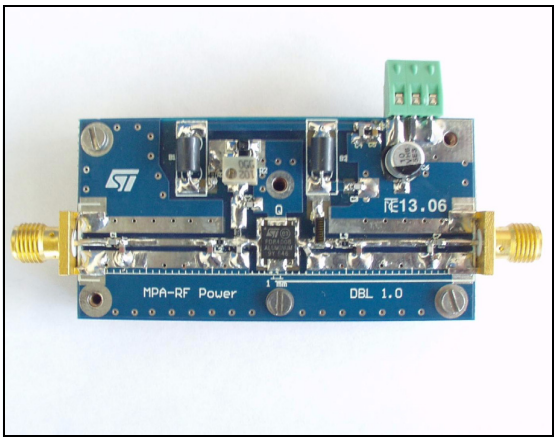
STEVAL-TDR021V1

Demonstration board using the PD84008L-E for 900 MHz 2-way radio

Features

- Excellent thermal stability
- Frequency: 740 - 950 MHz
- Supply voltage: 7.2 V
- Output power: 5 W
- Power gain: 11 ± 1.0 dB
- Efficiency: 48 % - 54%
- Load mismatch: infinite
- BeO free amplifier



Description

The STEVAL-TDR021V1 is a demonstration board using the PD84008L-E LDMOS transistor. It is designed for 2-way UHF portable radio applications.

Table 1. Device summary

Part number	Mechanical specification
STEVAL-TDR021V1	L = 60 mm, W = 30 mm

Contents

1 Electrical characteristics

T_A = + 25 °C, V_{DD} = 7.5 V, I_{dq} = 50 mA

Table 2. Electrical specification

Symbol	Test conditions	Min.	Typ.	Max.	Unit
Freq	Frequency range	740		950	MHz
P_{OUT}			5		W
Gain	@ P_{IN} = 26 dB		11 ± 1.0		dB
ND	@ P_{IN} = 26 dB		49 - 54		%
H2	2^{ND} Harmonic @ P_{IN} = 26 dB		-46 / -60		dBc
H3	3^{RD} Harmonic @ P_{IN} = 26 dB		-54 / -60		dBc
VSWR	Load mismatch all phases @ P_{OUT} = 5 W		Infinite		

2 Impedance

Figure 1. Impedance graphic

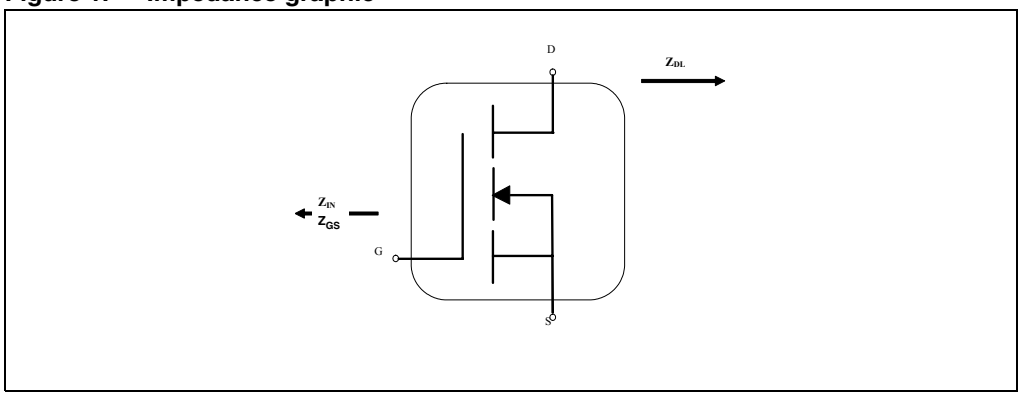


Table 3. Impedance data

F (MHz)	Z_{GS}	Z_{DL}
740	1.87 - j5.74	3.04 - j6.19
750	1.84 - j5.65	3.10 - j6.13
760	1.83 - j5.55	3.17 - j6.09
770	1.81 - j5.43	3.26 - j6.04
780	1.79 - j5.30	3.35 - j5.60
790	1.74 - j5.19	3.43 - j5.98
800	1.70 - j5.13	3.51 - j6.02
810	1.67 - j5.05	3.61 - j6.09
820	1.68 - j4.97	3.70 - j6.20
830	1.69 - j4.89	3.82 - j6.32
840	1.69 - j4.80	3.91 - j6.48
850	1.68 - j4.72	3.94 - j6.70
860	1.67 - j4.68	3.90 - j6.96
870	1.66 - j4.61	3.82 - j7.22
880	1.66 - j4.54	3.67 - j7.48
890	1.66 - j4.48	3.47 - j7.65
900	1.61 - j4.37	3.17 - j7.74
910	1.54 - j4.26	2.85 - j7.79
920	1.48 - j4.18	2.48 - j7.81
930	1.43 - j4.12	2.12 - j7.77
940	1.36 - j4.04	1.77 - j7.67
950	1.33 - j3.98	1.49 - j7.51

3 Typical performance

Figure 2. Output power vs. frequency Vdd = 7.2 V - Idq = 200 mA

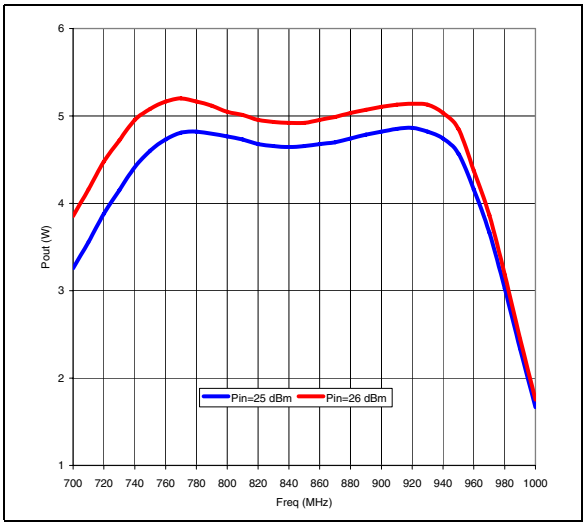


Figure 3. Gain vs. frequency Vdd = 7.2 V - Idq = 200 mA

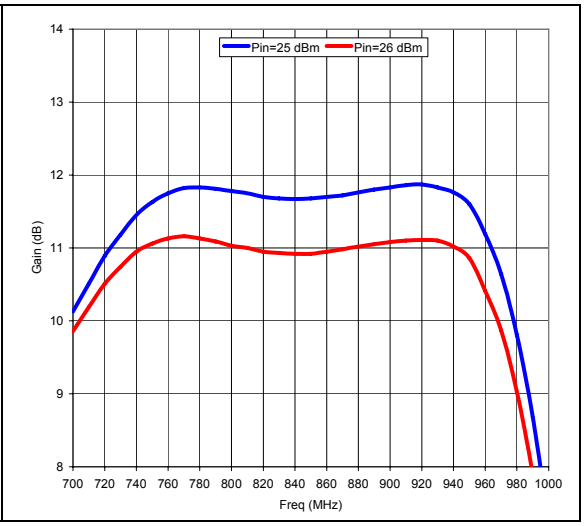


Figure 4. Input return loss vs. frequency Vdd = 7.2 V - Idq = 200 mA

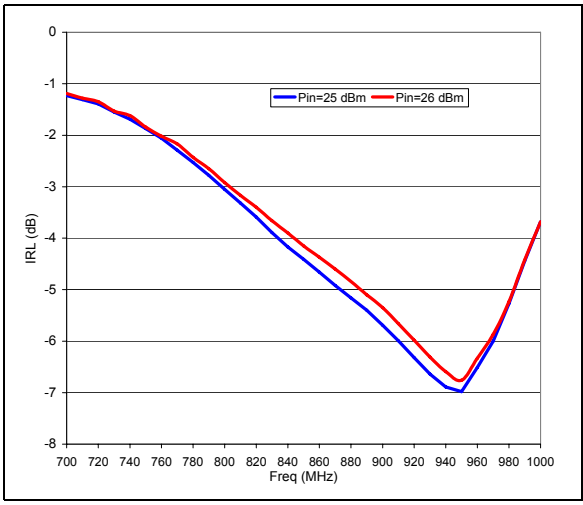


Figure 5. Efficiency vs. frequency Vdd = 7.2 V - Idq = 200 mA

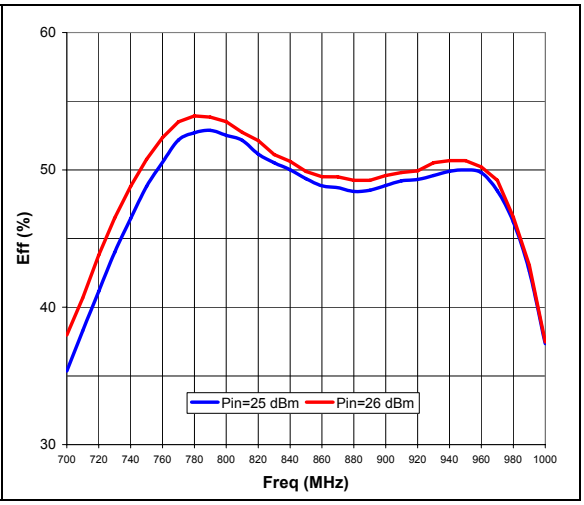


Figure 6. Gain vs. output Vdd = 7.2 V - Idq = 200 mA

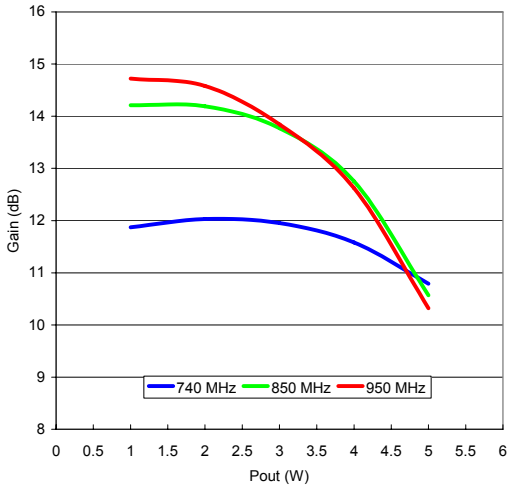
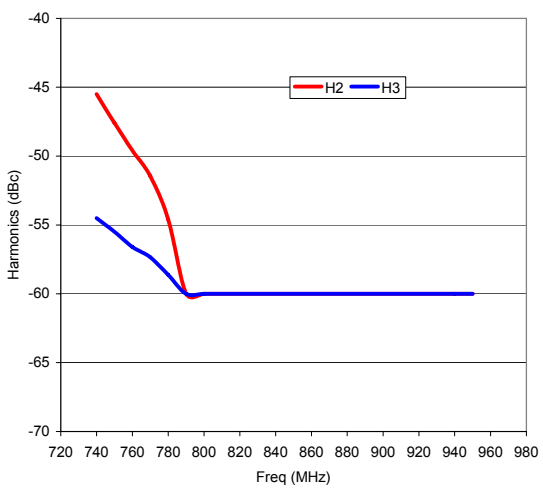


Figure 7. Harmonics vs. frequency Pin = 26 dBm Vdd = 7.2 V - Idq = 200 mA



4 Test circuit

Figure 8. Test circuit schematic

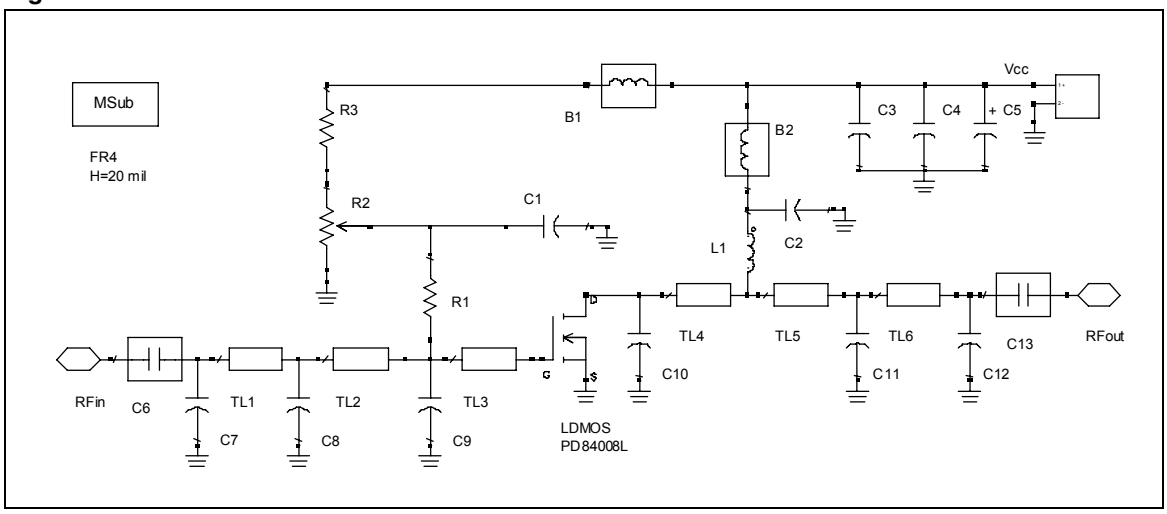


Table 4. Component part list

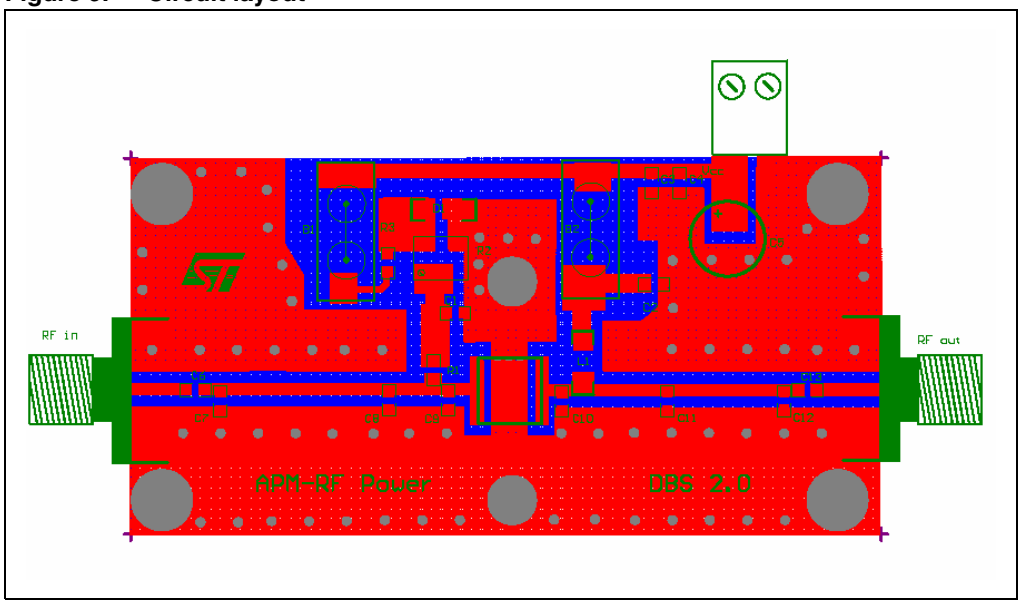
Component ID	Description	Value	Case size	Manufacturer	Part code
B1	Ferrite bead			Panasonic	EXCELDRC35C
B2	Ferrite bead			Panasonic	EXCELDRC35C
C1, C2	Capacitor	150 pF	0603	Murata	GRM39-C0G151J50D500
C3	Capacitor	1 nF	0603	Murata	GRM39-COG102J50D500
C4	Capacitor	10 nF	0603	Murata	GRM39-X7R103K50C560_
C5	Capacitor	10 µF	SMT	Panasonic	EEVHB1V100P
C6, C13	Capacitor	39 pF	0603	Murata	GRM39-C0G390J50D500
C7, C8	Capacitor	3,9 pF	0603	Murata	GRM39-C0G3R9C50Z500
C9, C10	Capacitor	18 pF	0603	Murata	GRQ706-C0G180J50K500
C11	Capacitor	8.2 pF	0603	Murata	GRM39-C0G8R2D50Z500
C12	Capacitor	2 pF	0603	Murata	GRQ706-C0G020C100K500
L1	Inductor	12.55 nH		Coilcraft	1606-10
R1	Resistor	510 Ω	0603	Tyco electronics	
R2	Potentiometer	1 kΩ		Bourns electronics	3224W-1-102

Table 4. Component part list (continued)

Component ID	Description	Value	Case size	Manufacturer	Part code
R3	Resistor	100 Ω	0603	Tyco electronics	01623440-1
TL1	Transmission Line	W=0.92 mm	L=12,5 mm		
TL2	Transmission Line	W=0.92 mm	L=3,5 mm		
TL3	Transmission Line	W=0.92 mm	L=2,6 mm		
TL4	Transmission Line	W=0.92 mm	L=1,8 mm		
TL5	Transmission Line	W=0.92 mm	L=5,3 mm		
TL6	Transmission Line	W=0.92 mm	L=10.0 mm		
RF in, RF out	SMA-CONN	50 Ω	60 mils	Johnson	142-0701-801
PD84008L-E	LDMOS			STMicroelectronics	PD84008L-E
Board	FR-4 THk=0.020" 2OZ Cu both sides				

5 Circuit layout

Figure 9. Circuit layout



6 Revision history

Table 5. Document revision history

Date	Revision	Changes
14-Oct-2010	1	Initial release

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