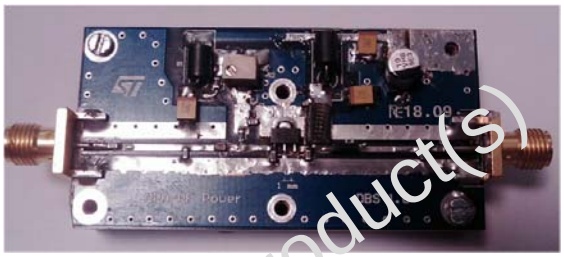
DB-85004-340

Demonstration board based on the PD85004 for 2-way radio

Preliminary data

Features

- Excellent thermal stability
- Frequency: 290 - 340 MHz
- Supply voltage: 13.6 V
- Output power: 4 W
- Power gain: 16.5 ±0.5 dB
- Efficiency: 51 % - 60 %
- Load mismatch: 20:1
- BeO-free amplifier



DB-85004-340

Description

The DB-85004-340 is a demonstration board based on the PD85004 LDMOS transistor and designed for 2-way radio applications. For additional information on the PD85004, please refer to the relevant datasheet.

Table 1. Device summary

Order code	Mechanical specification
DB-85004-340	L = 60 mm, W = 30 mm

Contents

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	16	V
I_D	Drain current	1.0	A
T_{CASE}	Operating case temperature	-20 to +85	°C
T_A	Maximum ambient temperature	+55	°C

2 Electrical characteristics

T_A = +25 °C, V_{DD} = 13.6 V, I_{dq} = 100 mA

Table 3. Electrical specifications

Symbol	Test conditions	Min	Typ	Max	Unit
Frequency	Frequency range	290		340	MHz
P_{OUT}			4		W
Gain	@ P_{IN} = 20 dBm		16.5 ±0.5		dB
ND	@ P_{IN} = 20 dBm		51 - 60		%
H2	2nd harmonic @ P_{IN} = 20 dBm		-33 / -56		dBc
H3	3rd harmonic @ P_{IN} = 20 dBm		-38 / -41		dBc
VSWR	Load mismatch all phases @ P_{OUT} = 4 W			20:1	

3 Impedance

Figure 1. Impedance illustration

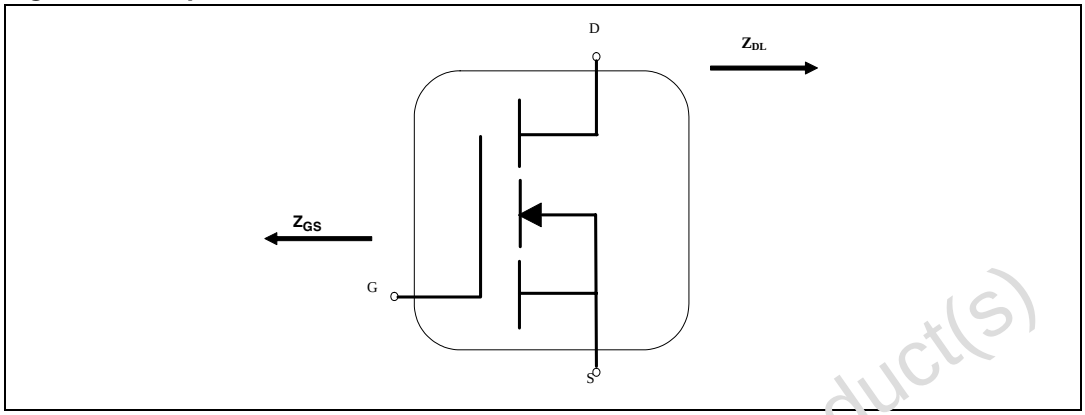


Table 4. Impedance data

Freq. (MHz)	Zgs	Zds
290	6.3 + 18.3j	9.36 + 2.1j
295	6.6 + 19.4j	9.76 + 2.6j
300	6.9 + 20.5j	10.17 + 3.2j
305	7.2 + 21.7j	10.82 + 3.7j
310	7.6 + 22.9j	11.5 + 4.2j
315	8.1 + 24.1j	12.2 + 4.7j
320	8.6 + 25.5j	13.3 + 5.1j
325	9.2 + 26.8j	14.5 + 5.5j
330	9.8 + 28.2j	15.8 + 5.9j
335	10.5 + 29.7j	17.5 + 5.8j
340	11.4 + 31.3j	19.4 + 5.6j

4 Typical performances

Figure 2. Gain and efficiency vs frequency V_{DD} = 13.6 V, Pin = 20 dBm, Idq = 100 mA

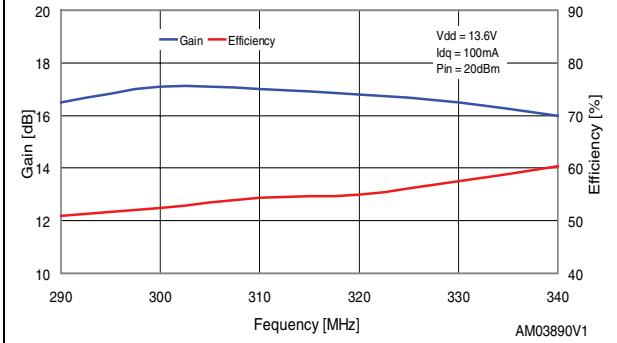


Figure 3. Gain vs output power V_{DD} = 13.6 V, Idq = 100 mA

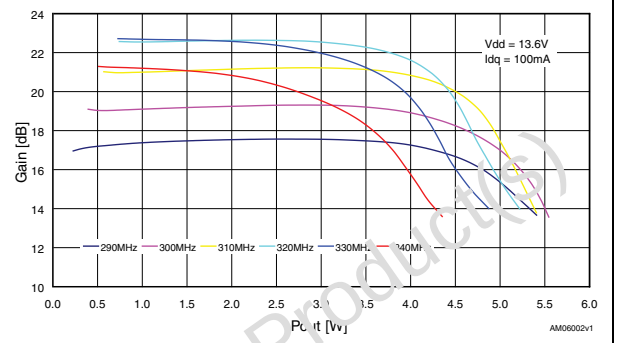


Figure 4. Efficiency vs output power V_{DD} = 13.6 V, Idq = 100 mA

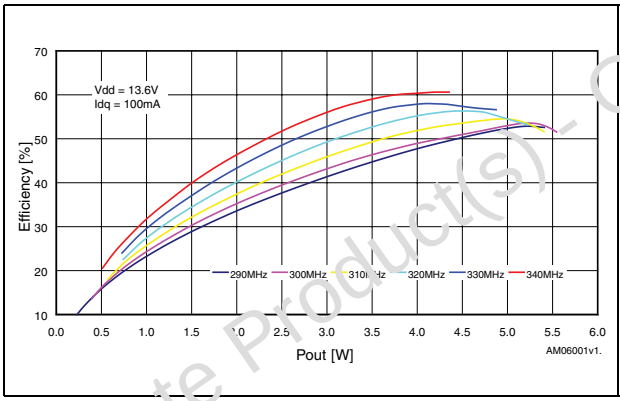
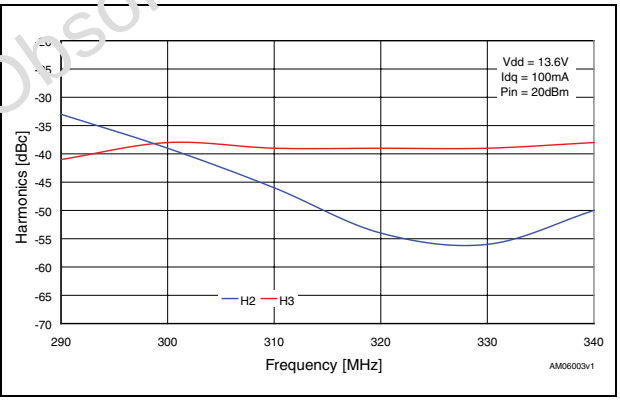


Figure 5. Harmonic vs frequency 13.6 V / 100 mA



5 Test circuit

Figure 6. Test circuit schematic

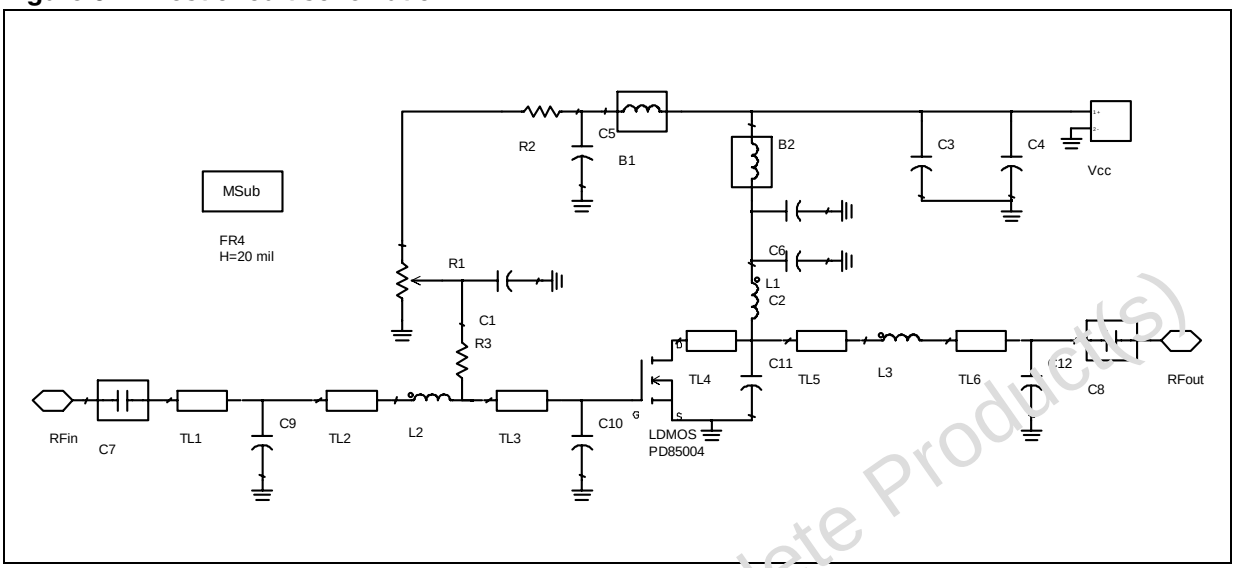


Table 5. Part list

Component ID	Description	Value	Case size	Manufacturer	Part Code
B1	Ferrite Bead			PANASONIC	EXCELDRC35C
B2	Ferrite Bead			PANASONIC	EXCELDRC35C
C1, C2	Capacitor	220 pF	0603	MURATA	
C3, C5, C6	Capacitor	1.5 µF	1210	AVX	TPSB155K035R2500
C4	Capacitor	10 µF	SMT	PANASONIC	EEVHB1V100P
C7, C8	Capacitor	56 pF	0603	MURATA	GRM1885C1H560
C9	Capacitor	47 pF	0603	MURATA	
C10	Capacitor	8.2 pF	0603	MURATA	GRM1885C1H8R2
C11	Capacitor	33 pF	0603	MURATA	GRM1885C1H330
C12	Capacitor	22 pF	0603	MURATA	GRM1885C1H220
L1	Inductor	23 nH	2508	COILCRAFT	2508-23
L2	Inductor	10 nH	0603	COILCRAFT	0603HC-10N
L3	Inductor	8.8 nH	1606	COILCRAFT	1606-8
R1	Potentiometer	10 KΩ		BOURNS ELECTRONICS	3214W-1-103E
R2	Resistor	1 KΩ	0603	TYCO ELECTRONICS	
R3	Resistor	150 Ω	0603	TYCO ELECTRONICS	

Table 5. Part list (continued)

Component ID	Description	Value	Case size	Manufacturer	Part Code
TL1	Transmission line	W=0.92mm	L=9.6mm		
TL2	Transmission line	W=0.92mm	L=3.6mm		
TL3	Transmission line	W=0.92mm	L=6mm		
TL4	Transmission line	W=0.92mm	L=2.8mm		
TL5	Transmission line	W=0.92mm	L=2.5mm		
TL6	Transmission line	W=0.92mm	L=9.8mm		
RF in, RF out	SMA-CONN	50 Ω	60 mils	JOHNSON	142-0701-801
PD85004	LDMOS			STMicroelectronics	PD85004
Board	FR-4 THk=0.020" 2OZ Cu both sides				

6 Revision history

Table 6. Document revision history

Date	Revision	Changes
05-Nov-2009	1	Initial release.

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