

RF SPDT Switch MMIC

NSG1001MX, NSVG1001MX

This device is single pole dual throw (SPDT) type RF antenna switch MMIC. It has low insertion loss and high isolation. This is designed for wireless communication applications such as WLAN and V2X.

It adopts a small surface mount package and it is also suitable for portable devices such as smart phones and automotive antennas.

Features

- Broadband Frequency Range 0.1 to 8.5 GHz
- Capable of 1.6 V Operation
- Low Insertion Loss / High Isolation / Middle Power
- Small and Thin-sized Package – 1.0 x 1.0 x 0.43 mm
- Wettable Flank Package for Optimal Automated Optical Inspection (AOI)
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- IEEE802.11 a/b/g/n/ac/ax WLAN, Bluetooth® Systems
- LTE & Wireless Communication Applications
- Automotive V2X and E-TOLL Applications

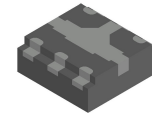
MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|-----------------------------|------------------|-------------|------|
| Control Voltage | V _{CTL} | 6 | V |
| Input Power 5 V, CW | P _{in} | 30 | dBm |
| Storage Temperature Range | T _{stg} | -55 to +150 | °C |
| Operating Temperature Range | T _{opr} | -40 to +125 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

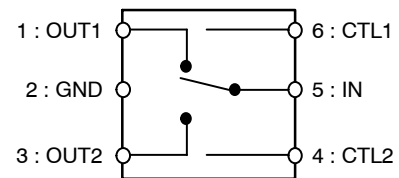
TRUTH TABLE

| On Path | V _{CTL1} | V _{CTL2} |
|-----------|-------------------|-------------------|
| IN – OUT1 | Low | High |
| IN – OUT2 | High | Low |

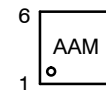


XDFNW
MX SUFFIX
CASE 717AE

ELECTRICAL CONNECTION



MARKING DIAGRAM



AA = Specific Device Code
M = Date Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|---------------|-------------------|--------------------|
| NSG1001MXTAG | X2DFNW6 (Pb-Free) | 3000 / Tape & Reel |
| NSVG1001MXTAG | X2DFNW6 (Pb-Free) | 3000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

NSG1001MX, NSVG1001MX

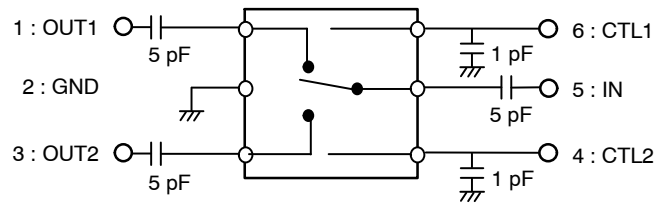
ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$ Control Voltage: 0/+2.7 V, DC Blocking Capacitor 5.0 pF

| Parameter | Symbol | Path | Condition | Value | | | Unit |
|--------------------------------|------------|-----------------------|-------------|-------|------|------|---------------|
| | | | | Min | Typ | Max | |
| Insertion Loss | IL | IN to OUT1, OUT2 | f = 2.5 GHz | | 0.40 | 0.55 | dB |
| | | | f = 6.0 GHz | | 0.50 | 0.65 | |
| | | | f = 8.5 GHz | | 0.65 | 0.85 | |
| Isolation | ISL | IN to OUT1, OUT2 | f = 2.5 GHz | 28.0 | 31.0 | | dB |
| | | | f = 6.0 GHz | 26.5 | 29.5 | | |
| | | | f = 8.5 GHz | 17.0 | 20.0 | | |
| Return Loss | RL | | f = 2.5 GHz | | 25.0 | | dB |
| | | | f = 6.0 GHz | | 20.0 | | |
| | | | f = 8.5 GHz | | 18.0 | | |
| 0.1 dB Compression Input Power | Pin 0.1 dB | IN to OUT1, OUT2 | f = 2.5 GHz | 25.0 | 27.0 | | dBm |
| | | | f = 6.0 GHz | 25.0 | 27.0 | | |
| Switching Time | | 50% VCTL to 90/10% RF | | | 100 | | ns |
| Switching Control Current | I_{CTL} | | No Signal | | 2.0 | 5.0 | μA |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pay attention to handling since it is liable to be affected by static electricity due to the high-frequency process adopted.

TEST CIRCUIT



NSG1001MX, NSVG1001MX

ELECTRICAL CHARACTERISTICS

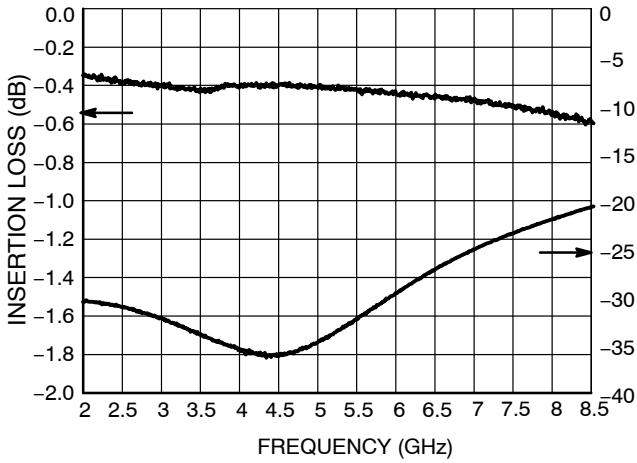


Figure 1. Insertion Loss, Isolation vs Frequency
IN-OUT1 ON, CTL1 = 0 V, CTL2 = 2.7 V

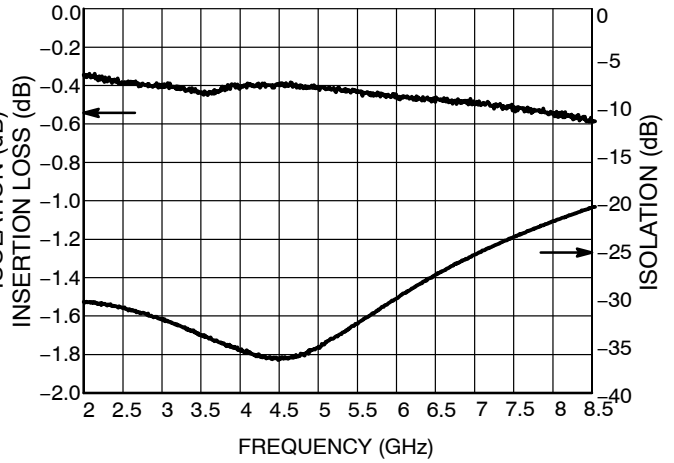


Figure 2. Insertion Loss, Isolation vs Frequency
IN-OUT2 ON, CTL1 = 2.7 V, CTL2 = 0 V

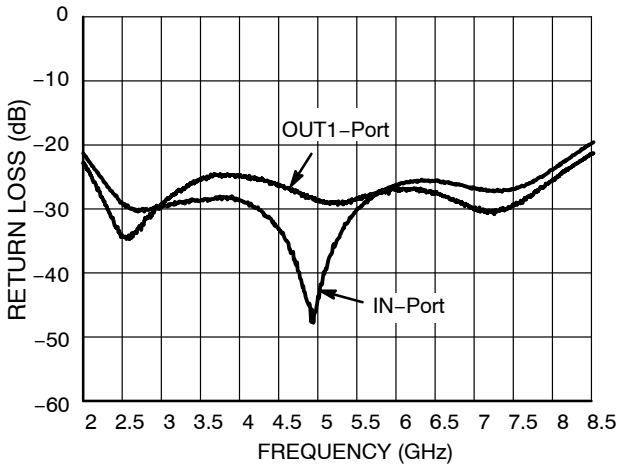


Figure 3. Return Loss vs Frequency
IN-OUT1 ON, CTL1 = 0 V, CTL2 = 2.7 V

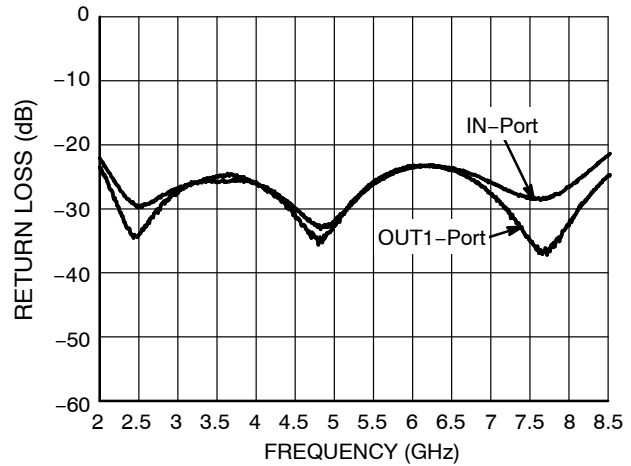


Figure 4. Return Loss vs Frequency
IN-OUT2 ON, CTL1 = 2.7 V, CTL2 = 0 V

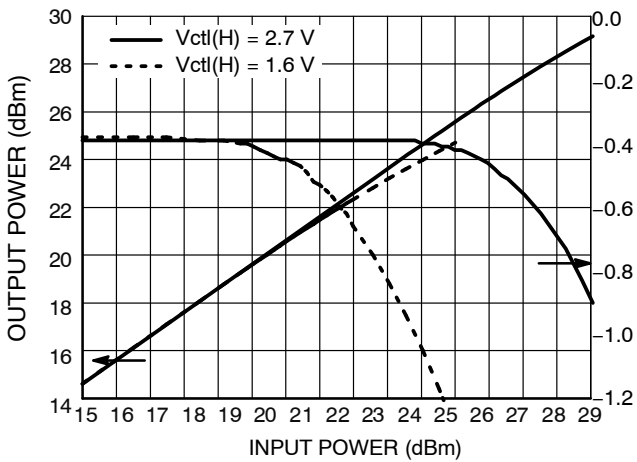


Figure 5. Output power, Insertion Loss vs Input Power
Freq = 2.5 GHz, IN-OUT1 ON

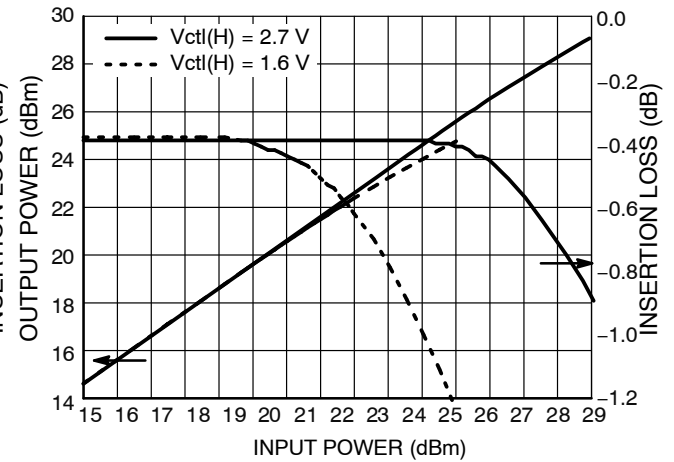


Figure 6. Output power, Insertion Loss vs Input Power
Freq = 2.5 GHz, IN-OUT2 ON

NSG1001MX, NSVG1001MX

ELECTRICAL CHARACTERISTICS

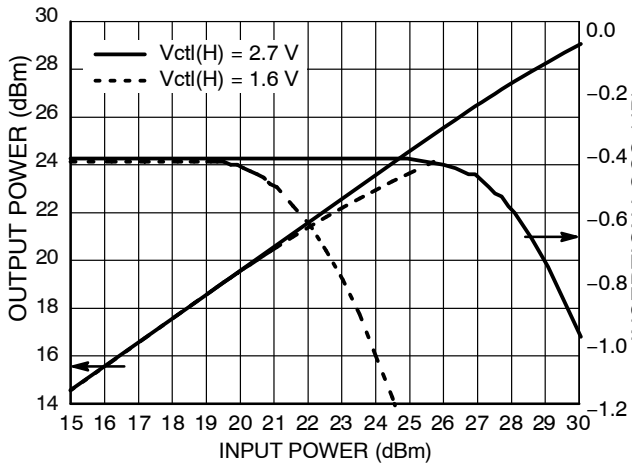


Figure 7. Output power, Insertion Loss vs Input Power
Freq = 6.0 GHz, IN-OUT1 ON

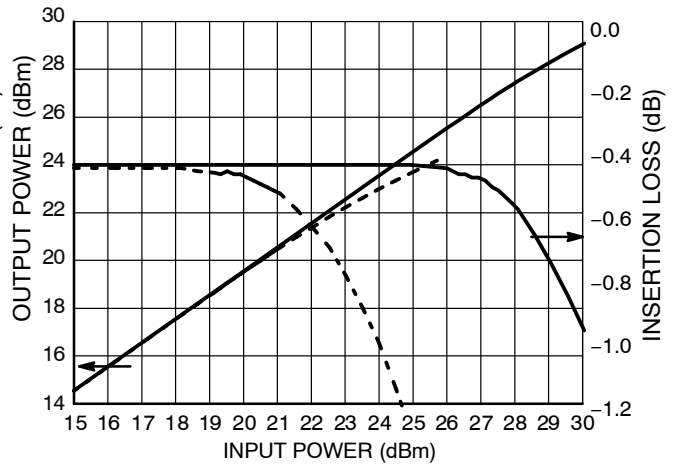
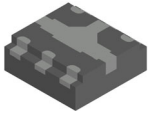


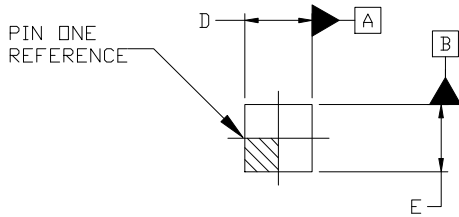
Figure 8. Output power, Insertion Loss vs Input Power
Freq = 6.0 GHz, IN-OUT2 ON

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

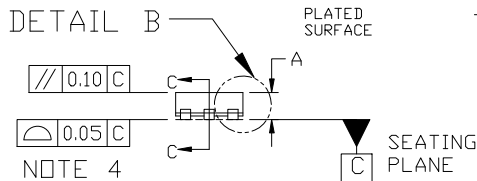


XDFNW6 1.0x1.0, 0.35P CASE 717AE ISSUE B

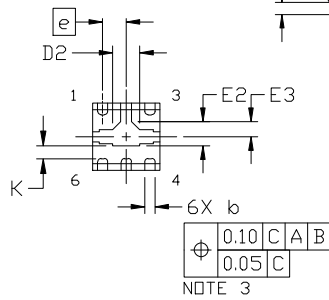
DATE 06 MAY 2022



TOP VIEW



SIDE VIEW



BOTTOM VIEW

GENERIC MARKING DIAGRAM*

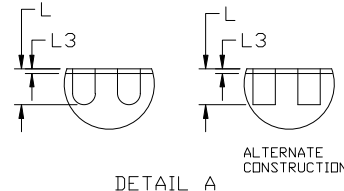


XX = Specific Device Code
M = Date Code

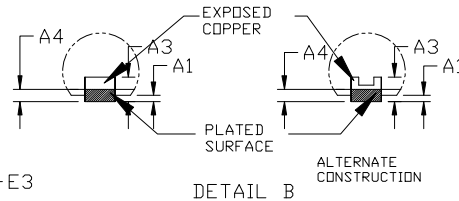
*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

NOTES:

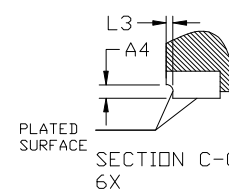
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION *b* APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.20 MM FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO ALL THE TERMINALS.
5. PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.



DETAIL A

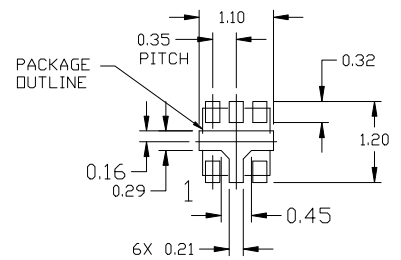


DETAIL B



SECTION C-C
6X

| DIM | MILLIMETERS | | |
|----------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.32 | 0.38 | 0.43 |
| A1 | 0.00 | --- | 0.05 |
| A3 | 0.152 REF | | |
| A4 | 0.10 | --- | --- |
| <i>b</i> | 0.10 | 0.16 | 0.22 |
| D | 0.90 | 1.00 | 1.10 |
| D2 | 0.30 | 0.40 | 0.50 |
| E | 0.90 | 1.00 | 1.10 |
| E2 | 0.36 REF | | |
| E3 | 0.23 REF | | |
| <i>e</i> | 0.35 BSC | | |
| K | 0.18 REF | | |
| L | 0.12 | 0.18 | 0.24 |
| L3 | --- | --- | 0.09 |



RECOMMENDED MOUNTING FOOTPRINT*

* For additional information on our Pb-Free strategy and soldering details, please download the DN Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERM/D.

| | | |
|-------------------------|------------------------------|--|
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| DESCRIPTION: | XDFNW6 1.0x1.0, 0.35P | PAGE 1 OF 1 |

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