



STEVAL-TDR014V1

Demonstration board based on the PD55008-E
for UHF mobile radio

Features

- Excellent thermal stability
- Frequency: 400 - 500 MHz
- Supply voltage: 12.5 V
- Output power: 8 W
- Efficiency: 48 % - 54 %
- Load mismatch: 20:1
- BeO-free amplifier

Description

The STEVAL-TDR014V1 is a demonstration board using the PD55008-E common source N-channel enhancement-mode lateral field effect RF power amplifier. It is designed as a driver for UHF mobile radio applications.

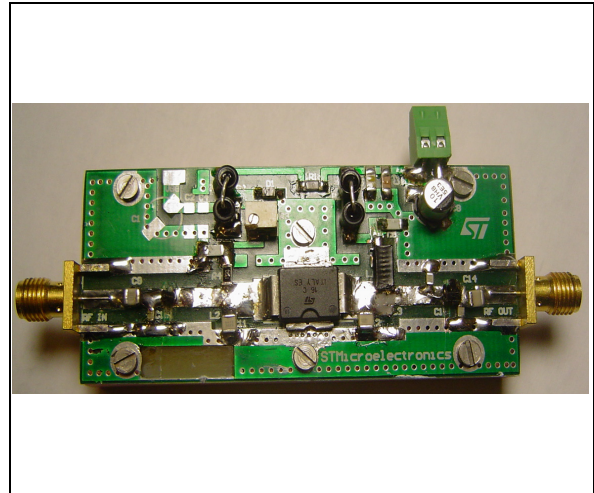


Table 1. Device summary

Order code	Mechanical specification
STEVAL-TDR014V1	L = 60 mm, W = 30 mm

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1 Electrical characteristics

$T_A = +25\text{ }^\circ\text{C}$, $V_{DD} = 12.5\text{ V}$, $I_{DQ} = 100\text{ mA}$

Table 2. Electrical Specification

Symbol	Test conditions	Min.	Typ.	Max.	Unit
Freq	Frequency range	400		500	MHz
P _{OUT}		8	10		W
Gain	@ P _{OUT} = 8 W	13.9 ± 0.7dB			dB
ND	@ P _{OUT} = 8 W	48		54	%
H2	2 ND Harmonic @ P _{OUT} = 8 W		-53	-50	dBc
H3	3 RD Harmonic @ P _{OUT} = 8 W		-60	-55	dBc
VSWR	Load mismatch all phases @ P _{OUT} = 8 W			20:1	

2 Typical performance

Figure 1. Output power vs. input power Figure 2. Gain vs. output power

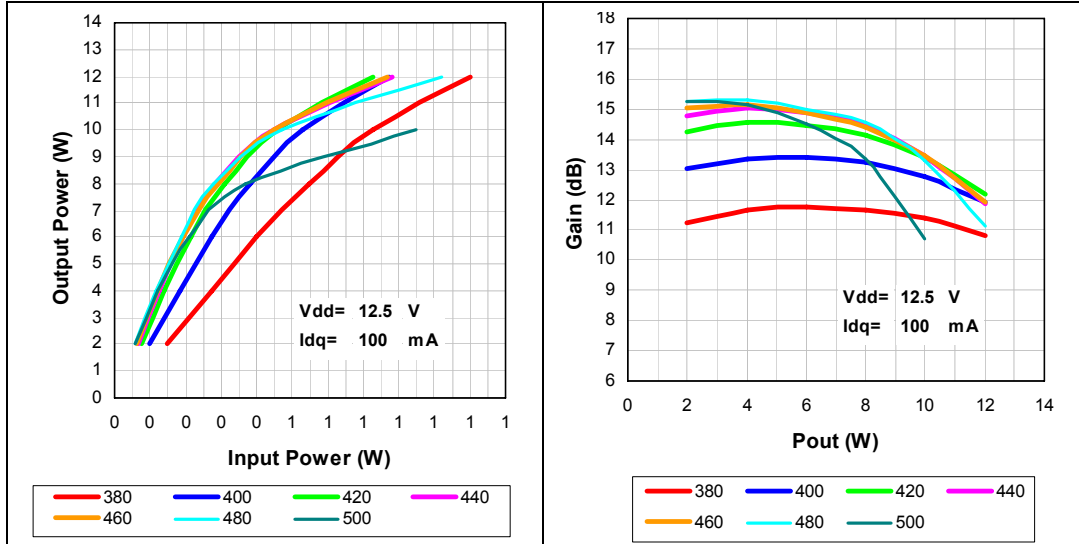


Figure 3. Drain efficiency vs. output power Figure 4. Gain vs. frequency

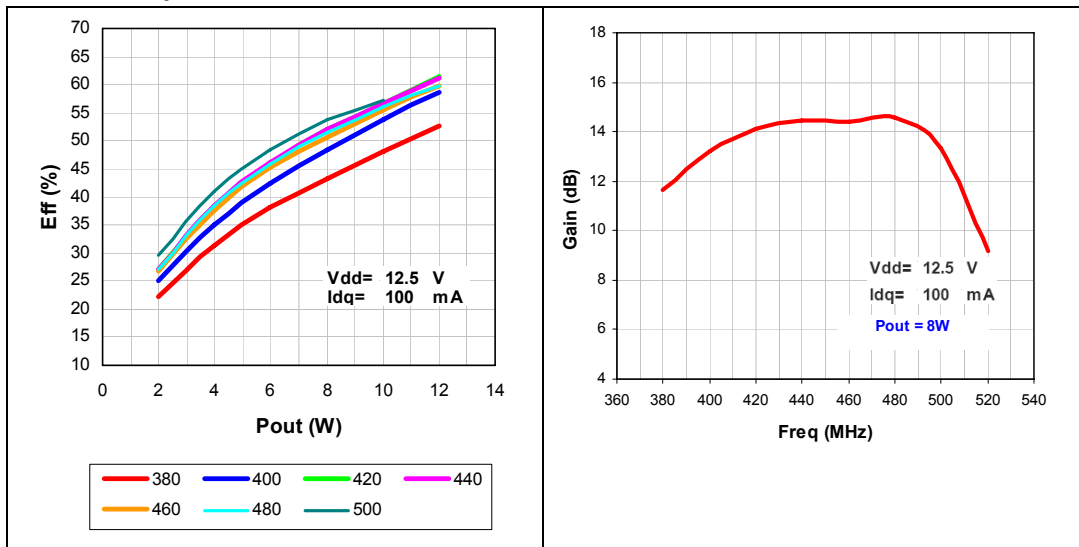


Figure 5. Efficiency vs. frequency

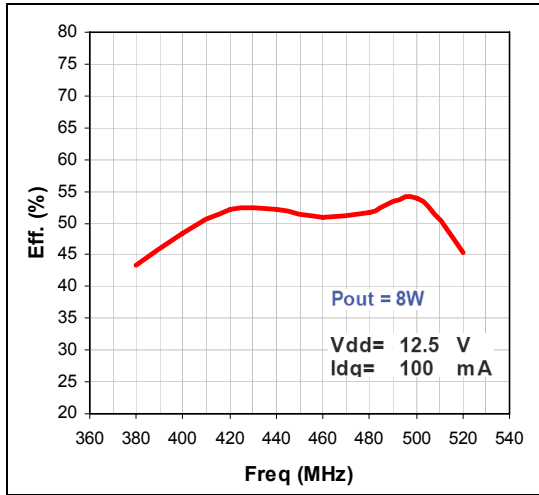


Figure 6. Input return loss vs. frequency

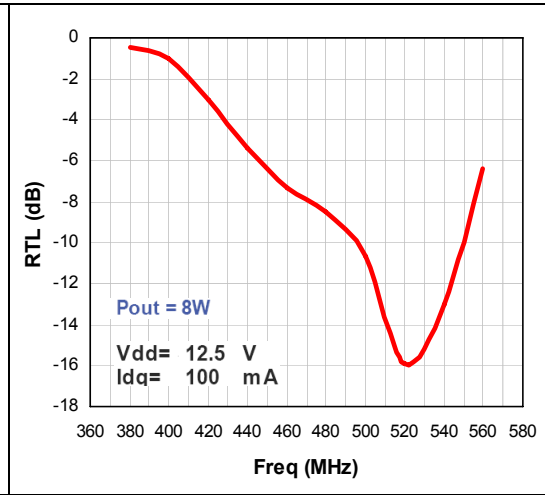


Figure 7. Harmonics vs. frequency

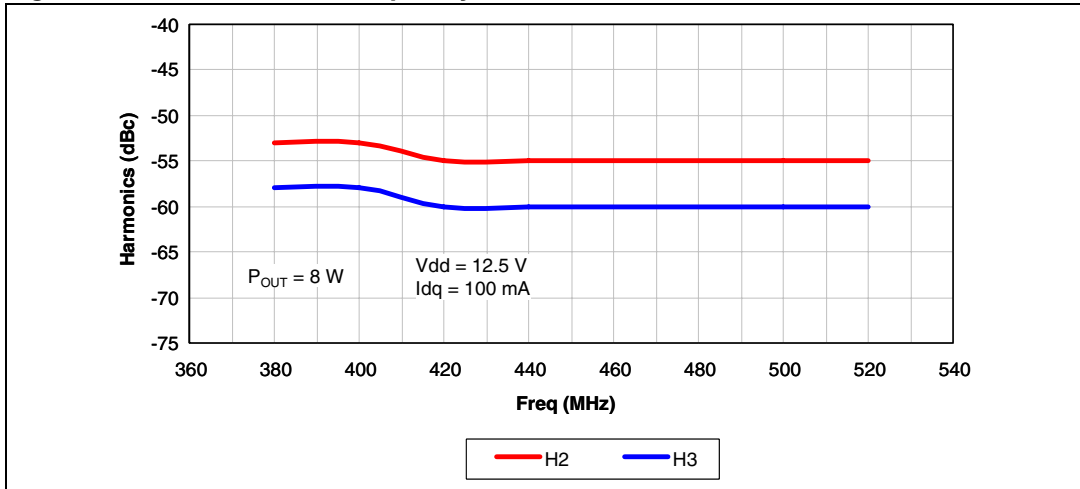
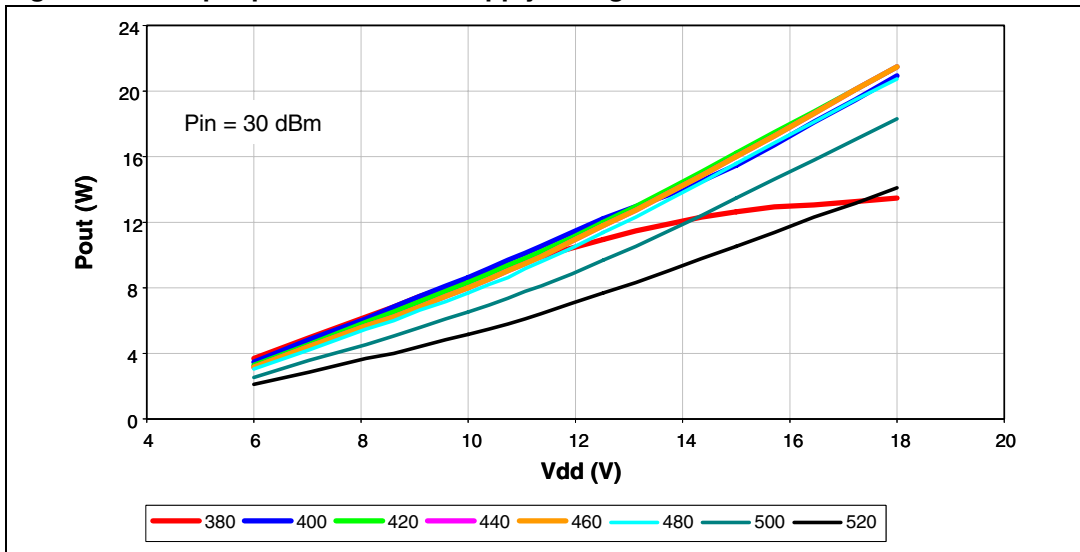
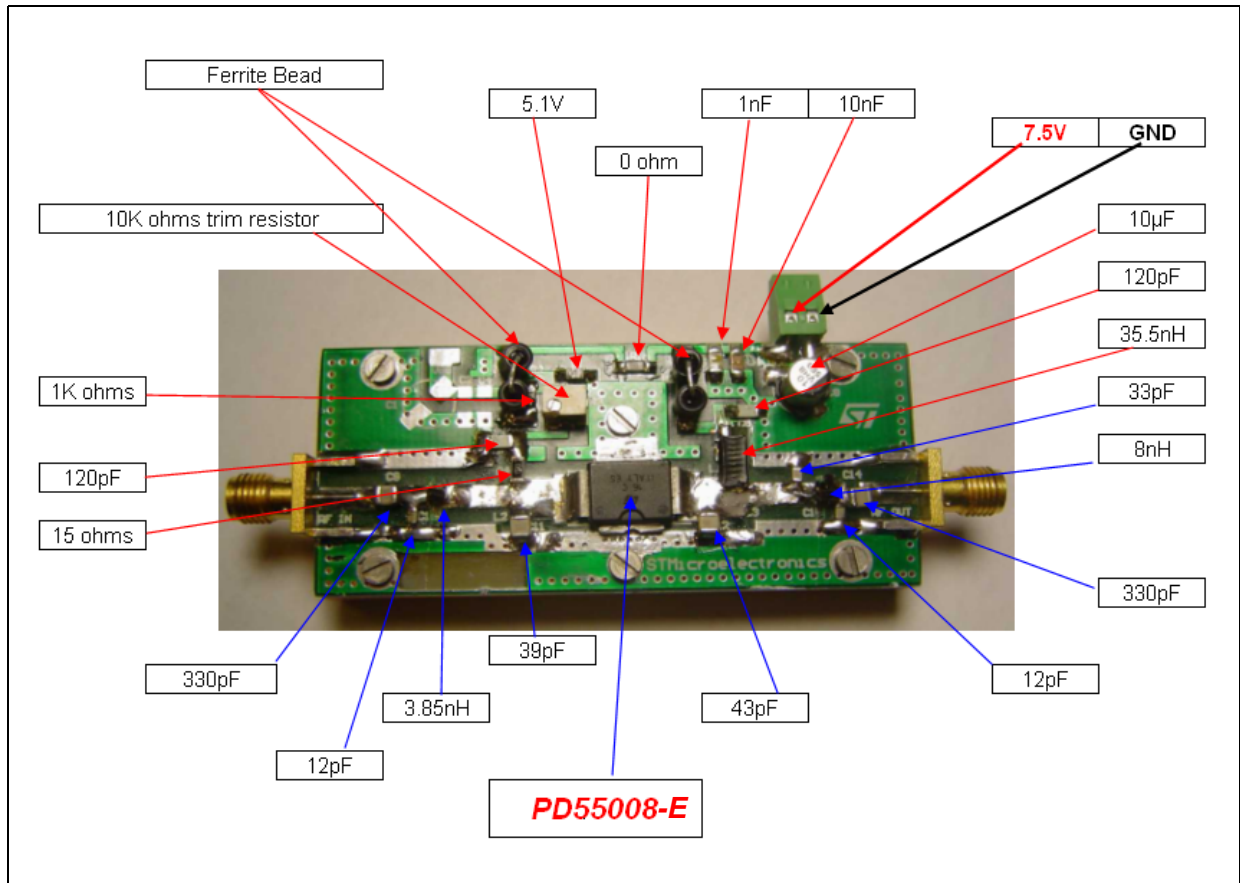


Figure 8. Output power vs. drain supply voltage



3 Test circuit

Figure 9. Test circuit schematic



4 Circuit layout

Figure 10. Circuit layout

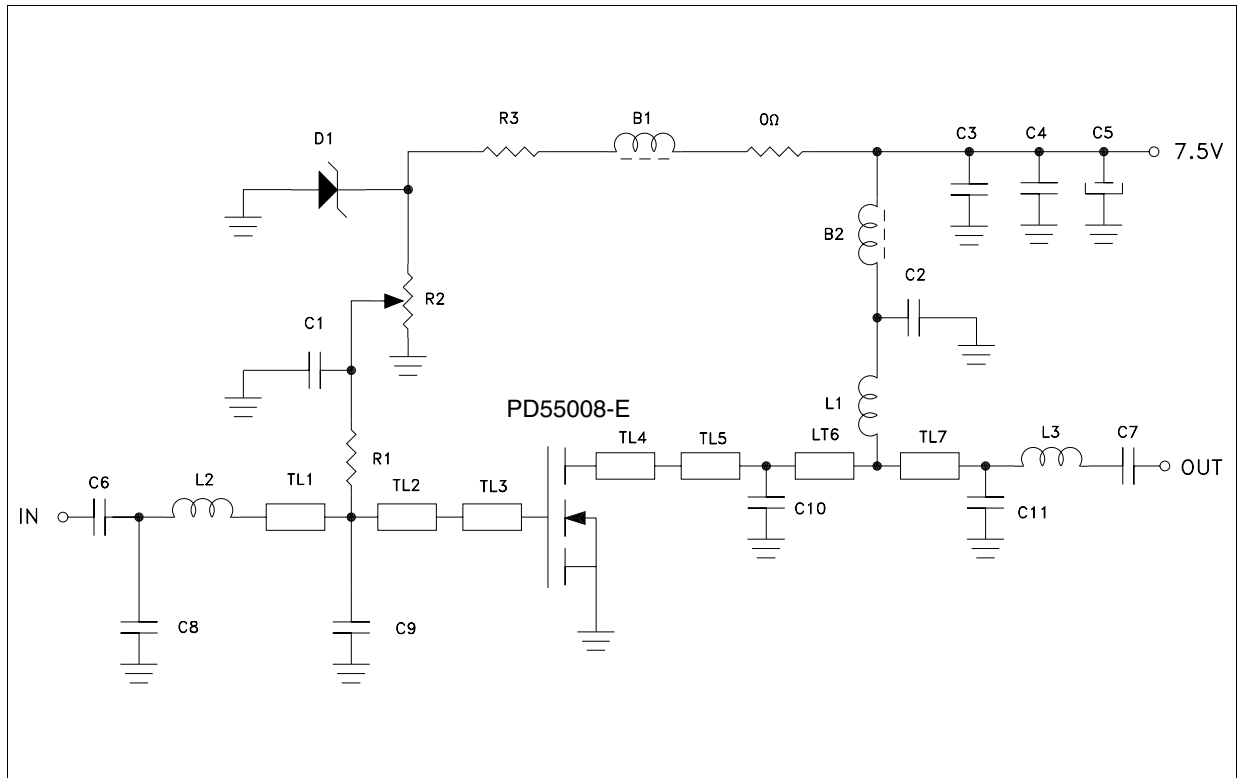


Table 3. Components part list for STEVAL-TDR014V1

Part type	Component ID	Description	Value	Case size	Manufacturer	Part code
CAP	C1	Capacitor	120 pF	1206	Murata	GRM42-6C0G121J50
CAP	C2	Capacitor	120 pF	1206	Murata	GRM42-6C0G121J50
CAP	C3	Capacitor	1 nF	1206	Murata	GRM42-6C0G102J50
CAP	C4	Capacitor	10 nF	1206	Murata	GRM42-6X7R104K50
Electrolytic CAP	C5	Capacitor	10 µF	SMT	Panasonic	EEVHB1V100P
CAP	C6	Capacitor	330 pF	100B	ATC	331
CAP	C7	Capacitor	330pF	100B	ATC	331
CAP	C8	Capacitor	12 pF	100B	ATC	120
CAP	C9	Capacitor	39 pF	100B	ATC	390
CAP	C10	Capacitor	43 pF	100B	ATC	430
CAP	C11	Capacitor	12 pF	100B	ATC	120
TL	TL1, TL7	Transmission Line	W = 2.87 mm L = 7 mm			
TL	TL2	Transmission Line	W = 4.9 mm L = 5 mm			
TL	TL3, TL4	Transmission Line	W = 6 mm L = 3 mm			
TL	TL5	Transmission Line	W = 4.9 mm L = 2.5 mm			
TL	TL6	Transmission Line	W = 4.9 mm L = 2.5 mm			
Ferrite Bead	B1	Ferrite Bead			PANASONIC	EXCELDRC35C
Ferrite Bead	B2	Ferrite Bead			PANASONIC	EXCELDRC35C
INDUCTOR	L1	Inductor	35.5nH		Coilcraft Mini Spring	B09TJ
INDUCTOR	L2	Inductor	3.85 nH		Coilcraft Micro Spring	0906-4J
INDUCTOR	L3	Inductor	8 nH		Coilcraft Mini Spring	A03TJ
TRANSISTOR	PD55008-E	LDMOS			STMicroelectronics	PD55008-E
Resistor	R1	Resistor	15 ohms	1206	TYCO ELECTRONICS	01623440-1
POT	R2	Potentiometer	10 k		BOURNS ELECTRONICS	3214W-1-103E
Resistor	R3	Resistor	1k	1206	TYCO ELECTRONICS	01623440-1
SMA-CONN	RF in	SMA-CONN			Johnson	142-0701-801
SMA-CONN	RF out	SMA-CONN			Johnson	142-0701-801
ZENER	D1	Zener Diode	5.1 V	SOD110	PHILIPS	BZX284C5V1
BOARD	FR-4 THk=0.060 2OZ Cu Both Sides					

5 Revision history

Table 4. Document revision history

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

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