dBm	—	33	—
Input IP2	F1 = 2.000 GHz, F2 = 2.010 GHz P1 = P2 Input Tone Power = 10 dBm	dBm	—	63	—
Input IP3	F1 = 2.000 GHz, F2 = 2.010 GHz P1 = P2 Input Tone Power = 10 dBm	dbm	—	45	—

2. Maximum source and load VSWR = 1.2:1

## Nominal Operating Conditions<sup>3</sup>

Parameter	Nominal Value
CW Input Power	30 dBm @ +25°C
DC Operating Voltage +V <sub>CC</sub> -V <sub>EE</sub>	+5.0 V -10 V
TTL Logic Voltage "0" "1"	0.0 V to 0.8 V 2.0 V to 5.0 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

3. Operating at nominal conditions with  $T_J \leq +175^\circ\text{C}$  will ensure MTTF >  $1 \times 10^6$  hours.

## Maximum Survivability Ratings<sup>4,5</sup>

Parameter	Absolute Maximum
CW Input Power	33 dBm @ +25°C
DC Operating Voltage +V <sub>CC</sub> -V <sub>EE</sub>	+4.5 V to +5.5 V -11 V to -10 V
TTL Logic Voltage "0" "1"	0.0 V to 0.8 V 2.0 V to 5.0 V
Operating Temperature	-55°C to +95°C
Storage Temperature	-65°C to +150°C

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

# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz



MASW-011135-CS02xx  
Rev. V4

## TTL Logic to RF Truth Table (Logic 0 = 0 V, Logic 1 = +5 V)

Insertion Loss Bias State = -10 V @ -15 mA

Isolation Bias State = +5 V @ +20 mA

RF State	TTL Logic Control (C1)	TTL Logic Enable (EN)
J0-J1 Insertion Loss & J0-J2 Isolation	1	0
J0-J2 Insertion Loss & J0-J1 Isolation	0	0
J0-J1 & J0-J2 Isolation	0 or 1	1

### IMPORTANT:

The TTL driver in the MASW-011135 SP2T does NOT use reverse polarity protection for the +V<sub>CC</sub> and -V<sub>EE</sub> voltage inputs. The MASW-011135 can be damaged if +V<sub>CC</sub> and -V<sub>EE</sub> voltage inputs are reversed.

### 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.

# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz

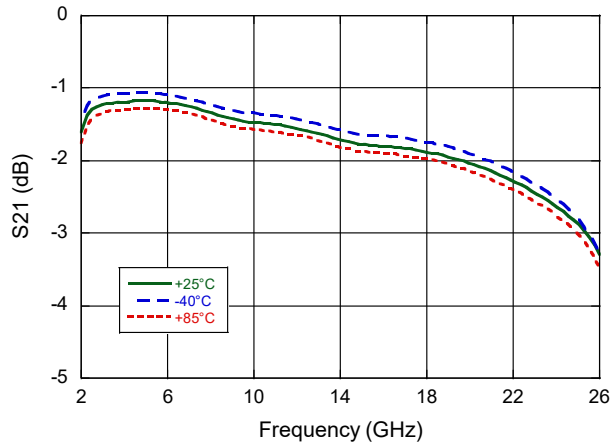


MASW-011135-CS02xx

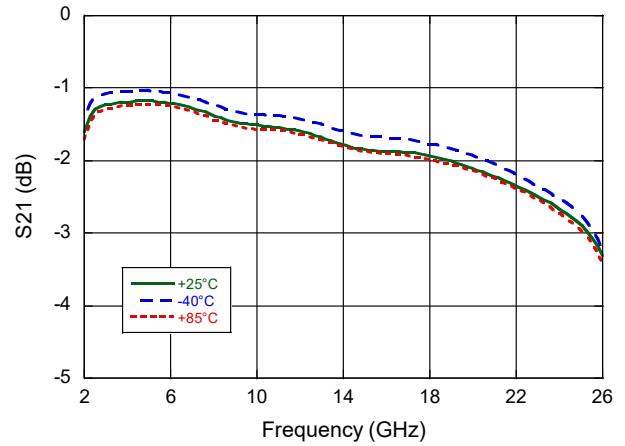
Rev. V4

## Typical Performance Curves

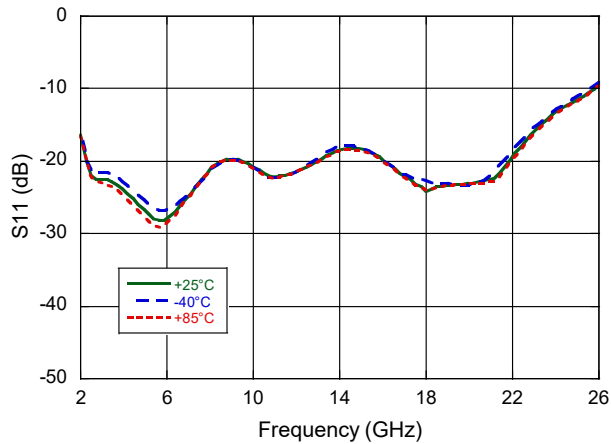
**J0-J1 Insertion Loss**



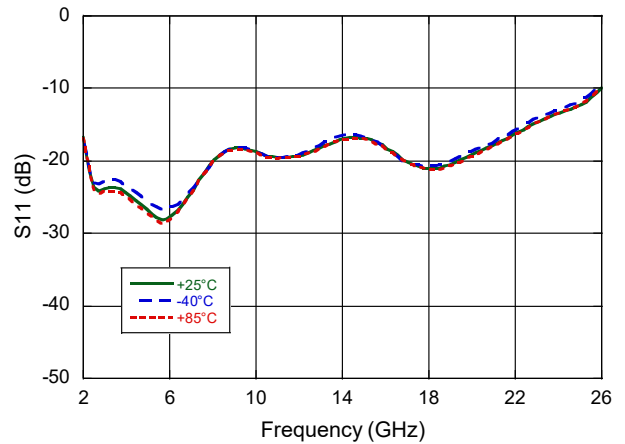
**J0-J2 Insertion Loss**



**J0-J1 Return Loss**



**J0-J2 Return Loss**



# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz

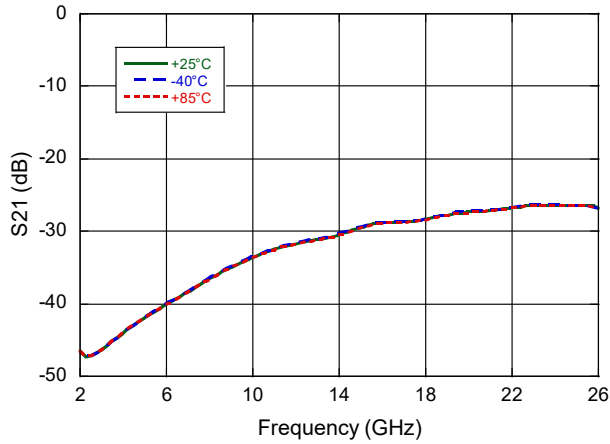


MASW-011135-CS02xx

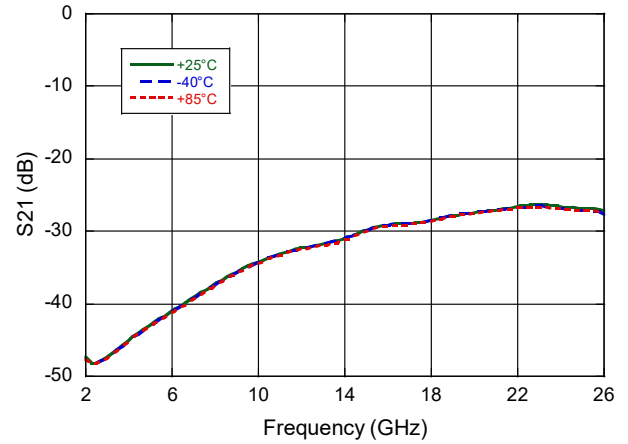
Rev. V4

## Typical Performance Curves: $T_A = +25^\circ\text{C}$

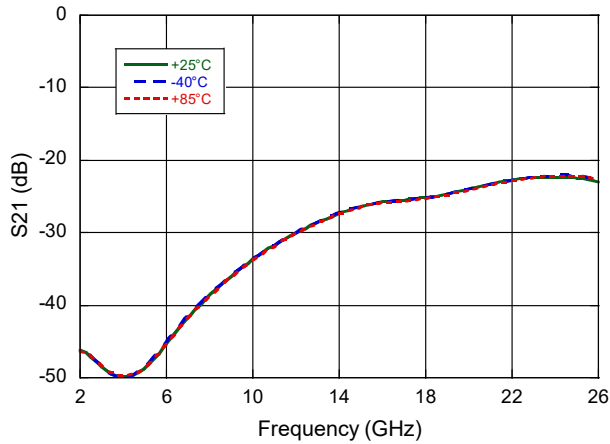
*J0-J1 Isolation ( J0-J2 in Insertion Loss )*



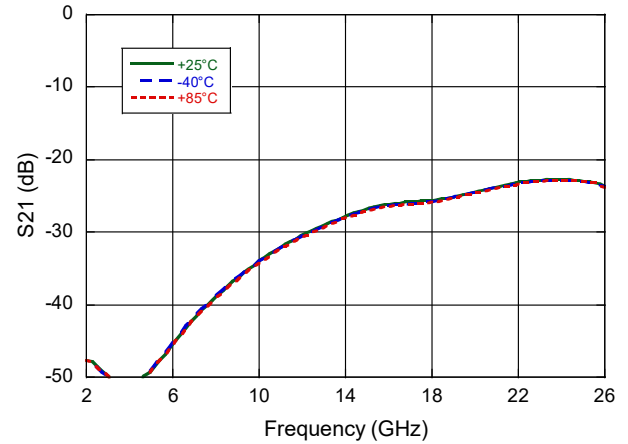
*J0-J2 Isolation ( J0-J1 in Insertion Loss )*



*J0-J1 Isolation ( J0-J2 in Isolation )*



*J0-J2 Isolation ( J0-J1 in Isolation )*

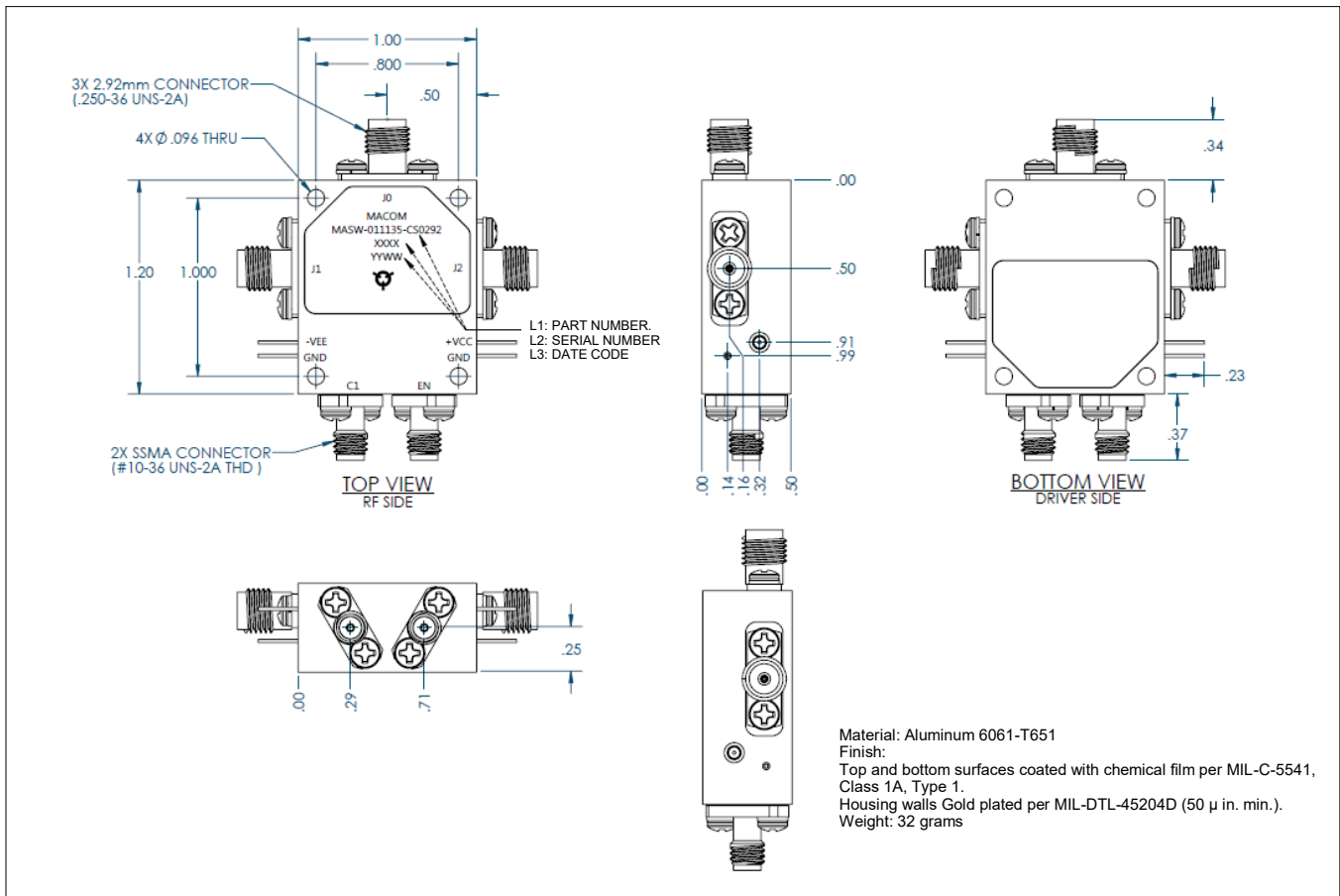


# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz



MASW-011135-CS02xx  
Rev. V4

## Outline Drawing: CS0292



† Meets JEDEC moisture sensitivity level (MSL) 1 requirements.

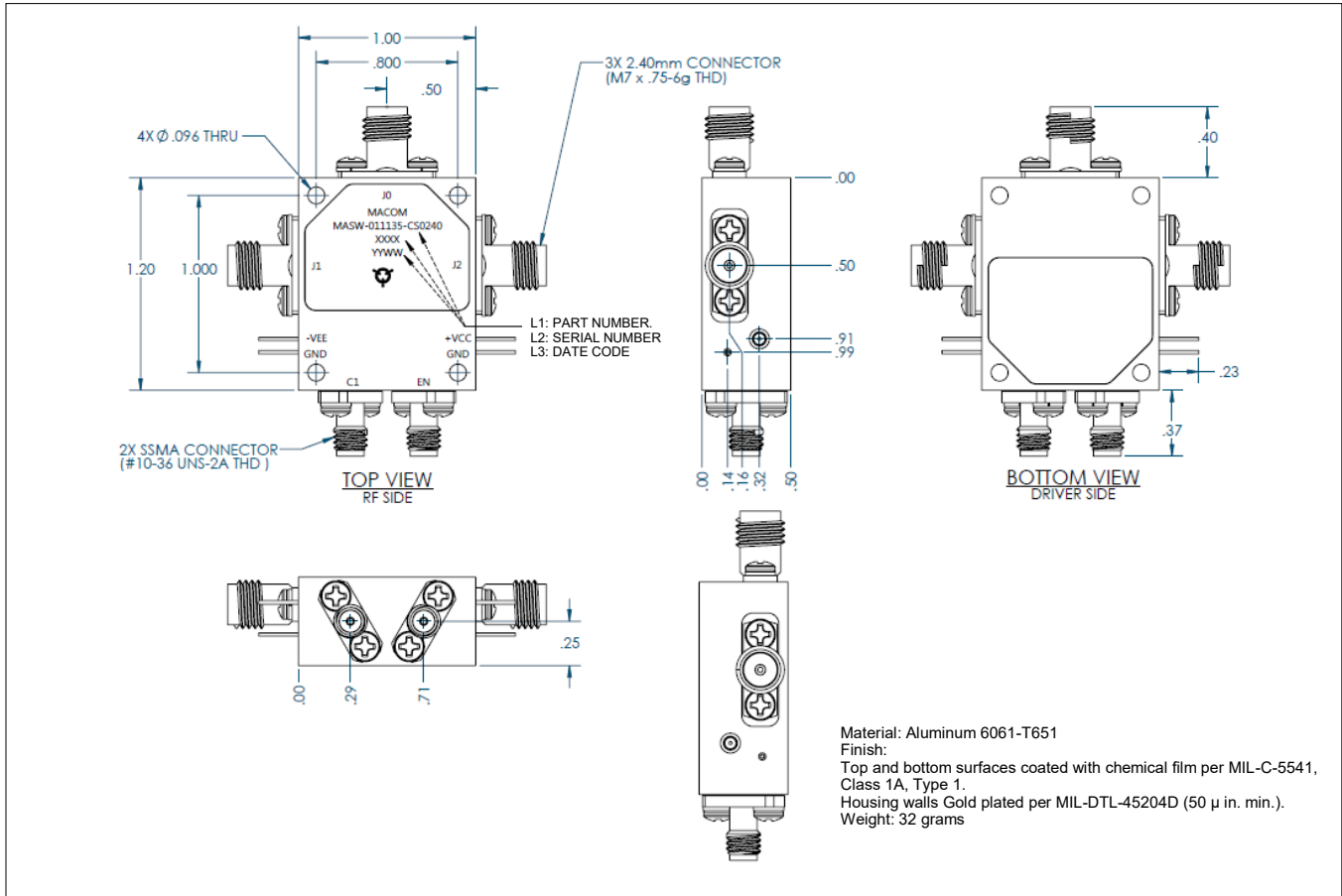
# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz



MASW-011135-CS02xx

Rev. V4

## Outline Drawing: CS0240



† Meets JEDEC moisture sensitivity level (MSL) 1 requirements.

# Connectorized Millimeter Wave Reflective SP2T Switch with TTL Driver, 2 - 26 GHz



MASW-011135-CS02xx

Rev. V4

MACOM Technology Solutions Inc. ("MACOM"). All rights reserved.

These materials are provided in connection with MACOM's products as a service to its customers and may be used for informational purposes only. Except as provided in its Terms and Conditions of Sale or any separate agreement, MACOM assumes no liability or responsibility whatsoever, including for (i) errors or omissions in these materials; (ii) failure to update these materials; or (iii) conflicts or incompatibilities arising from future changes to specifications and product descriptions, which MACOM may make at any time, without notice. These materials grant no license, express or implied, to any intellectual property rights.

THESE MATERIALS ARE PROVIDED "AS IS" WITH NO WARRANTY OR LIABILITY, EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHT, ACCURACY OR COMPLETENESS, OR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.