



## 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:  $11 \pm 1.0$  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.

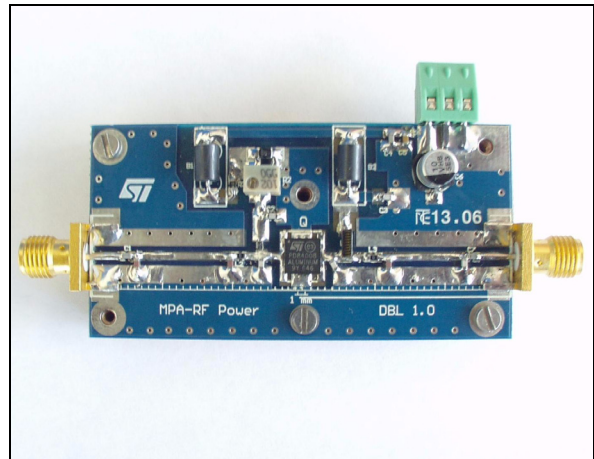


Table 1. Device summary

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

# Contents

1	<b>Electrical characteristics</b> .....	<b>3</b>
2	<b>Impedance</b> .....	<b>4</b>
3	<b>Typical performance</b> .....	<b>5</b>
4	<b>Test circuit</b> .....	<b>7</b>
5	<b>Circuit layout</b> .....	<b>9</b>
6	<b>Revision history</b> .....	<b>10</b>

# 1 Electrical characteristics

$T_A = +25\text{ }^\circ\text{C}$ ,  $V_{DD} = 7.5\text{ V}$ ,  $I_{dq} = 50\text{ mA}$

**Table 2. Electrical specification**

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

## 2 Impedance

Figure 1. Impedance graphic

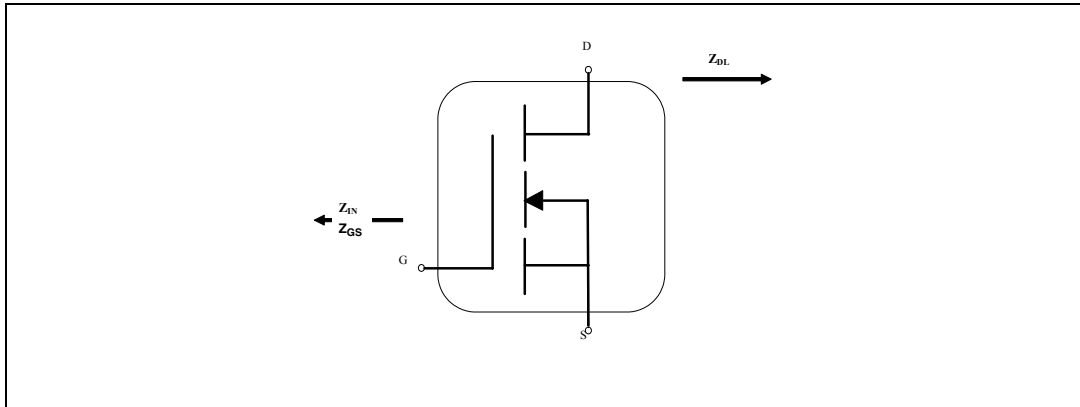
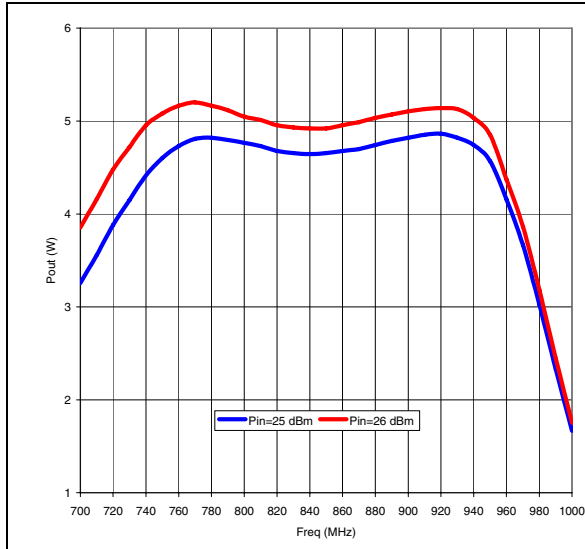


Table 3. Impedance data

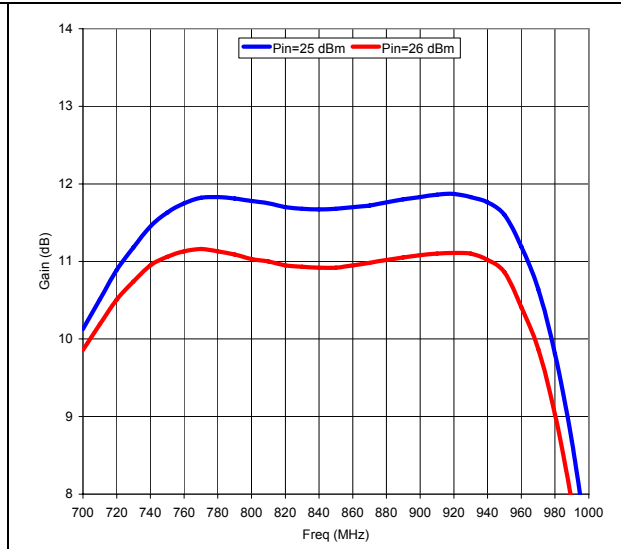
F (MHz)	Z <sub>GS</sub>	Z <sub>DL</sub>
740	1.87 - j5.74	3.04 - j6.19
750	1.84 - j5.65	3.10 - j6.13
760	1.83 - j5.55	3.17 - j6.09
770	1.81 - j5.43	3.26 - j6.04
780	1.79 - j5.30	3.35 - j5.60
790	1.74 - j5.19	3.43 - j5.98
800	1.70 - j5.13	3.51 - j6.02
810	1.67 - j5.05	3.61 - j6.09
820	1.68 - j4.97	3.70 - 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

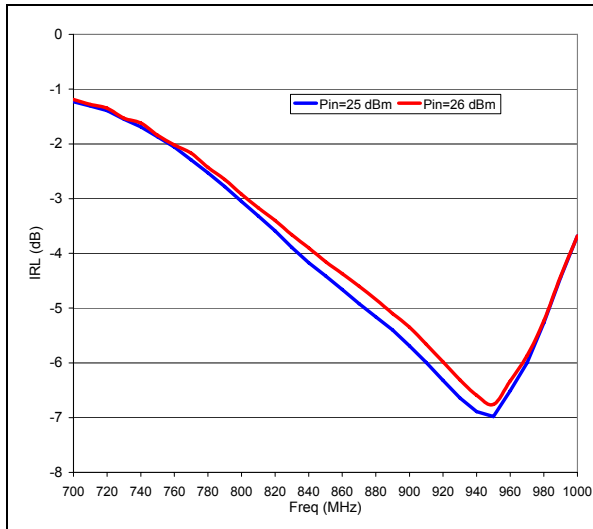
**Figure 2. Output power vs. frequency**  
 Vdd = 7.2 V - Idq = 200 mA



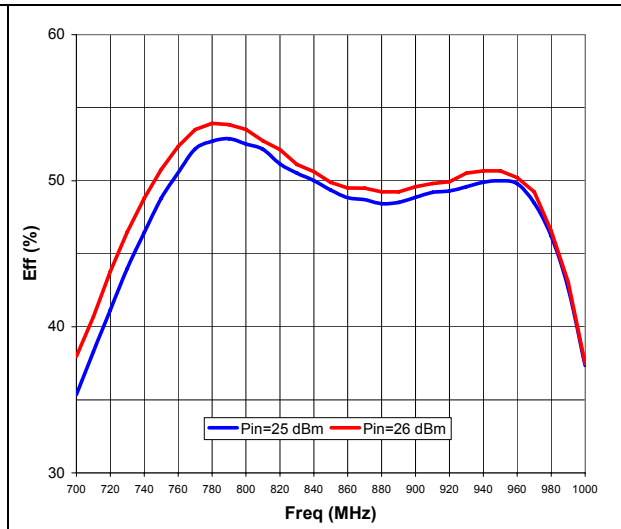
**Figure 3. Gain vs. frequency**  
 Vdd = 7.2 V - Idq = 200 mA



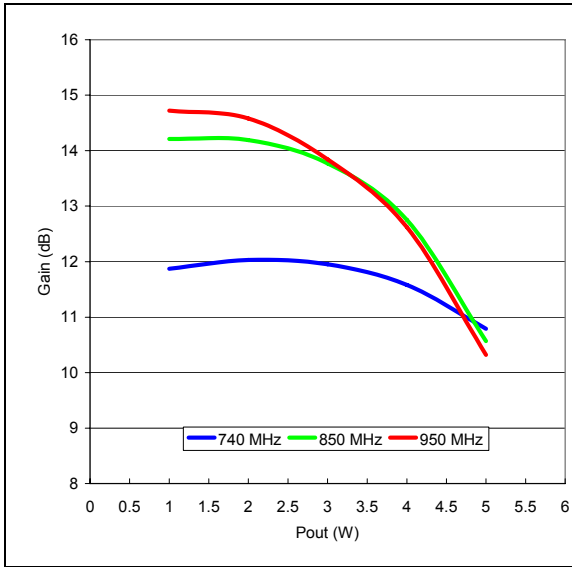
**Figure 4. Input return loss vs. frequency**  
 Vdd = 7.2 V - Idq = 200 mA



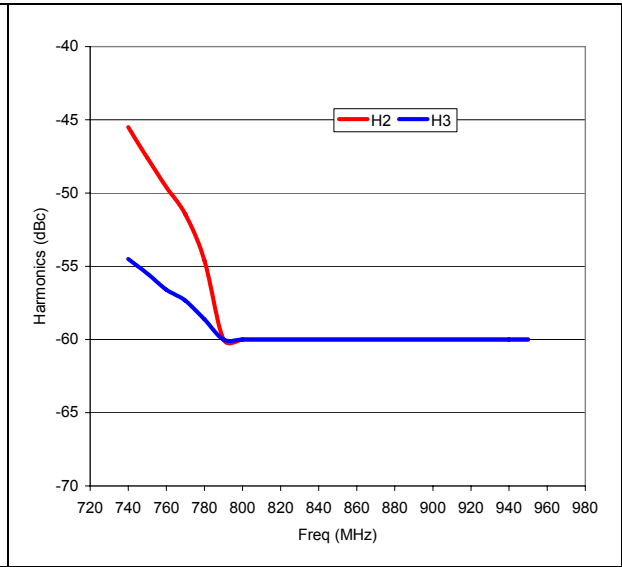
**Figure 5. Efficiency vs. frequency**  
 Vdd = 7.2 V - Idq = 200 mA



**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

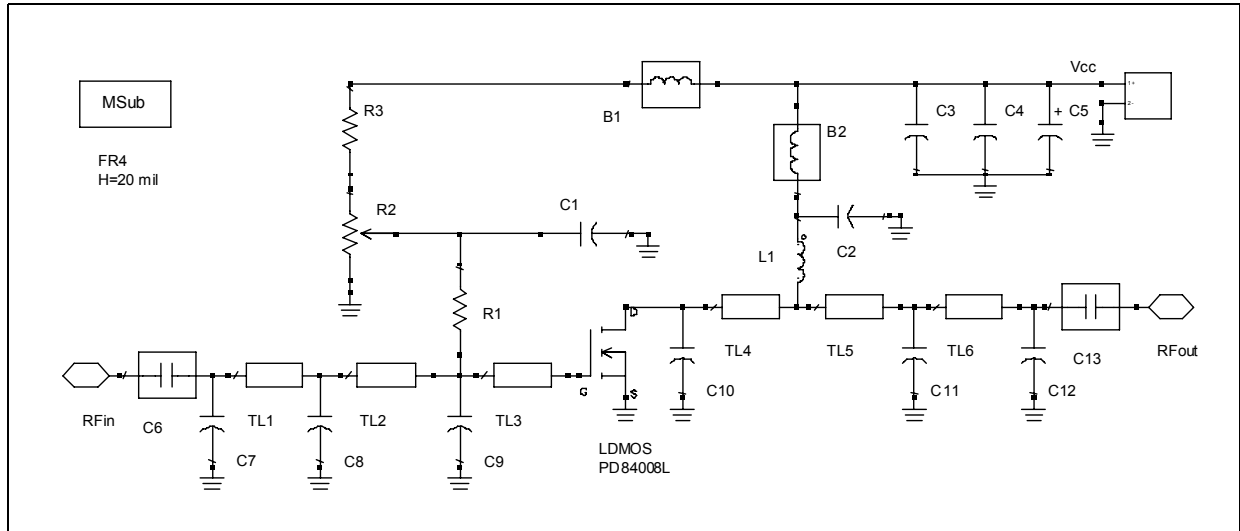


Table 4. Component part list

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

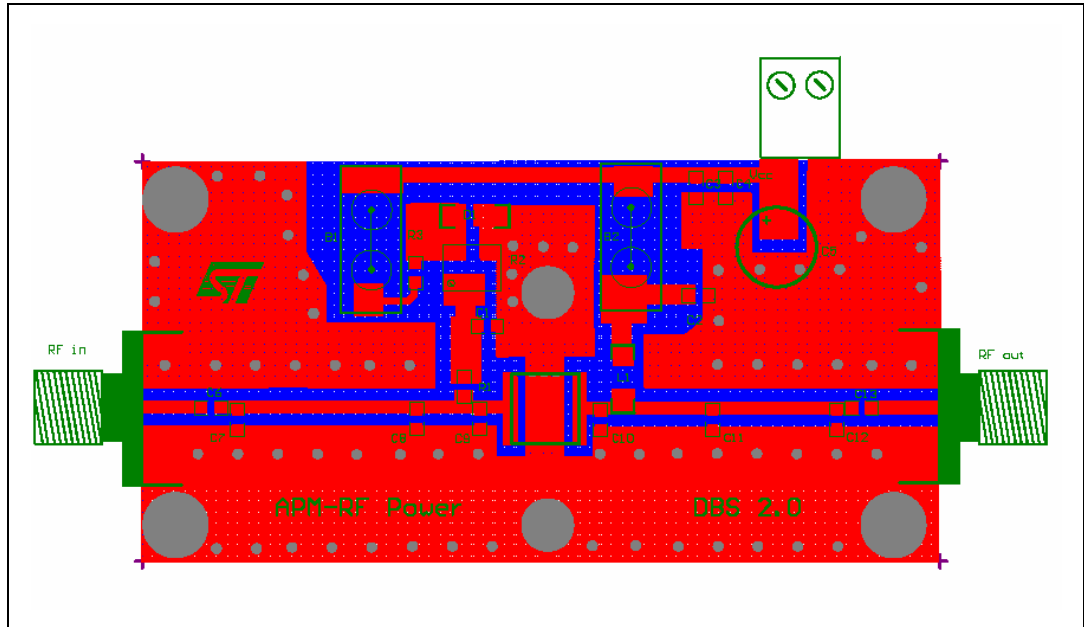
Table 4. Component part list (continued)

Component ID	Description	Value	Case size	Manufacturer	Part code
R3	Resistor	100 $\Omega$	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 $\Omega$	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

**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](http://www.st.com)



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[STEVAL-TDR021V1](#)