

Millimeter Wave Reflective SPST with TTL Driver

1 - 26.5 GHz



MASW-011138

Rev. V1

Features

- SPST Reflective Switch
- 2.4 mm Field Replaceable RF Connectors
- +5 V, -10 V, TTL Driver
- 3.1 dB Insertion Loss at 26.5 GHz
- 50 dB Isolation at 26.5 GHz
- 2:1 VSWR at 26.5 GHz
- 38 ns T_{ON} Switching Speed
- Non-RoHS* Part

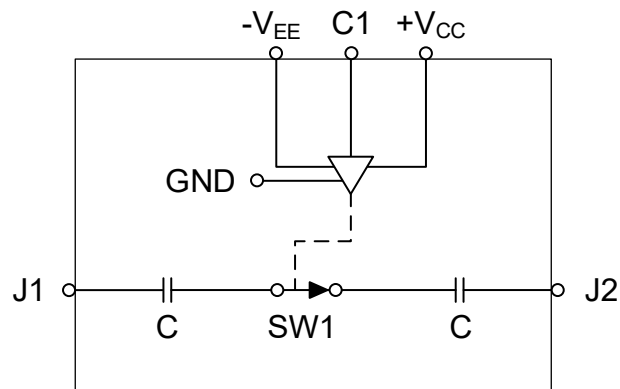
Applications

- Aerospace and Defense
- Space

Description

The MASW-011138 is a 1.0 - 26.5 GHz reflective SPST that uses 2.4 mm RF replaceable connectors with an integrated TTL driver operating with +5 VDC and -10 VDC. This product provides an exceptional isolation to insertion loss ratio, with 36 ns switching speed in a compact, 1.2" x 1.0" x 0.5" metal housing.

Functional Schematic



Port Configuration¹

Port Description	Function
J1	RF Input
J2	RF Output
C1	TTL Logic Control
+V _{CC}	+5 VDC
-V _{EE}	-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.

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

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $P_{IN} = 0 \text{ dBm}$ (unless otherwise defined), $Z_0 = 50 \Omega$, DC Power = +5V @ +30 mA, -10 V @ -0.4 mA

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss (J1-J2)	1.0 - 26.5 GHz	dB	—	2.0	—
Return Loss (J1-J2)	1.0 - 26.5GHz	dB	—	14	—
Isolation (J1-J2)	1.0 - 26.5GHz	dB	—	50	—
Switching Speed (T_{ON})	F = 10 GHz, 100 kHz TTL repetition rate (50% Control Voltage - 90% RF Voltage)	ns	—	37	—
Switching Speed (T_{OFF})	F = 10 GHz, 100 kHz TTL repetition rate (50% Control Voltage - 10% RF Voltage)	ns	—	34	—
CW Incident Power ²	12 GHz	dBm	—	33	—
Input IP2	F1 = 2.000 GHz, F2 = 2.010 GHZ P1 = P2 Input Tone Power = 10 dBm	dBm	—	72	—
Input IP3	F1 = 2.000 GHz, F2 = 2.010 GHZ P1 = P2 Input Tone Power = 10 dBm	dbm	—	38	—

2. Maximum source and load VSWR = 1.2:1

Nominal Operating Conditions³

Parameter	Nominal Value
CW Input Power	31 dBm @ +25°C
DC Operating Voltage +V _{CC} -V _{EE}	+5 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 x 10⁶ hours.

Maximum Survivability Ratings^{4,5}

Parameter	Absolute Maximum
CW Input Power	33 dBm @ +25°C
DC Operating Voltage +V _{CC} -V _{EE}	+4.5 V to +5.5 V -15 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

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

TTL Logic to RF Truth Table
(Logic 0 = 0 V, Logic 1 = +5 V)
Insertion Loss Bias State = -10 V @ -0.4 mA
Isolation Bias State = +5 V @ +30 mA

RF State	TTL Logic Control (C1)
J1-J2 Insertion Loss	1
J1-J2 Isolation	0

IMPORTANT:

The TTL driver in the MASW-011138 SP2T does NOT use reverse polarity protection for the +V_{CC} and -V_{EE} voltage inputs. The MASW-011138 can be damaged if +V_{CC} and -V_{EE} voltage inputs are reversed.

Handling Procedures

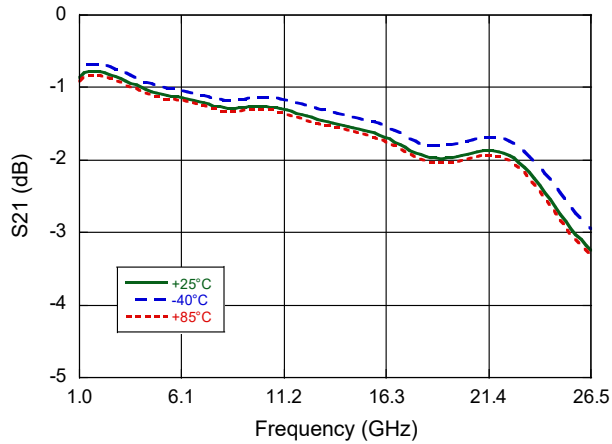
Please observe the following precautions to avoid damage:

Static Sensitivity

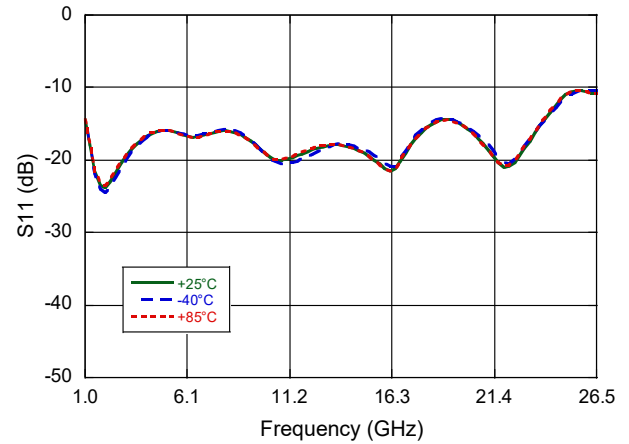
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

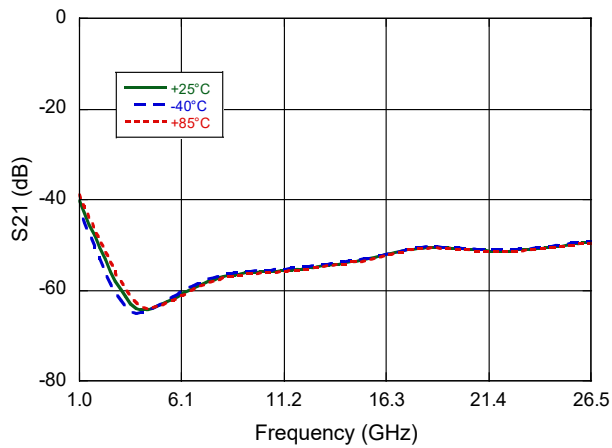
Insertion Loss (J1-J2)



Return Loss (J1-J2)



Isolation (J1-J2)



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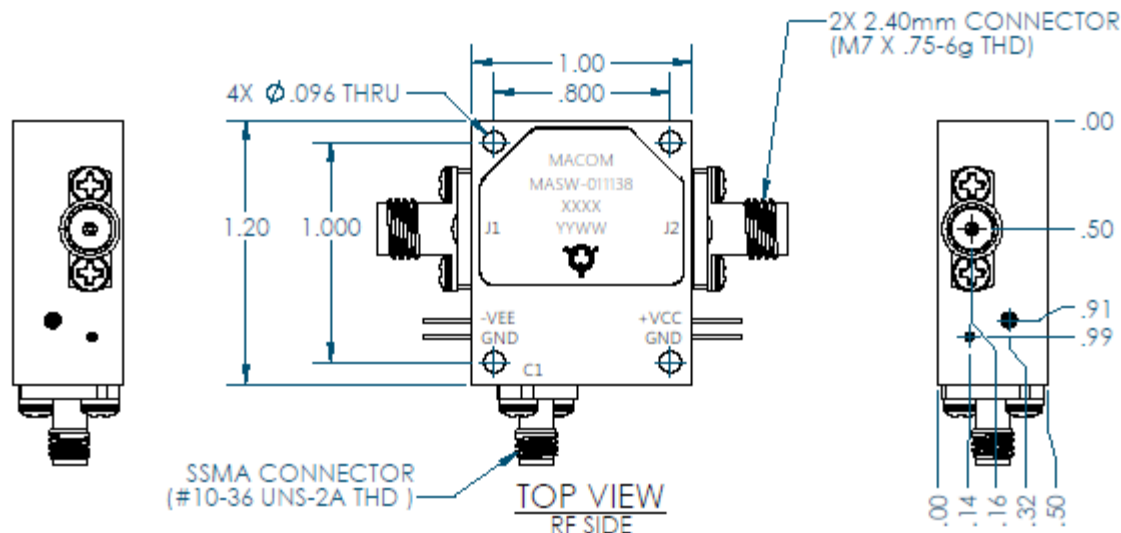
1 - 26.5 GHz



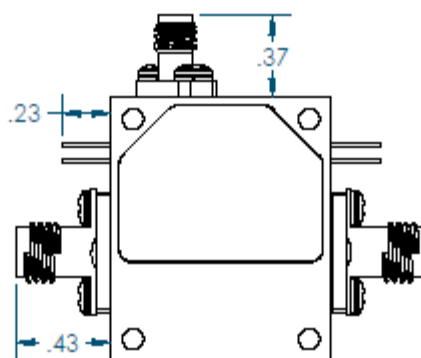
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Outline Drawing (Dimensions shown are in inches)



J1	RF INPUT
J2	RF OUTPUT
C1	TTL CONTROL
+VCC	+5 V
-VEE	-10 V
GND	GROUND



BOTTOM VIEW
DRIVER SIDE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
TOLERANCES ON	
DECIMALS	ANGLES
.X ± .1	±0.5°
.XX ± .02	
.XXX ± .005	
.XXXX ± .0005	
UNLESS OTHERWISE SPECIFIED 63° ALL OVER	
MATERIAL	SEE NOTE 1
FINISH	SEE NOTE 2

NOTES-

- MATERIAL:
ALUMINUM 6061-T651
- FINISH:
TOP AND BOTTOM SURFACES COATED WITH
CHEMICAL FILM PER MIL-C-5541, CLASS 3.
HOUSING WALLS GOLD PLATED PER MIL-DTL-
45204D(50 μIN MIN.).

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