MRF101AN 230 MHz
TEST FIXTURE

ORDERABLE PART NUMBER: **MRF101AN-230MHZ**

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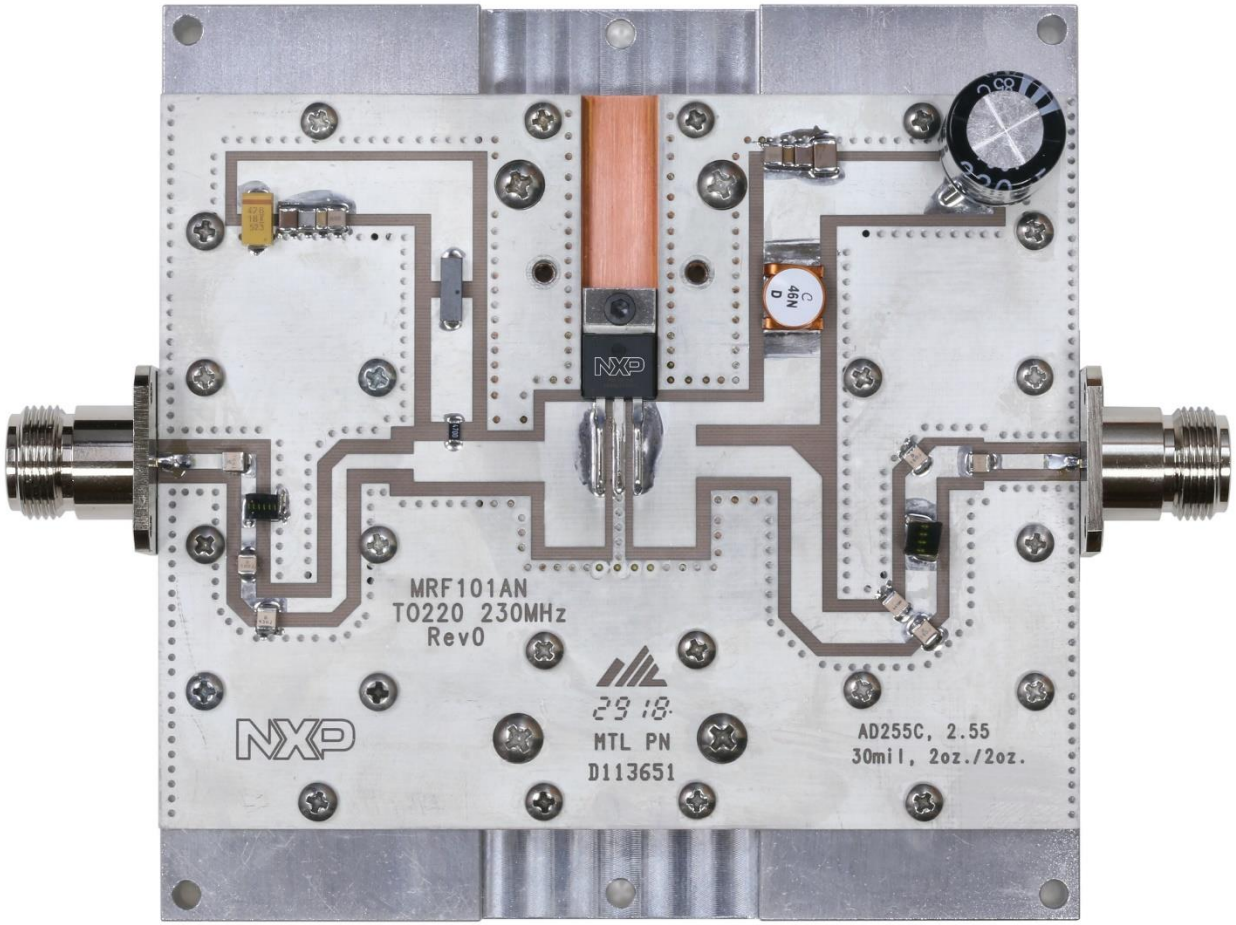
Introduction

- The NXP MRF101AN is a 1.8-250 MHz, 100 W CW RF power LDMOS transistor housed in a TO-220 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/MRF101AN.

- The following pages describe the 230 MHz pulse test fixture.
  Other boards can be found on www.nxp.com/MRF101CIRCUITS.

- The test fixture can be ordered through NXP's distribution partners and etailers using part number MRF101AN-230MHZ.

Fixture Overview – 10.16 cm × 12.70 cm (4.0″ × 5.0″)



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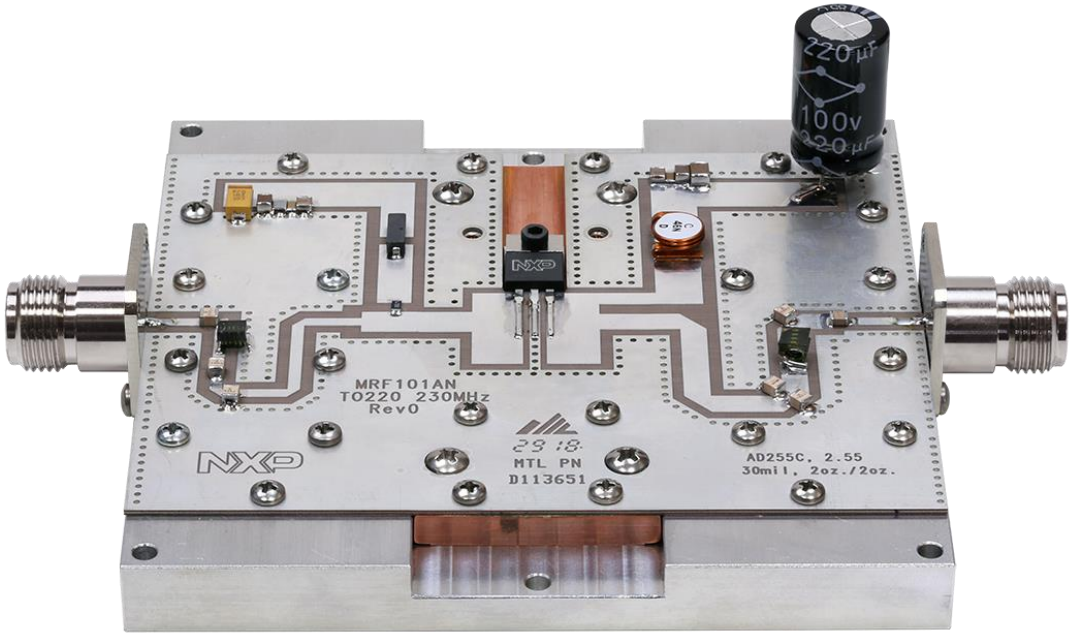
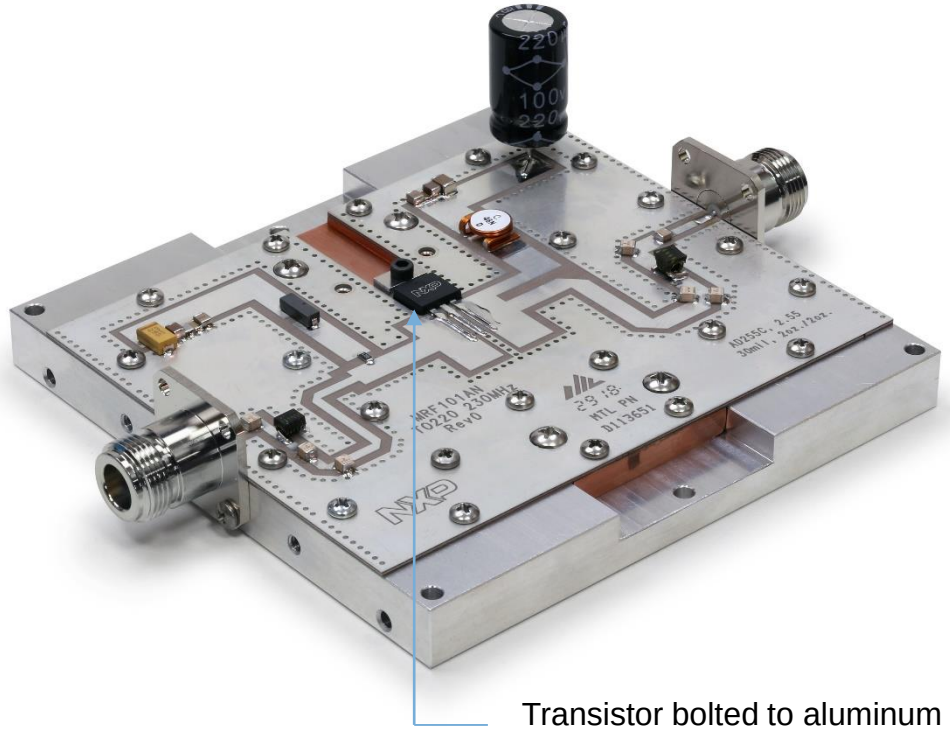


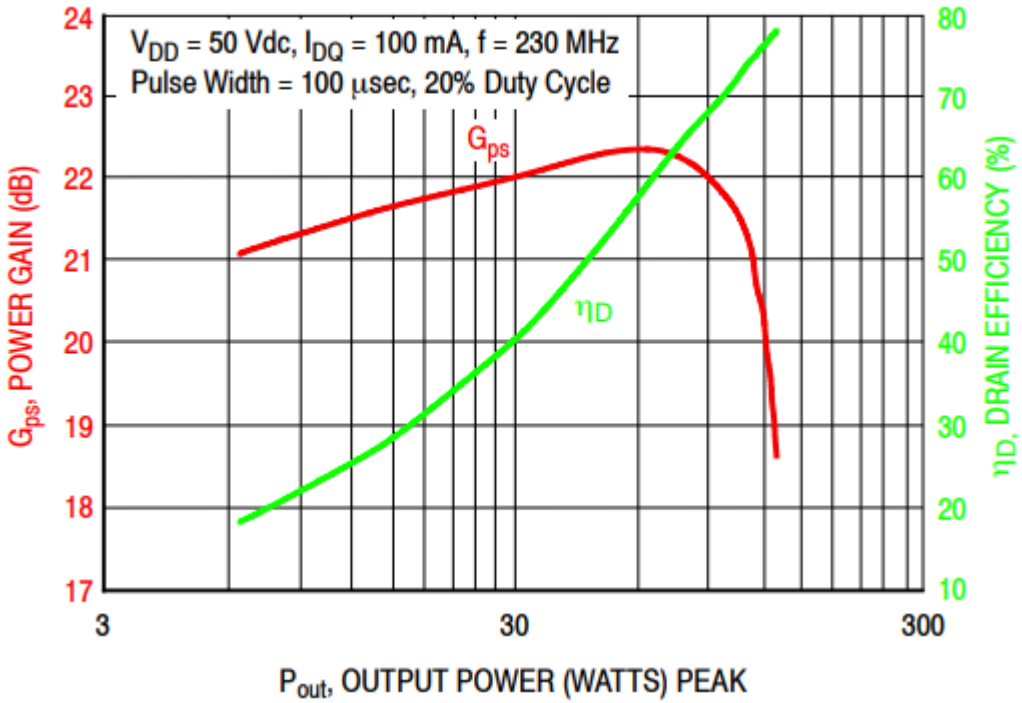
PCB bolted dry to aluminum baseplate.



Transistor bolted to aluminum baseplate using thermal grease.

Typical Performance

Pulsed (100 µs, 20% duty cycle)



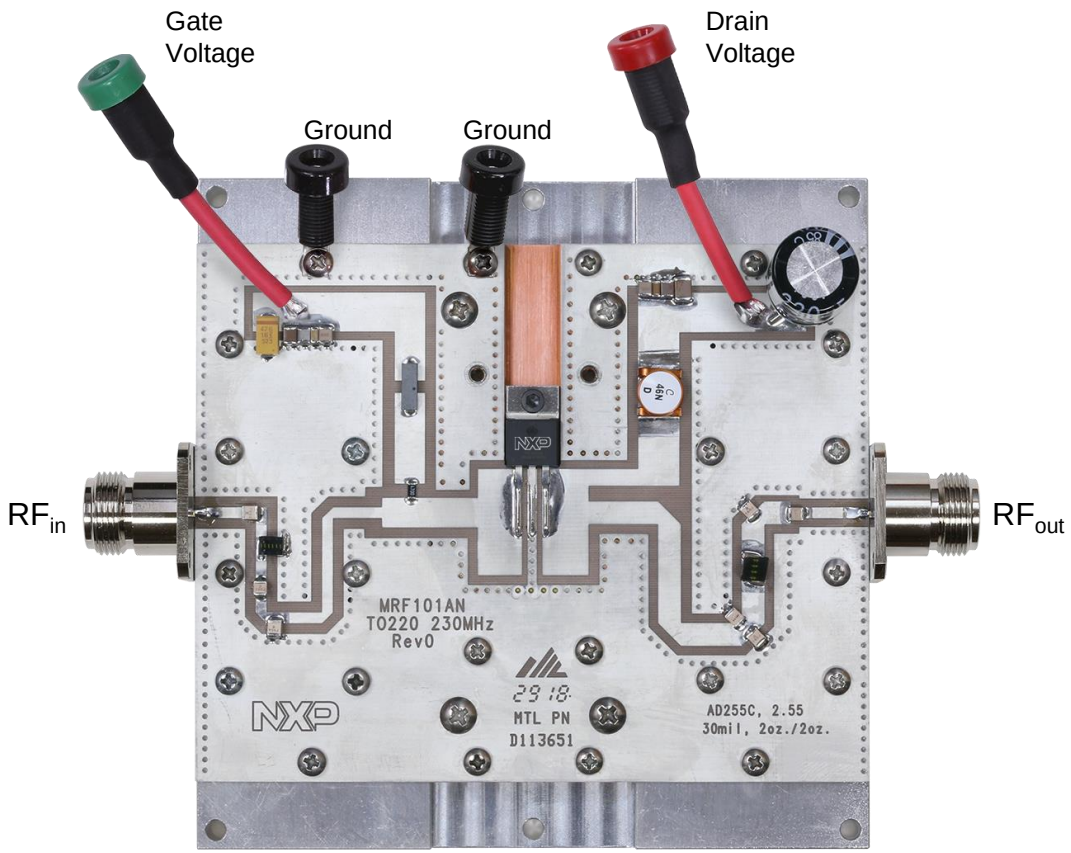
Typical Performance (P1dB):
V_{DD} = 50 Vdc, I_{DQ} = 100 mA, P_{in} = 0.9 W (29.5 dBm), Pulse

Frequency (MHz)	Signal Type	Output Power (W)	Power Gain (dB)	Drain Efficiency (%)
13.56	Pulse (100 µs, 20% Duty Cycle	115 Peak	21.1	76.7

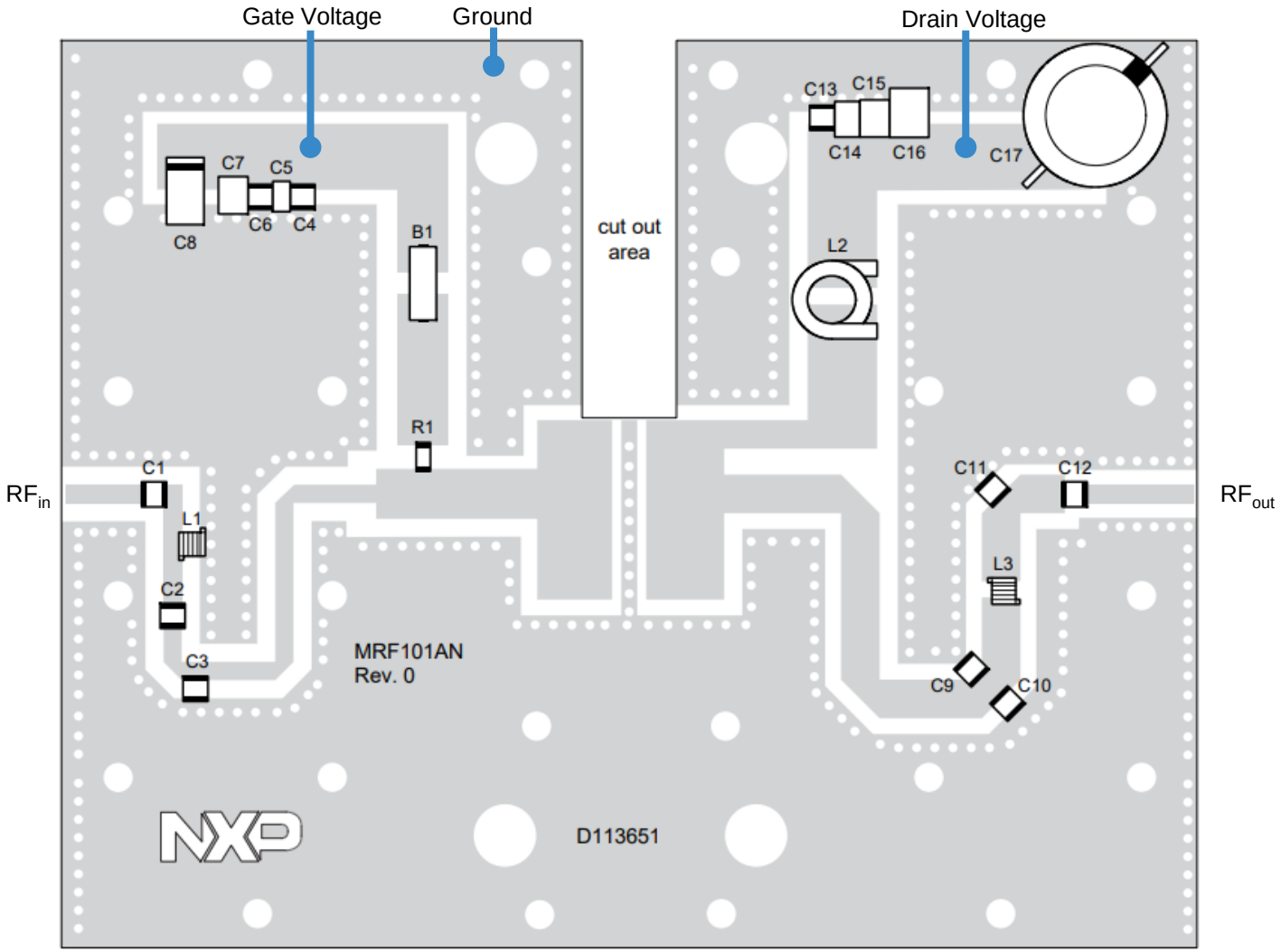
For further performance graphs: data sheet available on www.nxp.com/MRF101AN

Quick Start

1. Mount the test fixture onto a heatsink capable of dissipating more than 8 W in order to provide enough thermal dissipation (the baseplate included in this test fixture is not sufficient to serve as a standalone heatsink).
2. Terminate the RF output with a 50 ohm load capable of handling more than 115 W peak.
3. Connect the RF input to a 50 ohm source with the RF off.
4. Connect the ground.
5. Connect the gate 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} = 100 mA typically). The gate voltage should be around 2.5 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 0.9 W (29.5 dBm).
10. Check the RF output power (typically 115 W peak), the drain current (around 3 A for this power level) and the temperature of the board.



Component Placement Reference

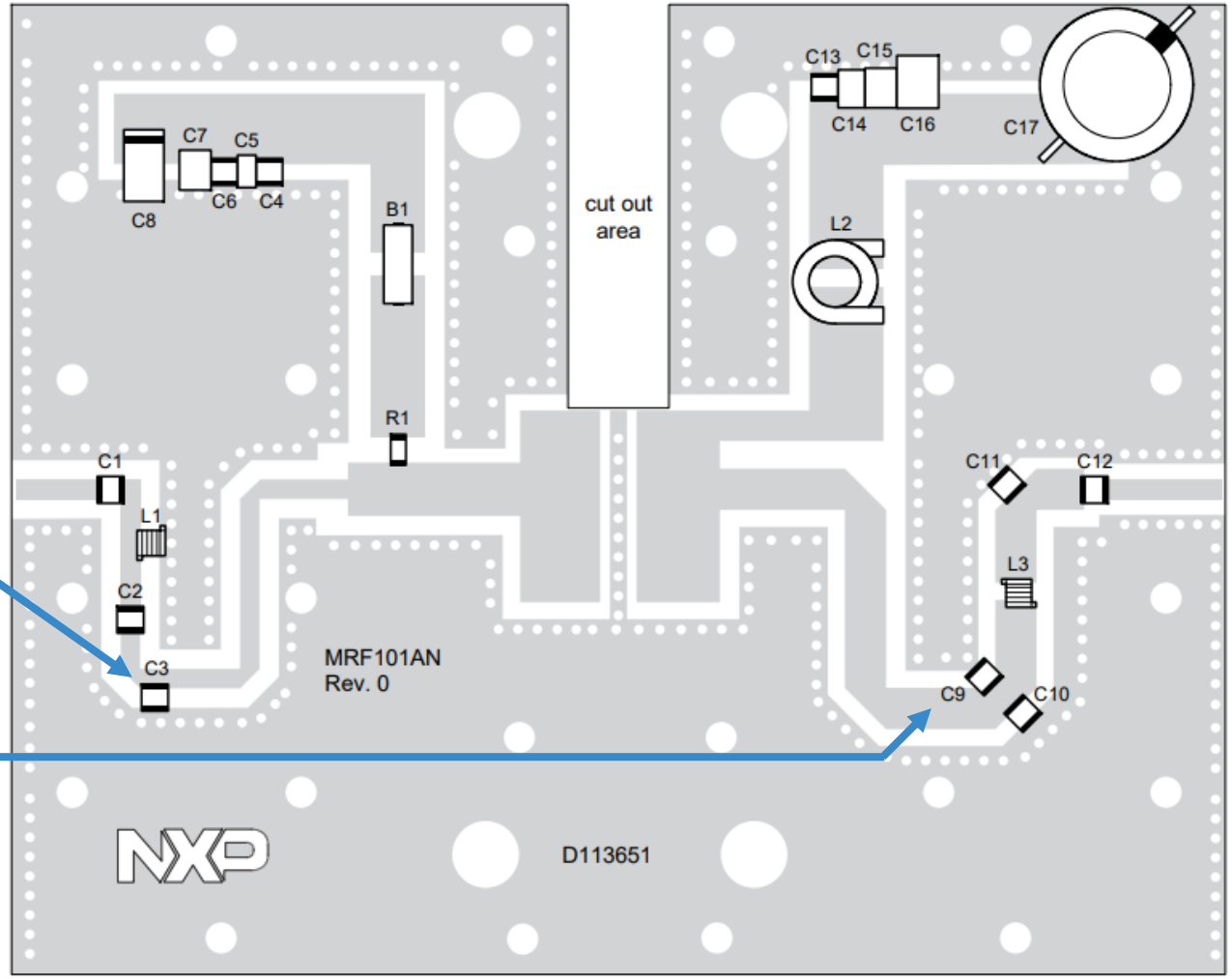


Bill of Materials

Part	Description	Part Number	Manufacturer
B1	Long Ferrite Bead	2743021447	Fair-Rite
C1, C2, C10	18 pF Chip Capacitor	ATC100B180JT500XT	ATC
C3	43 pF Chip Capacitor	ATC100B430JT500XT	ATC
C4, C13	1000 pF Chip Capacitor	ATC800B102JT50XT	ATC
C5	0.1 μF Chip Capacitor	GRM319R72A104KA01D	Murata
C6	10 nF Chip Capacitor	C1210C103J5GACTU	Kemet
C7	2.2 μF Chip Capacitor	C3225X7R1H225K	TDK
C8	47 μF, 16 V Tantalum Capacitor	T491D476K016AT	Kemet
C9	51 pF Chip Capacitor	ATC100B510JT500XT	ATC
C11	16 pF Chip Capacitor	ATC100B160JT500XT	ATC
C12	470 pF Chip Capacitor	ATC800B471JW50XT	ATC
C14	0.1 μF Chip Capacitor	C1812104K1RACTU	Kemet
C15	2.2 μF Chip Capacitor	C3225X7R2A225K	TDK
C16	2.2 μF Chip Capacitor	HMK432B7225KM-T	Taiyo Yuden
C17	220 μF, 100 V Electrolytic Capacitor	MCGPR100V227M16X26	Multicomp
L1	39 nH Chip Inductor	1812SMS-39NJLC	Coilcraft
L2	46 nH Chip Inductor	1010VS-46NME	Coilcraft
L3	17.5 nH, 4 Turn Inductor	GA3095-ALC	Coilcraft
R1	470 Ω, 1/4 W Chip Resistor	CRCW1206470RFKEA	Vishay
PCB	Rogers AD255C, 0.030″, ε_r = 2.55, 2 oz. Copper	D113651	MTL

Tuning Tips

- Moving C3 will impact IRL.
- Moving C9, C10 and/or C11 to the right will improve efficiency, but trade-off power.



Revision History

- The following table summarizes revisions to the content of the MRF101AN 230 MHz Test Fixture zip file:

Revision	Date	Description
0	June 2019	• Initial release
1	September 2019	• Quick Start updated to reflect pulse conditions, added license statement, general updates to align copy to current standard

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