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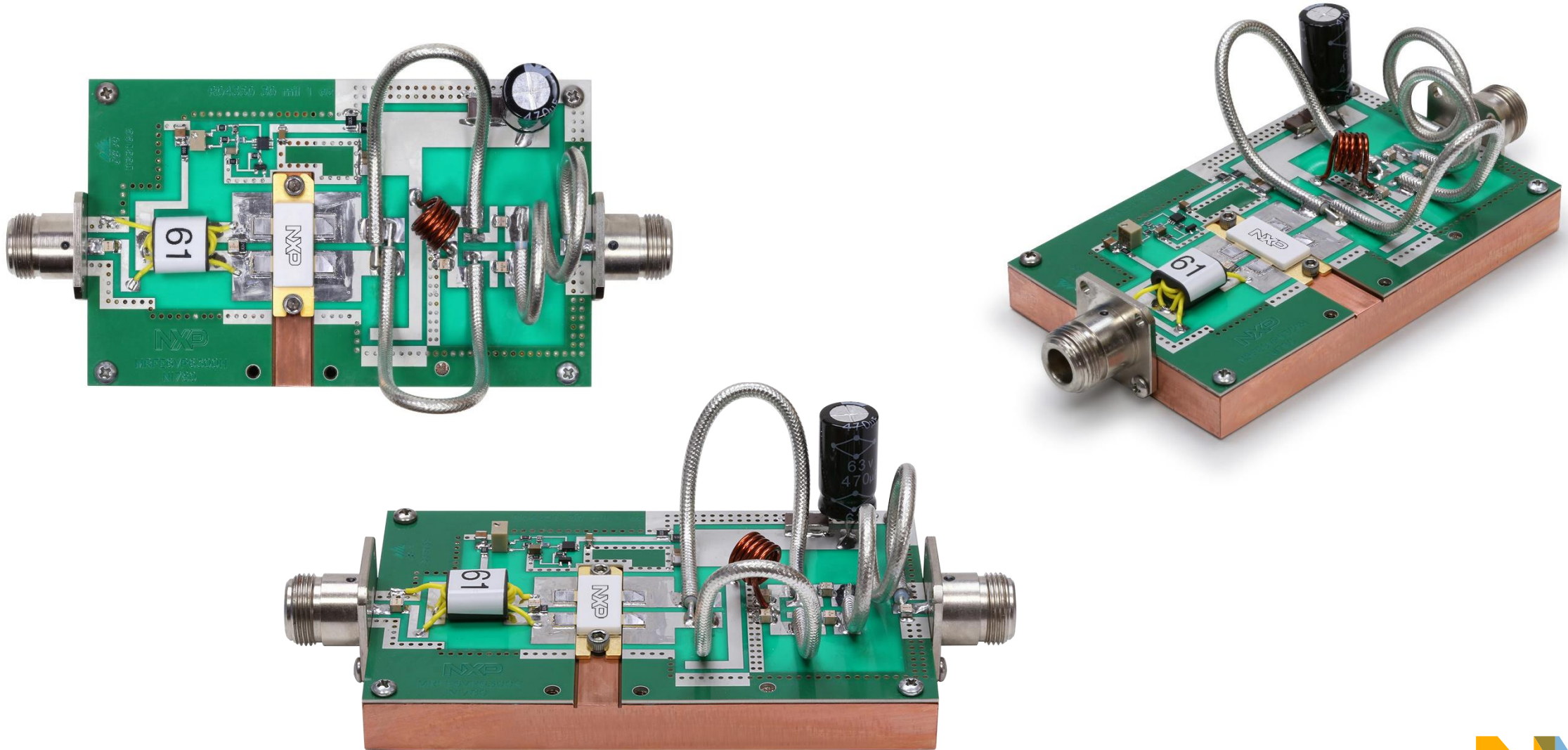
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Introduction

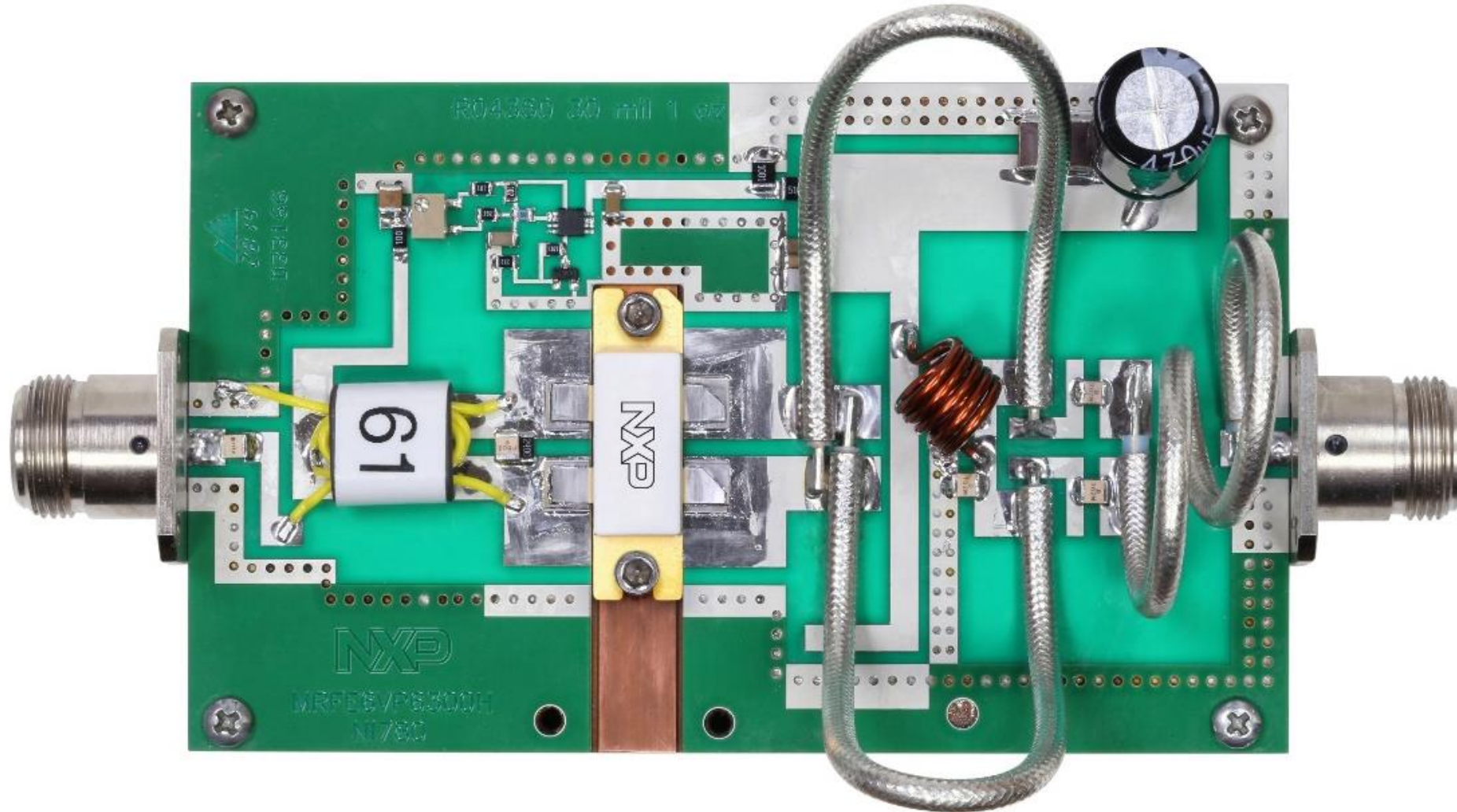
- The NXP MRFE6VP6300H is a 1.8-600 MHz, 300 W CW RF power LDMOS transistor housed in an NI-780 air-cavity ceramic package. Its unmatched input and output allows wide frequency range utilization.
 - Further details about the device, including its data sheet, are available [here](#).
- The following pages describe its 87.5-108 MHz reference circuit (evaluation board). Its typical application is FM radio broadcast transmitters.
- The reference circuit can be ordered through NXP's distribution partners and etailers using part number MRFE6VP6300H-88MHZ.



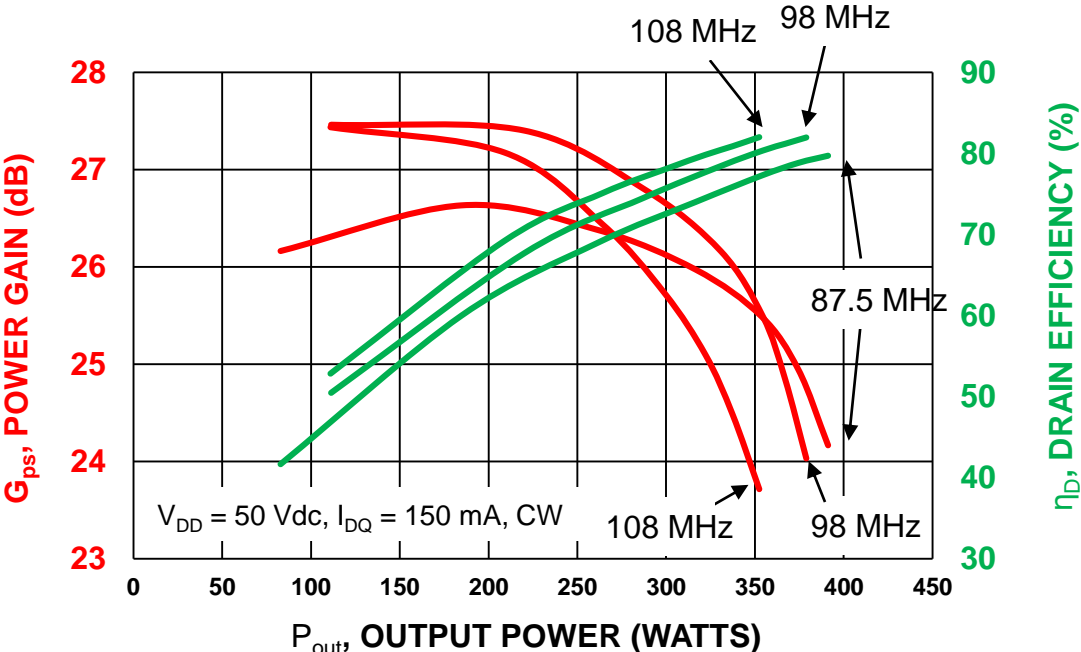
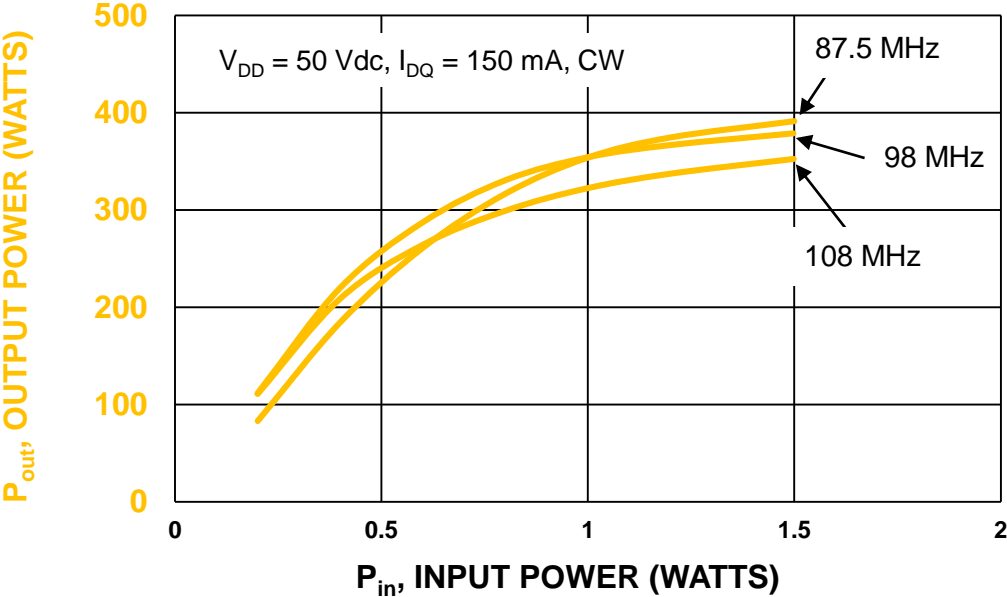
Circuit Overview – 7.3 cm x 12.0 cm (2.88" x 4.72")



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Typical CW Performance



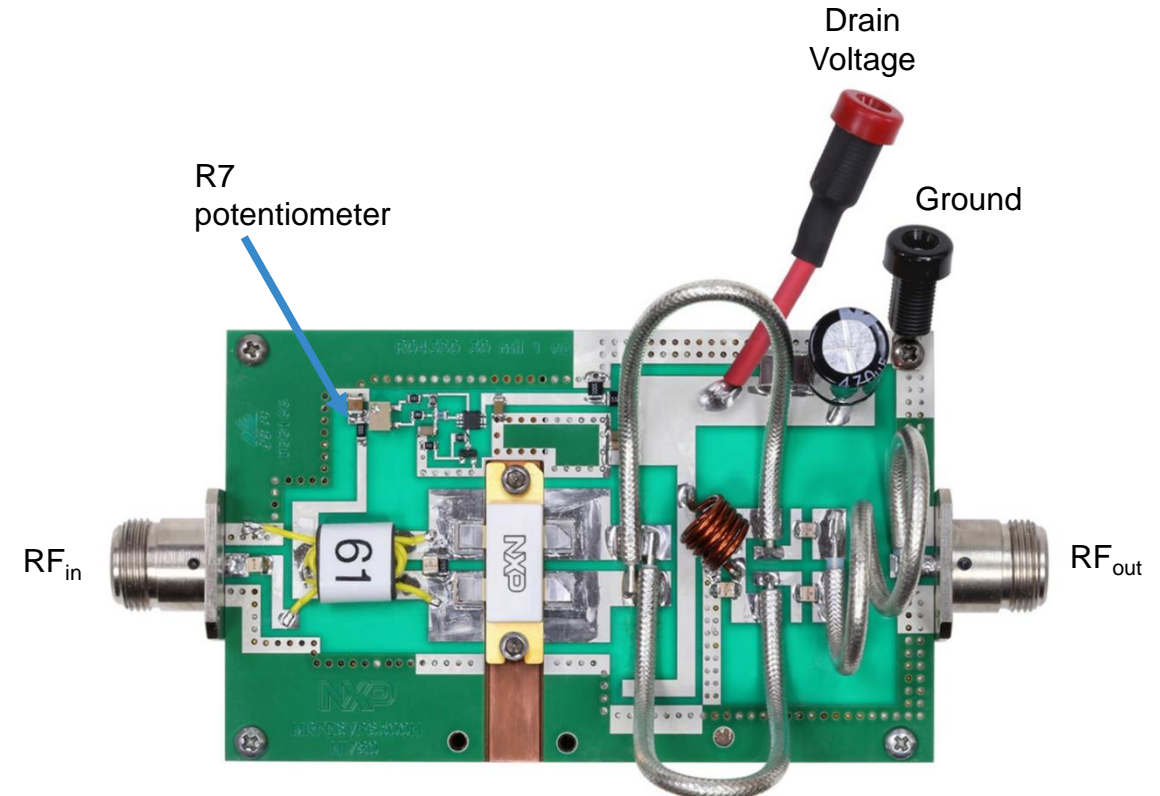
Typical Performance: $V_{DD} = 50\text{ Vdc}$, $I_{DQ} = 150\text{ mA}$, $P_{in} = 1.5\text{ W}$ (31.8 dBm), CW

Frequency (MHz)	Output Power (W)	Power Gain (dB)	Drain Efficiency (%)
87.5	391	24.2	79.7
98	379	24.0	82.0
108	353	23.7	81.7

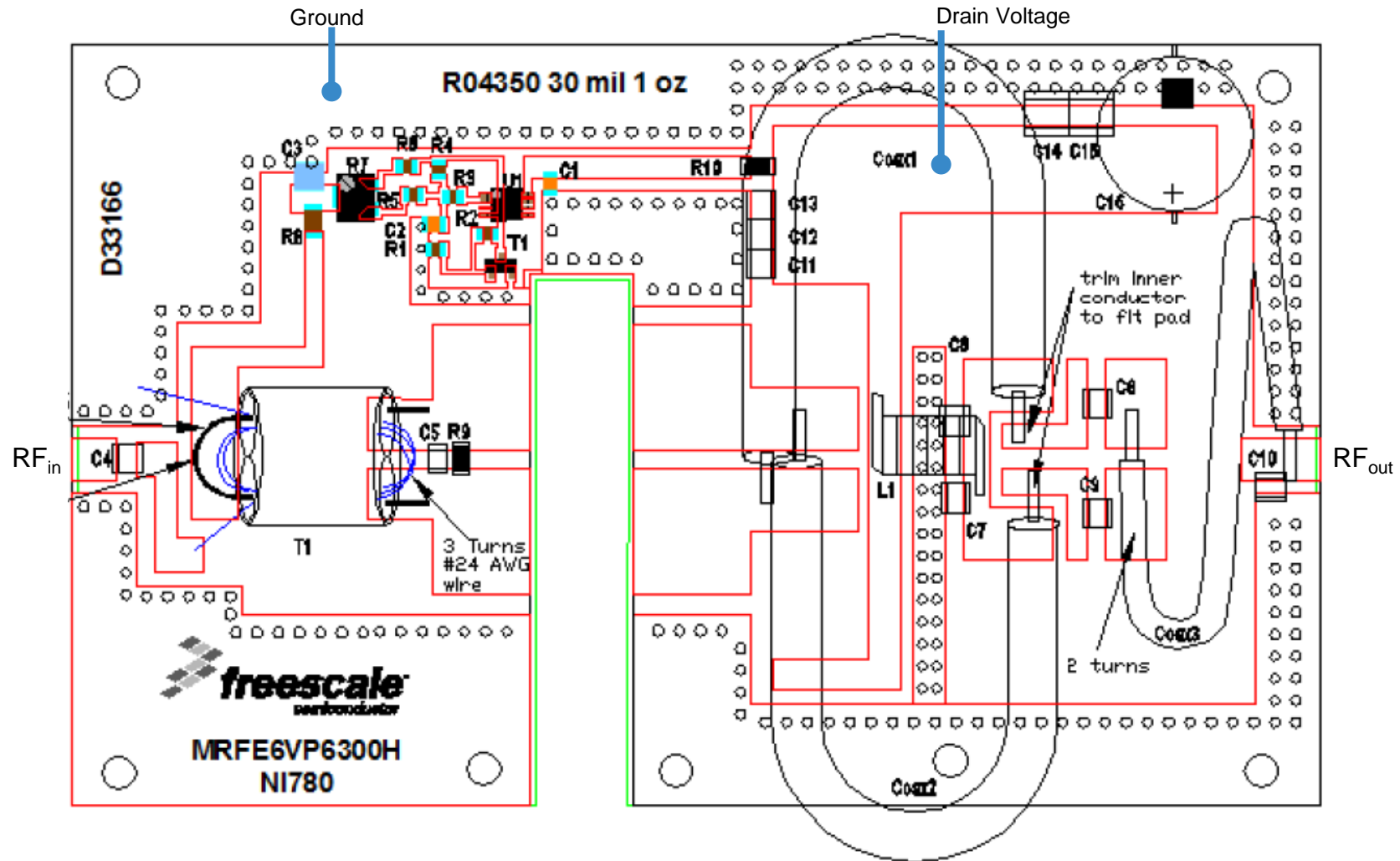


Quick Start

1. Mount the reference circuit onto a heatsink capable of dissipating more than 125 W in order to provide enough thermal dissipation (the baseplate included in this reference circuit is not sufficient to serve as a standalone heatsink).
2. Connect the ground.
3. Terminate the RF output with a 50 ohm load capable of handling more than 350 W.
4. Connect the RF input to a 50 ohm source with the RF off.
5. Connect the drain voltage (V_{DD}) and raise it slowly to 50 V while ensuring that the drain current remains below or equal to the typical drain quiescent current of $I_{DQ} = 100$ mA.
6. If needed, adjust the R7 potentiometer to modify the gate voltage to adjust the drain quiescent current.
7. Raise the RF input slowly to 1.5 W (31.8 dBm).
8. Check the RF output power (typically 350 W), the drain current (around 9 A for this power level) and the temperature of the board.



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.

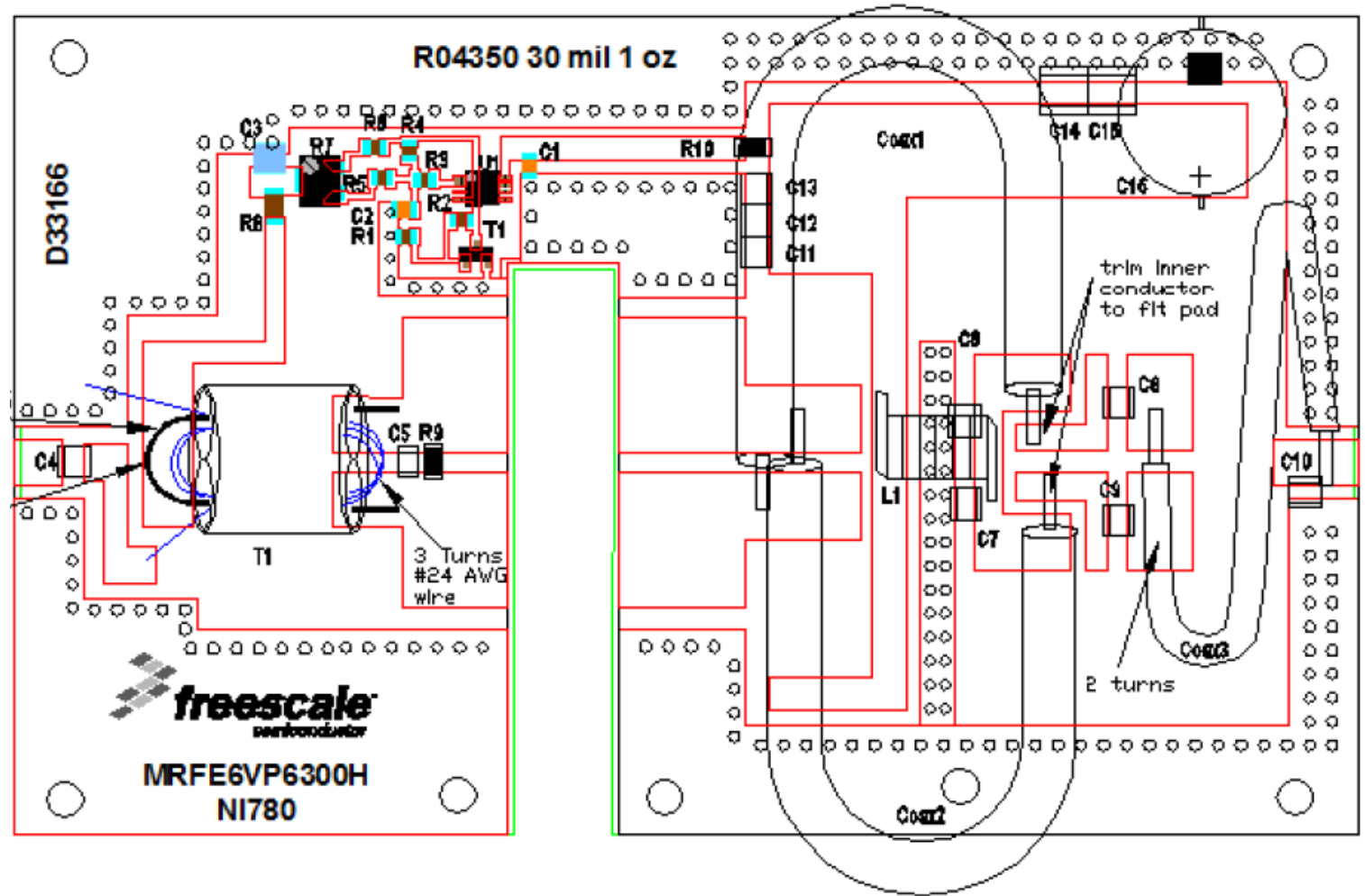


Bill of Materials

Designator	Description	Part#	Manufacturer
C1,C2	1 μ F 1206	GRM31CR72A105KA01L	Murata
C3	10K pF 200B Chip Capacitor	200B103KT50X	ATC
C4	110 pF 100B	100B111JT500X	ATC
C5	20.0 pF 100B	100B200JT500X	ATC
C6,C7,C8,C9	1000 pF 200B	100B102JT50X	ATC
C10	1.0 pF 100B	100B1R0BT500X	ATC
C11	15 nF	C3225CH2A153JT	TDK
C12	47 nF	GRM31MR72A473KA01L	Murata
C13	470 nF	GRM31MR72A474KA35L	Murata
C14,C15	10 μ F 100V	C5750X7S2A106M	TDK
C16	470 μ F 63V	MCGPR63V477M13X26	Multicomp
R1	2.2K ohm 0805 Chip Resistor	CRCW08052K20JNEA	Dale/Vishay
R2	1.2K ohm 0805 Chip Resistor	CRCW08051K20FKEA	Dale/Vishay
R3	10 ohm 0805 Chip Resistor	RK73H2ATTD10R0F	KOA Speer
R4	1.0K ohm 0805 Chip Resistor	RR1220P-102-D	Susumu
R5	3.9K ohm 0805 Chip Resistor	CRCW08053K90JNEA	Dale/Vishay
R6	200 ohm 0805 Chip Resistor	CRCW0805200RJNEA	Dale/Vishay
R7	5K Potentiometer	3224 W -1-502E	Bourns
R8	10 ohm 1206 Chip Resistor	CRCW120610R0JNEA	Dale/Vishay
R9	240 ohm 1206 Chip Resistor	CRCW1206240RFKEA	Dale/Vishay
R10	5.1K ohm 1210 Chip Resistor	CRCW12105K10FKEA	Dale/Vishay
R11	1.0K ohm 1210 Chip Resistor	CRCW12101K00FKEA	Dale/Vishay
L1	Inductor 5 Turns #16 AWG Dia 8mm	Handwound	NXP
Coax1,2	Flex cable 4.72" (120 mm) 35 ohm	HSF-141C- 35	Hongsen Cable
Coax3	Flex cable 6.29" (160 mm) 50 ohm	SM141 50 OHMS	Huber Suhner
T1	61 Material Binocular Core ferrite 9:1 (see Layout)	2861000102	Fair-Rite
U1	Adjustable Micro power voltage Regulator	LP2951ACDMR2G	ON-semiconductor
U2	Bipolar NPN transistor	BC847ALT1G	ON-semiconductor
PCB	RO4350 30 1 oz	D33166	MTL

Tuning Tips

- Increasing the coaxial length will increase efficiency but will decrease output power at 108 MHz.



Revision History

- The following table summarizes revisions to the content of the MRFE6VP6300H 87.5-108 MHz Reference Circuit zip file.

Revision	Date	Description
0	September 2019	• Initial Release



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