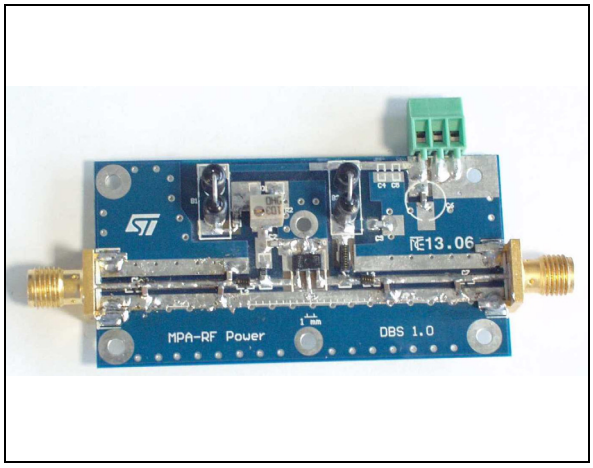
STEVAL-TDR025V1

Portable UHF 2-way radio demonstration board based on the PD84001

Preliminary data

Features

- Excellent thermal stability
- Frequency: 380 - 520 MHz
- Supply voltage: 7.2 V
- Output power: 1 W
- Power gain: 15.5 ± 0.7 dB
- Efficiency: 58 % - 67 %
- Load mismatch: 20:1
- BeO-free amplifier



Description

The STEVAL-TDR025V1 demonstration board is a portable UHF 2-way radio designed as a platform for valuating the performance of the PD84001 LDMOS RF power transistor.

Table 1. Device summary

Order code	Mechanical specification
STEVAL-TDR025V1	L = 60 mm, W = 30 mm

This is preliminary information on a new product now in development or undergoing evaluation. Details are subject to change without notice.

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1 Electrical characteristics

T_A = + 25 °C, V_{DD} = 7.2 V, I_{dq} = 100 mA

Table 2. Electrical specifications

Symbol	Test conditions	Min.	Typ.	Max.	Unit
Freq	Frequency range	380		520	MHz
P_{OUT}			1		W
Gain	@ P_{IN} = 15 dBm		15.5 ± 0.7		dB
ND	@ P_{IN} = 15 dBm		58 - 67		%
H2	2nd harmonic @ P_{IN} = 15 dBm		TBD		dBc
H3	3rd harmonic @ P_{IN} = 15 dBm		TBD		dBc
VSWR	Load mismatch all phases @ P_{OUT} = 1 W			20:1	

2 Impedance

Figure 1. Impedance illustration

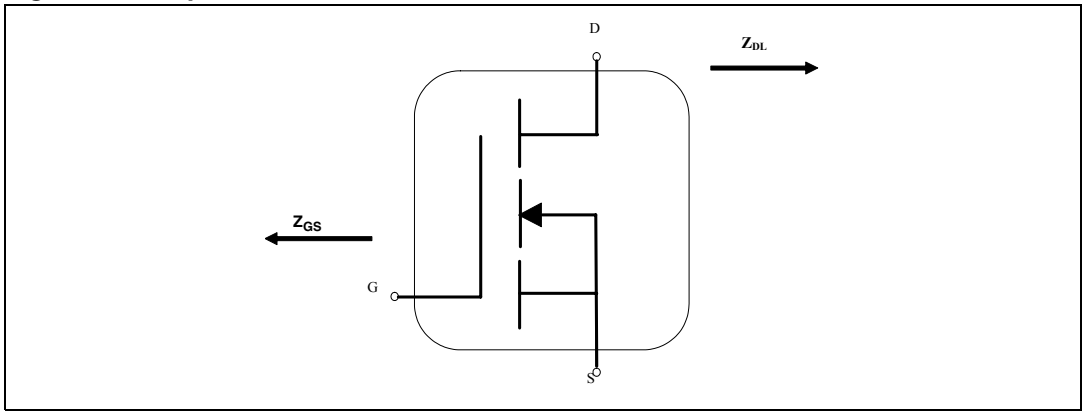


Table 3. Impedance data

f (MHz)	Z_{GS}	Z_{DL}
380	8.53 + j1.78	18.79 + j8.37
410	7.84 + j4.05	17.15 + j7.78
440	7.29 + j6.3	15.56 + j7.95
470	6.77 + j8.63	14.08 + j8.58
500	6.36 + j10.91	12.8 + j9.53
520	6.13 + j12.5	12.05 + j10.3

3 Typical performance

Figure 2. Output power vs. frequency Vdd = 7.2 V, Idq = 100 mA

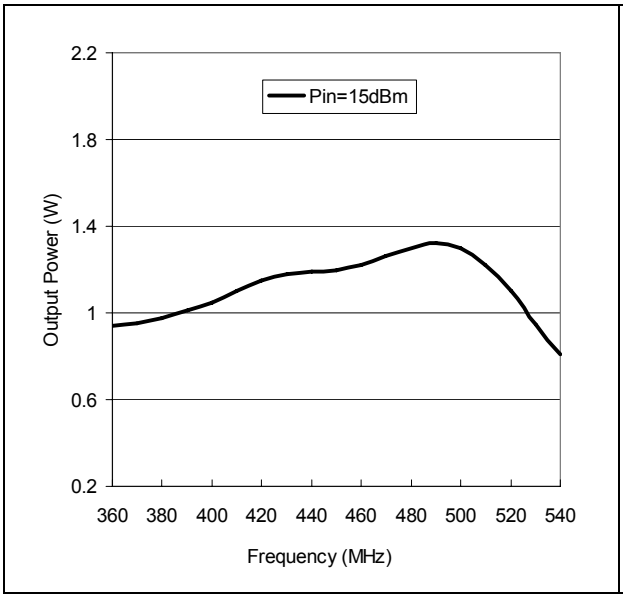


Figure 3. Efficiency vs. frequency Vdd = 7.2 V, Idq = 100 mA

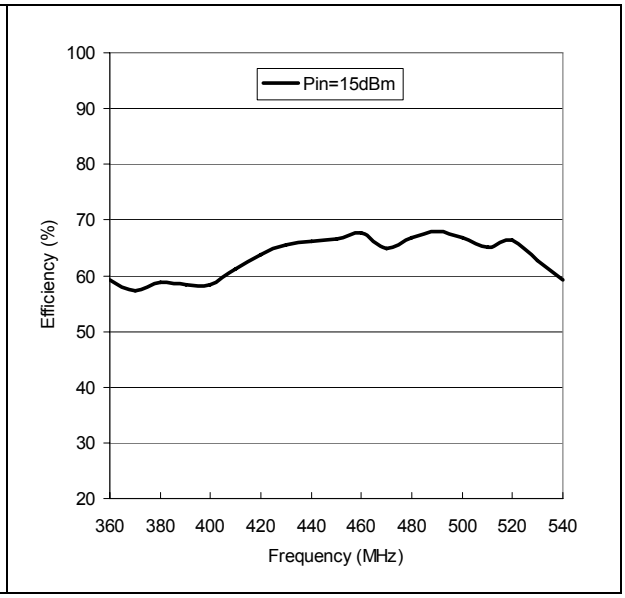


Figure 4. Gain vs. frequency Vdd = 7.2 V, Idq = 100 mA

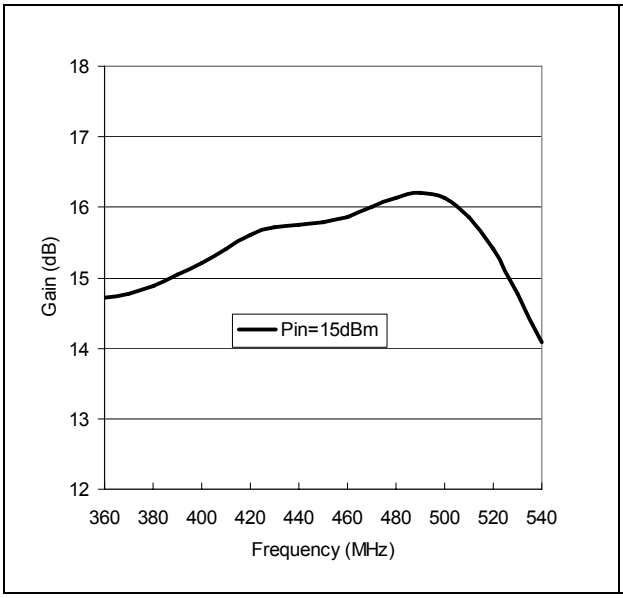


Figure 5. Input return loss vs. frequency Vdd = 7.2 V, Idq = 100 mA

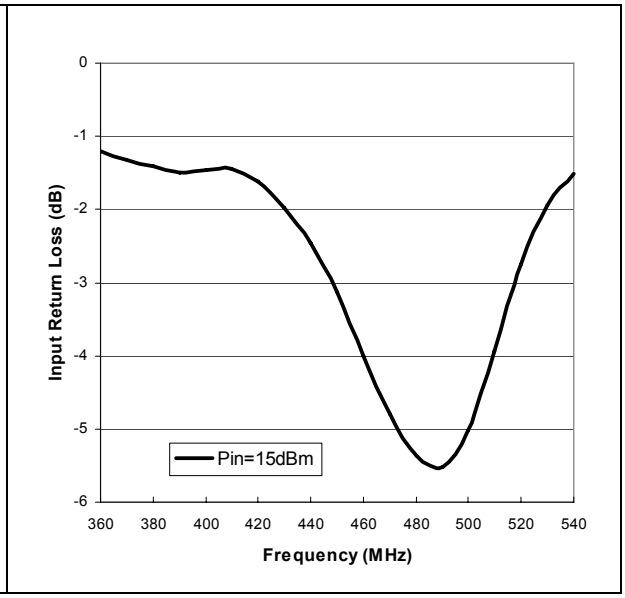


Figure 6. Output power vs. input power Vdd = 7.2 V, Idq = 100 mA

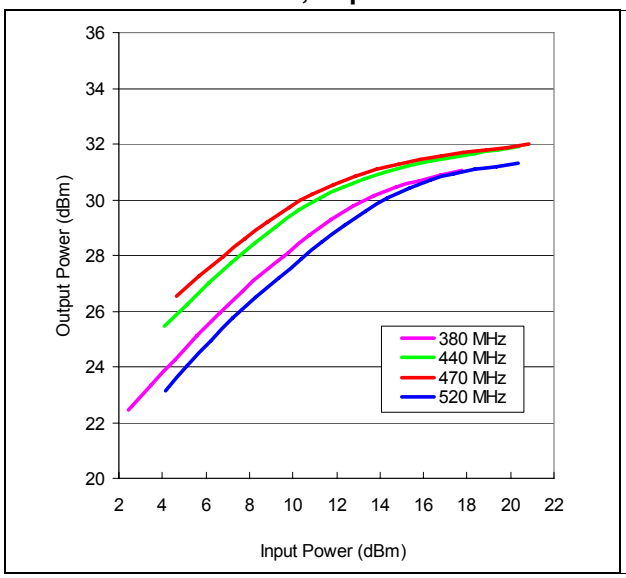


Figure 7. Efficiency vs. output power Vdd = 7.2 V, Idq = 100 mA

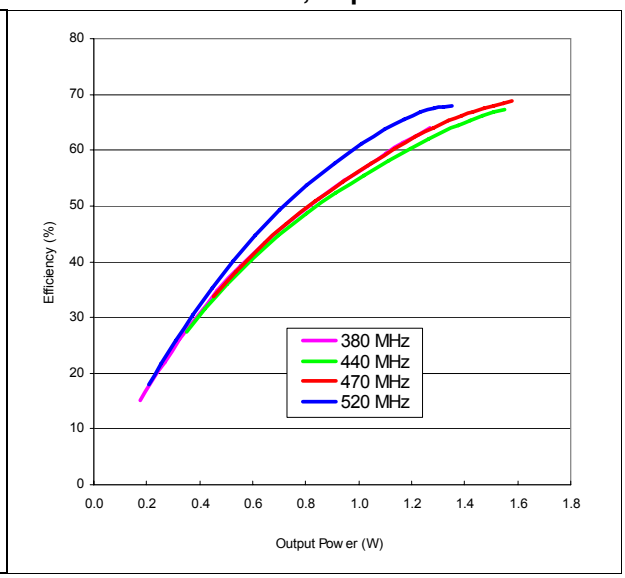
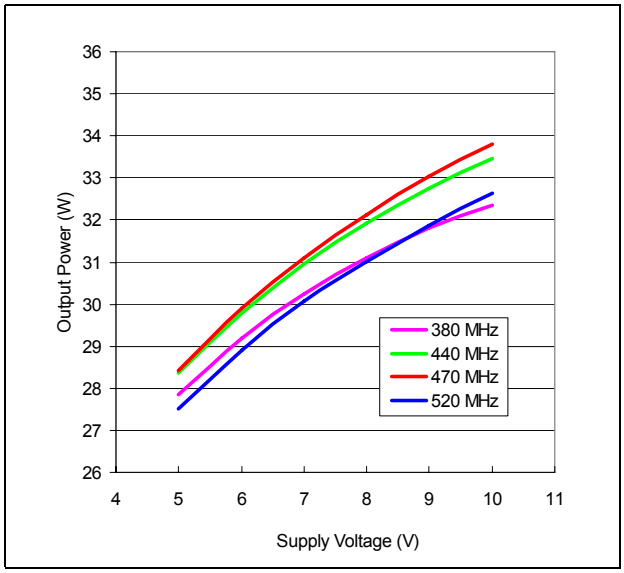


Figure 8. Output power vs. supply voltage Pin = 15 dBm, Idq = 100 mA



4 Test circuit

Figure 9. Test circuit schematic

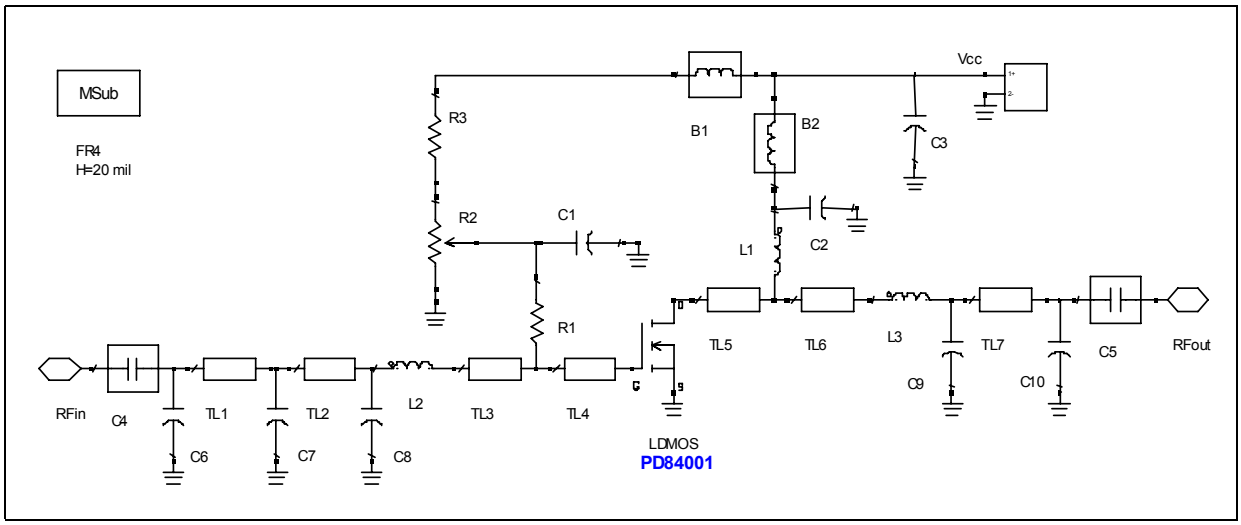


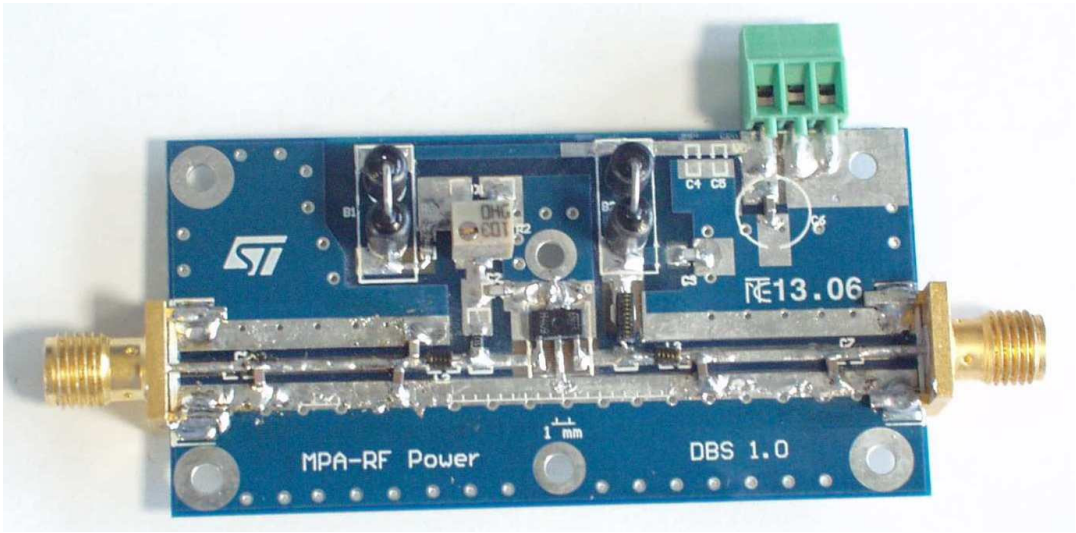
Table 4. Part list

Component ID	Description	Value	Case size	Manufacturer	Part code
B1	Ferrite Bead			Panasonic	EXCELDRC35C
B2	Ferrite Bead			Panasonic	EXCELDRC35C
C1, C2	Capacitor	120 pF	0603	Murata	GRM39-C0G121J50D500
C3	Capacitor	1 µF	0603	Murata	GRM39-X5R105K16D52K
C4, C5	Capacitor	39 pF	0603	Murata	GRM39-C0G390J50D500
C6	Capacitor	1.2 pF	0603	Murata	GRM39-C0G1R2C50Z500
C7	Capacitor	3.9 pF	0603	Murata	GRM39-C0G3R9C50Z500
C8	Capacitor	12 pF	0603	Murata	GRM39-C0G120J50D500
C9	Capacitor	5.6 pF	0603	Murata	GRM39-C0G5R6D50Z500
C10	Capacitor	3.3 pF	0603	Murata	GRM39-C0G3R3C50Z500
L1	Inductor	12.55 nH		Coilcraft	1606-10
L2,L3	Inductor	5.4 nH		Coilcraft	0906-4
R1	Resistor	510 Ω	0603	Tyco Electronics	
R2	Potentiometer	10 kΩ		Bourns Electronics	3214W-1-103E
R3	Resistor	1 k	0603	Tyco Electronics	01623440-1
TL1	Transmission line	W=0.92 mm	L=10.5 mm		
TL2	Transmission line	W=0.92 mm	L=0.8 mm		
TL3	Transmission line	W=0.92 mm	L=1.0 mm		

Table 4. Part list (continued)

Component ID	Description	Value	Case size	Manufacturer	Part code
TL4	Transmission line	W=0.92 mm	L=4.5 mm		
TL5	Transmission line	W=0.92 mm	L=3.6 mm		
TL6	Transmission line	W=0.92 mm	L=1.5 mm		
TL7	Transmission line	W=0.92 mm	L=10.0 mm		
RF in, RF out	SMA-CONN	50 Ω	60 mils	JOHNSON	142-0701-801
PD84001	LDMOS			STMicroelectronics	PD84001
Board	FR-4 THk=0.020" 2 OZ Cu both sides				

Figure 10. Demonstration board photo



5 Revision history

Table 5. Document revision history

Date	Revision	Changes
19-Oct-2010	1	Initial release

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