



STEVAL-TDR020V1

Portable UHF 2-way radio demonstration board
based on the PD84006L-E

Features

- Excellent thermal stability
- Frequency: 740 - 950 MHz
- Supply voltage: 7.2 V
- Output power: 4 W
- Power gain: 12.3 ± 0.3 dB
- Efficiency: 50 % - 57 %
- Load mismatch 20:1
- BeO free amplifier

Description

The STEVAL-TDR020V1 demonstration board is a portable UHF 2-way radio designed as a platform for evaluating the performance of the PD84008L-E LDMOS RF power transistor.

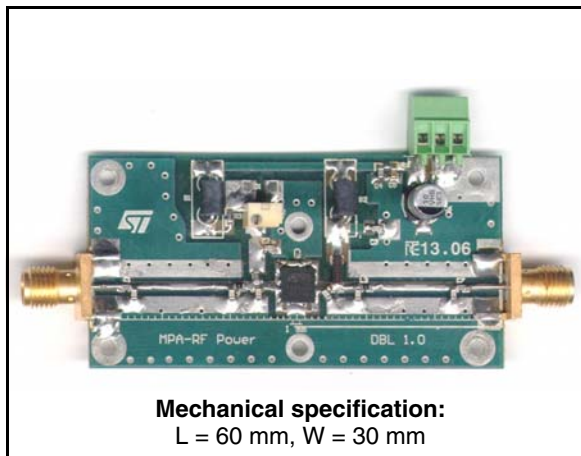


Table 1. Device summary

Order code
STEVAL-TDR020V1

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1 Electrical characteristics

$T_A = +25\text{ }^{\circ}\text{C}$, $V_{DD} = 7.2\text{ V}$, $I_{dq} = 200\text{ mA}$

Table 2. Electrical specification

Symbol	Test conditions	Min	Typ	Max	Unit
Freq	Frequency range	740		950	MHz
P _{OUT}			4		W
Gain	@ P _{IN} = 24 dBm		12.3 ± 0.3		dB
ND	@ P _{IN} = 24 dBm		50 - 57		%
H2	2 ND Harmonic @ P _{IN} = 24 dBm		-48 / -65		dBc
H3	3 RD Harmonic @ P _{IN} = 24 dBm		-64 / -70		dBc
VSWR	Load mismatch all phases @ P _{OUT} = 4 W		20:1		

2 Impedance

Figure 1. Impedance graphic

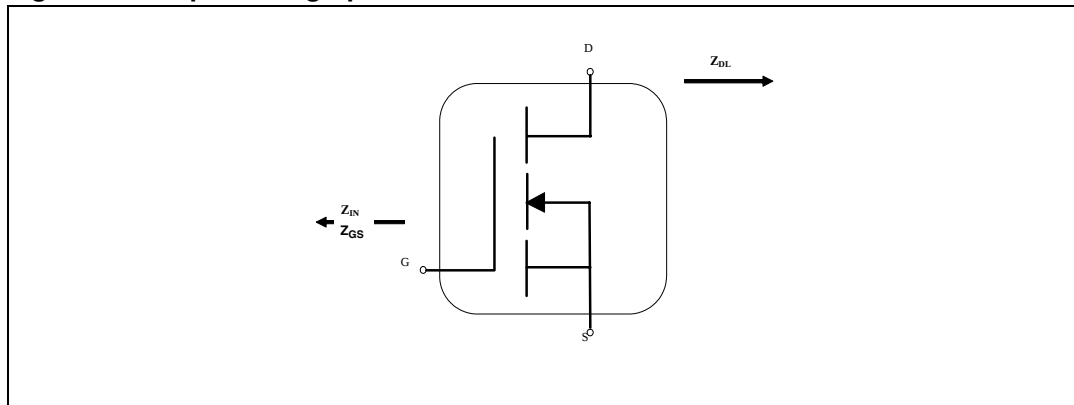


Table 3. Impedance data

F(MHz)	Z_{GS}	Z_{DL}
740	2,52 + j1,42	3,06 + j0,41
750	2,52 + j1,56	3,09 + j0,51
760	2,51 + j1,73	3,12 + j0,64
770	2,46 + j1,84	3,13 + j0,72
780	2,47 + j1,96	3,13 + j0,81
790	2,48 + j2,07	3,13 + j0,87
800	2,45 + j2,22	3,14 + j0,96
810	2,44 + j2,27	3,08 + j1,02
820	2,45 + j2,43	3,05 + j1,04
830	2,41 + j2,57	3,04 + j1,11
840	2,40 + j2,67	2,98 + j1,14
850	2,41 + j2,80	2,99 + j1,24
860	2,38 + j2,92	2,91 + j1,29
870	2,37 + j3,06	2,88 + j1,38
880	2,36 + j3,20	2,81 + j1,40
890	2,37 + j3,25	2,70 + j1,47
900	2,31 + j3,36	2,56 + j1,53
910	2,25 + j3,49	2,50 + j1,62
920	2,16 + j3,57	2,31 + j1,72
930	2,16 + j3,66	2,21 + j1,82
940	2,11 + j3,78	2,11 + j1,96
950	2,06 + j3,86	1,98 + j2,07

3 Typical performance

Figure 2. Output power and efficiency vs frequency
Vdd = 7.2 V, Idq = 200 mA, Pin = 24 dBm

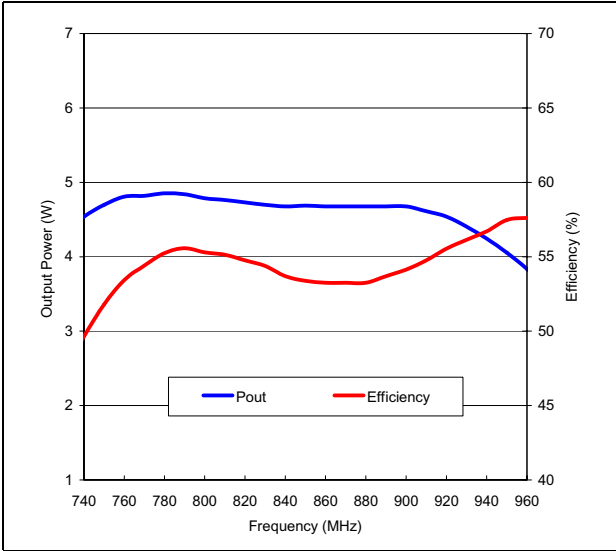


Figure 3. Gain vs output power
Vdd = 7.2 V, Idq = 200 mA

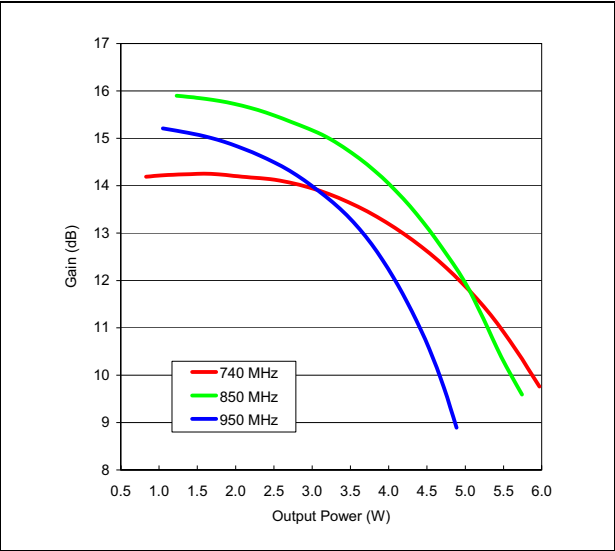


Figure 4. Input return loss vs frequency
Vdd = 7.2 V, Idq = 200 mA

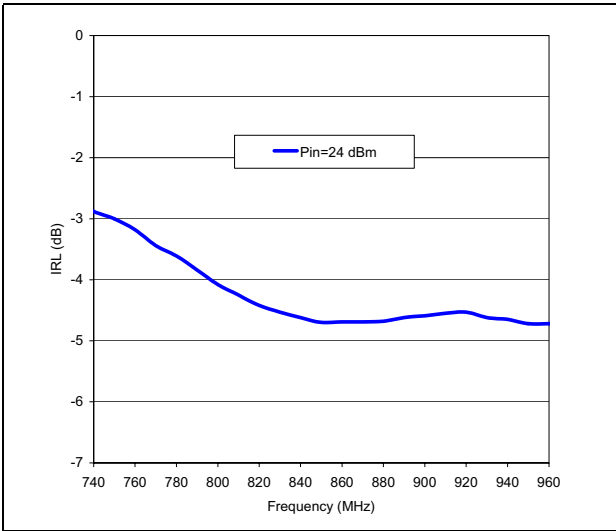


Figure 5. Harmonics vs frequency
Vdd = 7.2 V, Idq = 200 mA, Pin = 24 dBm

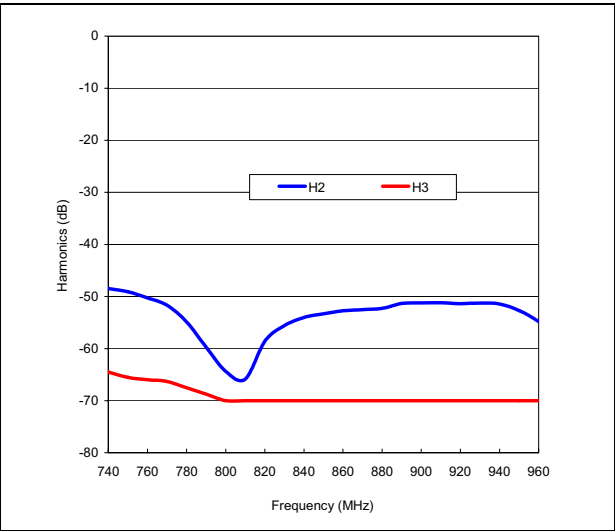
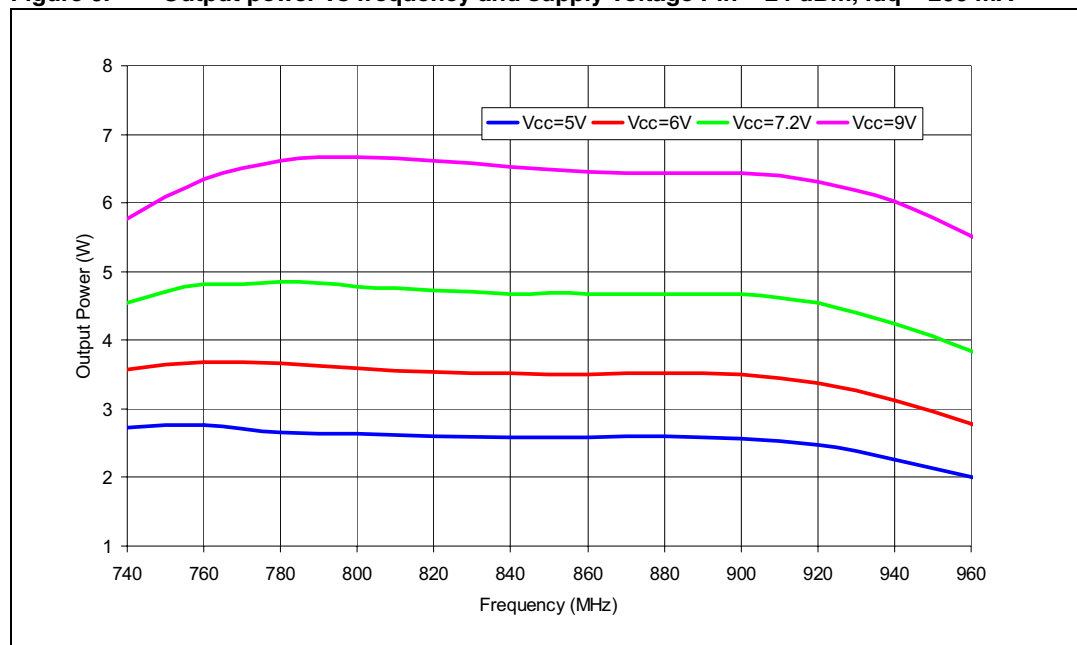


Figure 6. Output power vs frequency and supply voltage $P_{in} = 24\text{ dBm}$, $I_{dq} = 200\text{ mA}$ 

4 Test circuit

Figure 7. Test circuit schematic

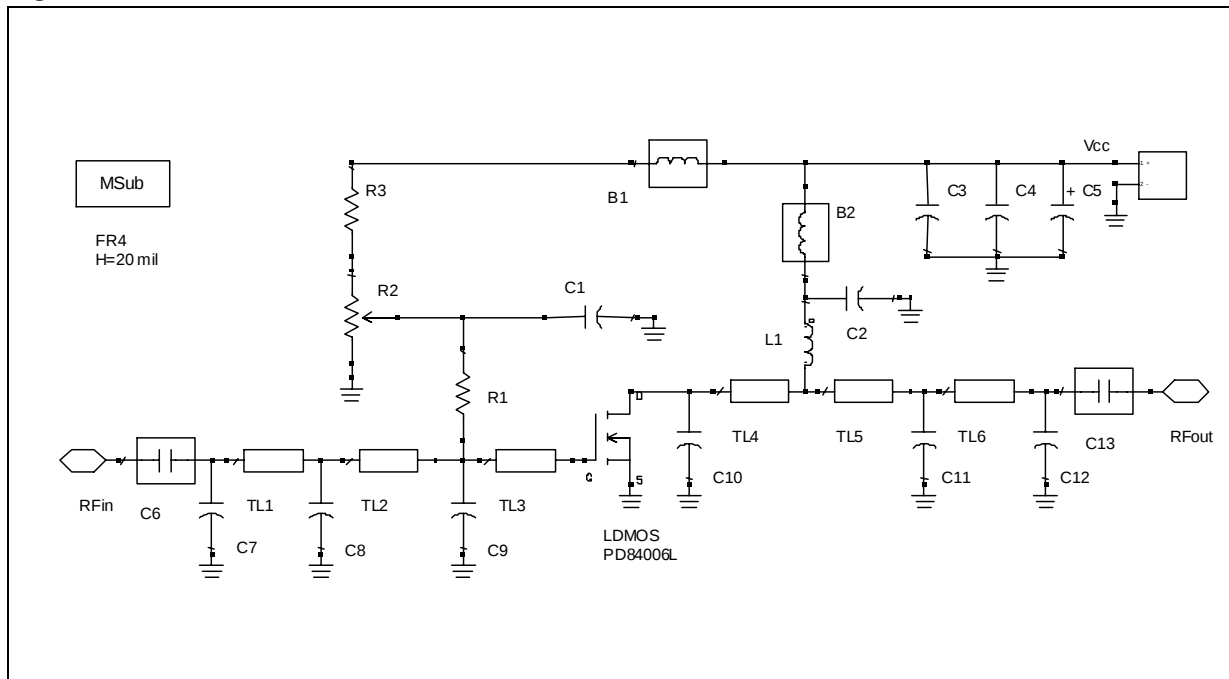
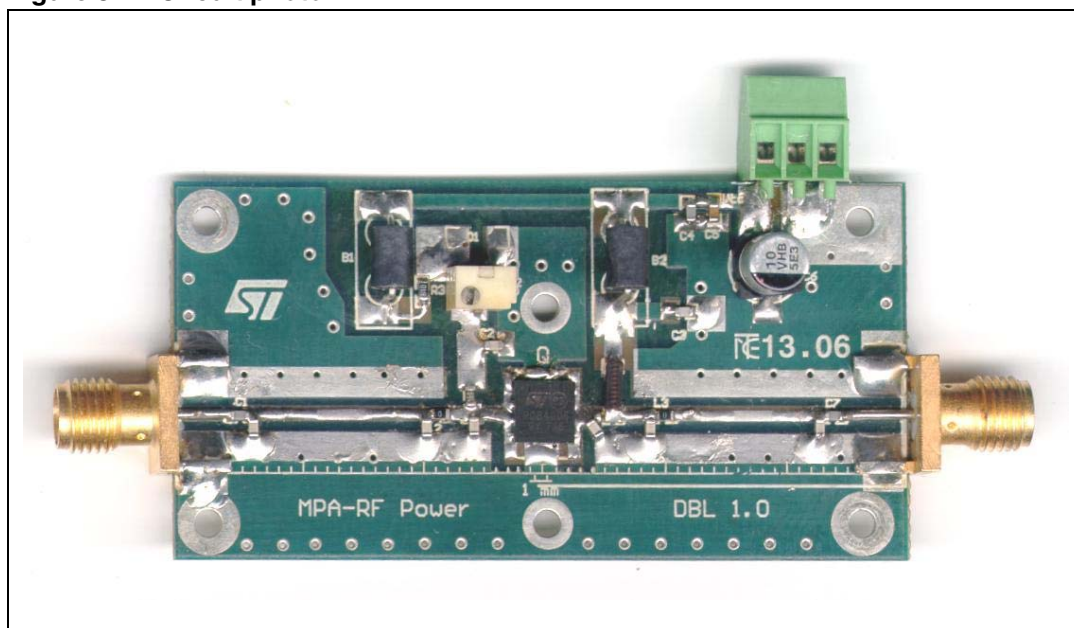


Table 4. Component list

Component ID	Description	Value	Case size	Manufacturer	Part code
B1, B2	Ferrite Bead			Panasonic	EXCELDRC35C
C1, C2	Capacitor	150 pF	0603	MURATA	GRM39-C0G151J50D500
C3	Capacitor	1 nF	0603	MURATA	GRM39-COG102J50D500
C4	Capacitor	10 nF	0603	MURATA	GRM39-X7R103K50C560_
C5	Capacitor	10 uF	SMT	Panasonic	EEVHB1V100P
C6, C13	Capacitor	39 pF	0603	MURATA	GRM39-C0G390J50D500
C7	Capacitor	3,3 pF	0603	MURATA	GQM1885C2A3R3C
C8	Capacitor	8,2 pF	0603	MURATA	GQM1885C1H8R2D
C9	Capacitor	18 pF	0603	MURATA	GQM1885C1H180J
C10	Capacitor	15 pF	0603	MURATA	GQM1885C1H150J
C11	Capacitor	12 pF	0603	MURATA	GQM1885C1H120J
C12	Capacitor	4,7 pF	0603	MURATA	GQM1885C2A4R7
L1	Inductor	12.55 nH		Coilcraft	1606-10
R1	Resistor	56 Ω	0603	Tyco Electronics	
R2	Potentiometer	10 K Ω		Bourns Electronics	3214W-1-103E
R3	Resistor	1 K	0603	Tyco Electronics	01623440-1
TL1	Transmission line	W=0.92 mm	L= 13,50 mm		
TL2	Transmission line	W=0.92 mm	L= 3,15 mm		
TL3	Transmission line	W=0.92 mm	L= 2,90 mm		
TL4	Transmission line	W=0.92 mm	L= 2,00 mm		
TL5	Transmission line	W=0.92 mm	L= 2,20 mm		
TL6	Transmission line	W=0.92 mm	L= 13,20 mm		
RF in, RF out	SMA-CONN	50 Ω	60 mils	JOHNSON	142-0701-801
PD84006L-E	LDMOS			STMicroelectronics	PD84006L-E
Board	FR-4 THk=0.020" 2OZ Cu both sides				

5 Circuit photo

Figure 8. Circuit photo



6 Revision history

Table 5. Document revision history

Date	Revision	Changes
18-Oct-2010	1	Initial release.

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