



STEVAL-TDR027V1

Portable UHF 2-way radio demonstration board
based on the PD84008L-E

Features

- Excellent thermal stability
- Frequency: 380 - 512 MHz
- Supply voltage: 7.2 V
- Output power: > 6 W
- Power gain: 11.7 ± 0.5 dB
- Efficiency: 46% - 71%
- Load mismatch: 20:1 all phases
- BeO-free amplifier

Description

The STEVAL-TDR027V1 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.

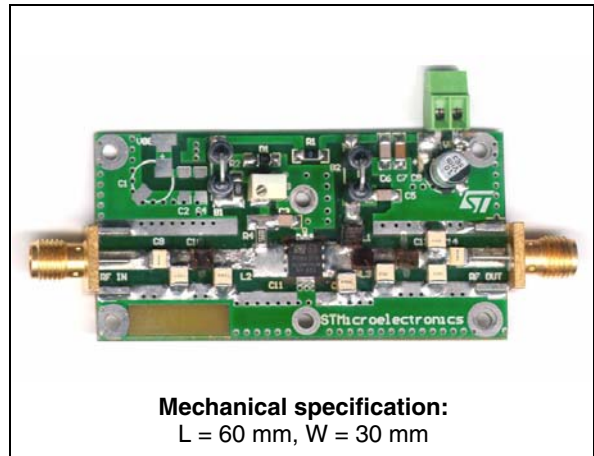


Table 1. Device summary

Part number
STEVAL-TDR027V1

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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	380		512	MHz
P _{OUT}	@ P _{IN} = 27 dBm	6			W
Gain	@ P _{IN} = 27 dBm		11.7 ± 0.5		dB
ND	@ P _{IN} = 27 dB		46 - 71		%
H2	2nd harmonic @ P _{IN} = 27 dB		-38 / -70		dBc
H3	3rd harmonic @ P _{IN} = 27 dB		-60 / -70		dBc
VSWR	Load mismatch all phases @ P _{OUT} = 6 W			20:1	

2 Impedance

Figure 1. Impedance diagram

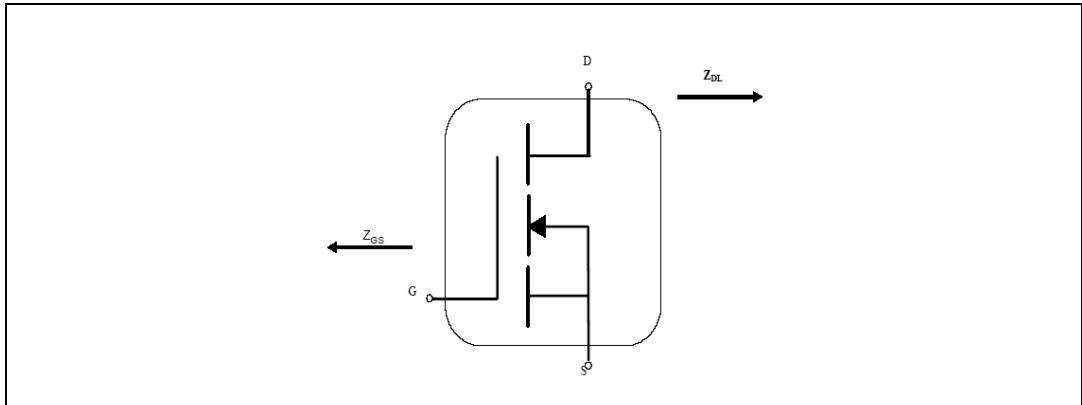


Table 3. Impedance data

F (MHz)	Z_{GS}	Z_{DL}
380	$3,3 + j6,2$	$2,2 - j0,7$
390	$3,6 + j6,7$	$2,2 - j0,4$
400	$4,1 + j7,1$	$2,2 - j0,1$
410	$4,6 + j7,4$	$2,2 + j0,2$
420	$5,3 + j7,5$	$2,2 + j0,5$
430	$6,2 + j7,3$	$2,3 + j0,8$
440	$6,8 + j6,6$	$2,4 + j1,0$
450	$7,0 + j5,4$	$2,4 + j1,3$
460	$6,4 + j4,2$	$2,6 + j1,5$
470	$5,2 + j3,6$	$2,7 + j1,6$
480	$3,9 + j3,7$	$2,8 + j1,7$
490	$2,8 + j4,2$	$2,9 + j1,8$
500	$2,1 + j4,9$	$3,0 + j1,9$
510	$1,6 + j5,6$	$3,1 + j1,8$
520	$1,3 + j6,3$	$3,2 + j1,7$

3 Typical performance

Figure 2. Output power and efficiency vs. frequency (pin=27 dBm)

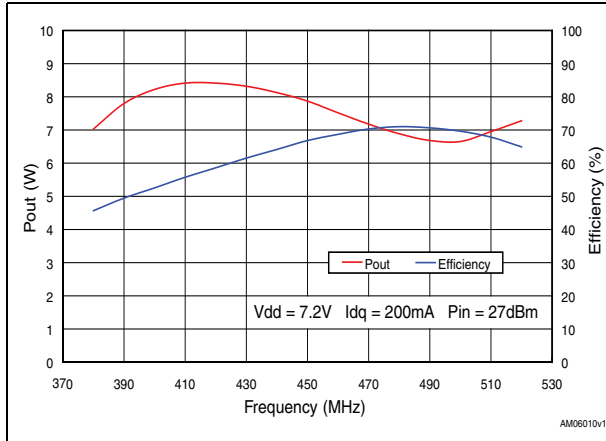


Figure 3. Output power and efficiency vs. frequency (pin=28 dBm)

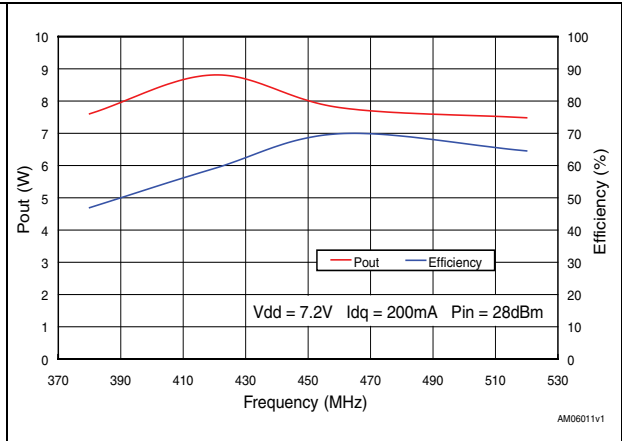


Figure 4. Gain vs. frequency

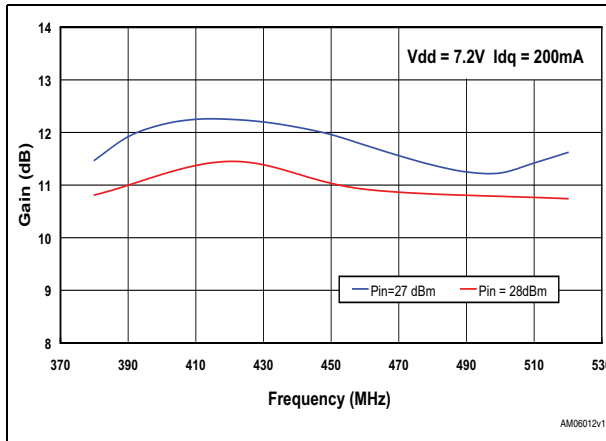


Figure 5. Gain vs. Pout

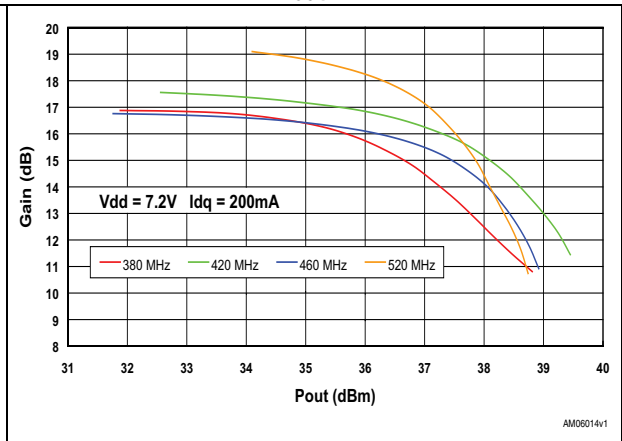


Figure 6. Input return loss vs. frequency

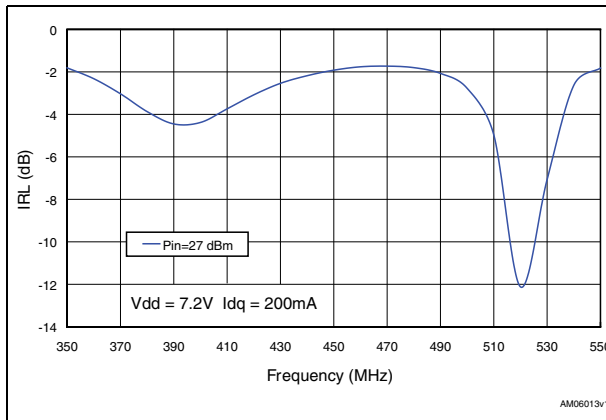


Figure 7. Drain current vs. output power

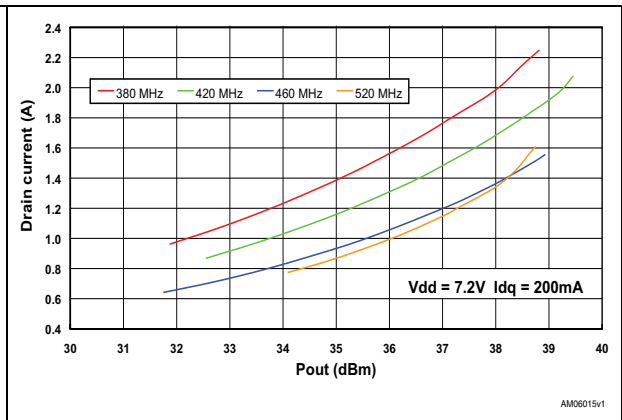
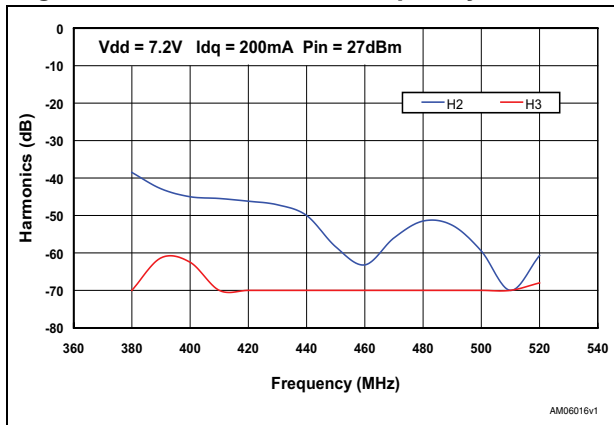


Figure 8. Harmonics vs. frequency



4 Test circuit

Figure 9. Test circuit schematic diagram

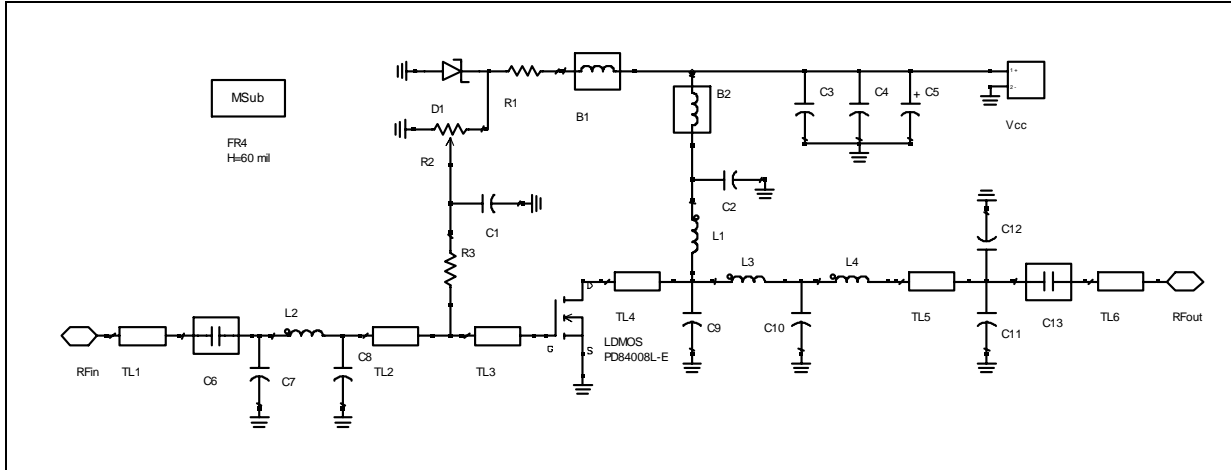


Table 4. Component list

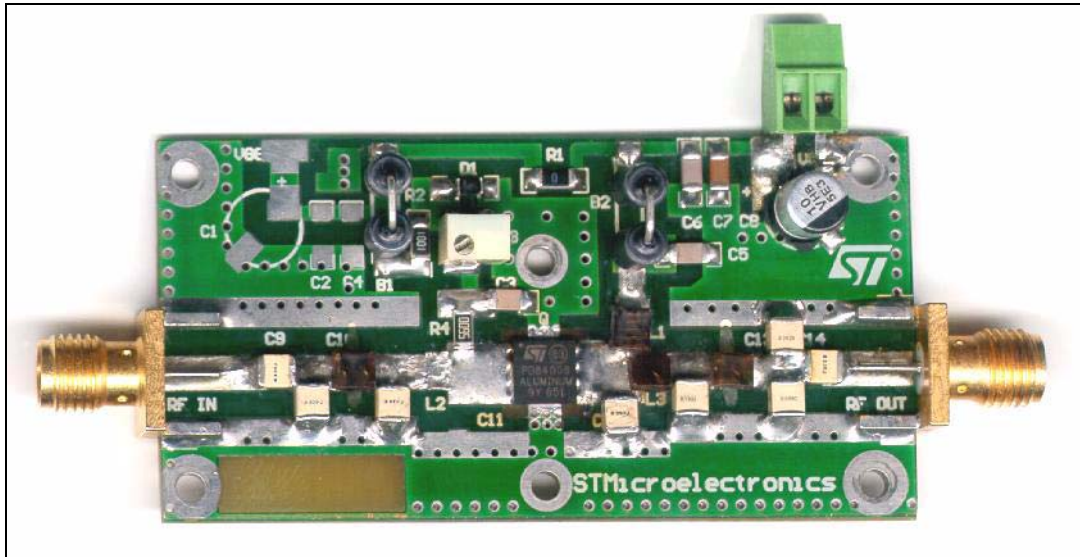
Component ID	Description	Value	Case size	Manufacturer	Part code	
B1	Ferrite bead			Panasonic	EXCELDRC35C	
B2				Panasonic	EXCELDRC35C	
C1, C2	Capacitor	120 pF	1206	MURATA	GRM42-6 COG 121J 50_	
C3		1 nF	1206	MURATA	GRM42-6 COG 102J 50	
C4		100 nF	1206	MURATA	GRM42-6_X7R 104K 50_	
C5		10 uF	SMT	Panasonic	EEVHB1V100P	
C6, C13		33 pF	100B	ATC	ATC 100B 330JW	
C7		22 pF	100B	ATC	ATC 100B 220JW	
C8		47 pF	100B	ATC	ATC 100B 470JW	
C9		39 pF	100B	ATC	ATC 100B 390JW	
C10		15 pF	100B	ATC	ATC 100B 150JW	
C11		6.8 pF	100B	ATC	ATC 100B 6R8BW	
C12		2.2 pF	100B	ATC	ATC 100B 2R2BW	
D1		Zener diode	5.1 V	SOD110	Philips	BZX284C5V1
L1		Inductor	18.5 nH		Coilcraft	A05T
L2	5 nH			Coilcraft	A02T	
L3, L4	2.5 nH			Coilcraft	A01T	
R1	Resistor	1 kΩ	1206	Tyco Electronics	01623440-1	

Table 4. Component list (continued)

Component ID	Description	Value	Case size	Manufacturer	Part code
R2	Potentiometer	10 k Ω		Bourns Electronics	3214W-1-103E
R3	Resistor	560 Ω	1206	Bourns Electronics	
TL1	Transmission line	W=2.87 mm	L=7.4 mm		
TL2		W=2.87 mm	L=5.0 mm		
TL3		W=4.98 mm	L=4.8 mm		
TL4		W=4.98 mm	L=4.0 mm		
TL5		W=2.87 mm	L=1.5 mm		
TL6		W=2.87 mm	L=6.1 mm		
PD84008L	LDMOS			STMicroelectronics	PD84008L-E
Board	FR-4 THk=0.060" 2OZ Cu both sides				

5 Board photo

Figure 10. STEVAL-TDR027V1 demonstration board



6 Revision history

Table 5. Document revision history

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

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