MRFX035H 30-400 MHz REFERENCE CIRCUIT

ORDERABLE PART NUMBER: **MRFX035H-30MHZ**

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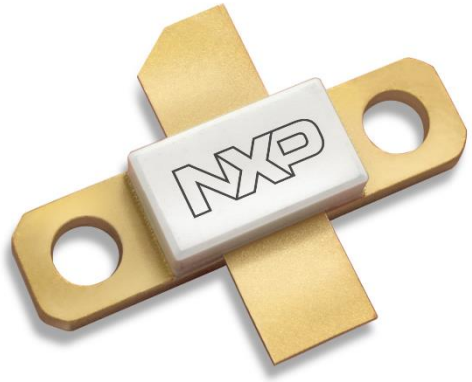
Introduction

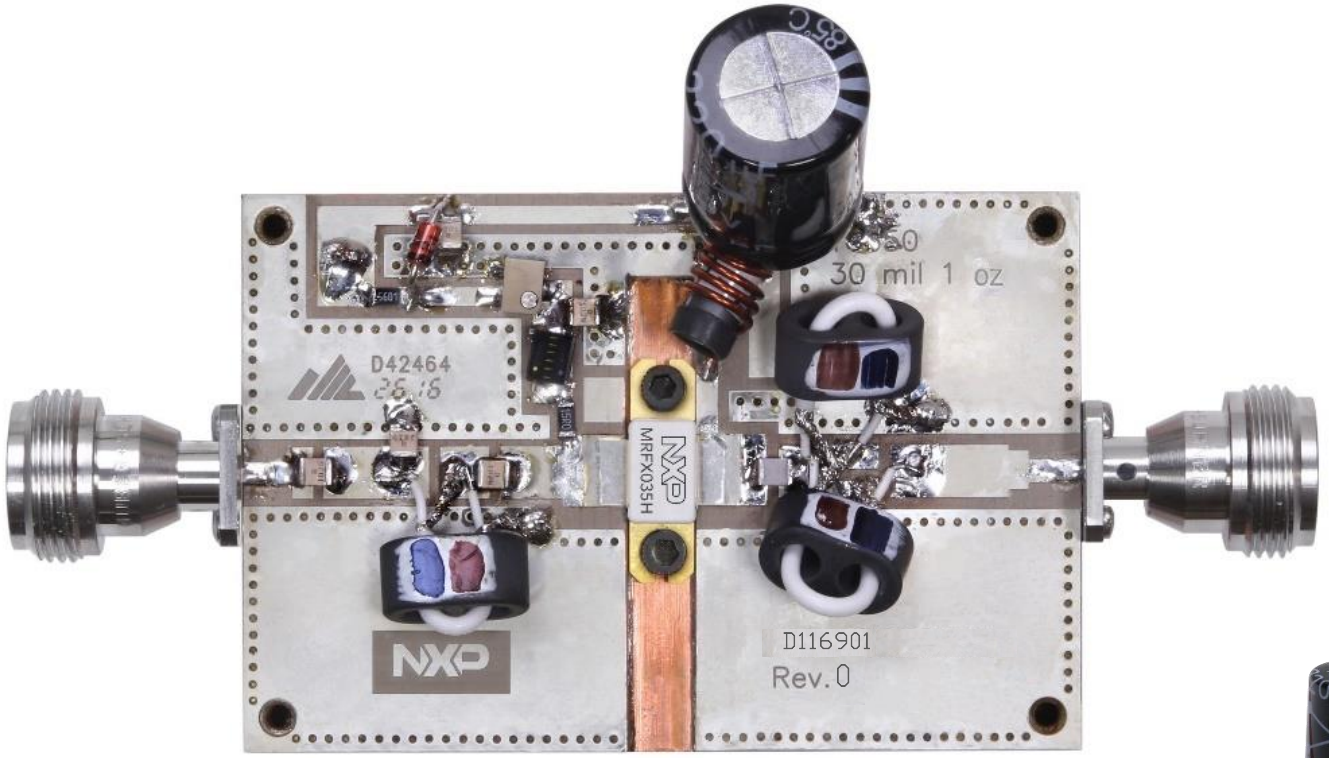
- The NXP MRFX035H is a 1.8-512 MHz, 35 W CW RF power LDMOS transistor housed in an NI-360 air-cavity ceramic package. Its unmatched input and output allows wide frequency range utilization.
  - Further details about the device, including its data sheet, are available here.

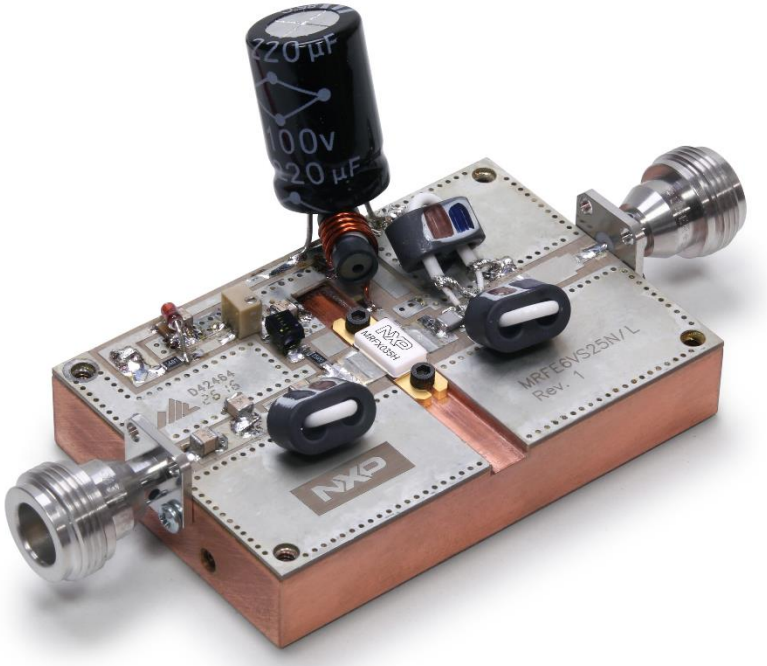
- The following pages describe the 30-400 MHz reference circuit (evaluation board).

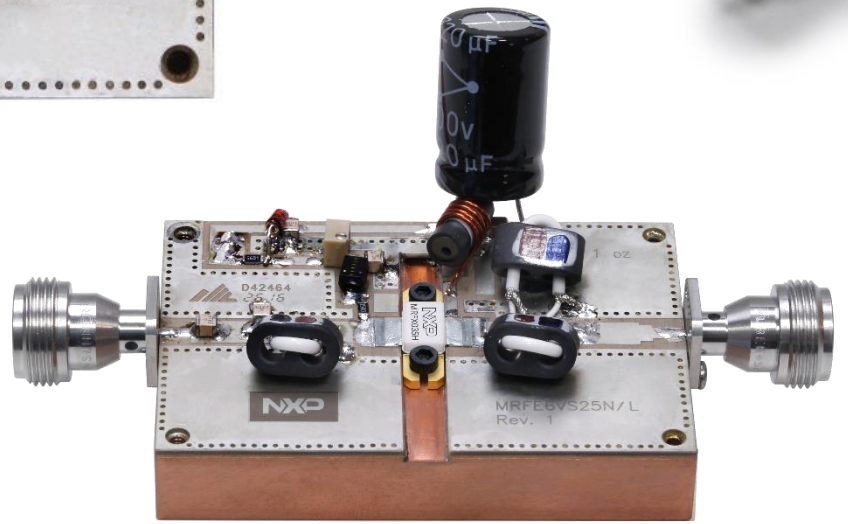
- The reference circuit can be ordered through NXP's distribution partners and etailers using part number MRFX035H-30MHZ.



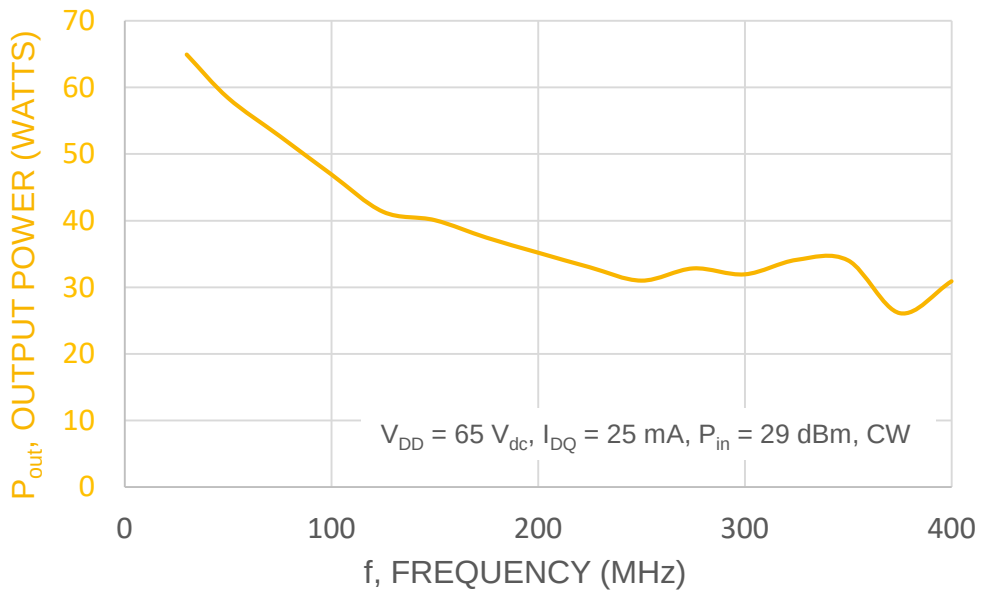
Circuit Overview – 5.08 cm x 7.62 cm (2.0″ × 3.0″)

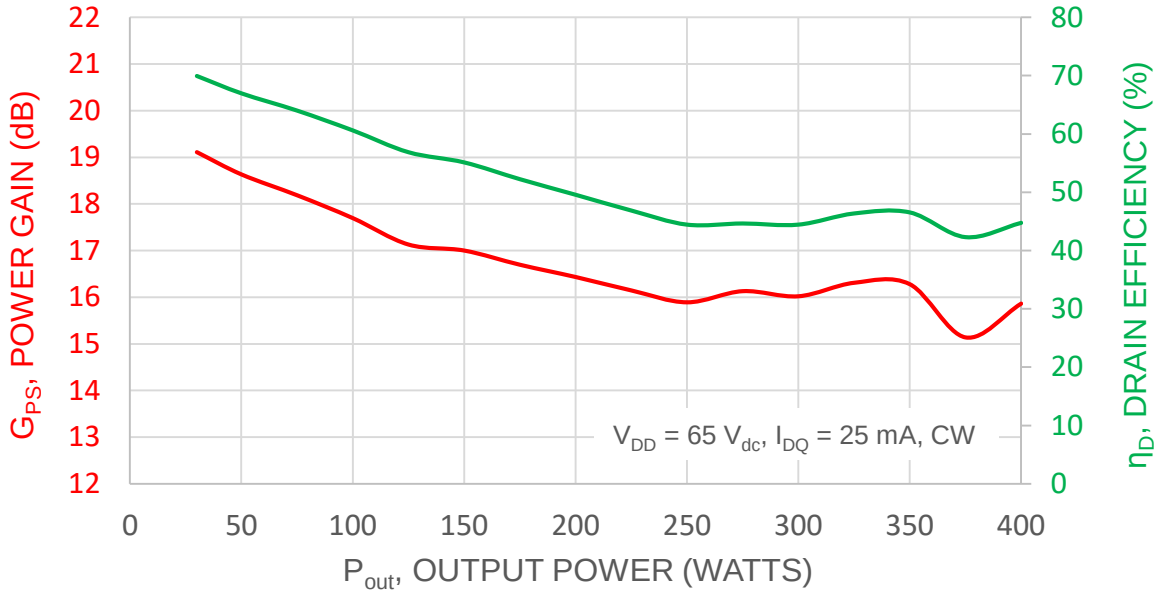






Typical CW Performance 1/2

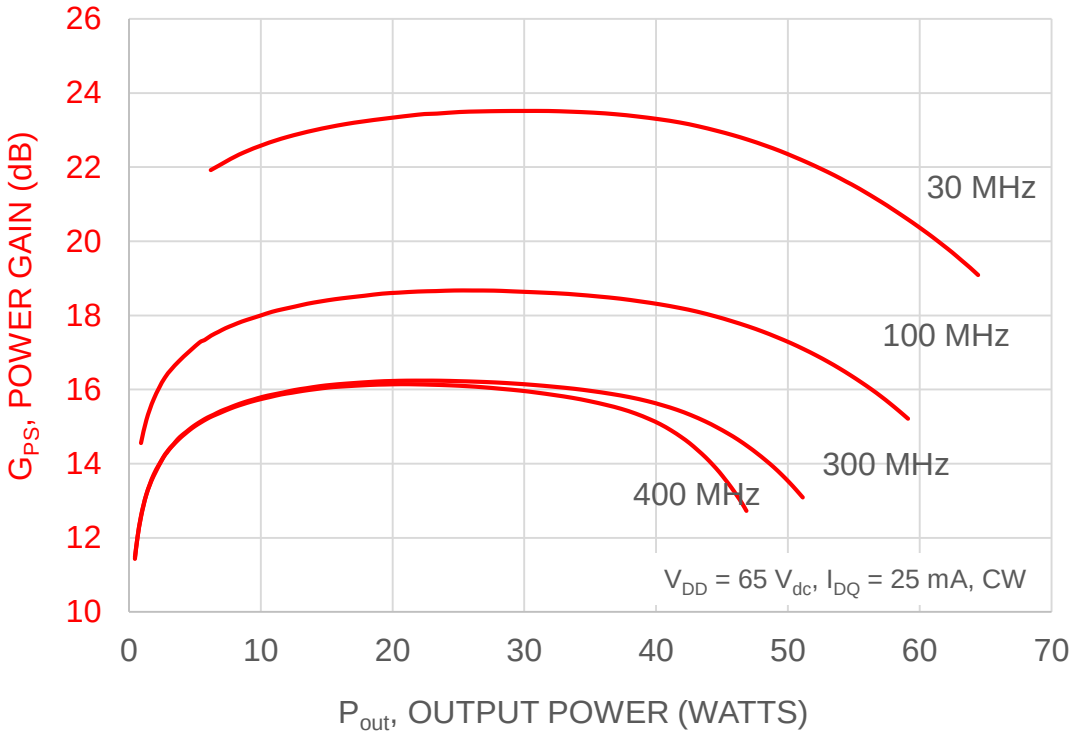


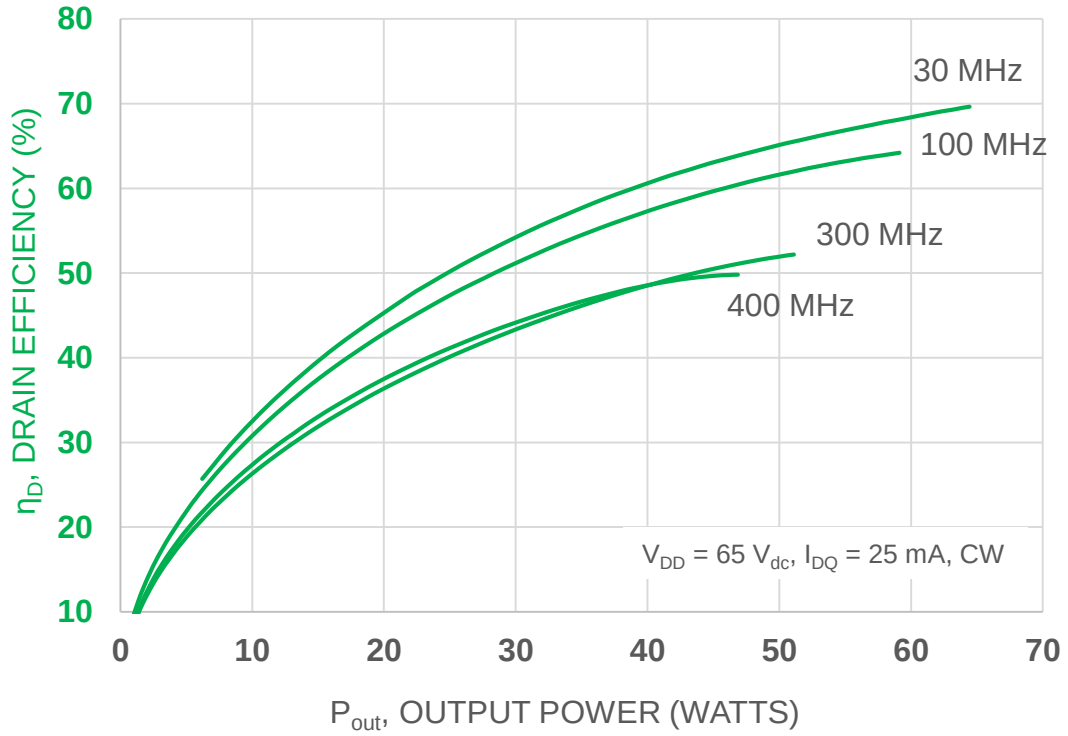


Typical Performance: V_{DD} = 65 Vdc, I_{DQ} = 25 mA, P_{in} = 0.8 W (29 dBm), CW

Frequency (MHz)	Output Power (W)	Power Gain (dB)	Drain Efficiency (%)
30	65	19.1	70.0
100	47	17.7	60.6
200	35	16.4	49.6
300	32	16.0	44.4
400	31	15.9	44.8

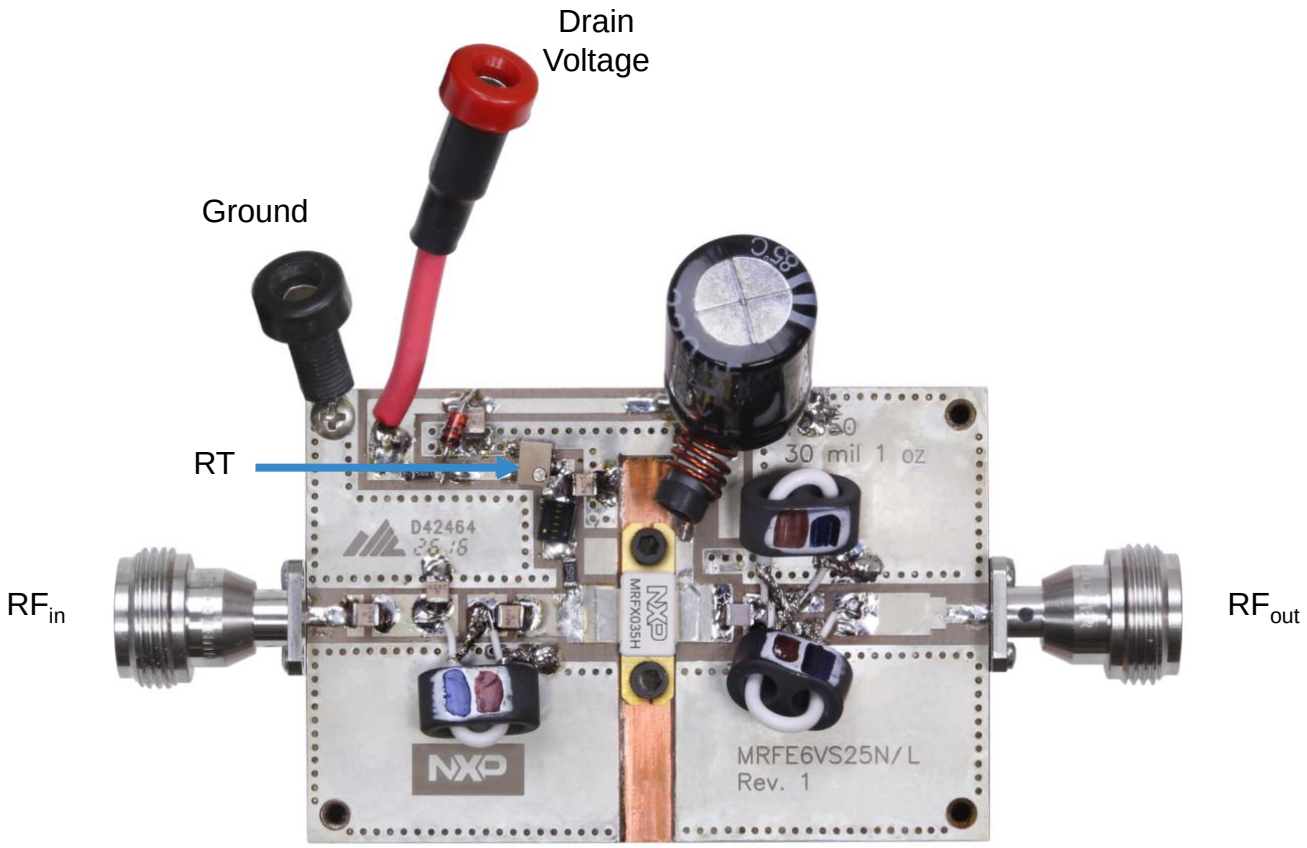
Typical CW Performance 2/2



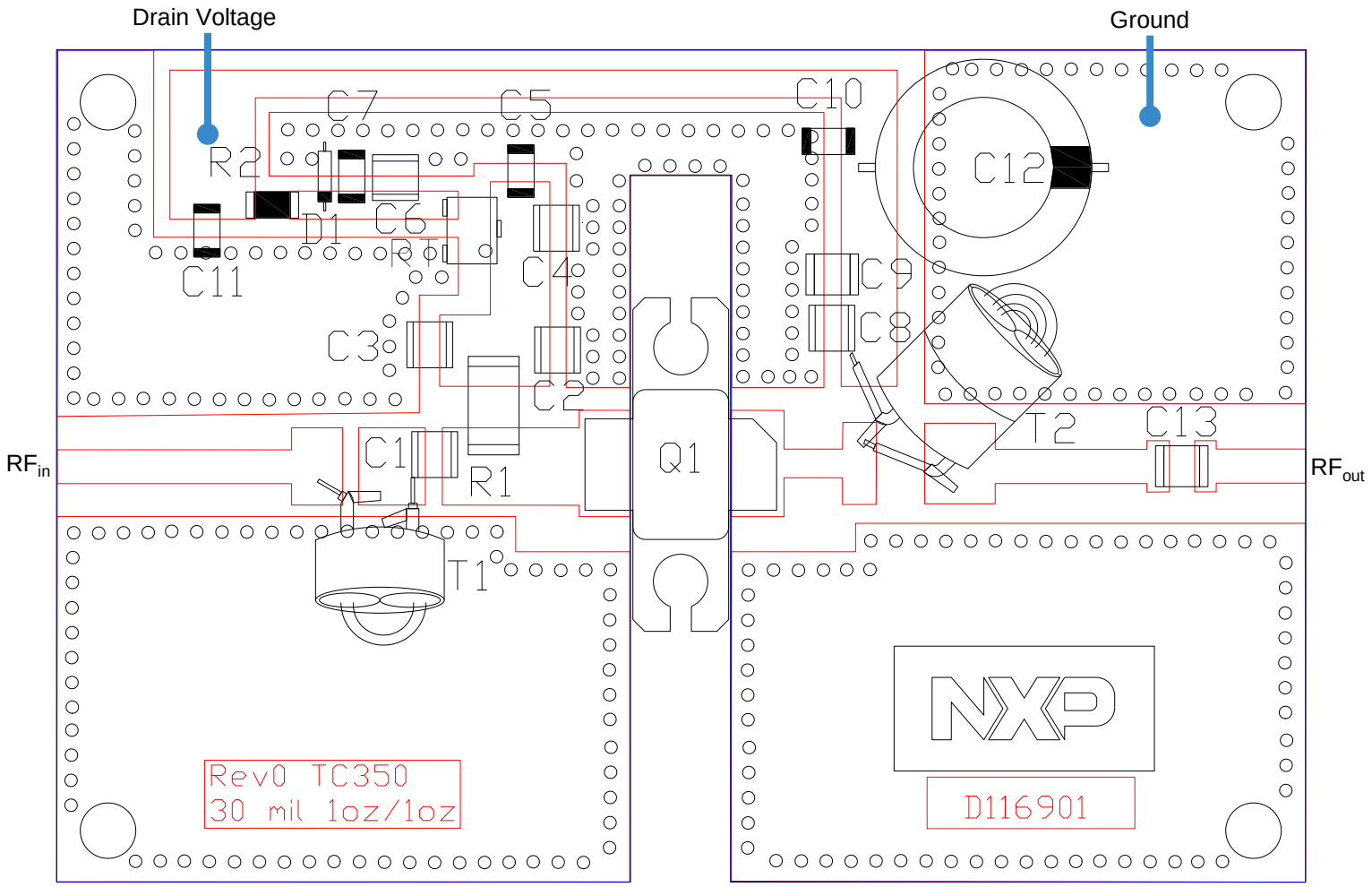


Quick Start

1. Mount the reference circuit onto a heatsink capable of dissipating more than 40 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. Terminate the RF output with a 50 ohm load capable of dissipating more than 30 W.
3. Connect the RF input to a 50 ohm source with the RF off.
4. Connect the ground.
5. Connect the drain voltage (V_{DD}) and raise it slowly to 65 V while ensuring that the drain current remains below or equal to the typical drain quiescent current of I_{DQ} = 25 mA.
6. If needed, adjust the RT potentiometer to modify the gate voltage to adjust the drain quiescent current.
7. Raise the RF input slowly to 0.8 W (29 dBm).
8. Check the RF output power (typically 35 W), the drain current (around 1 A for this power level) and the temperature of the board.



Component Placement Reference

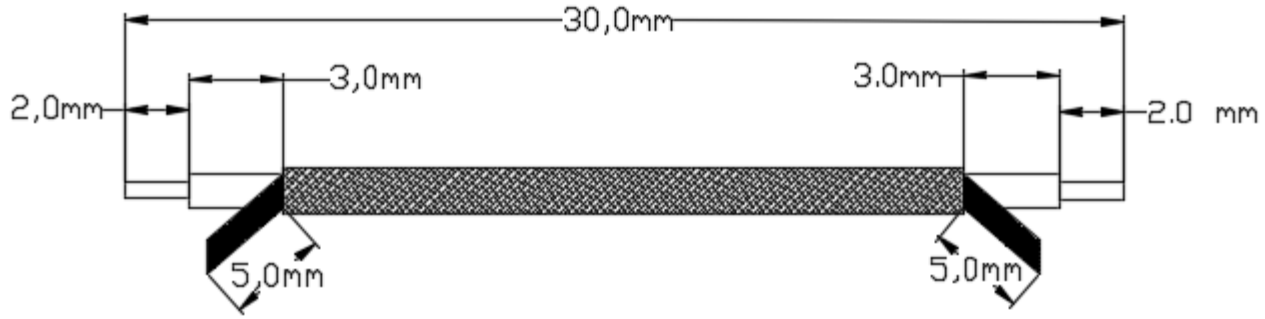


Bill of Materials

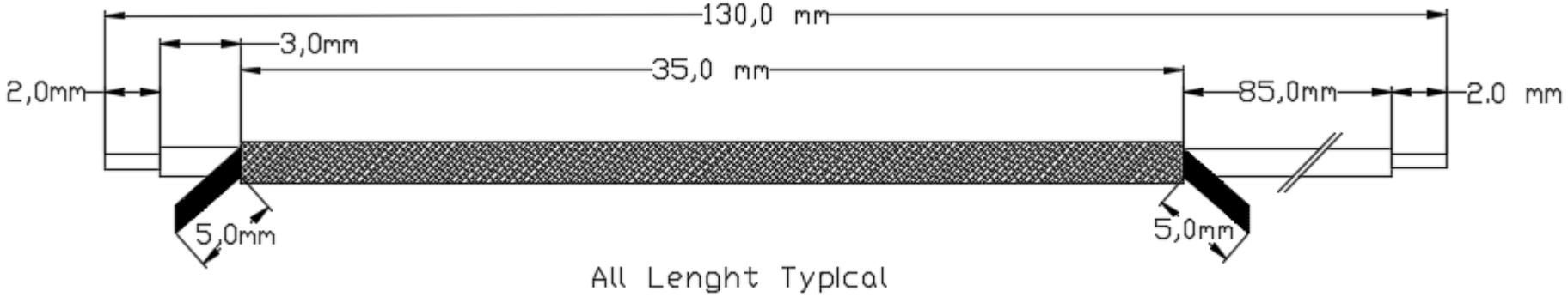
Designator	Description	Part Number	Manufacturer
C1,C3,C4,C6,C9	1,000 pF 100V chip capacitor	1111C102JW201X	PPI
C2	470 pF 200V chip capacitor	1111C471JW601X	PPI
C8,C13	15 nF chip capacitor	C3225CH2A153J125AA	TDK
C5, C7, C10	10 nF chip capacitor	GRM319R72A103KA01D	Murata
C11	1 µF chip capacitor	C3216X7R2A105K160AA	TDK
C12	220 µF 100V Electrolytic Capacitor	MCGPR100V227M16X26	Multicomp
R1	47.5Ω 2512 chip resistor	CRCW251247R5FKEG	Vishay
R2	5.6K 1206 chip resistor	CRCW12065K60FKEA	Dale/Vishay
RT	SMT Trim Pot 5K, (11 turn)	3224W-1-502E	Bourns
T1	61 Core w/ 30 mm 25 ohm White teflon coated coax cable, with ferrite E1	2861001502/D260-4118-0000	Fair-Rite/Microdot
T2	61 Core x2 w/ 130 mm 25 ohm White teflon coated coax cable, with ferrite E2, E3	2861001502/D260-4118-0000	Fair-Rite/Microdot
D1	8.2V Zener Diode	1N4738A	Fairchild Semi
PCB	TC350 30 mil 1/1 oz	D116901	Rogers
Heatsink	Copper Heatsink NI360	C150X150T490D34	NXP

Coaxial Cables Details

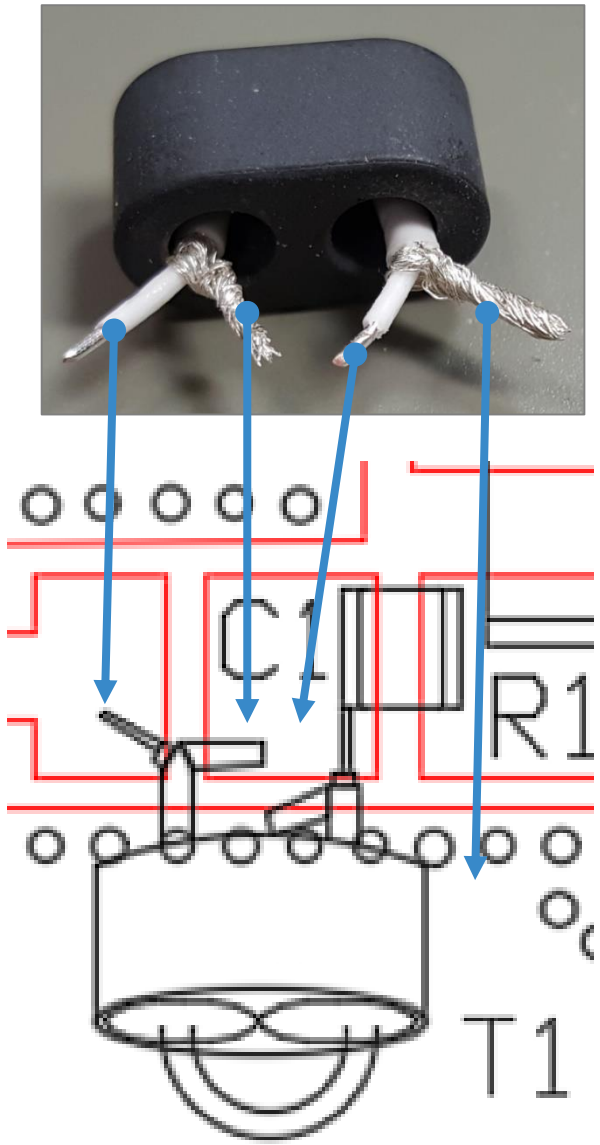
T1



T2



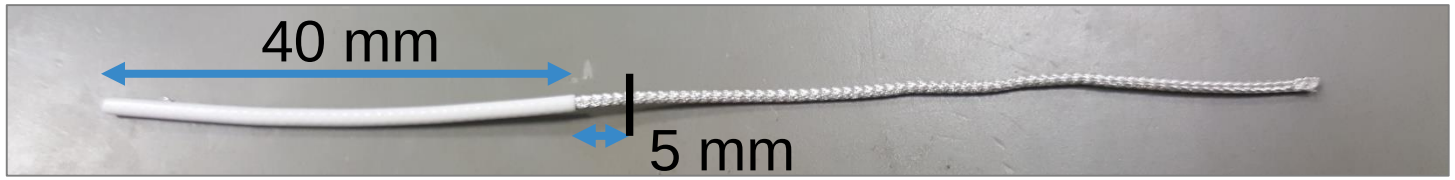
Assembly Details – Transformer T1



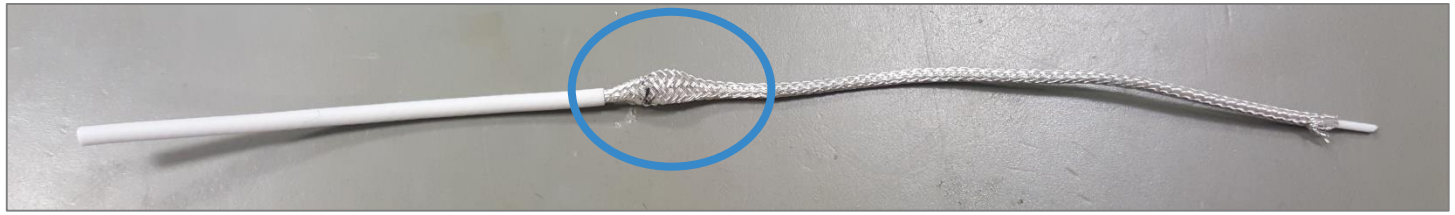
Assembly Details – T2 Transformer 1/4

1. Cut 130 mm of coax. cable

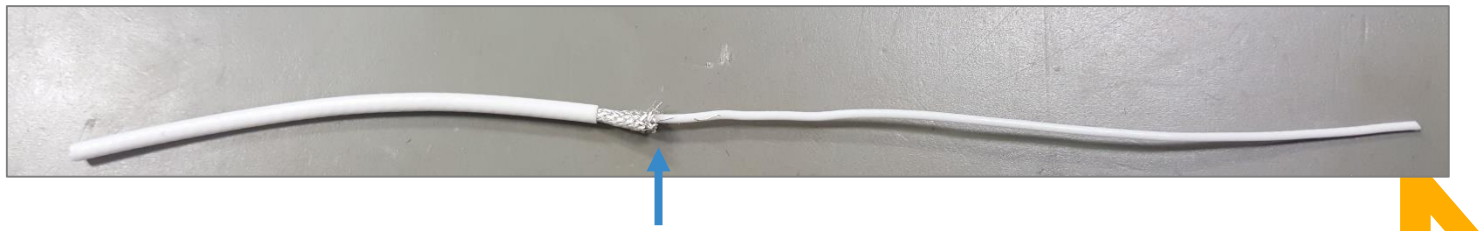
2. Remove jacket at 40 mm and mark braid at 5 mm



3. Slide the braid to create a gap between braid and center of conductor insulant

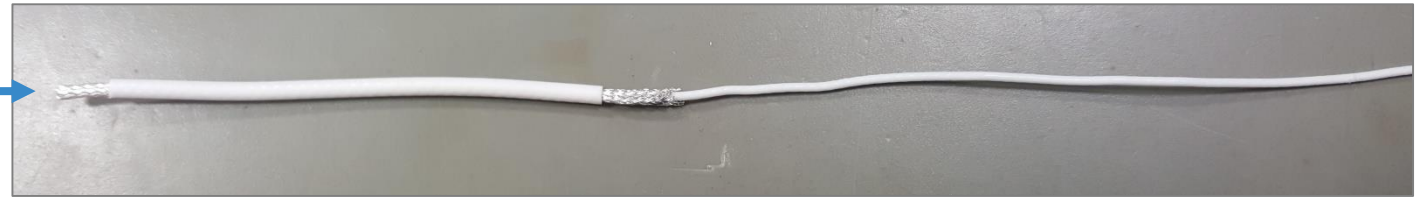


4. Cut the braid at the mark with a pair of wire cutters



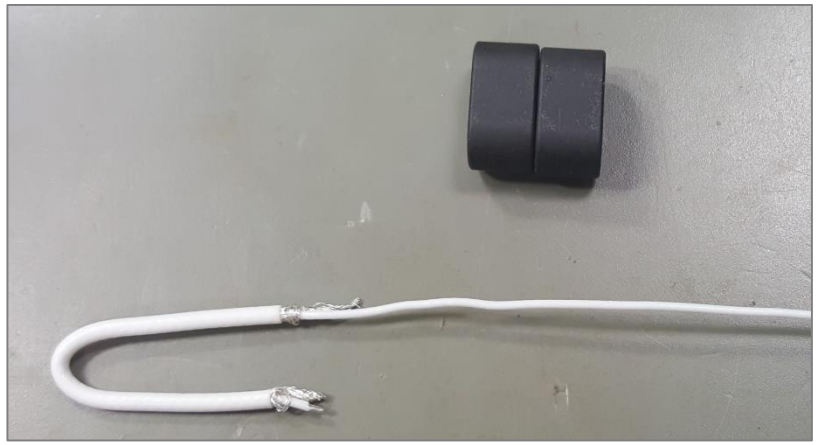
Assembly Details – T2 Transformer 2/4

6. Remove 5 mm of jacket



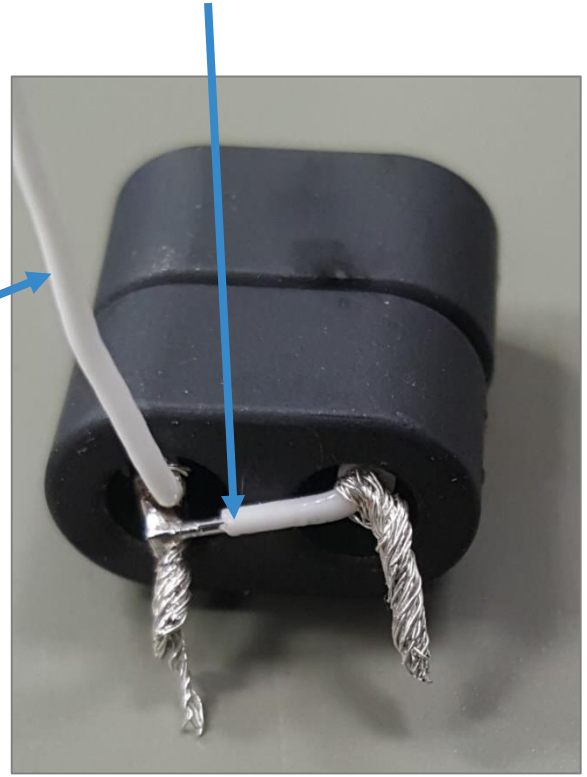
7. Twist the braid

8. Form the coax to fit the ferrite and pass it through



Assembly Details – T2 Transformer 3/4

9. Solder central conductor to the braid at the other end of the coax

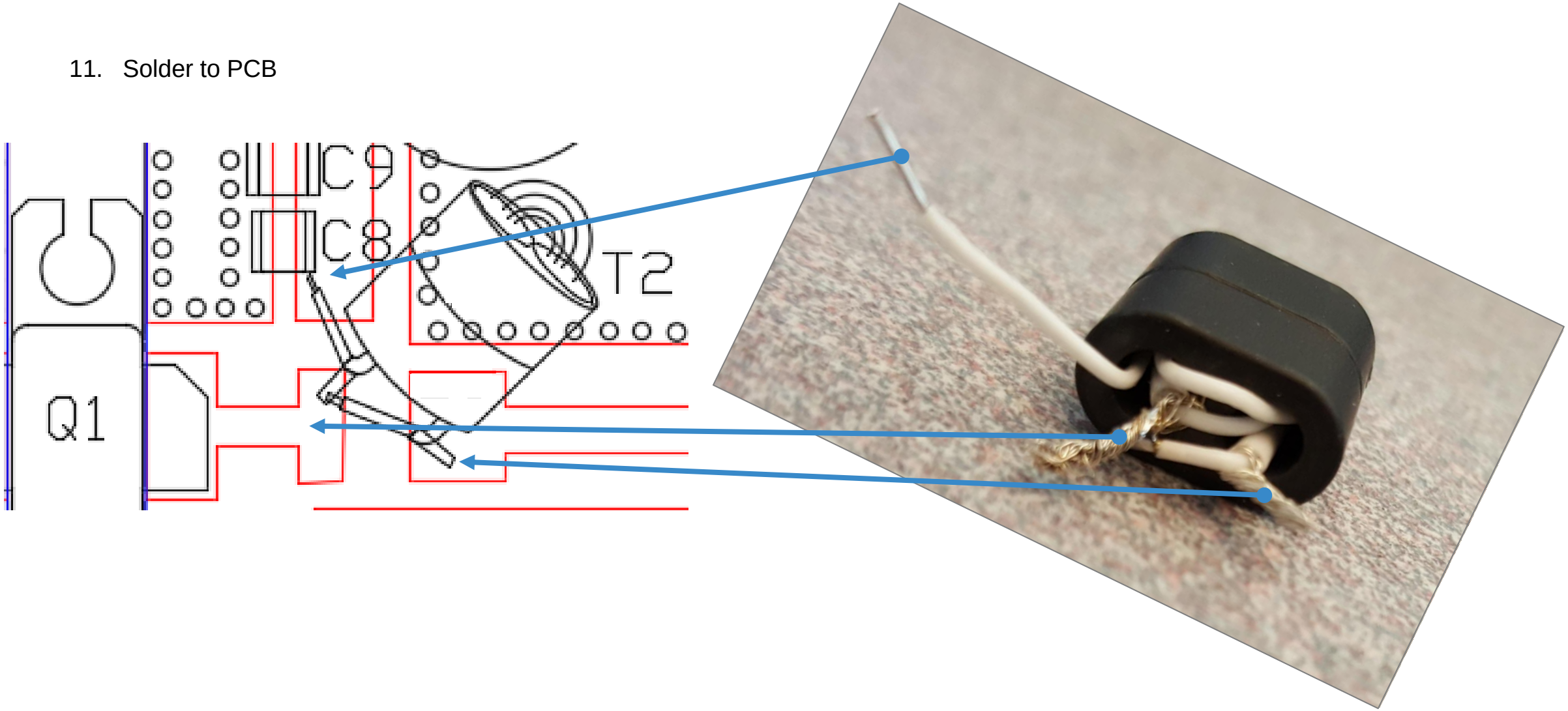


10. Wire 2 turns through the ferrite

End Result

Assembly Details – T2 Transformer 4/4

11. Solder to PCB



Revision History

- The following table summarizes revisions to the content of the MRFX035H 30-400 MHz Reference Circuit zip file:

Revision	Date	Description
0	September 2019	• Initial release

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