

Auto Gain Control for Sub-GHz Using the NSVP264SDSF3, NSVR351SDSA3 and NCV2904

AND90260/D

Overview

This application note explains about an Auto Gain Control (AGC) for Sub-GHz using onsemi’s NSVP264SDSF3, NSVR351SDSA3 and NCV2904.

NSVP264SDSF3 is a dual type PIN diode best suited for high-frequency applications which is assembled in the 3-pin surface mount package. NSVR351SDSA3 is a dual type silicon schottky barrier diode best suited for high-frequency applications which is assembled in the 3-pin surface mount package. NCV2904 is a Single Supply

Dual Operational Amplifiers which is assembled in the 8-pin surface mount package. For detail information about the performance, please refer to the datasheet of each product.

The evaluation board is adjusted to achieve the most suitable performance on Sub-GHz (500–900 MHz).

A standard material FR4 is used for the printed circuit board (PCB). Please note that the losses of the PCB and the SMA connector are not excluded from the Power level.

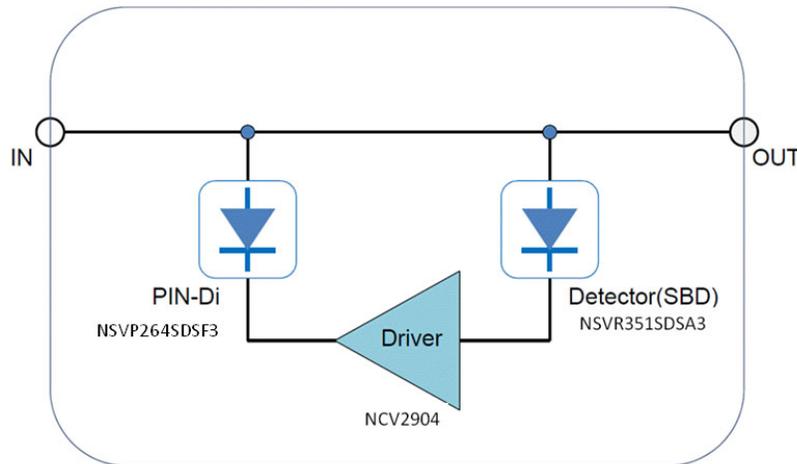


Figure 1. Block Diagram

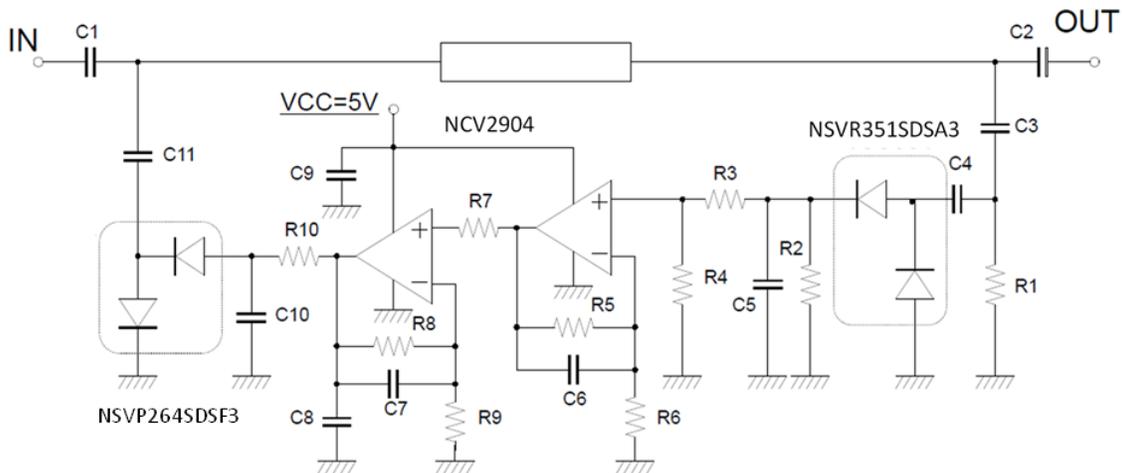


Figure 2. Circuit Design

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BILL OF MATERIALS

Part	Ref.	Size	Specification
PIN-Di	-	SC-70	NSVP264SDSF3
Driver	-	Micro8	NCV2904
Detector	-	CP	NSVR351SDSA3
Resistor	R1	1005	68 Ω
	R2	1005	470 k Ω
	R3	1005	1.2 k Ω
	R4	1005	82 k Ω
	R5	1005	33 k Ω
	R6	1005	8.2 k Ω
	R7	1005	220 Ω
	R8	1005	47 k Ω
	R9	1005	8.2 k Ω
	R10	1005	68 Ω
Capacitor	C1, 2	1005	1000 pF
	C3	1005	2 pF
	C4~7	1005	1000 pF
	C8, 9	1608	0.1 μ F
	C10, 11	1005	1000 pF
Material	-	24.8 x 14.5 mm	FR4

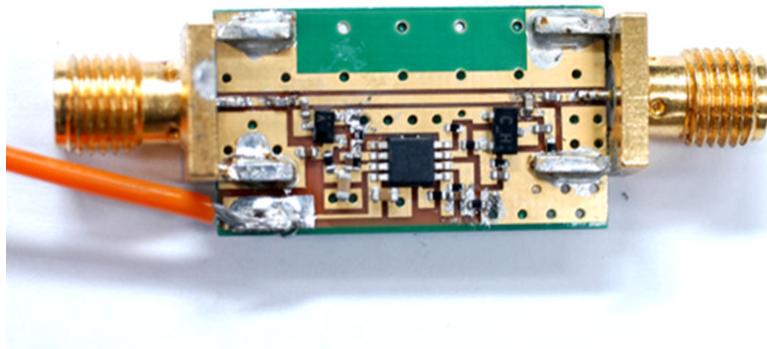


Figure 3. Evaluation Board

SUMMARY OF DATA

($T_A = 25^\circ\text{C}$, Circuit Voltage = 5.0 V, $f = 90\text{ MHz}$)

Frequency	Parameter	Symbol	Result			Unit
	Input Power	Pin	-20.0	-10.0	0.0	dBm
300 MHz	Power Gain	Ga	-0.36	-0.36	-2.27	dBm
500 MHz	Power Gain	Ga	-0.67	-0.70	-4.47	dBm
900 MHz	Power Gain	Ga	-1.04	-1.06	-6.75	dBm

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$P_{IN} - P_{OUT}$

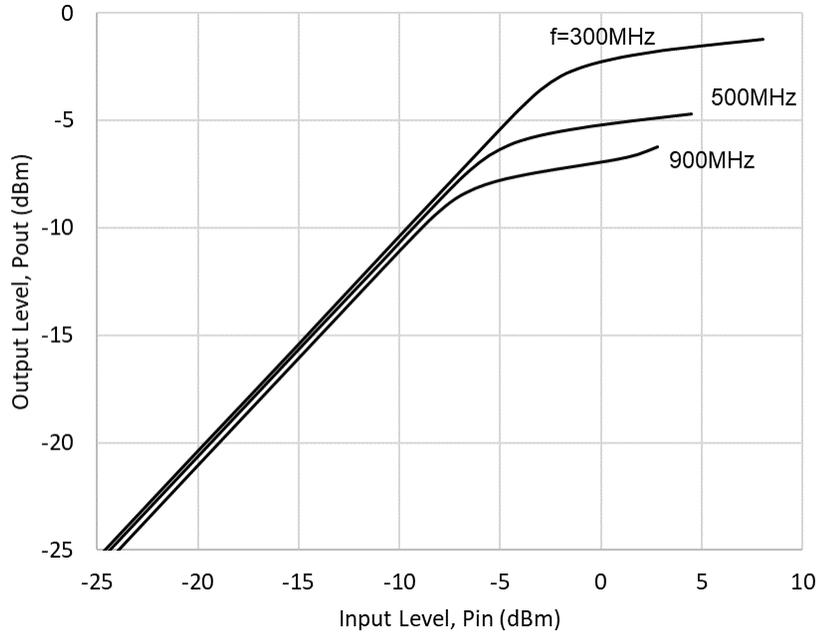


Figure 4. $P_{IN} - P_{OUT}$

Power Gain

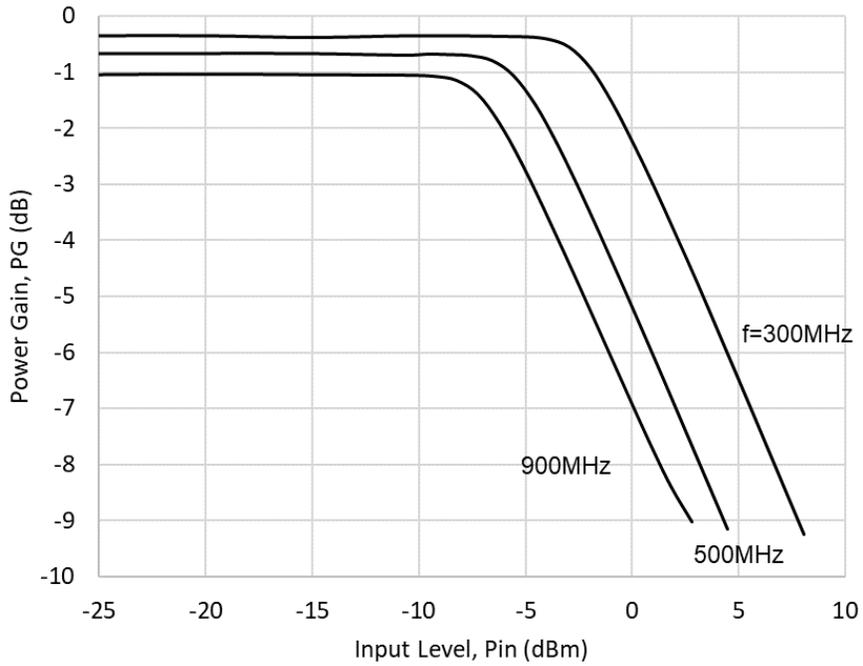


Figure 5. $P_{IN} - P_G$

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