

AFIC901N 760-870 MHz REFERENCE CIRCUIT OVERVIEW

ORDERABLE PART NUMBER: AFIC901N-760MHZ



PUBLIC



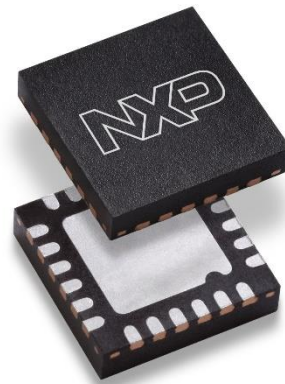
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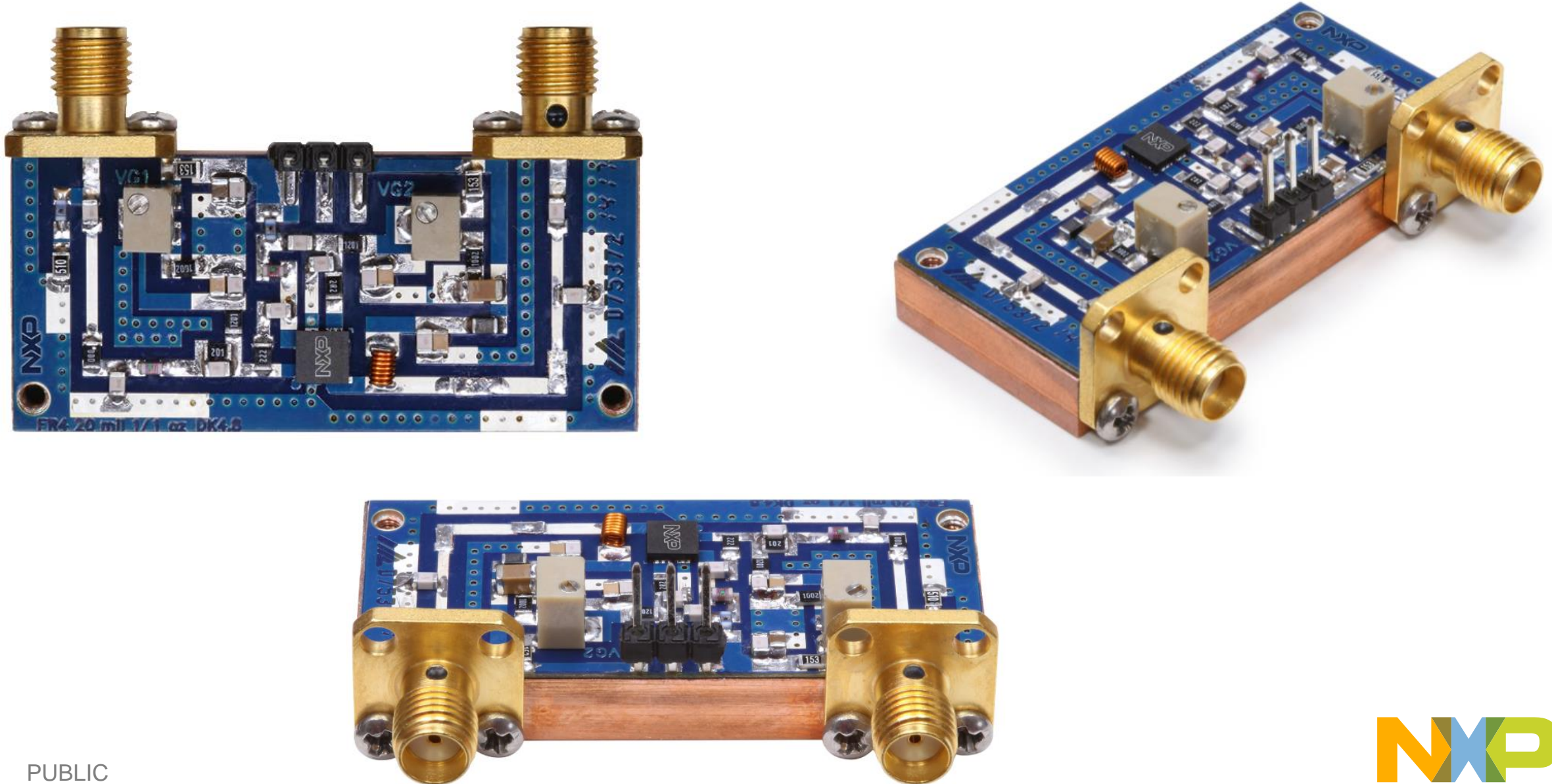
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Introduction

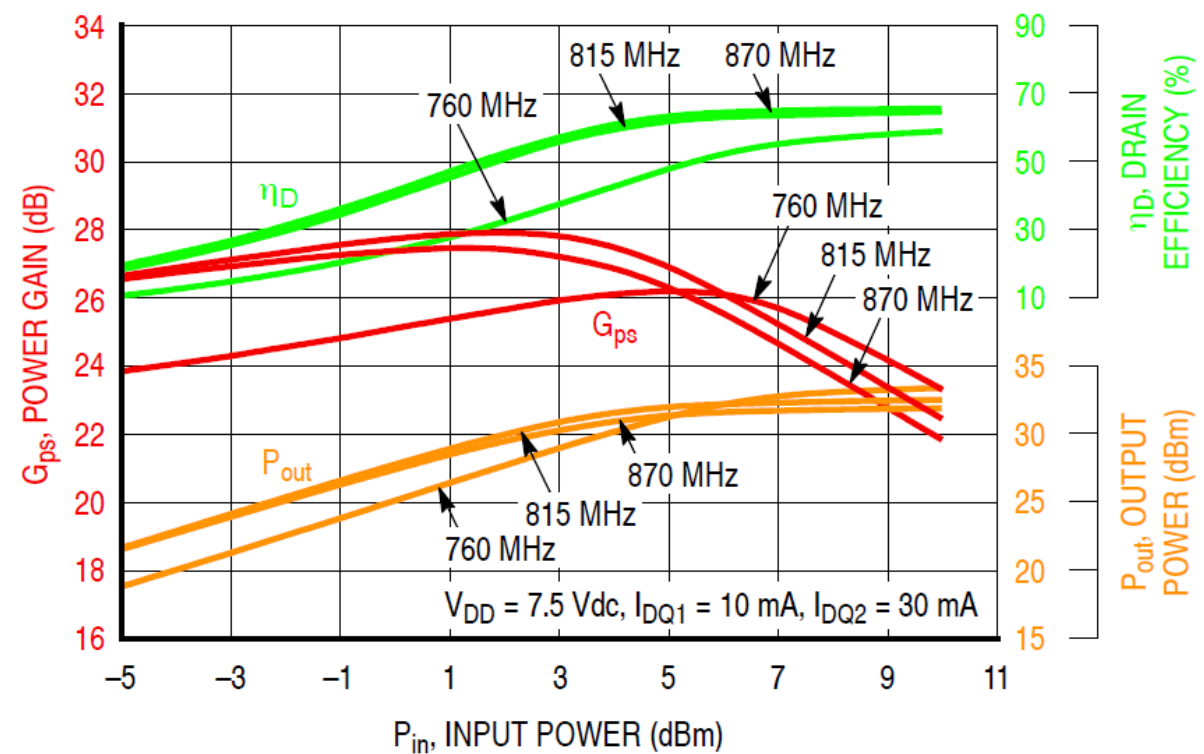
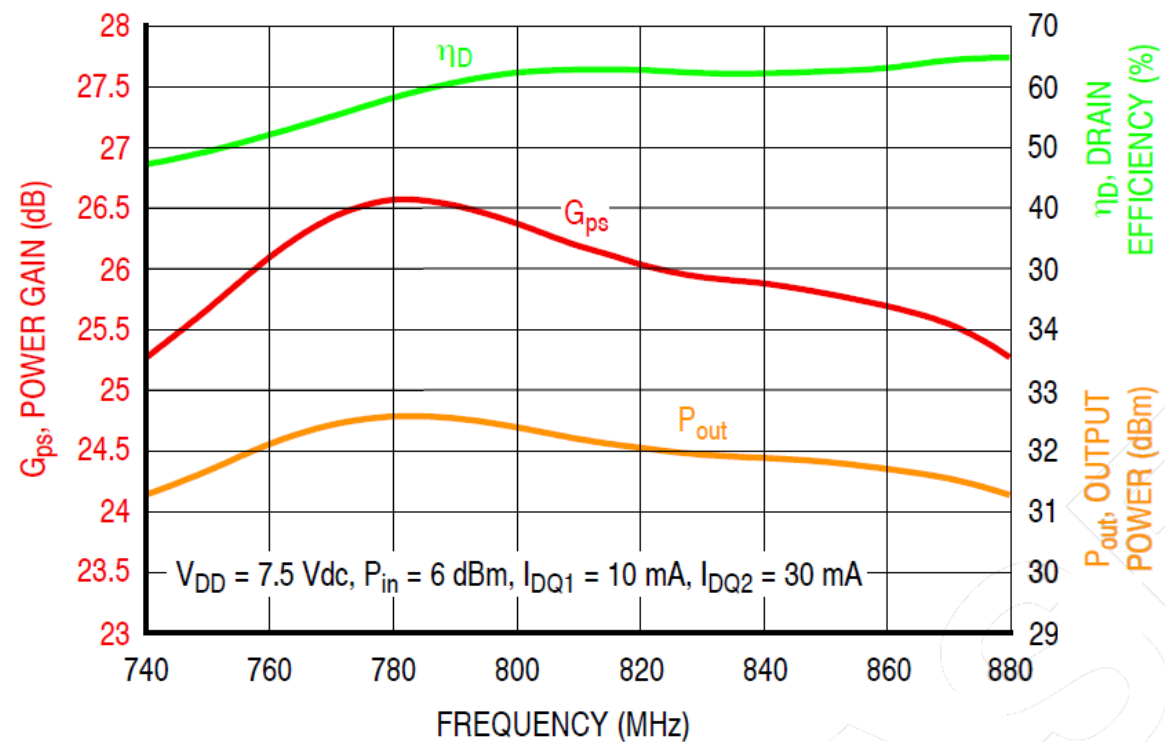
- The NXP AFIC901N is a 1.8-1000 MHz, 1 W CW RF power LDMOS transistor housed in a QFN package. It has no input, no output and no inter-stage matching, allowing off-chip matching for flexible use across frequencies.
 - Further details about the device, including its data sheet, are available [here](#).
- The following pages describe the 760-870 MHz reference circuit (evaluation board). Its typical applications are land mobile radio and use as a generic driver.
- The reference circuit can be ordered through NXP's distribution partners and etailers using part number AFIC901N-760MHZ.



Circuit Overview – 2.11 cm × 4.72 cm (0.83" × 1.86")



Typical CW Performance



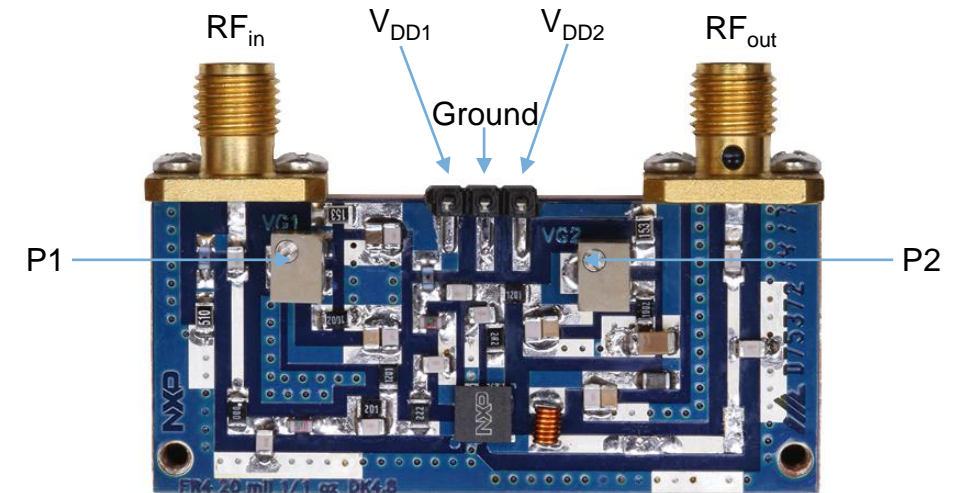
$V_{DD} = 7.5$ Vdc, $I_{DQ1} = 10$ mA, $I_{DQ2} = 30$ mA

Frequency (MHz)	P_{in} (dBm)	G_{ps} (dB)	η_D (%)	P_{out} (dBm)
760	5.0	25.5	48.4	30.5
815	5.0	26.5	62.3	31.5
870	5.0	25.5	61.3	30.5

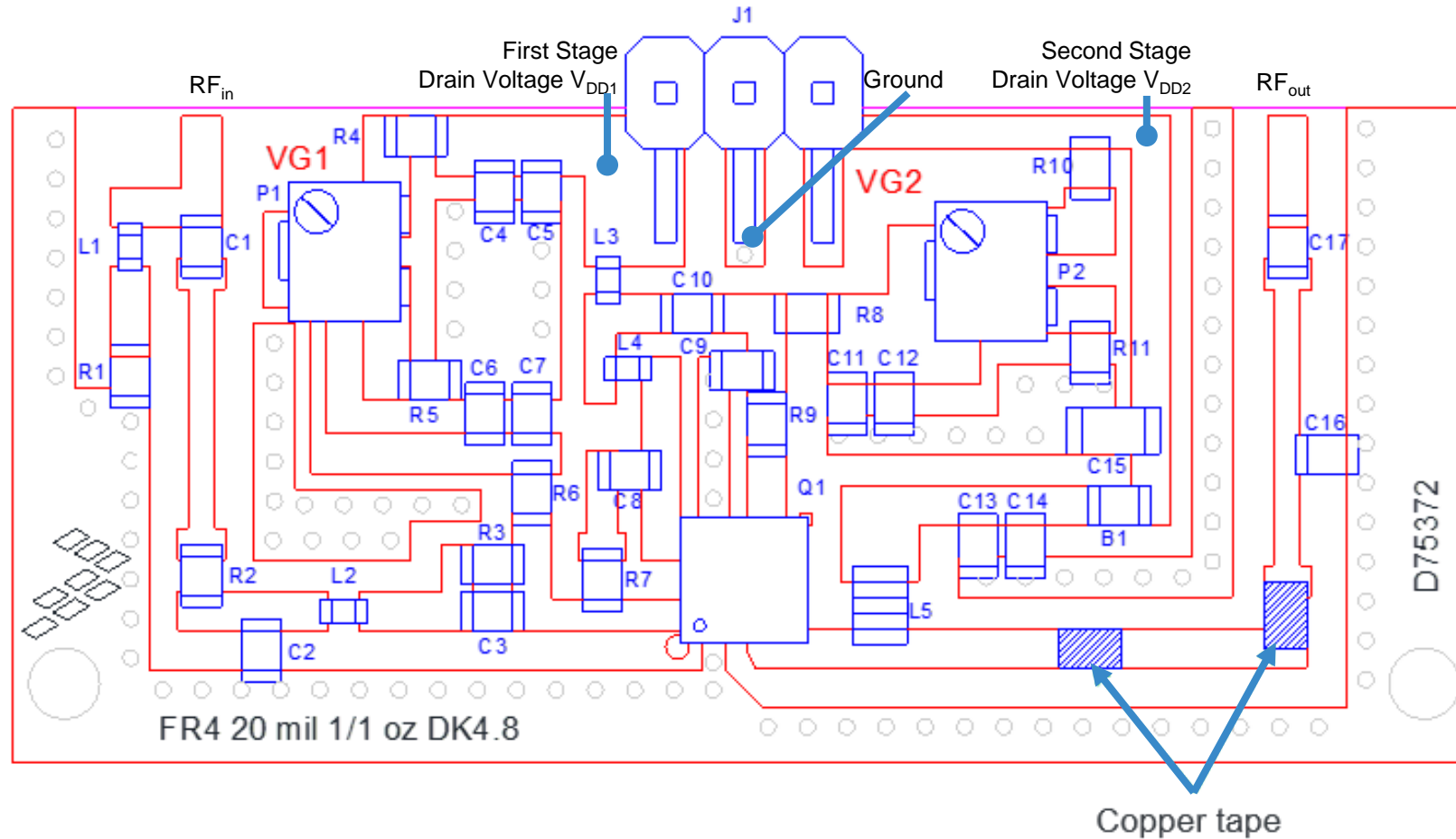


Quick Start

1. Connect the ground.
2. Terminate the RF output with a 50 ohm load capable of handling more than 1 W power.
3. Connect the RF input to a 50 ohm source with the RF off.
4. Connect the first stage drain voltage (V_{DD1}) and raise it slowly to 7.5 V while ensuring that the drain current remains below or equal to the typical drain quiescent current of $I_{DQ1} = 10$ mA.
5. If needed, adjust the P1 potentiometer to modify the first stage gate voltage to control the first stage drain quiescent current I_{DQ1} .
6. Disconnect the first stage drain voltage V_{DD1} . Connect the second stage drain voltage (V_{DD2}) and raise it slowly to 7.5 V while ensuring that the drain current remains below or equal to the typical quiescent current of $I_{DQ2} = 30$ mA.
7. If needed, adjust the P2 potentiometer to modify the second stage gate voltage to control the second stage drain current I_{DQ2} .
8. Keep V_{DD2} connected to 7.5 V and connect again first stage V_{DD1} to 7.5 V. The total drain current should typically be 40 mA.
9. Raise the RF input slowly to 5 dBm (3 mW).
10. Check the RF output power (typically 1 W), the drain current (around 0.3 A for this power level) and the temperature of the board. Ensure the baseplate is not overheating.



Component Placement Reference

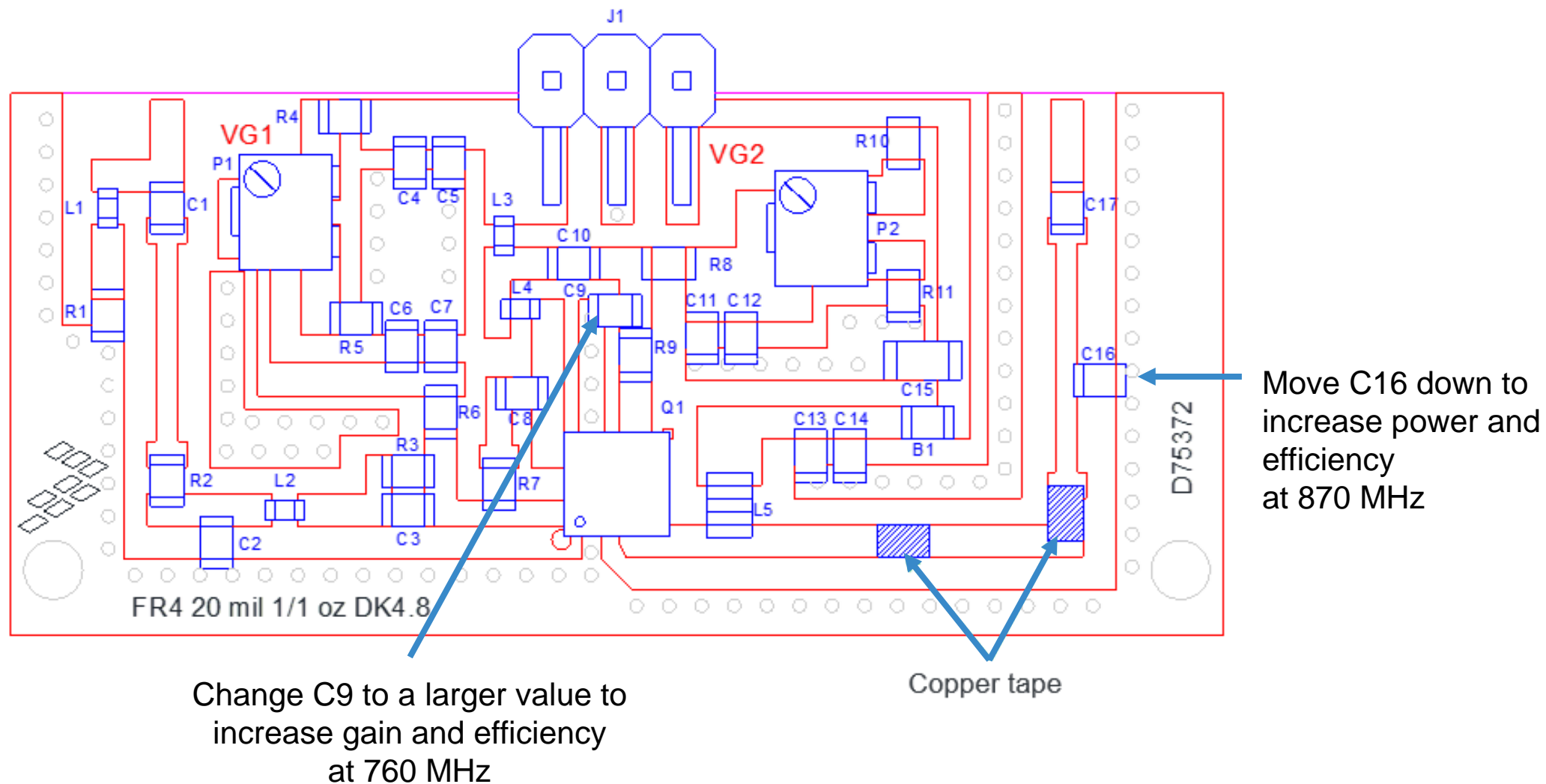


Note: PCBs may have either NXP or Freescale markings. Existing Freescale boards will not migrate to NXP markings unless a board is revised.

Bill of Materials

Part	Description	Part Number	Manufacturer
B1	RF Bead	2508051107Y0	Fair-Rite
C1, C9, C10, C17	10 pF Chip Capacitor	GQM2195C2E100FB12D	Murata
C2	2.4 pF Chip Capacitor	GQM2195C2E2R4BB12D	Murata
C3, C5, C7, C8, C11, C13	100 pF Chip Capacitor	GQM2195C2E101GB12D	Murata
C4	1 μ F Chip Capacitor	GRM21BR71H105KA12L	Murata
C6, C12, C14	1000 pF Chip Capacitor	C2012X7R2E102M085AA	TDK
C15	10 μ F Chip Capacitor	GRM31CR61H106KA12L	Murata
C16	4.7 pF Chip Capacitor	GQM2195C2E4R7BB12D	Murata
J1	Right-Angle Breakaway Header (3 Pins)	22-28-8360	Molex
L1, L3	39 nH Inductor	LL1608-FSL39NJ	TOKO
L2, L4	10 nH Inductor	LL1608-FSL10NJ	TOKO
L5	25 nH Inductor	0908SQ25N	Coilcraft
P1, P2	5.0 k Ω Multi-turn Cermet Trimmer Potentiometer	3224W-1-502E	Bourns
Q1	RF Power LDMOS Amplifier	AFIC901N	NXP
R1	51 Ω , 1/10 W Chip Resistor	RR1220Q-510-D	Susumu
R2	0 Ω , 2.5 A Chip Resistor	CRCW08050000Z0EA	Vishay
R3	200 Ω , 1/8 W Chip Resistor	CRCW0805200RJNEA	Vishay
R4, R10	15 k Ω , 1/10 W Chip Resistor	RR1220P-153-B-T5	Susumu
R5, R11	10 k Ω , 1/8 W Chip Resistor	CRCW080510K0FKEA	Vishay
R6, R8	1.2 k Ω , 1/8 W Chip Resistor	CRCW08051K20FKEA	Vishay
R7	2.2 k Ω , 1/8 W Chip Resistor	CRCW08052K20JNEA	Vishay
R9	2.2 Ω , 1/8 W Chip Resistor	CRCW08052R20JNEA	Vishay
PCB	FR4 (S-1000), 0.020", $\epsilon_r = 4.8$	D75372	MTL

Tuning Tips



Revision History

- The following table summarizes revisions to the content of the AFIC901N 760-870 MHz Reference Circuit zip file.

Revision	Date	Description
0	September 2019	• Initial Release



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