MRFX1K80N 230 MHz
TEST FIXTURE

ORDERABLE PART NUMBER: **MRFX1K80N-230MHZ**

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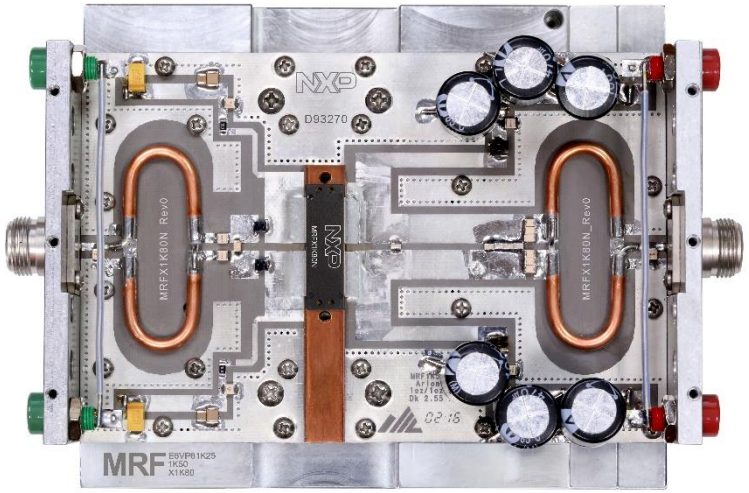
Introduction

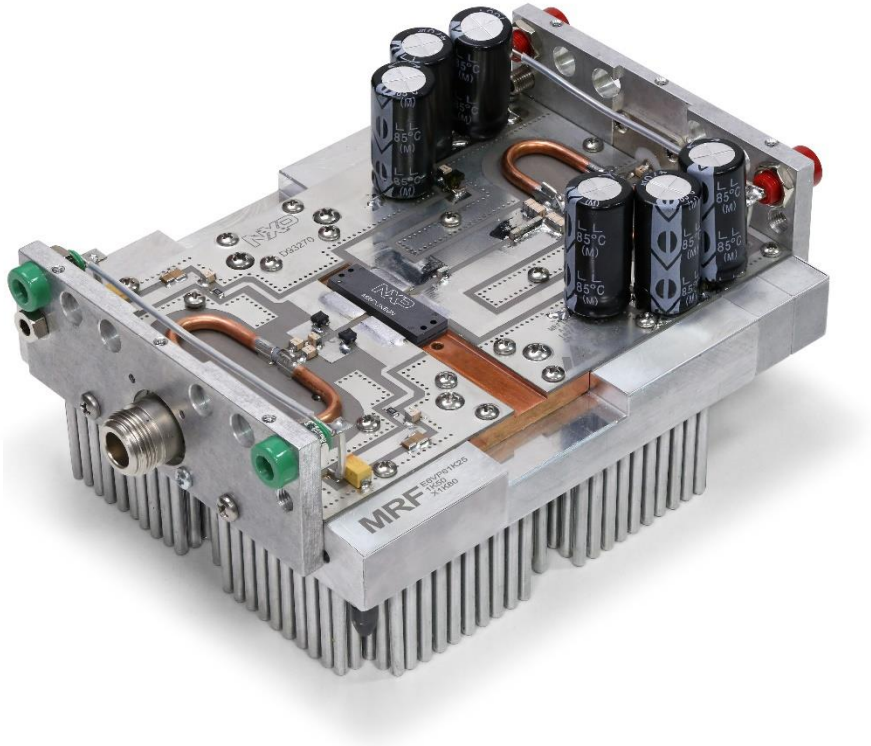
- The NXP MRFX1K80N is a 1.8-400 MHz, 1800 W CW RF power LDMOS transistor housed in an OM-1230 over-molded plastic package. Its unmatched input and output allows wide frequency range utilization.
  - Further details about the device, including its data sheet, are available on www.nxp.com/MRFX1K80N.

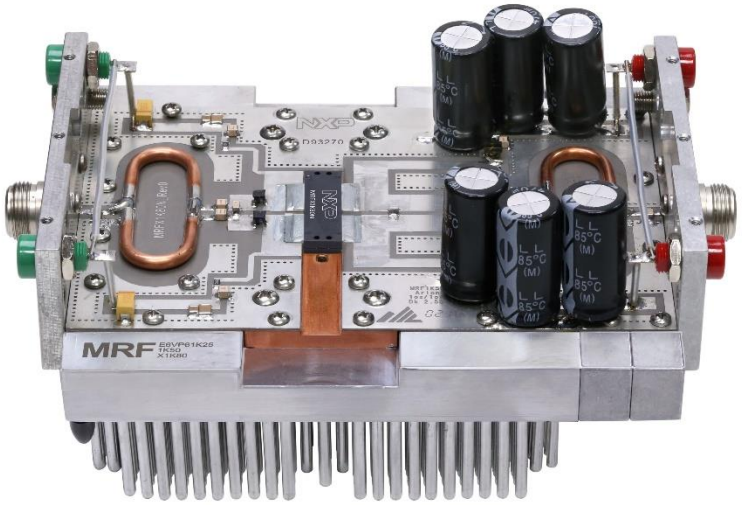
- The following pages describe the 230 MHz pulse test fixture.

- The test fixture can be ordered through NXP's distribution partners and etailers using part number MRFX1K80N-230MHZ.

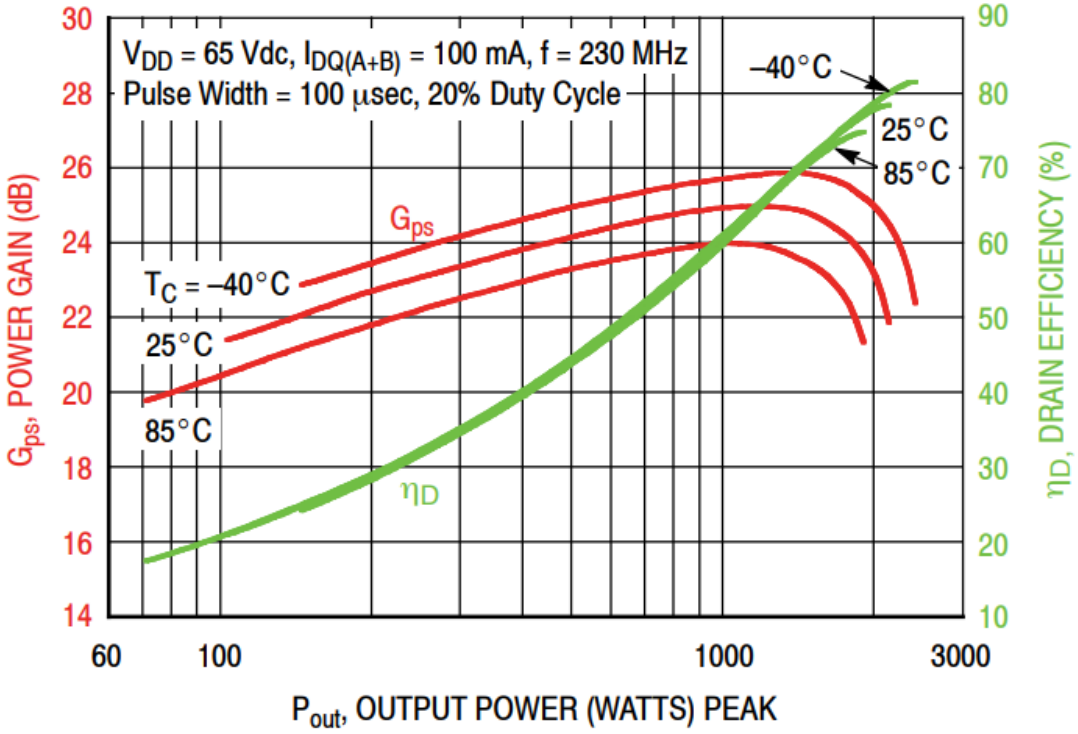
Circuit Overview – 10.16 cm × 15.24 cm (4.0″ x 6.0″)

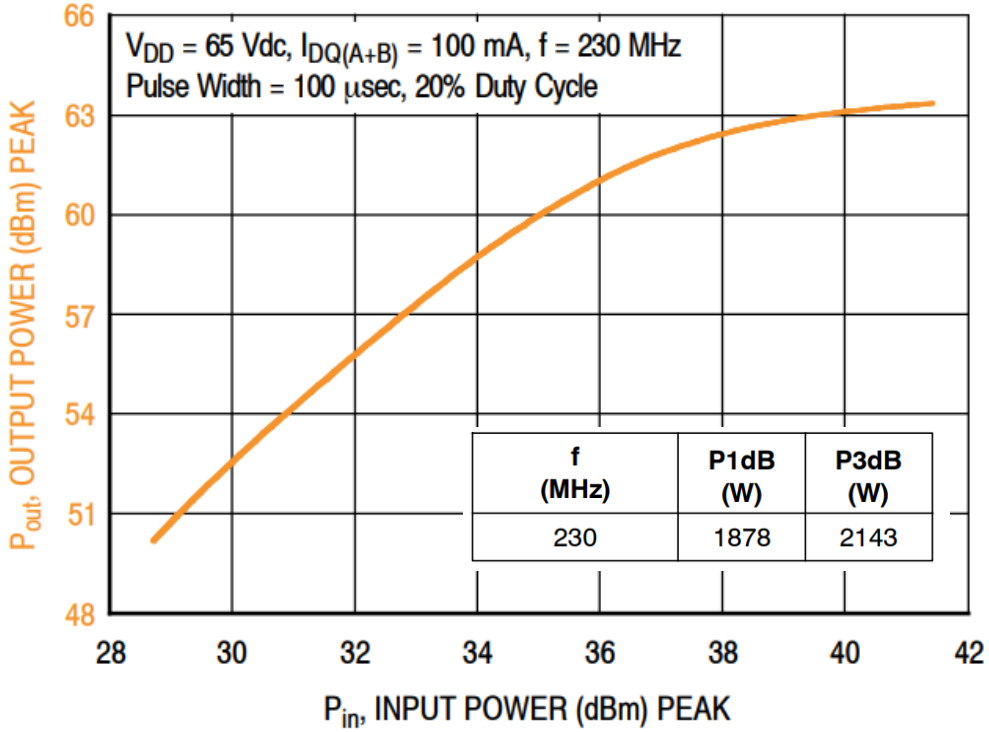






Typical Pulse Performance



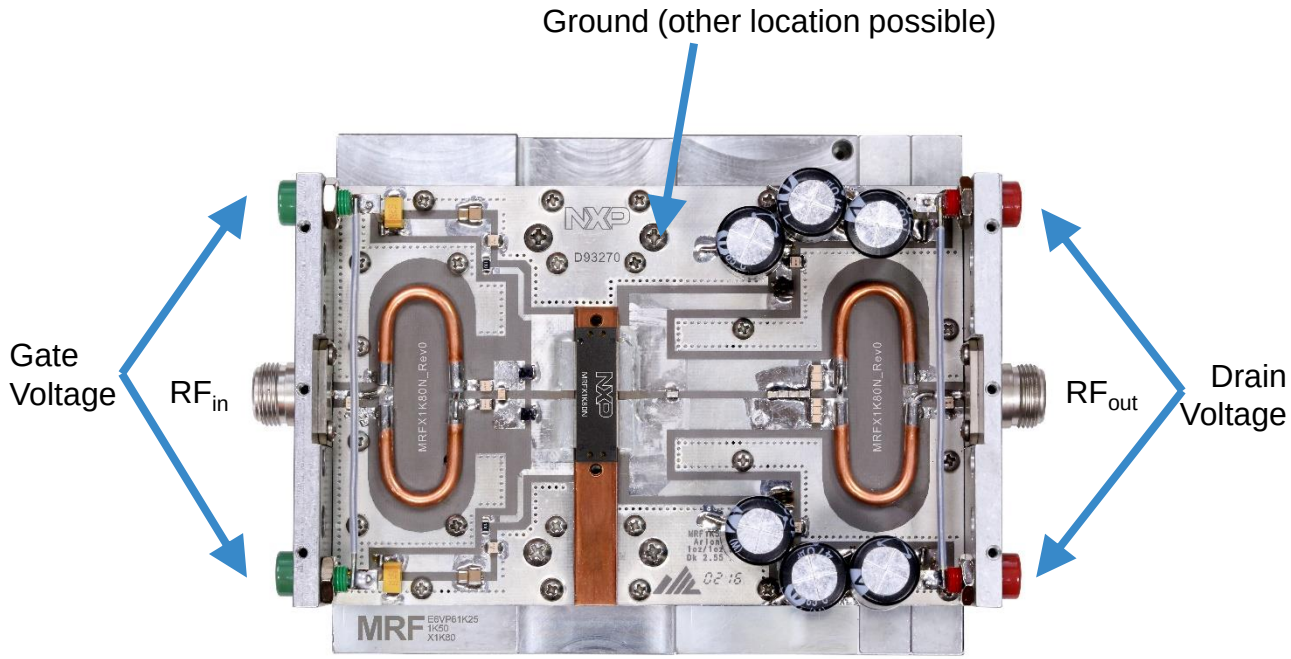


Typical Performance (P1dB): V_{DD} = 65 Vdc, $I_{DQ(A+B)}$ = 100 mA, P_{in} = 6.5 W (38.2 dBm) Peak, Pulse

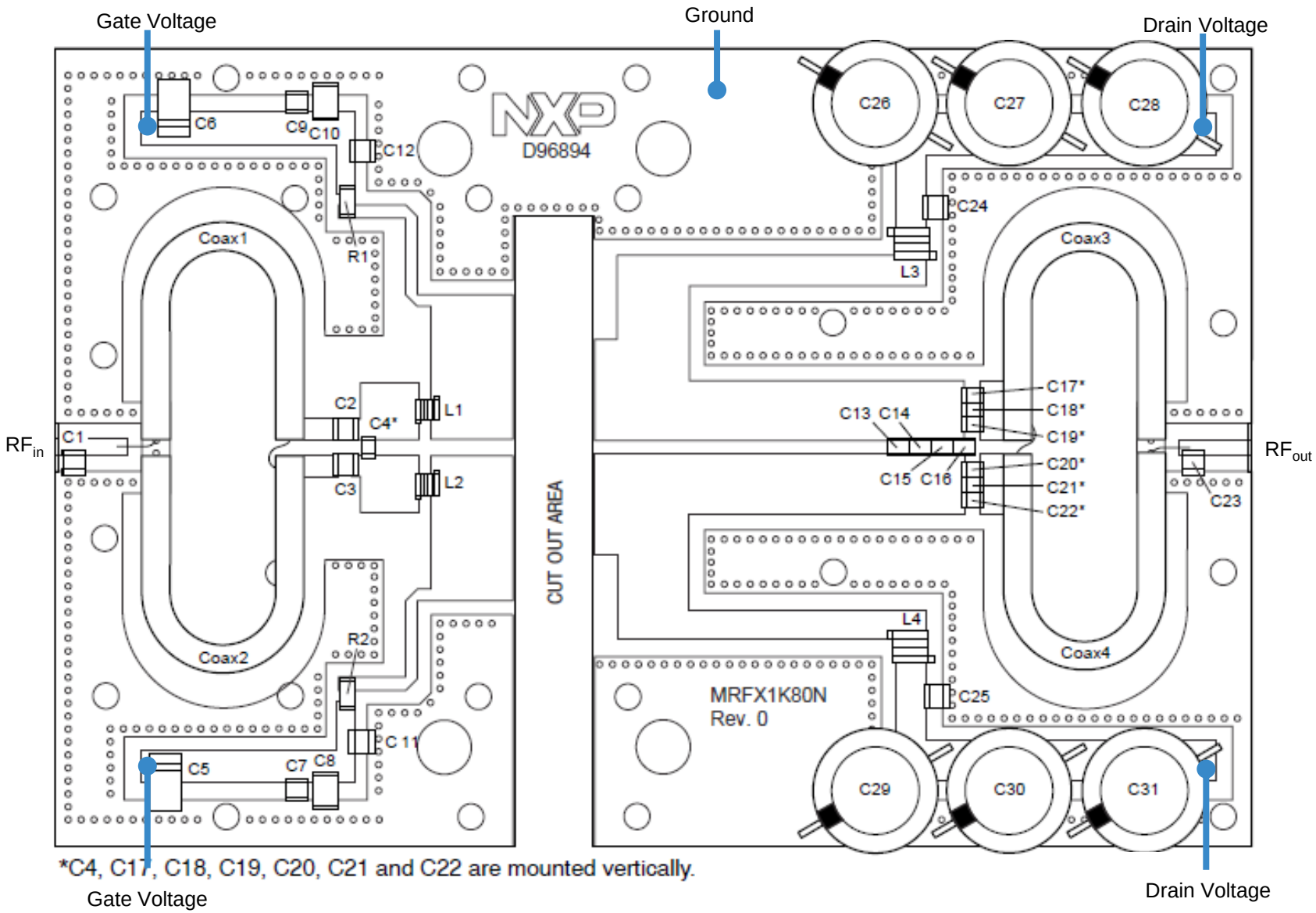
Frequency (MHz)	Signal Type	Pout (W)	Gain (dB)	Drain Efficiency (%)
230	Pulse (100 μsec, 20% Duty Cycle)	1800 Peak	24.4	75.7

Quick Start

1. Mount the reference circuit onto a heatsink capable of dissipating more than 140 W in order to provide enough thermal dissipation (the circuit is capable for more but has been measured in pulse conditions).
2. Connect the ground.
3. Terminate the RF output with a 50 ohm load capable of handling more than 1800 W peak.
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 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 be around 2.8 V.
8. Set the RF input to pulse conditions (typically 100 µs pulse width with 20% duty cycle).
9. Raise the RF input slowly to 6.5 W peak (38.2 dBm).
10. Check the RF output power (typically 1800 W peak), the drain current (around 37 A peak for this power level) and the temperature of the board.



Component Placement Reference



Bill Of Materials

Part	Description	Part Number	Manufacturer
C1, C2, C3	22 pF Chip Capacitor	ATC100B220JT500XT	ATC
C4	27 pF Chip Capacitor	ATC100B270JT500XT	ATC
C5, C6	22 μF, 35 V Tantalum Capacitor	T491X226K035AT	Kemet
C7, C9	0.1 μF Chip Capacitor	CDR33BX104AKWS	AVX
C8, C10	220 nF Chip Capacitor	C1812C224K5RACTU	Kemet
C11, C12, C24, C25	1000 pF Chip Capacitor	ATC100B102JT50XT	ATC
C13	24 pF Chip Capacitor	ATC800R240JT500XT	ATC
C14, C15	20 pF Chip Capacitor	ATC800R200JT500XT	ATC
C16	22 pF Chip Capacitor	ATC800R220JT500XT	ATC
C17, C18, C19, C20, C21, C22	240 pF Chip Capacitor	ATC100B241JT200XT	ATC
C23	8.2 pF Chip Capacitor	ATC100B8R2CT500XT	ATC
C26, C27, C28, C29, C30, C31	470 μF, 100 V Electrolytic Capacitor	MCGPR100V477M16X32-RH	Multicomp
Coax1, 2, 3, 4	25 Ω Semi Rigid Coax Cable, 2.2" Shield Length	UT-141C-25	Micro-Coax
L1, L2	5 nH Inductor, 2 Turns	A02TKLC	Coilcraft
L3, L4	6.6 nH Inductor, 2 Turns	GA3093-ALC	Coilcraft
R1, R2	10 Ω, 1/4 W Chip Resistor	CRCW120610R0JNEA	Vishay
PCB	Rogers AD255A 0.030", ε_r = 2.55	D96894	MTL

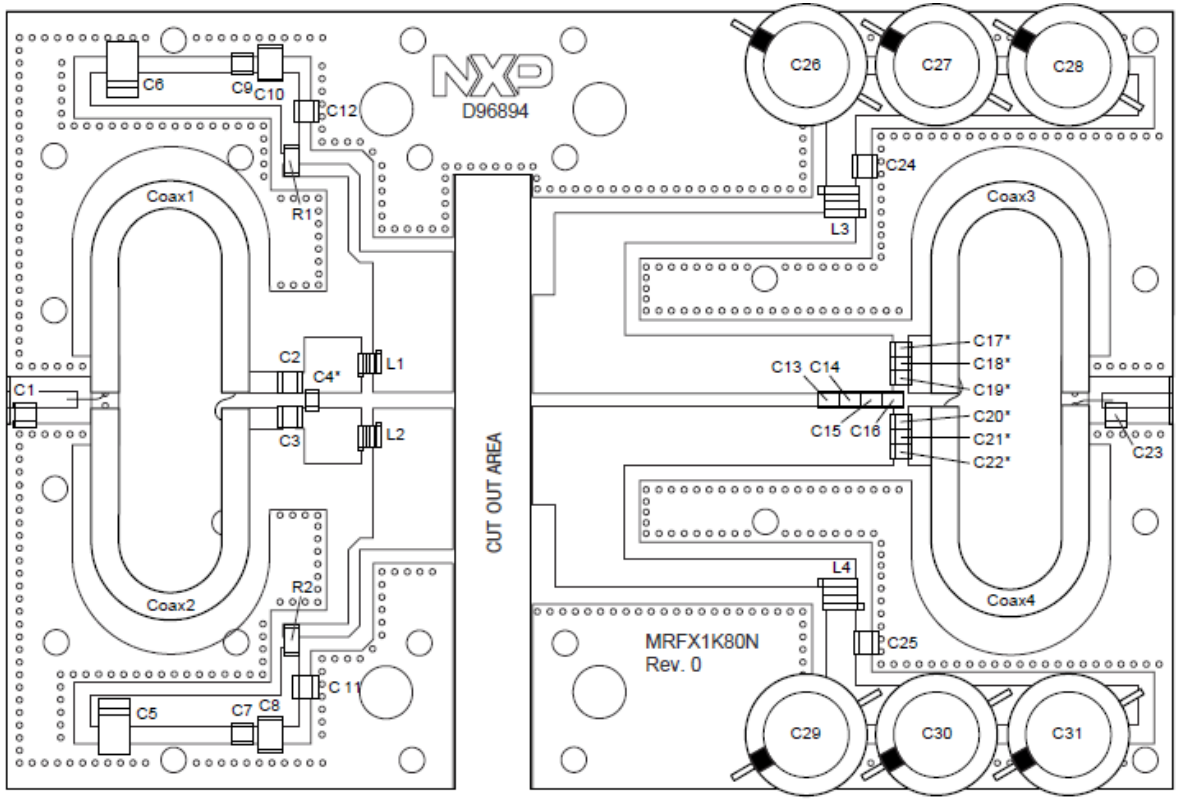
Tuning Tips

Input Matching Network:

- Moving C4 to the right will improve IRL.

Output Matching Network:

- Moving C13, C14, C15, C16, C23 to the right will improve efficiency but will decrease output power..



*C4, C17, C18, C19, C20, C21 and C22 are mounted vertically.

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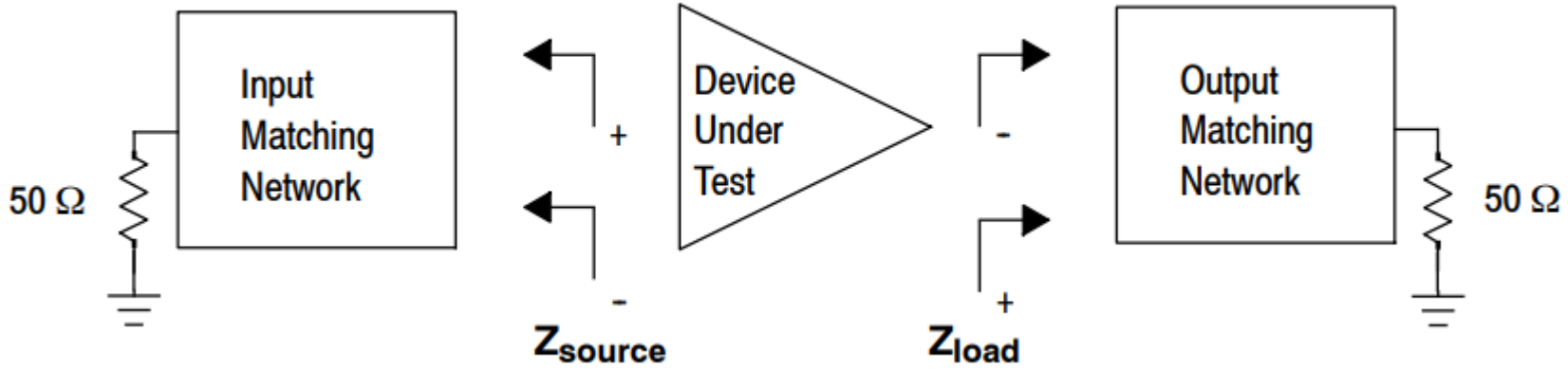
Impedances

f MHz	Z_{source} Ω	Z_{load} Ω
230	0.9 + j2.3	1.9 + j2.5

Z_{source} = Test fixture impedance as measured from gate to gate, balanced configuration.

Z_{load} = Test fixture impedance as measured from drain to drain, balanced configuration.



Revision History

- The following table summarizes revisions to the content of the MRFX1K80N 230 MHz Test Fixture zip file.

Revision	Date	Description
0	September 2019	• Initial Release

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