

# Diode Detector Circuit Using the NSR201MX

## AND9694/D

### Overview

This application note explains about onsemi's NSR201MX which is used as a diode detector circuit.

A Schottky diode is a diode using the schottky barrier generating due to the junction of the metal and the semiconductor. Because of its low forward voltage and fast switching operation, it is suitable for high-frequency use.

In wireless applications like WiFi, it is necessary to detect the received power and to feed back the detection voltage to

transceiver IC. A Schottky diode is used in detection circuit in this case.

The principle of diode detection is rectifying the signal (AC component) through a diode and generating voltage as DC component. The detection makes use of the non-linear characteristic of the Schottky diode, so a bias circuit is not necessary.

### Evaluation Board

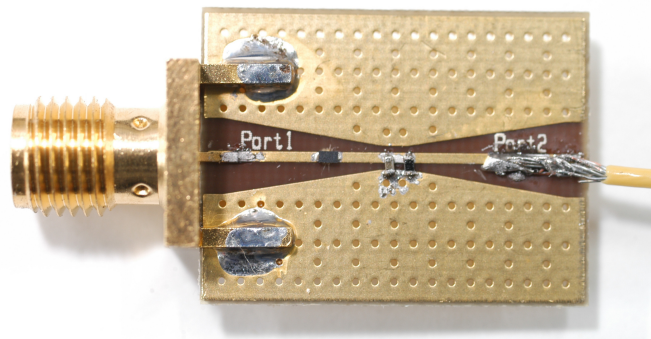


Figure 1. Evaluation Board

### Circuit Design

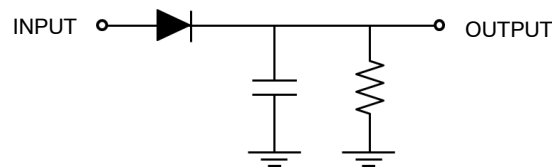


Figure 2. Circuit Design

Table 1. BILL OF MATERIALS

Item	Symbol	Value	Manufacturer	Size
SBD	D1	NSR201MX	onsemi	X2DFN2
	C1	18 pF	Various	1005
Resistor	R1	100 kΩ	Various	1005
Material		FR-4		25 x 10 mm

## Measurement Results

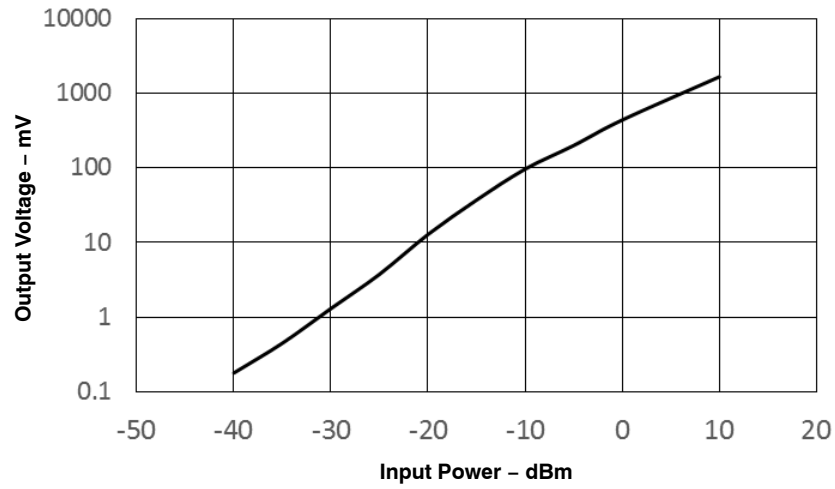


Figure 3. Output Voltage vs. Input Power

## Spice Model

Table 2. MODEL : DIODE

Parameter	Value	Unit	Parameter	Value	Unit
IS	123n	A	Ibv	7.65u	A
N	1.28		Nbv	40.56	
BV	5.338		Ibvl	0.008m	A
IBV	7.65u	A	Nbvl	1	
RS	12.2	$\Omega$	Visw	0.5	V
CJO	100f	F	Fcsw	0.5	
VJ	0.5	V	EG	690.0m	eV
M	0.5		XTI	2	
FC	0.5				
TT	3p	S	C	50f	F
Isr	93.5f	A	L	0.45n	H
Nr	2.4				

## Equivalent Circuit Model

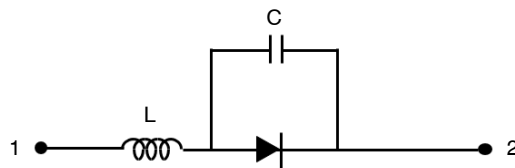


Figure 4. Equivalent Circuit Model

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