AFV10700H 1030-1090 MHz
REFERENCE CIRCUIT

ORDERABLE PART NUMBER: **AFV10700H-1090**

PUBLIC

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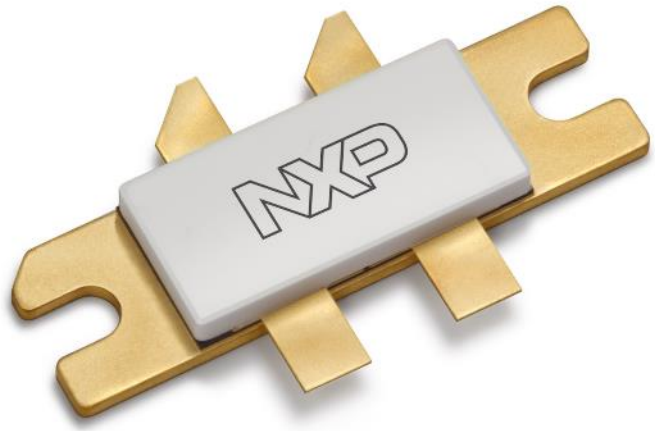
Introduction

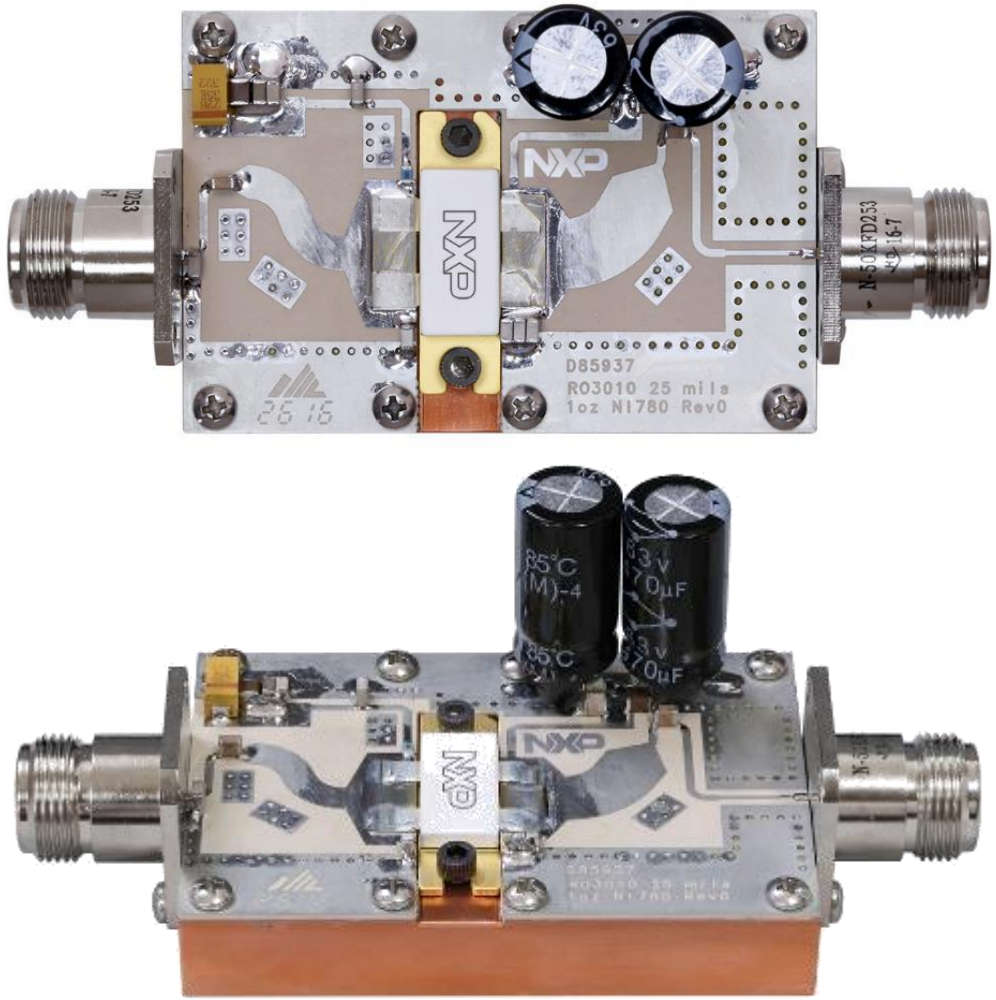
- The NXP AFV10700H is a 960-1215 MHz, 700 W RF power LDMOS transistor housed in an NI-780 air-cavity ceramic package. Its input and output pre-matching allows optimal wideband performance over the specified frequency.
  - Further details about the device, including its data sheet, are available on www.nxp.com/AFV10700H.

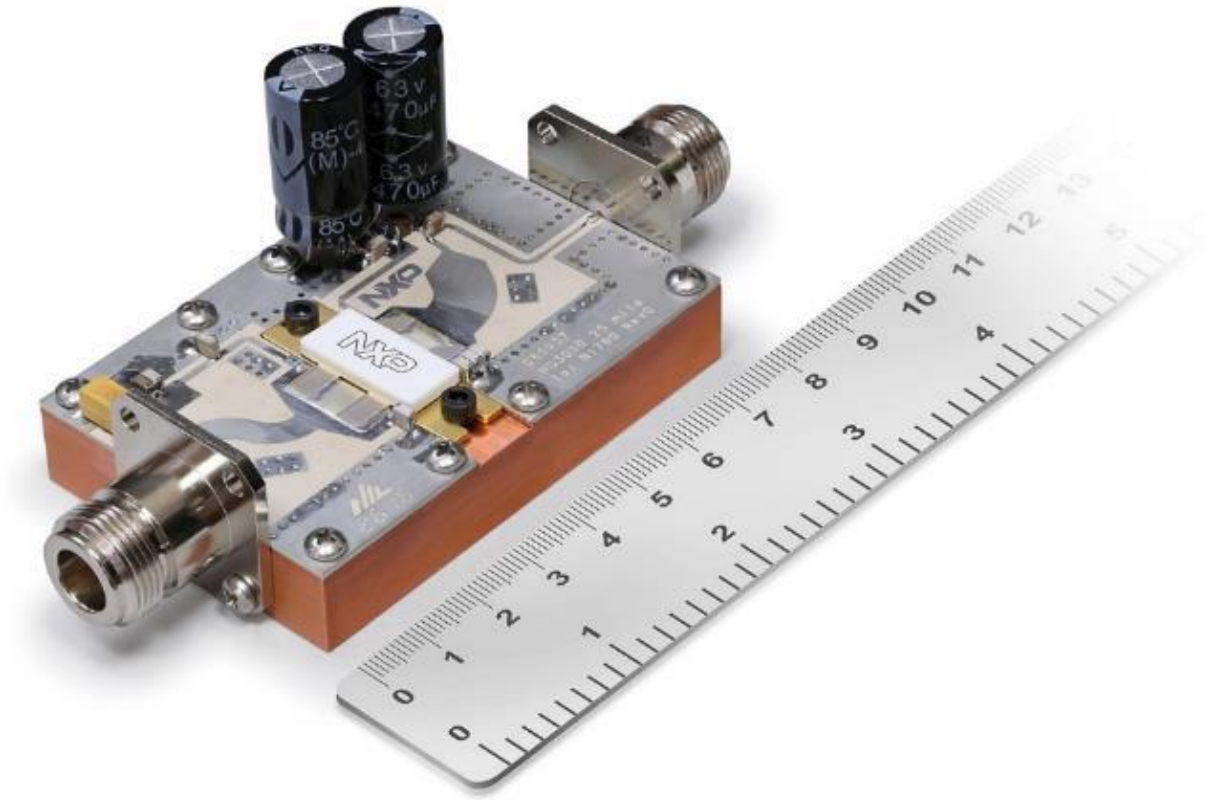
- The following pages describe the 1030-1090 MHz reference circuit (evaluation board).
  Its typical application is avionics radar transmitters.

- The reference circuit can be ordered through NXP's distribution partners and etailers using part number AFV10700H-1090.



Circuit Overview – 5.08 cm × 7.62 cm (2.0″ × 3.0″)





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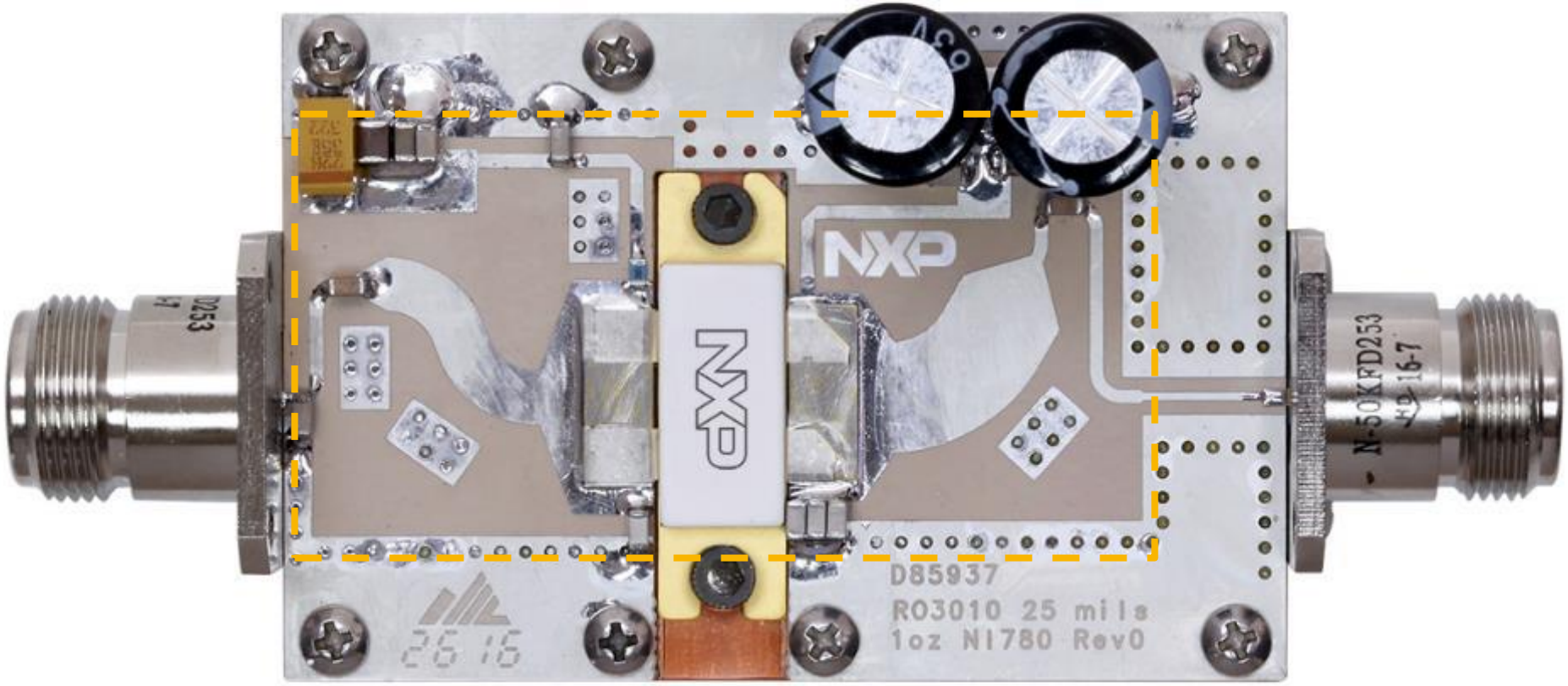
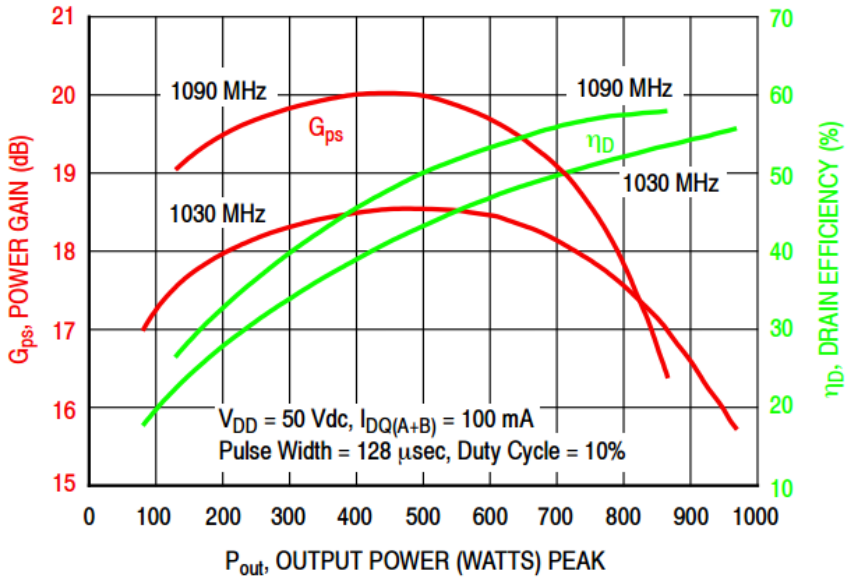
Matching area size with earless package: 3.3 cm x 6.6 cm (1.3″ x 2.6″)

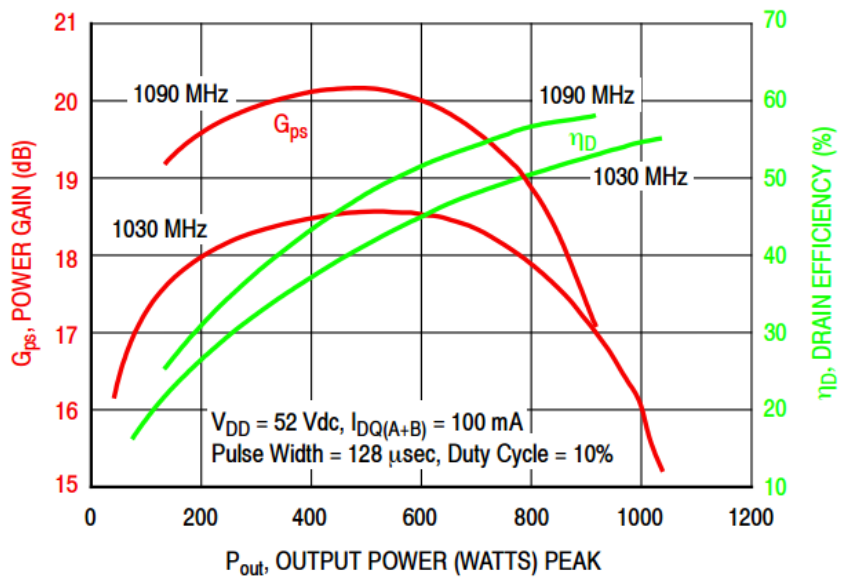


Typical Performance

V_{DD} = 50 Vdc



V_{DD} = 52 Vdc

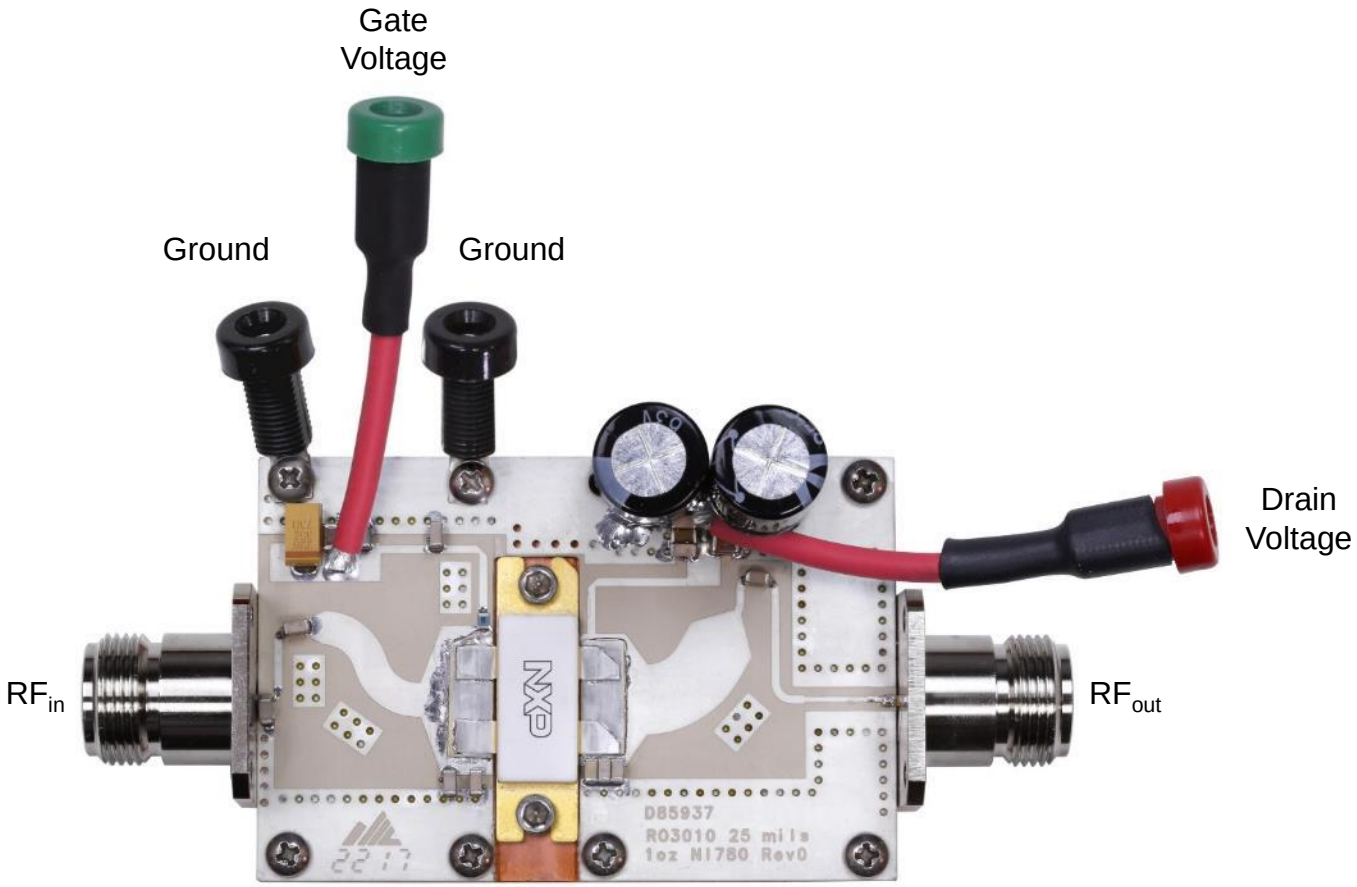


Typical Performance (P1dB): $I_{DQ(A+B)}$ = 100 mA, Pulse

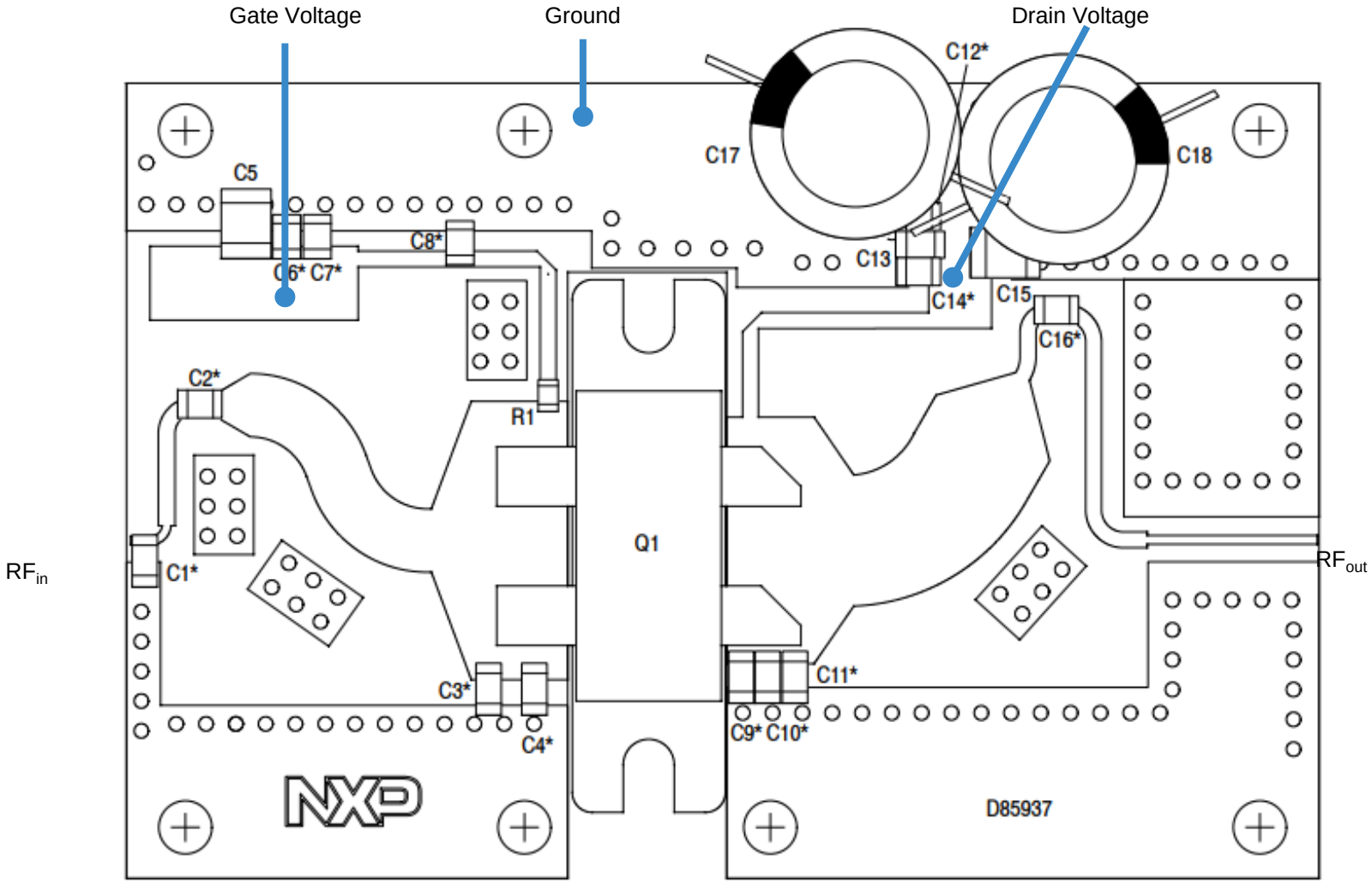
Frequency (MHz)	Signal Type	V_{DD} (V)	P_{out} (W)	G_{ps} (dB)	η_D (%)
1030	Pulse (128 μsec, 10% Duty Cycle)	50	800 Peak	17.5	52.1
1090			700 Peak	19.0	56.1
1030		52	850 Peak	17.5	51.7
1090			770 Peak	19.2	56.1

Quick Start

1. Mount the reference circuit onto a heatsink capable of dissipating more than 80 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 80 W.
4. Connect the RF input to a 50 ohm source with the RF off.
5. Connect the gate bias voltage, set to 0 V.
6. Connect the drain voltage (V_{DD}) and raise slowly to 50 V. Current should be 0 A.
7. Raise the gate voltage slowly until the drain current reaches the desired level (drain quiescent current $I_{DQ(A+B)}$ = 100 mA typically). The gate voltage should typically be around 2.1 V.
8. Set the RF input to pulse conditions (typically 128 µs pulse width with 10% duty cycle). This test fixture is not meant for CW operations.
9. Raise the RF input slowly to 10 W (40 dBm).
10. Check the RF output power (typically 800 W pulse), the drain current (around 3 A for this power level) and the temperature of the board.



Component Placement Reference



*C1, C2, C3, C4, C6, C7, C8, C9, C10, C11, C12, C14 and C16 are mounted vertically.

Bill of Materials

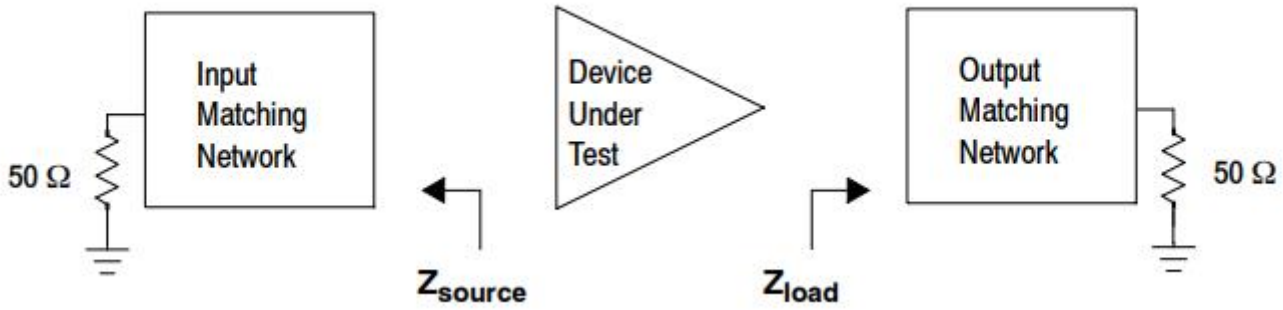
Part	Description	Part Number	Manufacturer
C1	1.5 pF Chip Capacitor	ATC800B1R5BT500XT	ATC
C2, C8, C14	39 pF Chip Capacitor	ATC800B390JT500XT	ATC
C3, C4	4.3 pF Chip Capacitor	ATC800B4R3CT500XT	ATC
C5, C15	2.2 μF Chip Capacitor	C3225X7R2A225K230AB	TDK
C6, C12	1000 pF Chip Capacitor	ATC800B102JT50XT	ATC
C7	100 pF Chip Capacitor	ATC800B101JT500XT	ATC
C9	4.7 pF Chip Capacitor	ATC800B4R7CT500XT	ATC
C10, C11	3.3 pF Chip Capacitor	ATC800B3R3CT500XT	ATC
C13	1.0 μF Chip Capacitor	GRM31CR72A105KA01L	Murata
C16	270 pF Chip Capacitor	ATC800B271JT200XT	ATC
C17, C18	470 μF, 63 V Electrolytic Capacitor	MCGPR63V477M13X26-RH	Multicomp
Q1	RF High Power LDMOS Transistor	AFV10700H	NXP
R1	22 Ω, 1/8 W Chip Resistor	RK73H2ATTD22R0F	KAO Speer
PCB	Rogers RO3010 0.025″, ε_r = 11.2	D85937	MTL

Impedances

f MHz	Z_{source} Ω	Z_{load} Ω
1030	2.3 – j1.7	0.91 – j0.76
1090	2.0 – j1.9	0.88 – j0.47

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 AFV10700H 1030-1090 MHz Reference Circuit zip file.

Revision	Date	Description
0	September 2019	• Initial Release

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