



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.

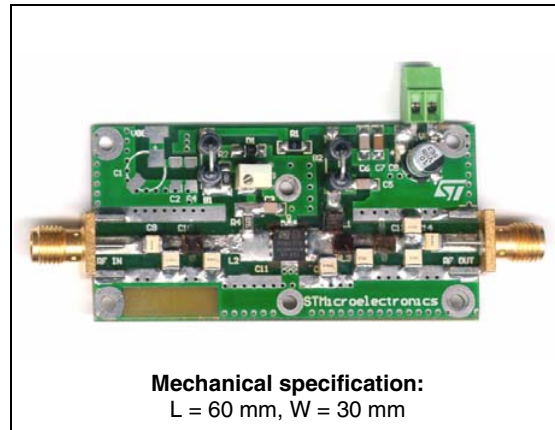


Table 1. Device summary

Part number
STEVAL-TDR027V1

Contents

1	Electrical characteristics	3
2	Impedance	4
3	Typical performances	5
4	Test circuit	7
5	Circuit photo	9
6	Revision history	10

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

2 Impedance

Figure 1. Impedance diagram

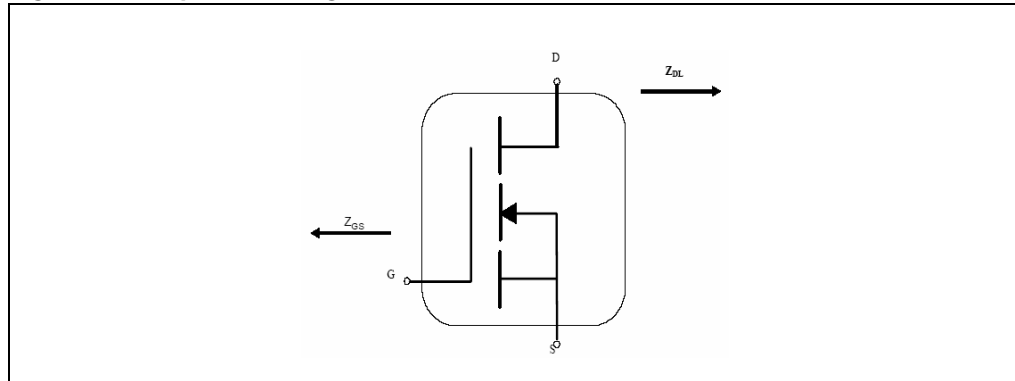


Table 3. Impedance data

F (MHz)	Z_{GS}	ZDL
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)

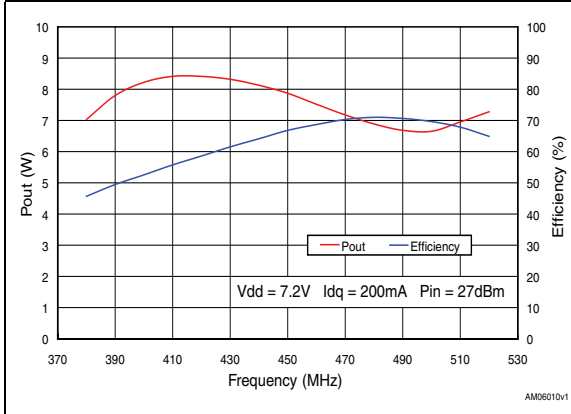


Figure 3. Output power and efficiency vs. frequency (pin=28 dBm)

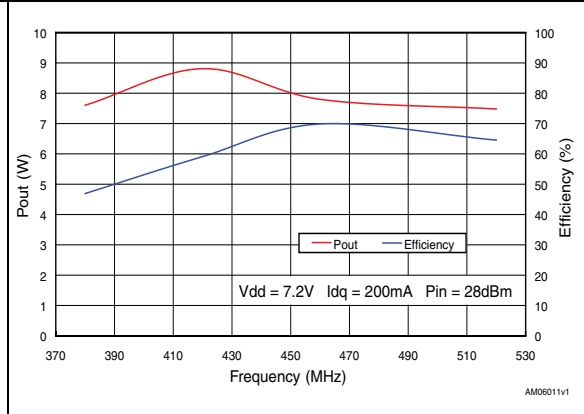


Figure 4. Gain vs. frequency

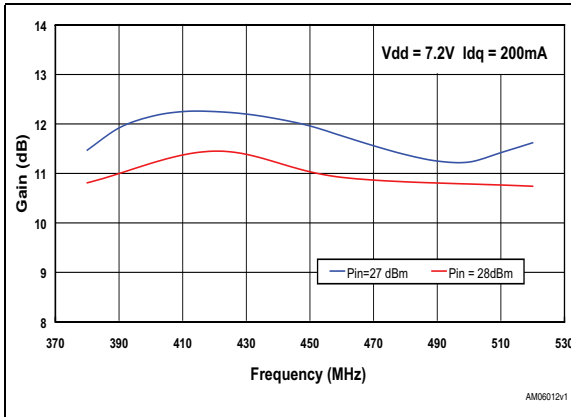


Figure 5. Gain vs. P_{out}

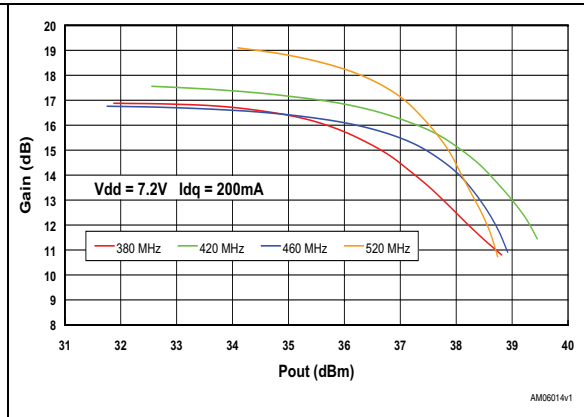


Figure 6. Input return loss vs. frequency

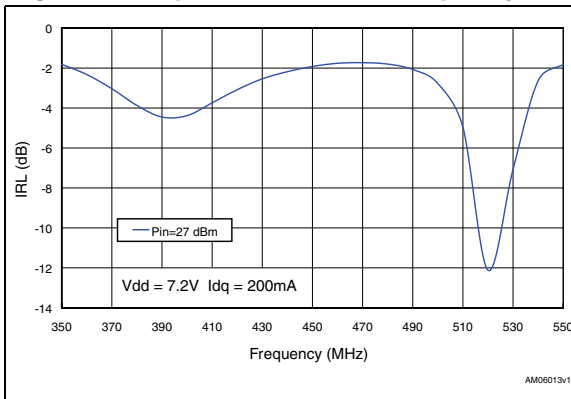


Figure 7. Drain current vs. output power

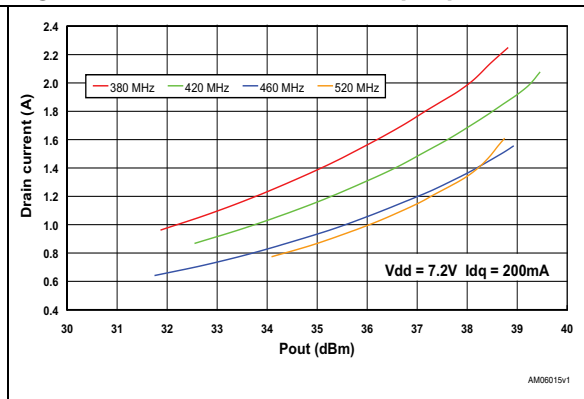
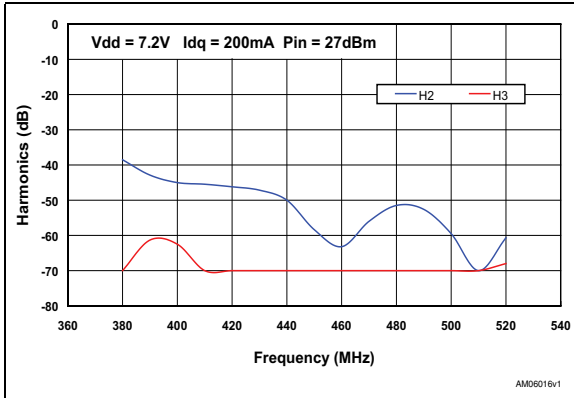


Figure 8. Harmonics vs. frequency



4 Test circuit

Figure 9. Test circuit schematic diagram

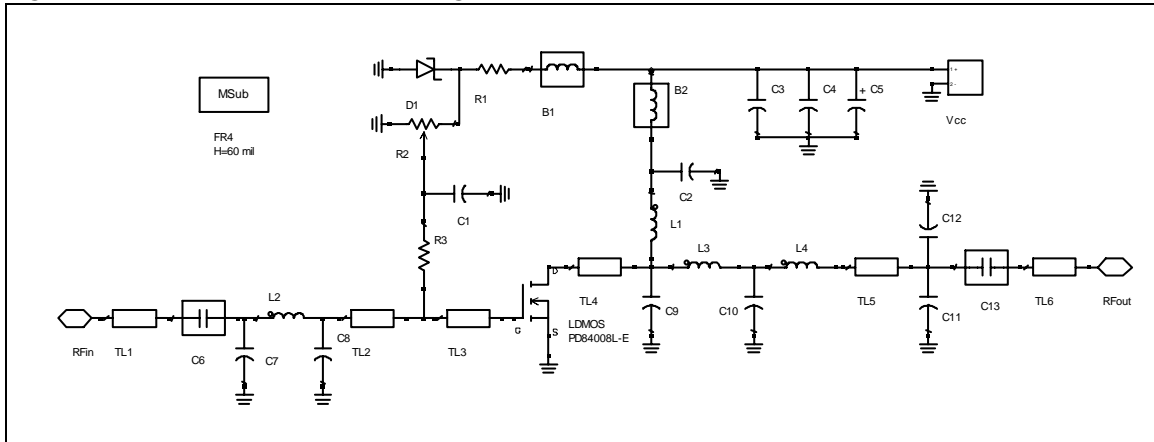


Table 4. Component list

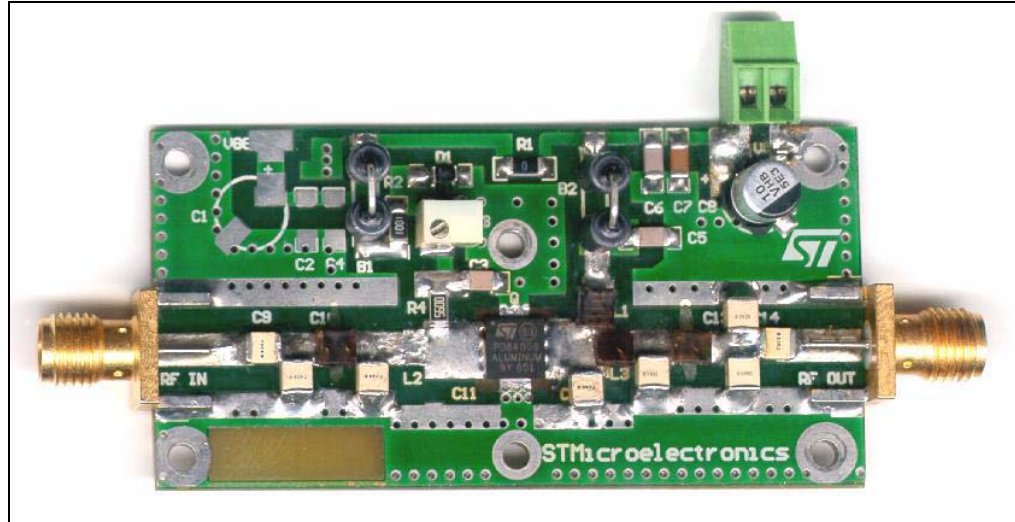
Component ID	Description	Value	Case size	Manufacturer	Part code
B1	Ferrite bead			Panasonic	EXCELDRC35C
B2				Panasonic	EXCELDRC35C
C1, C2	Capacitor	120 pF	1206	MURATA	GRM42-6 COG 121J 50_
C3		1 nF	1206	MURATA	GRM42-6 COG 102J 50
C4		100 nF	1206	MURATA	GRM42-6_X7R 104K 50_
C5		10 uF	SMT	Panasonic	EEVHB1V100P
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
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.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2010 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

