MRFX035H 1.8-54 MHz REFERENCE CIRCUIT

ORDERABLE PART NUMBER: **MRFX035H-2MHZ**

PUBLIC

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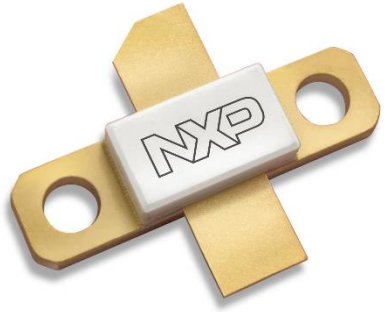
Introduction

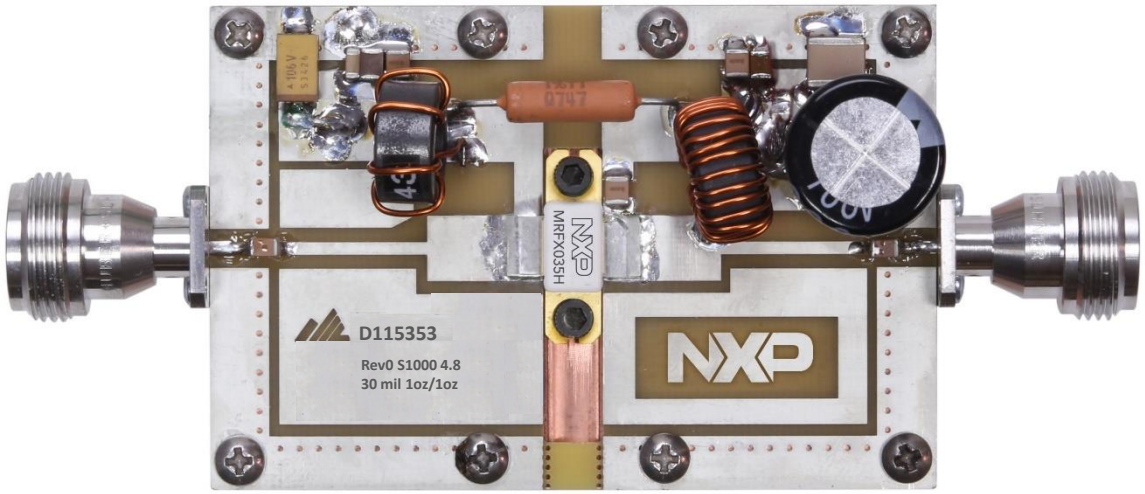
- The NXP MRFX035H is a 1.8-512 MHz, 35 W CW RF power LDMOS transistor housed in an NI-360 air-cavity ceramic package. Its unmatched input and output allows wide frequency range utilization.
- Further details about the device, including its data sheet, are available here.

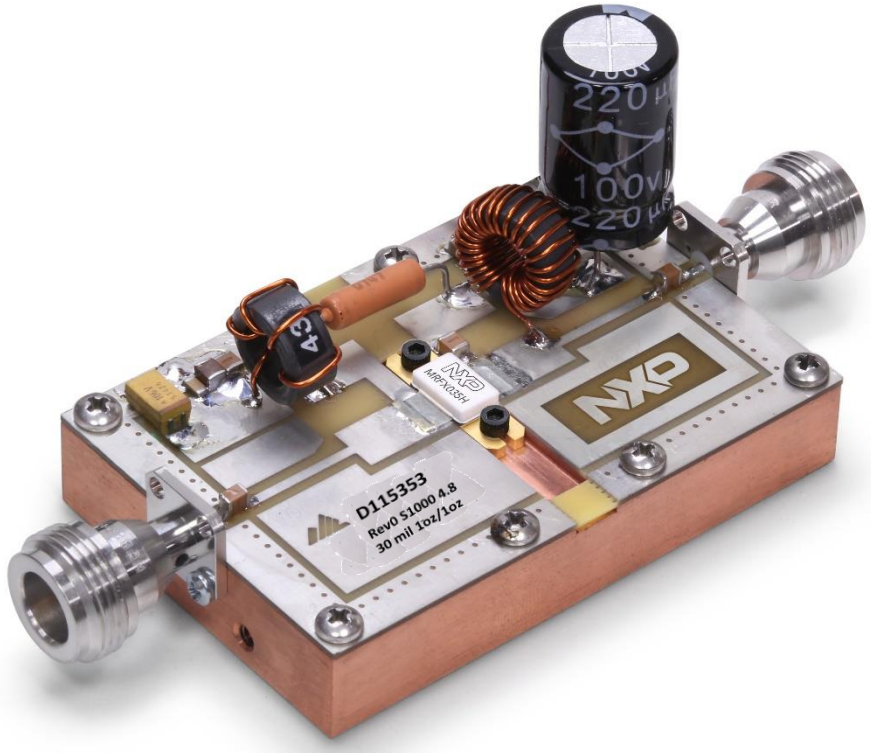
- The following pages describe the 1.8-54 MHz reference circuit (evaluation board).
  Its typical applications are broadband drivers, RF Energy and HF radios.

- The reference circuit can be ordered through NXP's distribution partners and etailers using part number MRFX035H-2MHZ.

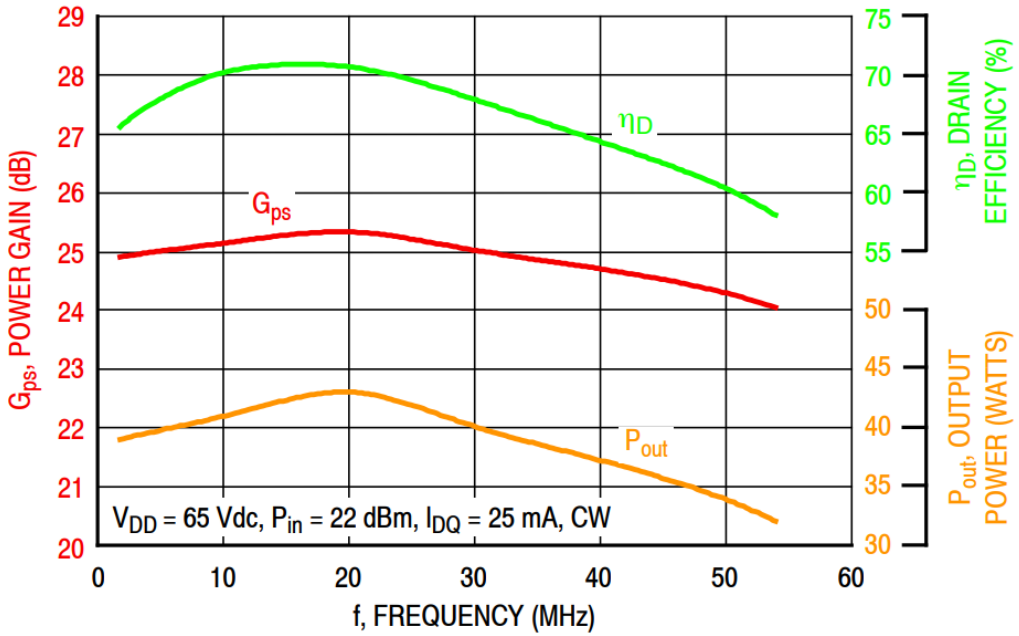


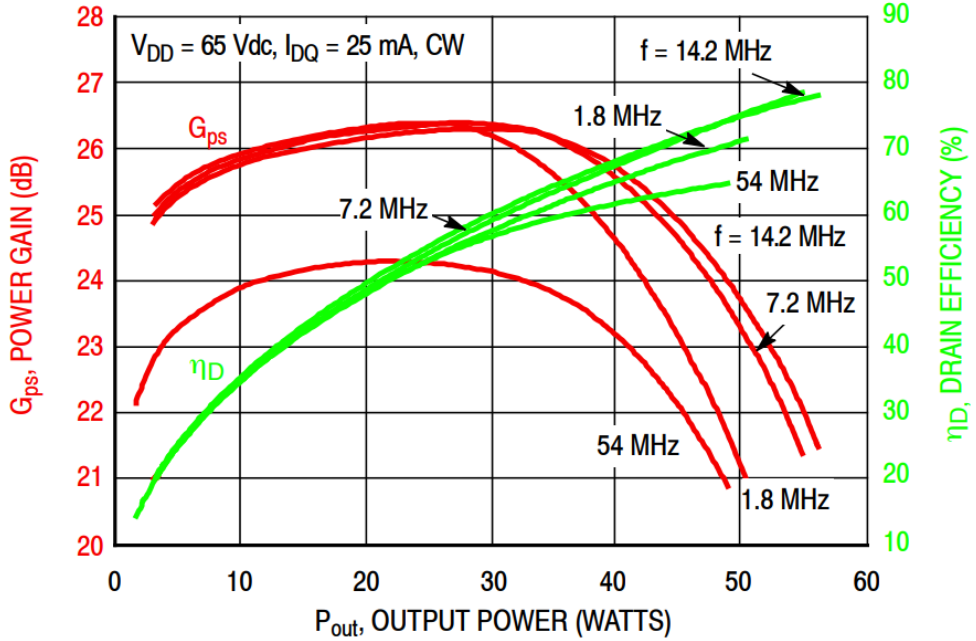
Circuit Overview – 2.0″ × 3.0″ (5.1 cm × 7.6 cm)





Typical CW Performance 1/2

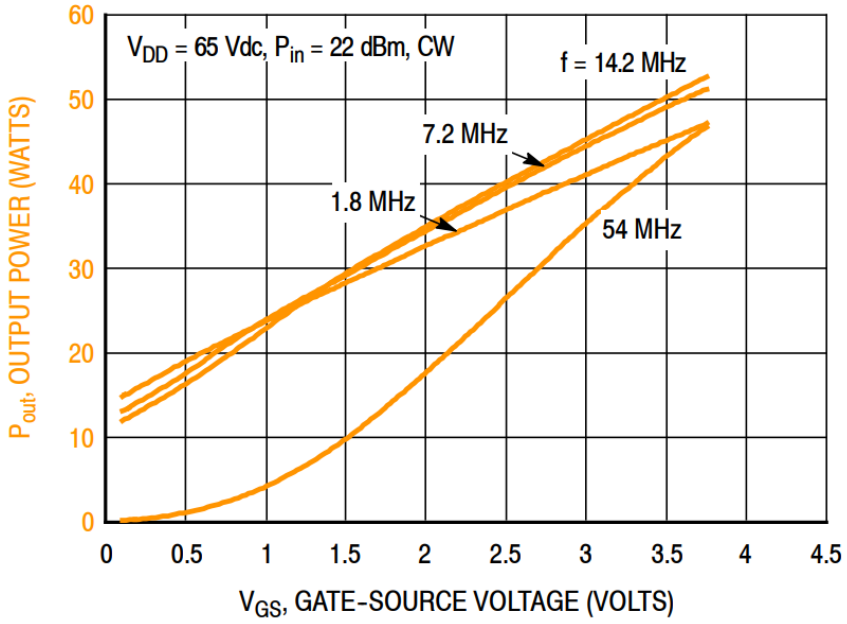


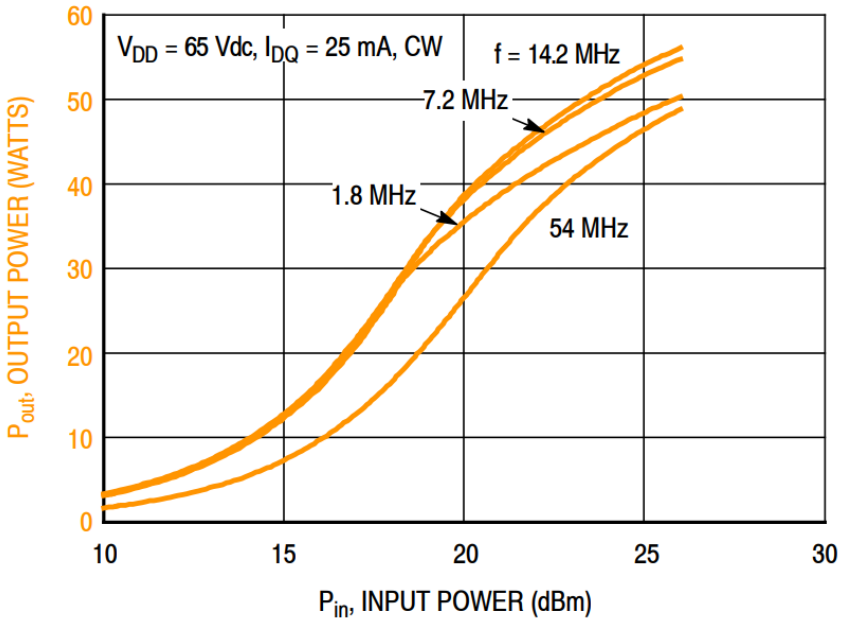


Typical Performance:
V_{DD} = 65 Vdc, I_{DO} = 25 mA, P_{in} = 125 mW (21 dBm), CW

Frequency (MHz)	P_{out} (W)	G_{ps} (dB)	η_D (%)
1.8	39	24.9	65.7
7.2	42	25.2	69.3
14.2	43	25.3	70.3
54	32	24.1	58.1

Typical CW Performance 2/2



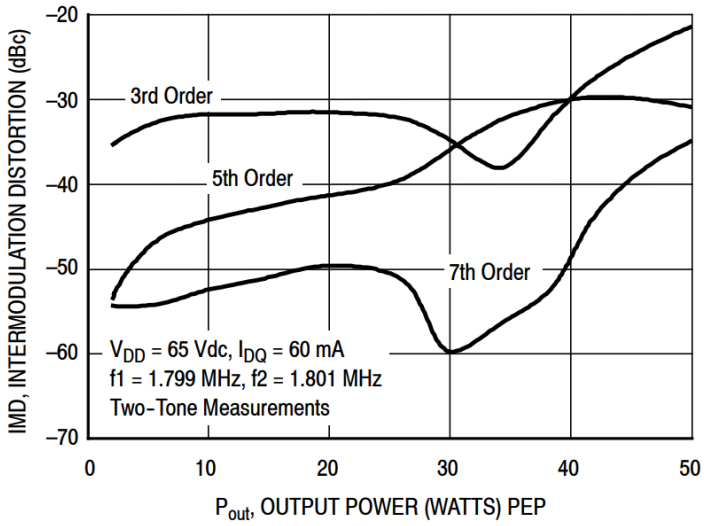


Typical Performance:
V_{DD} = 65 Vdc, I_{DQ} = 25 mA, CW

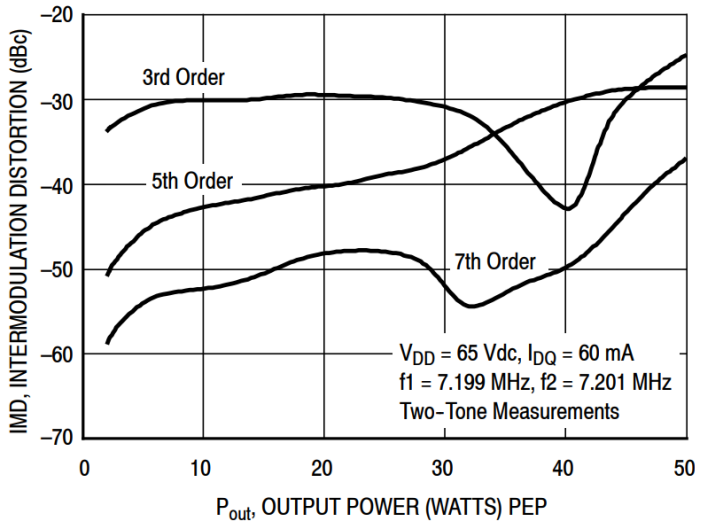
f (MHz)	P1dB (W)	P3dB (W)
1.8	36.4	44.6
7.2	43.7	51.3
14.2	44.5	52.4
54	38.7	47.7

Typical 2-tone IMD (Intermodulation Distortion)

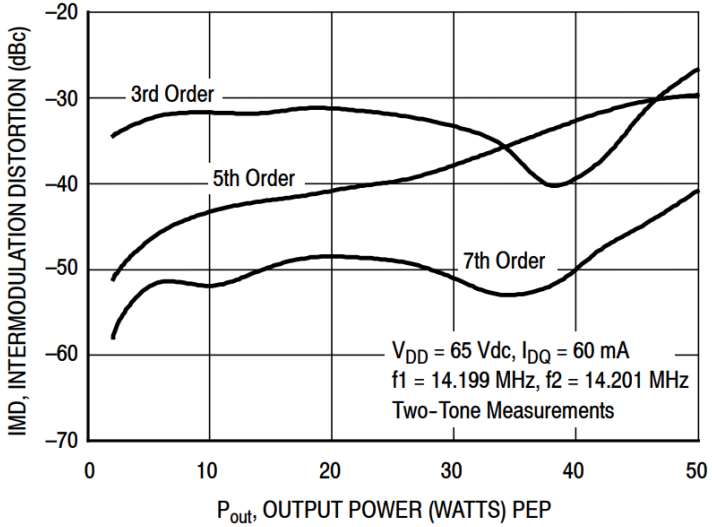
1.8 MHz



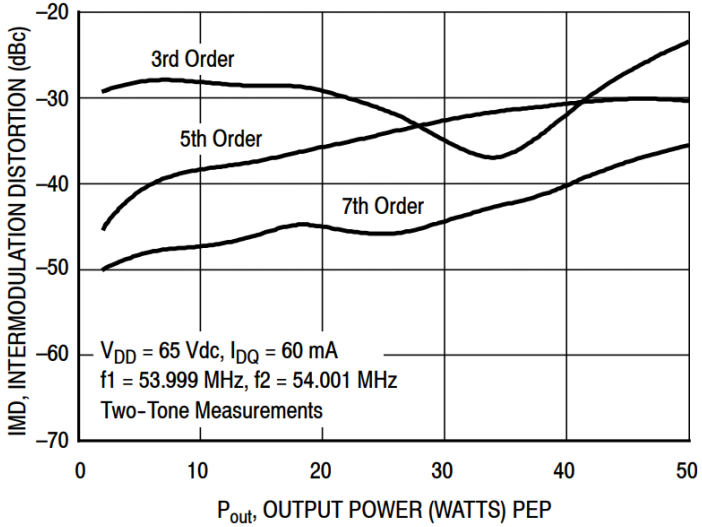
7.2 MHz



14.2 MHz

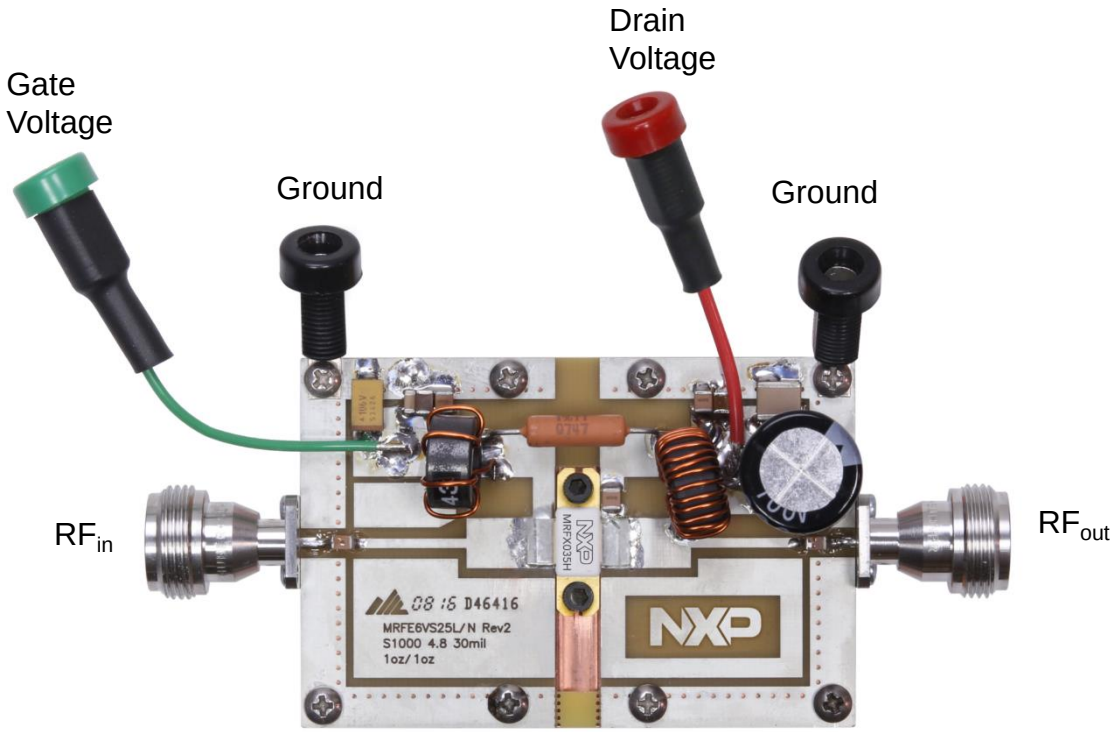


54 MHz

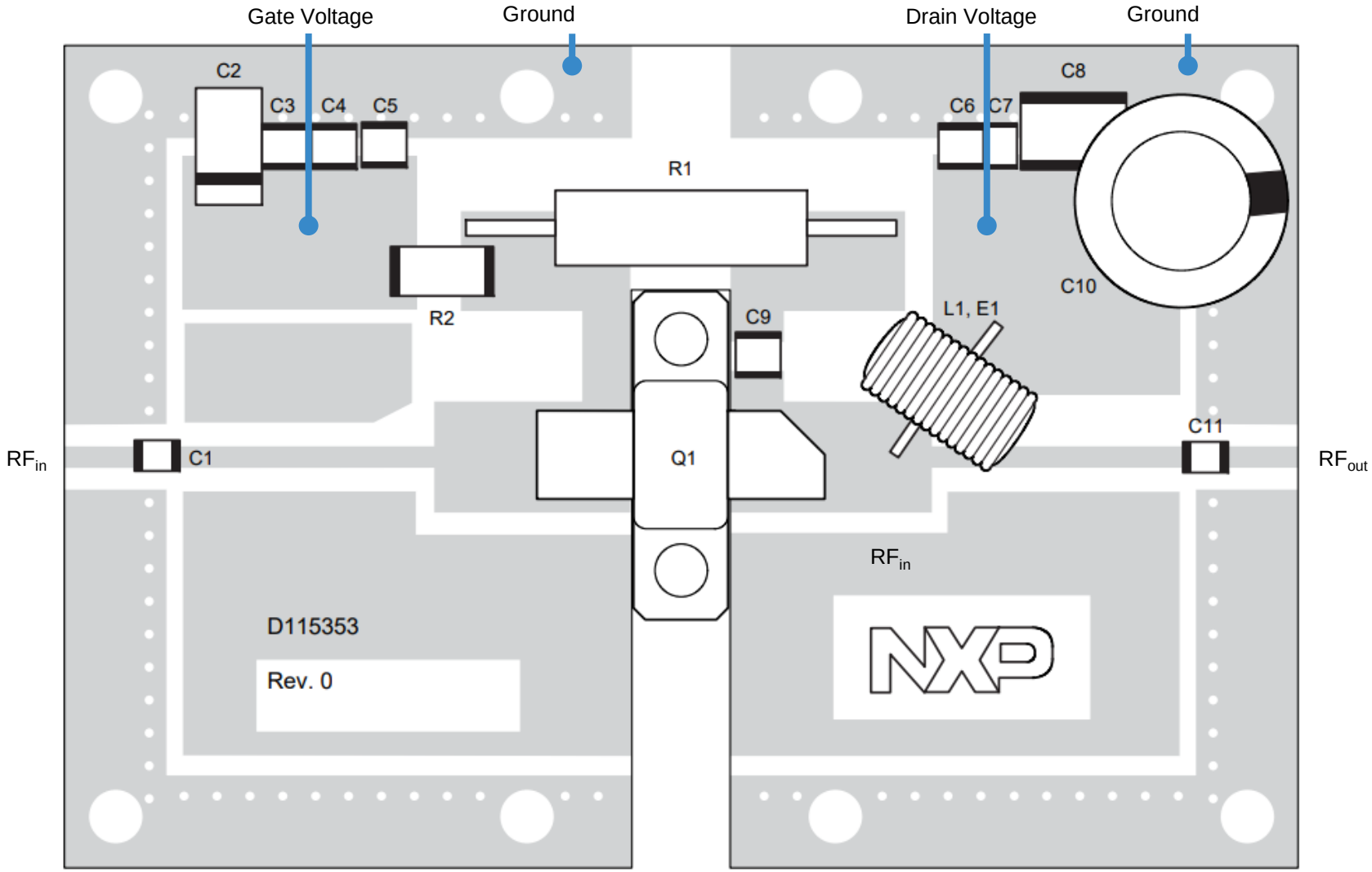


Quick Start

1. Mount the reference circuit onto a heatsink capable of dissipating more than 25 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 50 W.
4. Connect the RF input to a 50 ohm source with the RF off.
5. Connect the gate voltage, set to 0 V.
6. Connect the drain voltage (V_{DD}) and raise it slowly to 65 V. Current should be 0 A.
7. Raise the gate voltage until the drain current reaches the desired level (drain quiescent current I_{DQ} = 25 mA typically).
8. Raise the RF input slowly to 125 mW (21 dBm).
9. Check the RF output power (typically 32 W at 54 MHz), the drain current (around 1 A for this power level) and the temperature of the board.



Component Placement Reference



Bill of Materials

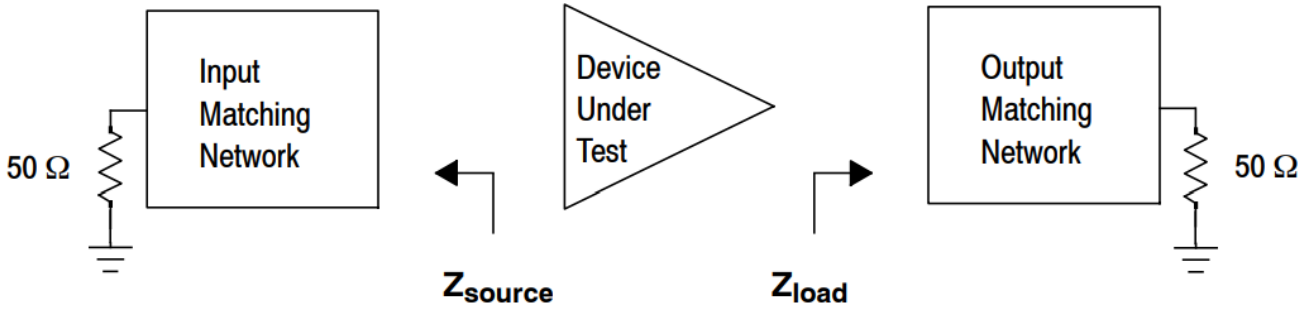
Part	Description	Part Number	Manufacturer
C1, C5, C6, C9, C11	22 nF Chip Capacitor	C3216NP02A223J160AA	TDK
C2	10 μF, 35 V Tantalum Capacitor	T491D106K035AT	Kemet
C3	0.1 μF Chip Capacitor	C1206C104K1RACTU	Kemet
C4	2.2 μF Chip Capacitor	C3225X7R1H225K	TDK
C7	0.1 μF Chip Capacitor	C3216C0G2A104J160AE	TDK
C8	2.2 μF Chip Capacitor	G2225X7R225KT3AB	ATC
C10	220 μF, 100 V Electrolytic Capacitor	MCGPR100V227M16X26	Multicomp
E1	61 Ferrite Toroid	5961001101	Fair-Rite
L1	26 Turns, 23 AWG, Toroid Transformer with Ferrite E1	MW0454 Copper Magnet Wire	Temco
Q1	RF Power LDMOS Transistor	MRFX035H	NXP
R1	1 kΩ, 3 W Axial Leaded Resistor	CPF31K0000FKE14	Vishay
R2	330 Ω, 1 W Chip Resistor	RMCF2512JT330R	Stackpole Electronics
PCB	FR4 0.30″, ε_r = 4.8, 1 oz. Copper	D115353	MTL

Impedances

f MHz	Z_{source} Ω	Z_{load} Ω
1.8	42.6 – j2.98	48.8 + j0.18
7.2	42.5 – j1.78	48.5 – j1.37
14.2	42.4 – j2.46	48.3 – j2.80
54	41.3 – j8.14	46.5 – j10.59

Z_{source} = Test circuit impedance as measured from gate to ground.

Z_{load} = Test circuit impedance as measured from drain to ground.



Revision History

- The following table summarizes revisions to the content of the MRFX035H 1.8-54 MHz Reference Circuit zip file.

Revision	Date	Description
0	September 2019	• Initial Release

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