

# MRFE6VP5600H 434 MHz REFERENCE CIRCUIT

ORDERABLE PART NUMBER: **MRFE6VP5600-434**



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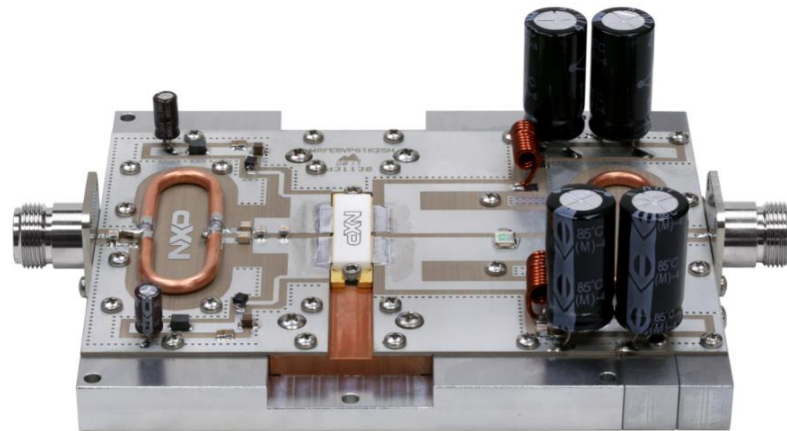
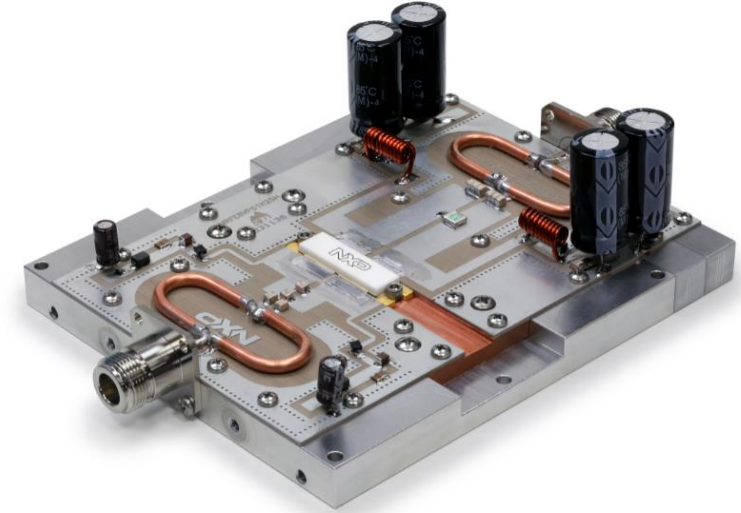
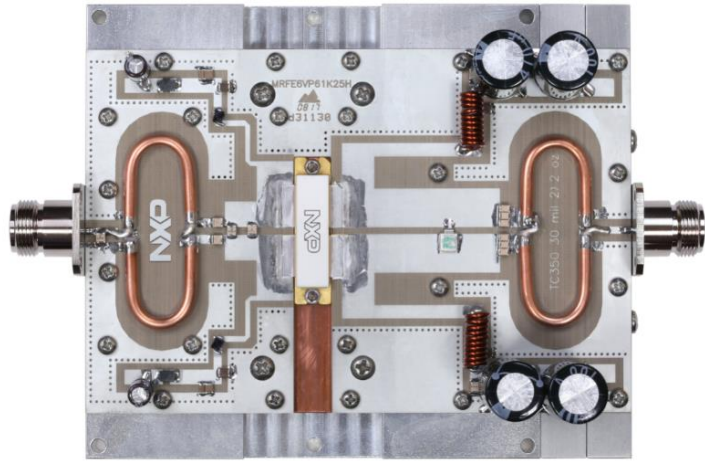
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# Introduction

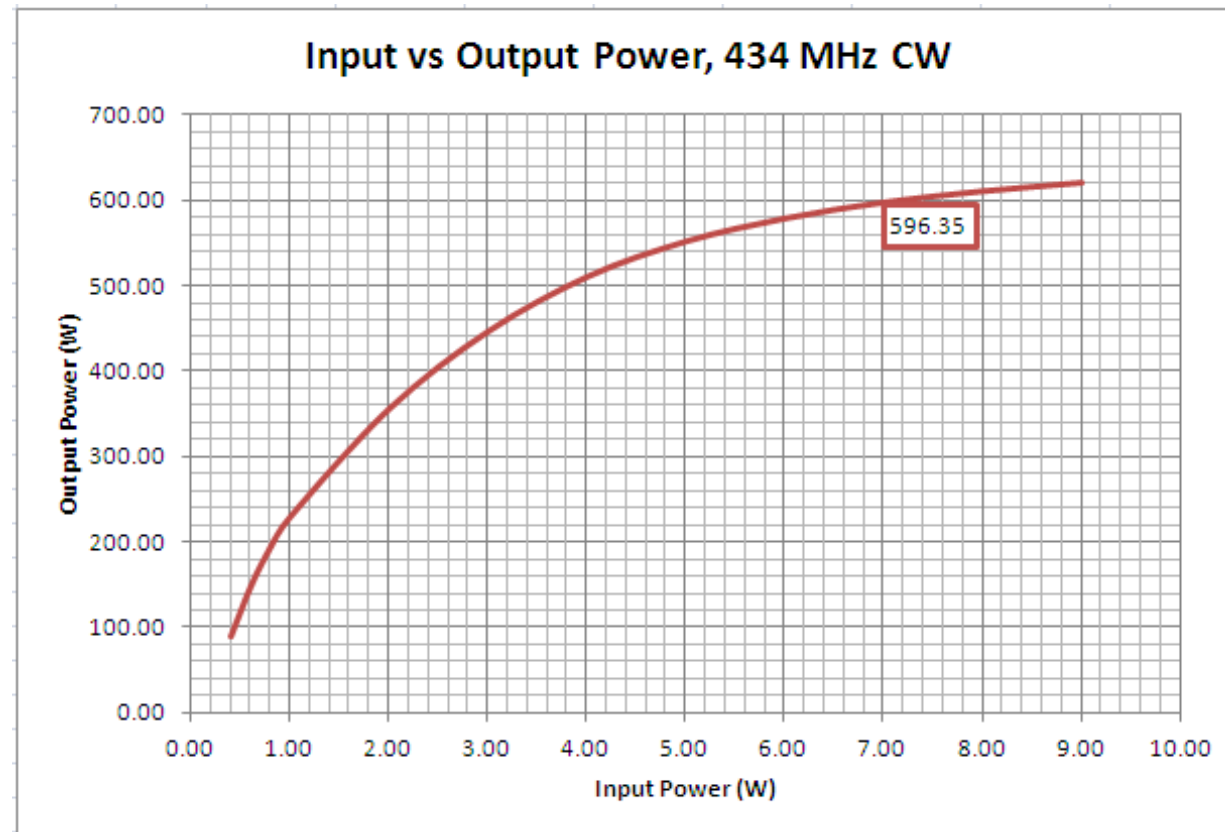
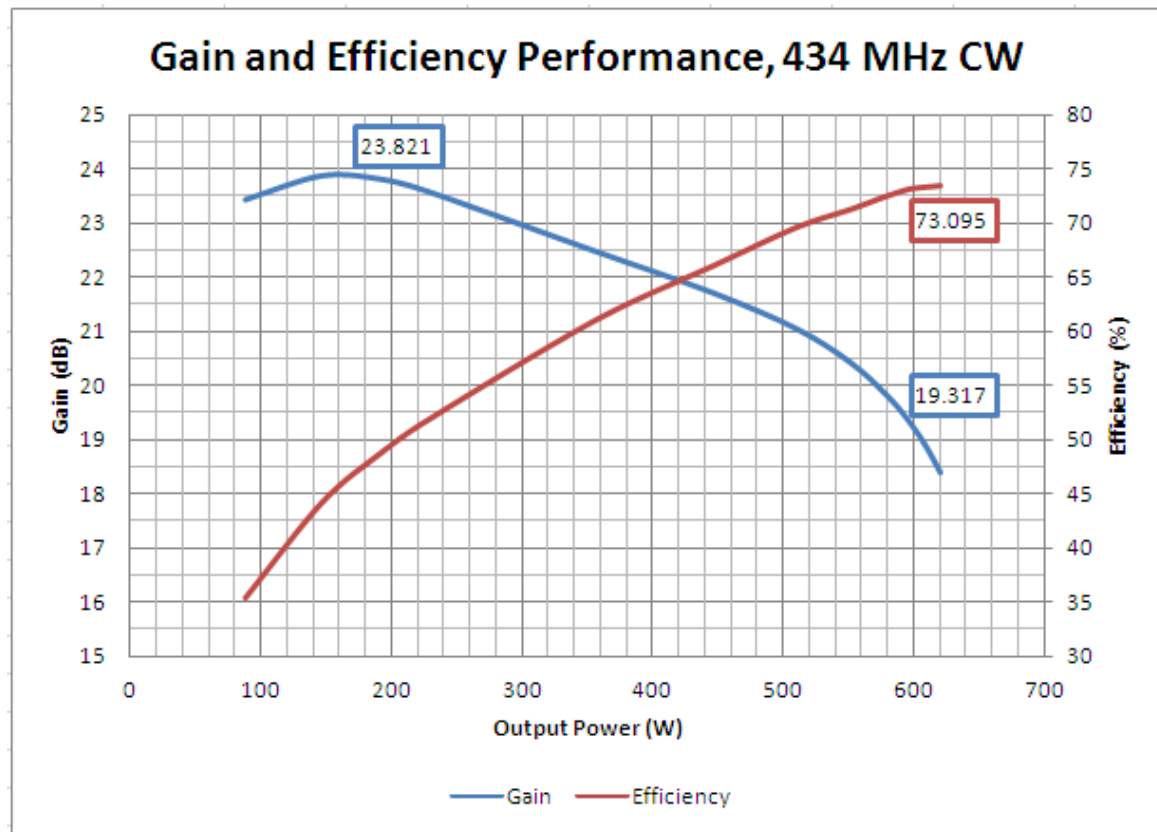
- The NXP MRFE6VP5600H is a 1.8-600 MHz, 600 W CW RF power LDMOS transistor housed in an NI-1230 air-cavity ceramic package. Its unmatched input and output allows wide frequency range utilization.
  - Further details about the device, including its data sheet, are available [here](#).
- The following pages describe the 434 MHz reference circuit (evaluation board). Its typical application are industrial, scientific and medical (ISM), including RF energy.
- The reference circuit can be ordered through NXP's distribution partners and etailers using part number MRFE6VP5600-434.



# Circuit Overview – 10.16 cm × 15.24 cm (4.0" × 6.0")



# Typical CW Performance

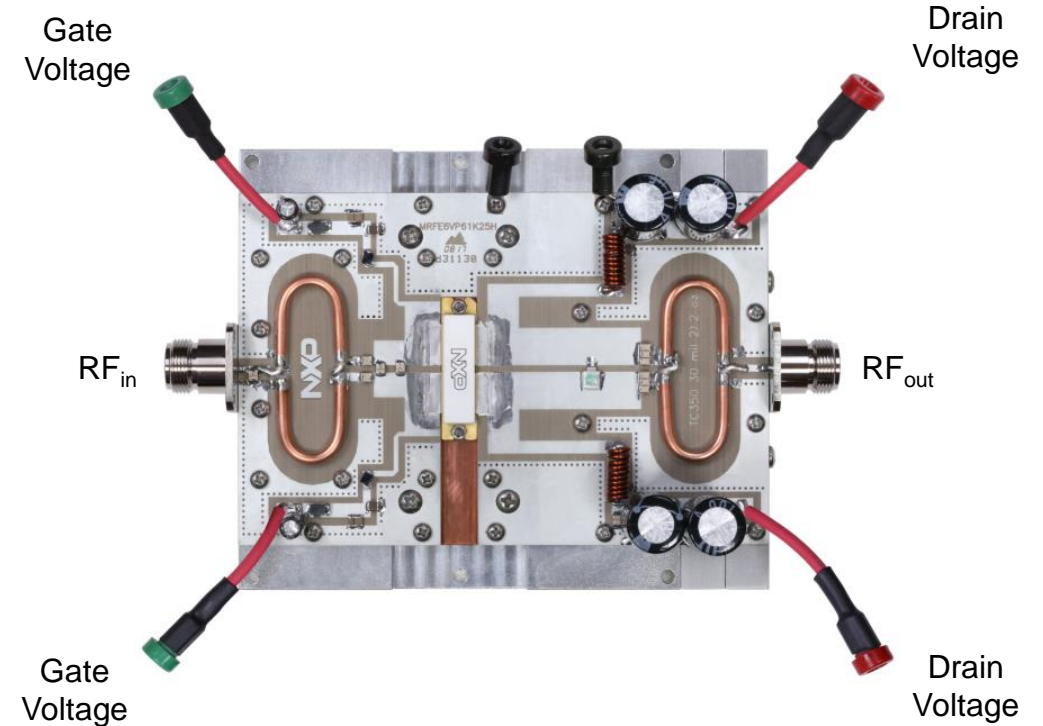


Typical Performance.  $V_{DD} = 48$  Vdc,  $I_{DQ} = 125$  mA,  $P_{in} = 7$  W (38.5 dBm), CW

Frequency (MHz)	$P_{out}$ (W)	$G_{ps}$ (dB)	$\eta_D$ (%)
434	600	19.3	73.1

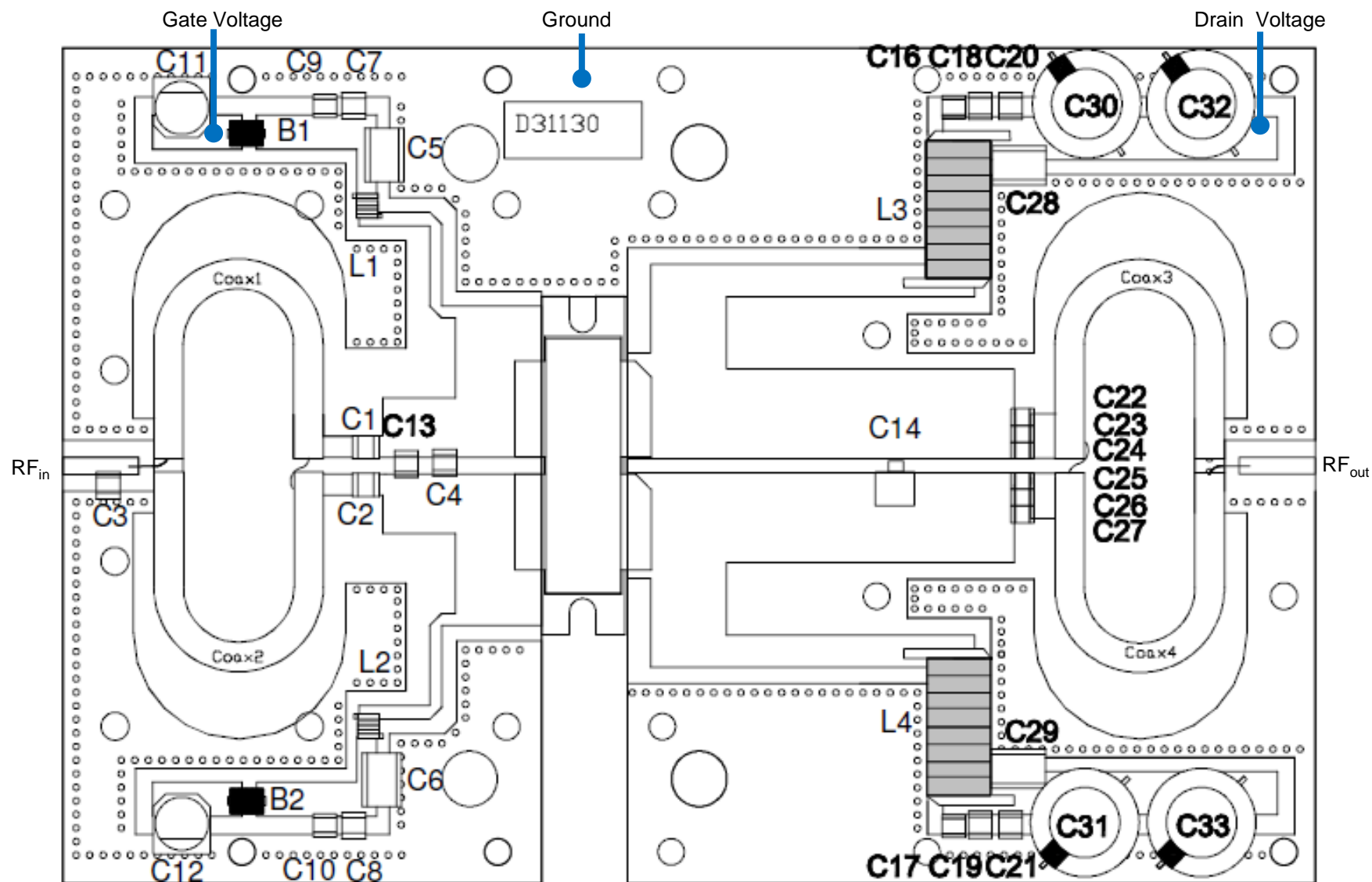
# Quick Start

1. Mount the reference circuit onto a heatsink capable of dissipating more than 200 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 dissipating more than 600 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 it slowly to 48V. Current should be 0 A.
7. Raise the gate voltage slowly until the drain current reaches the desired level (drain quiescent current  $I_{DQ} = 125$  mA typically). The gate voltage should be around 2.5 V.
8. Raise the RF input slowly to 7 W (38.5 dBm).
9. Check the RF output power (typically 600 W), the drain current (typically around 17 A for this power level) and the temperature of the board.



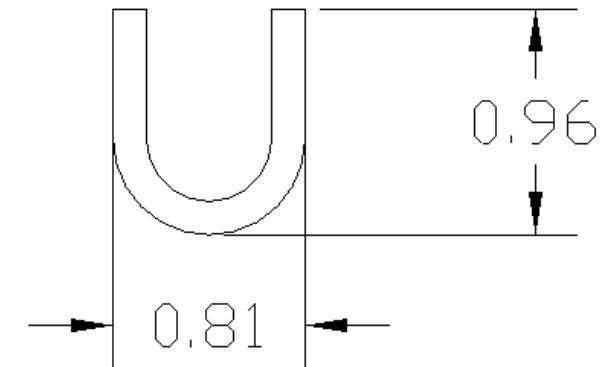
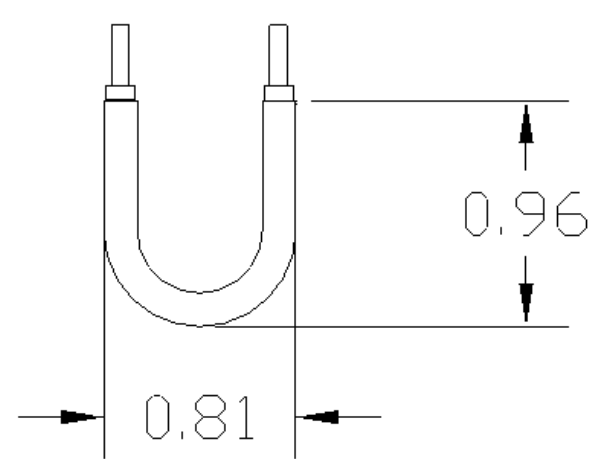
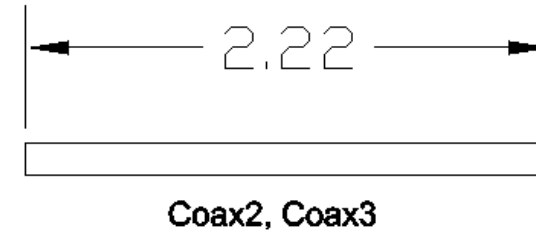
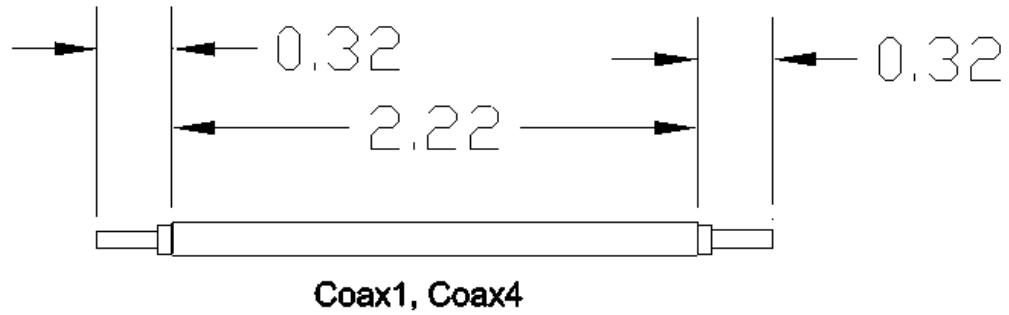


# Component Placement Reference



# Balun Drawing

(Inches)





# Bill of Materials

Component ID	Description	Part Number	Manufacturer
B1,B2	SM Bead Short (47 ohm@100MHz)	2743019447	Fair-Rite
C1,C2,C22,C23,C24,C25,C26,C27	120 pF, ATC, 100B Ceramic Capacitor	100B121JT500X	ATC
C3	2 pF, ATC, 100B Ceramic Capacitor	100B2R0JT500X	ATC
C4	47 pF, ATC, 100B Ceramic Capacitor	100B470JT500X	ATC
C5,C6,C28,C29	2.2 $\mu$ F / 100V	C3225X7R2A225KT	TDK
C7,C8,C20,C21	.22 $\mu$ F / 100V	C1210C224K1RAC-TU	Kemet
C9,C10,C18,C19	0.1 $\mu$ F / 100V	C1206C104K1RAC-TU	Kemet
C11,C12	47 $\mu$ F / 50V	476KXM050M	ILLINOIS
C13	43 pF, ATC, 100B Ceramic Capacitor	100B430JT500X	ATC
C14	33 pF / 300V Mica CDE	MIN02-002DC330J-F	CDE
C16,C17	200 pF, ATC, 100B Ceramic Capacitor	100B201JT200X	ATC
C30,C31,C32,C33	470 $\mu$ F 100V Electrolytic Capacitor	MCGPR100V477M16X32-RH	Multicomp
L1,L2	2.5 nH, 1 turn Inductor	A01TKLC	CoilCraft
L3,L4	10 Turn #16AWG, ID=0.155" Handwound Inductor	Belden 8074	Belden
Coax1,2,3,4	25 ohm SemiRigid CoAx Length 2.2"	UT-141C-25	Micro-Coax
PCB	Arlon TC350 30 mil 2 oz	D31130	MTL
Heatsink	Insert, 1.5"x 4", Cu, NI-1230 (Beast)	MSP-1BP-01 RevE	N/A
Q1	600W LDMOS RF Power Transistor	MRFE6VP5600H	NXP

# Revision History

- The following table summarizes revisions to the content of the MRFE6VP5600H 434 MHz Reference Circuit zip file.

Revision	Date	Description
0	September 2019	<ul style="list-style-type: none"><li>• Initial Release</li></ul>





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