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

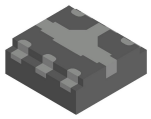
MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

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.

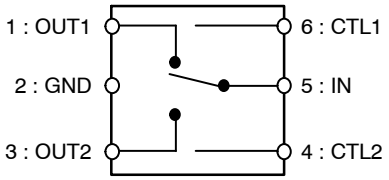
TRUTH TABLE

On Path	V_{CTL1}	V_{CTL2}
IN − OUT1	Low	High
IN − OUT2	High	Low

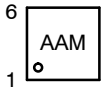


XDFNW
MX SUFFIX
CASE 717AE

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.

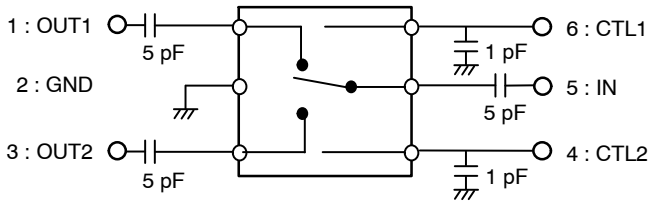
ELECTRICAL CHARACTERISTICS at T_A = 25°C Control Voltage: 0/+2.7 V, DC Blocking Capacitor 5.0 pF

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



ELECTRICAL CHARACTERISTICS

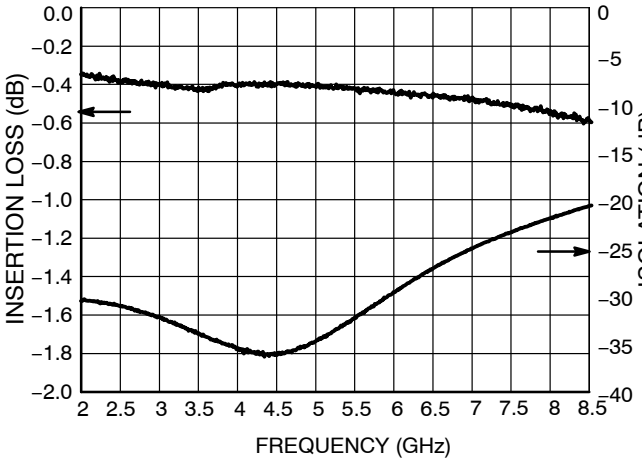


Figure 1. Insertion Loss, Isolation vs Frequency IN−OUT1 ON, CTL1 = 0 V, CTL2 = 2.7 V

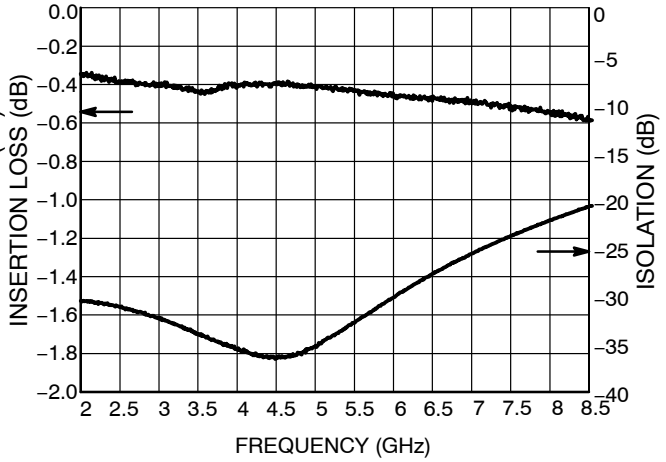


Figure 2. Insertion Loss, Isolation vs Frequency IN−OUT2 ON, CTL1 = 2.7 V, CTL2 = 0 V

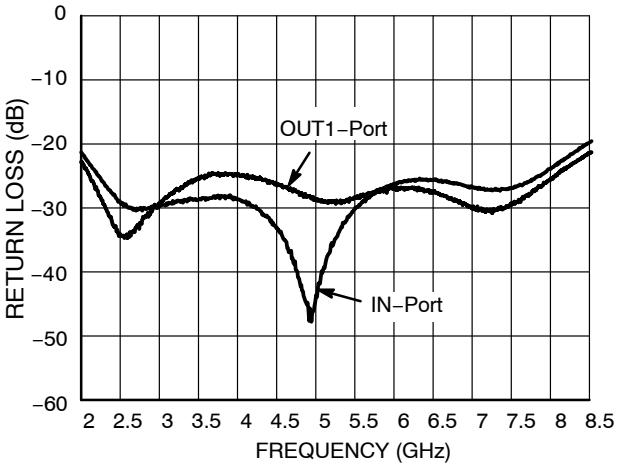


Figure 3. Return Loss vs Frequency IN−OUT1 ON, CTL1 = 0 V, CTL2 = 2.7 V

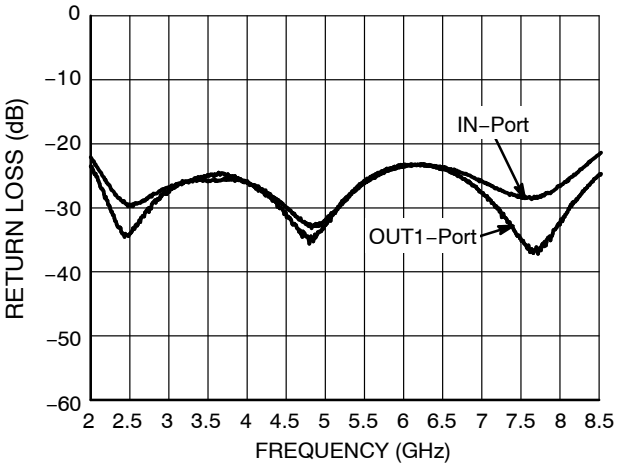


Figure 4. Return Loss vs Frequency IN−OUT2 ON, CTL1 = 2.7 V, CTL2 = 0 V

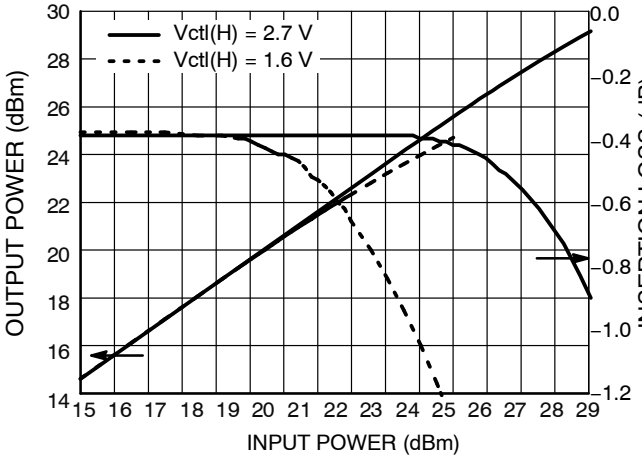


Figure 5. Output power, Insertion Loss vs Input Power Freq = 2.5 GHz, IN−OUT1 ON

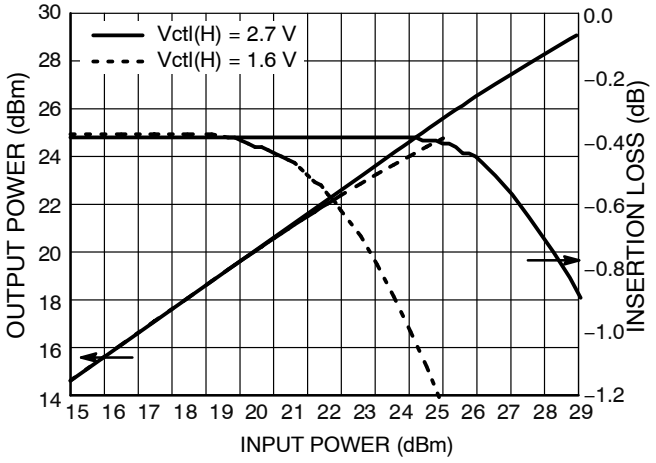


Figure 6. Output power, Insertion Loss vs Input Power Freq = 2.5 GHz, IN−OUT2 ON

ELECTRICAL CHARACTERISTICS

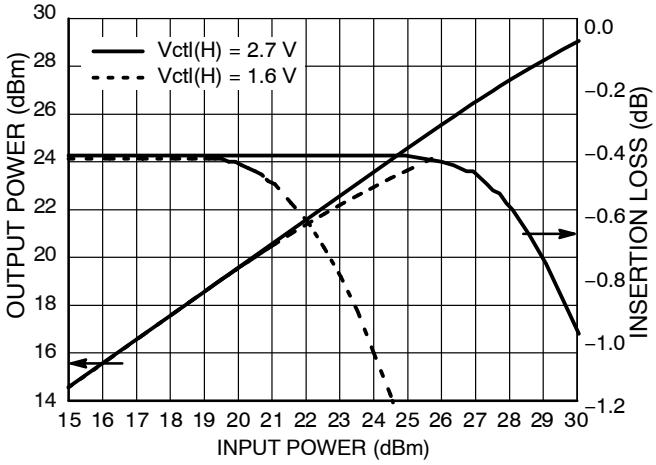


Figure 7. Output power, Insertion Loss vs Input Power Freq = 6.0 GHz, IN−OUT1 ON

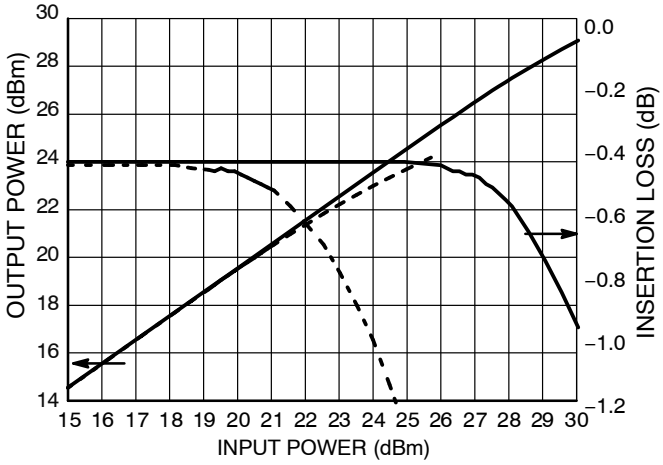
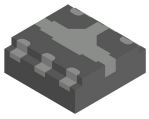


Figure 8. Output power, Insertion Loss vs Input Power Freq = 6.0 GHz, IN−OUT2 ON



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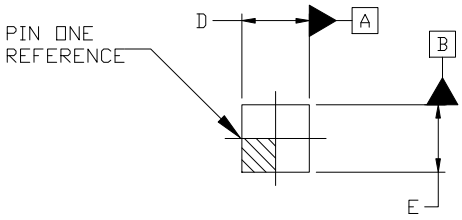
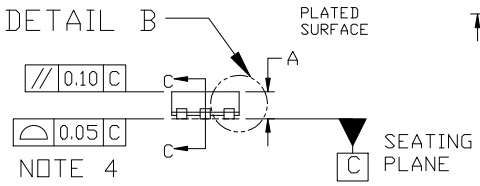
ISSUE B

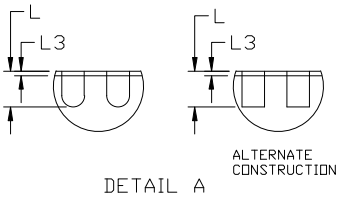
DATE 06 MAY 2022



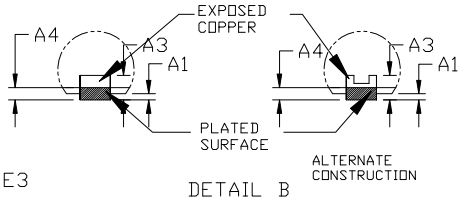
TOP VIEW



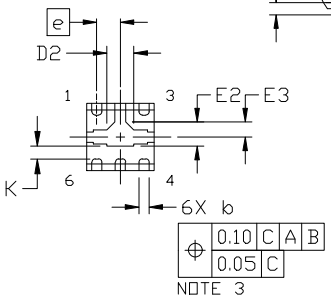
SIDE VIEW



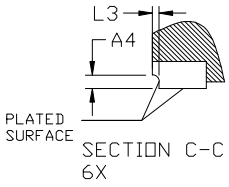
DETAIL A



DETAIL B



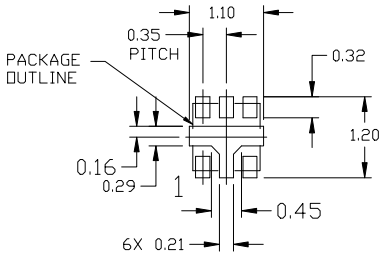
BOTTOM VIEW



SECTION C-C
6X

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 TO ALL THE TERMINALS.
5. PACKAGE DIMENSIONS EXCLUSIVE OF BURRS AND MOLD FLASH.

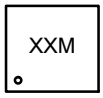
	MILLIMETERS		
DIM	MIN.	NOM.	MAX.
A	0.32	0.38	0.43
A1	0.00	---	0.05
A3	0.152 REF		
A4	0.10	---	---
b	0.10	0.16	0.22
D	0.90	1.00	1.10
D2	0.30	0.40	0.50
E	0.90	1.00	1.10
E2	0.36 REF		
E3	0.23 REF		
e	0.35 BSC		
K	0.18 REF		
L	0.12	0.18	0.24
L3	---	---	0.09



RECOMMENDED
MOUNTING FOOTPRINT*

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

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.

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

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