



DB-85015-940

RF power amplifier using 1 x PD85015-E
N-channel enhancement-mode lateral MOSFETs

Features

- Excellent thermal stability
- Frequency: 860 - 940 MHz
- Supply voltage: 13.6 V
- Output power: 10 W
- Power gain: 15.7 ± 0.4 dB
- Efficiency: 60% - 62%
- Load mismatch: 20:1
- BeO free amplifier

Description

The DB-85015-940 is a common source N-channel enhancement-mode lateral field effect RF power amplifier designed for UHF radio applications.

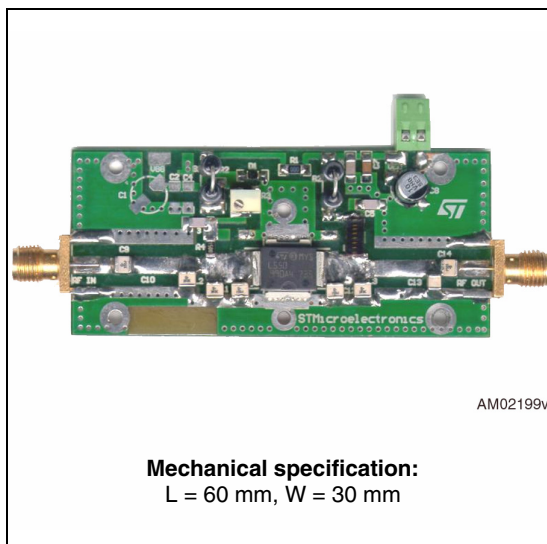


Table 1. Device summary

Order codes
DB-85015-940

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1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	24	V
I_D	Drain current	3	A
P_{DISS}	Power dissipation	25	W
T_{CASE}	Operating case temperature	-20 to +85	°C
T_A	Max. ambient temperature	55	°C

2 Electrical characteristics

$T_A = +25\text{ °C}$, $V_{DD} = 13.6\text{ V}$, $I_{DQ} = 200\text{ mA}$

Table 3. Electrical specification

Symbol	Test conditions	Min.	Typ.	Max.	Unit
Freq	Frequency range	860		940	MHz
P_{OUT}	@ $P_{IN} = 25\text{ dBm}$	10			W
Gain	@ $P_{IN} = 25\text{ dBm}$		15.7 ± 0.4		dB
ND	@ $P_{IN} = 25\text{ dBm}$		60 - 62		%
H2	2 ND harmonic @ $P_{IN} = 25\text{ dBm}$			-40	dBc
H3	3 RD harmonic @ $P_{IN} = 25\text{ dBm}$			-50	dBc
VSWR	Load mismatch all phases @ $P_{IN} = 25\text{ dBm}$			20:1	

3 Impedance

Figure 1. Impedance graphic

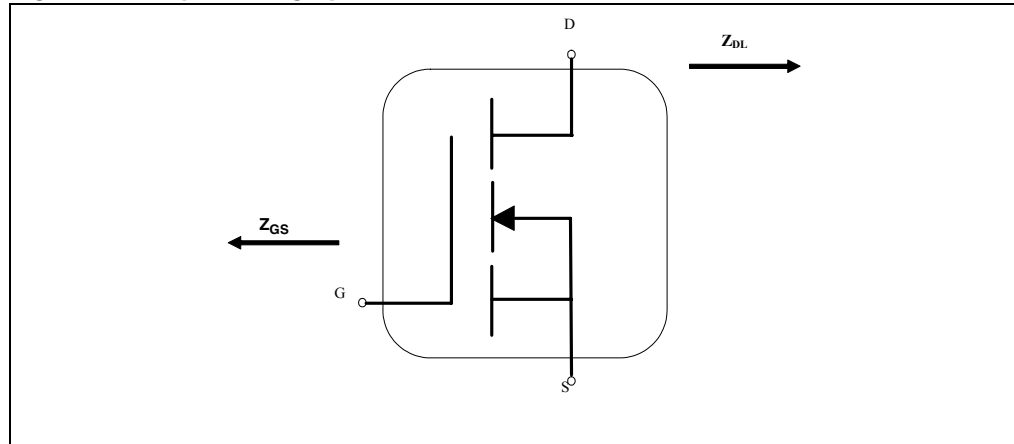


Table 4. Impedance data

f(MHz)	Z_{GS} (Ω)	Z_{DL} (Ω)
860	$1,61 + j1,43$	$2,67 + j3,62$
870	$1,60 + j1,67$	$2,62 + j3,76$
880	$1,49 + j1,82$	$2,58 + j3,91$
890	$1,43 + j2,05$	$2,52 + j4,05$
900	$1,37 + j2,23$	$2,49 + j4,19$
910	$1,31 + j2,41$	$2,43 + j4,29$
920	$1,28 + j2,58$	$2,36 + j4,46$
930	$1,19 + j2,77$	$2,28 + j4,59$
940	$1,14 + j2,96$	$2,18 + j4,67$

4 Typical performance

4.1 $V_{DD} = 13.6\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{IN} = 25\text{ dBm}$

Figure 2. Output power and drain current vs frequency_ $V_{DD} = 13.6\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{IN} = 25\text{ dBm}$

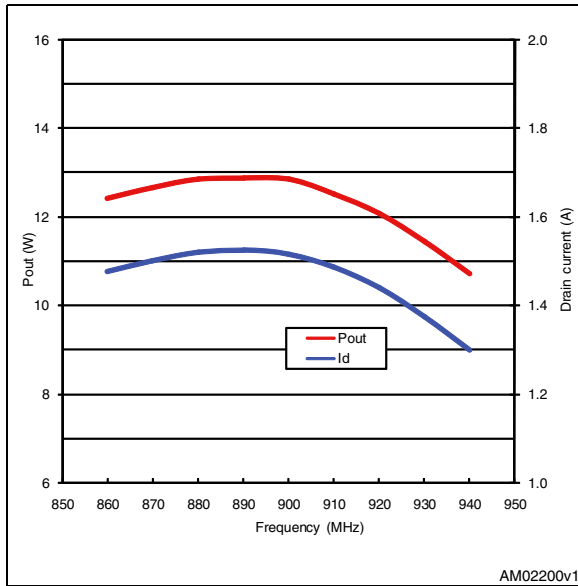


Figure 3. Gain and efficiency vs frequency_ $V_{DD} = 13.6\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{IN} = 25\text{ dBm}$

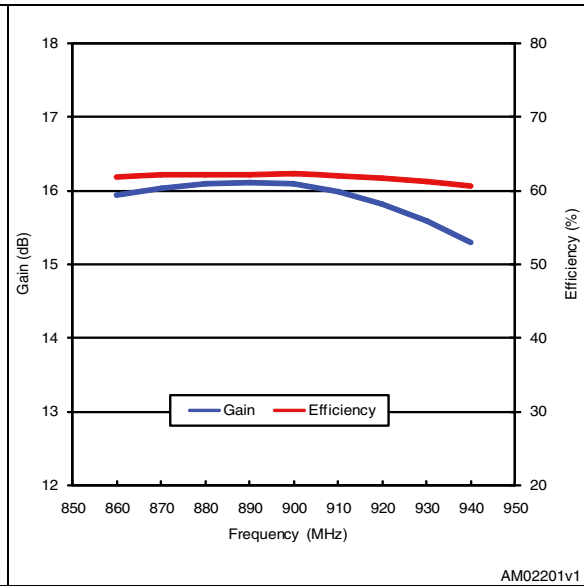


Figure 4. Input return loss vs frequency_ $V_{DD} = 13.6\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{IN} = 25\text{ dBm}$

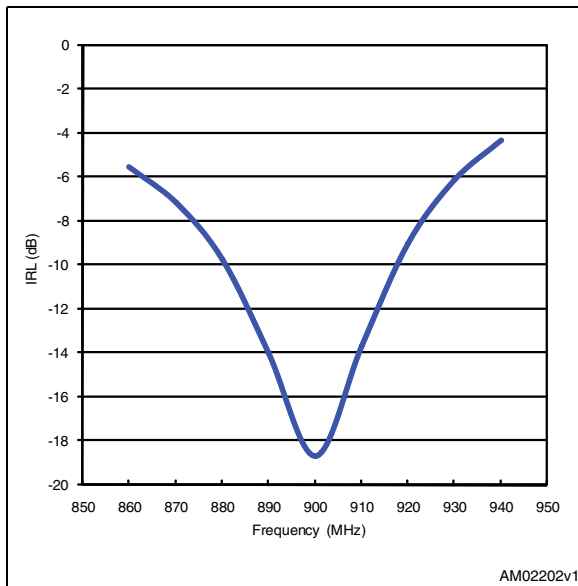
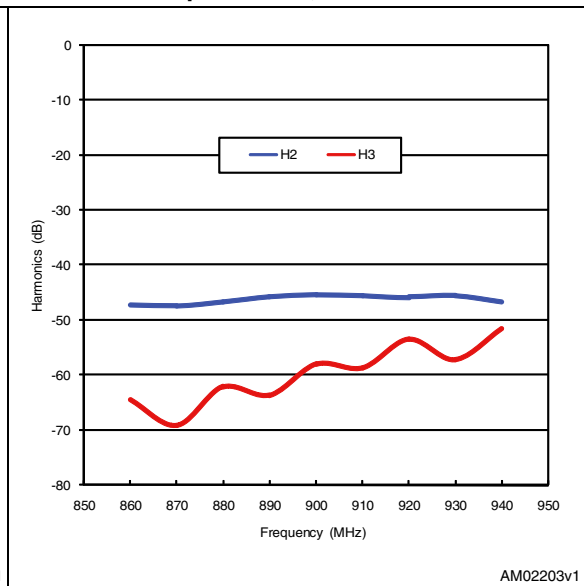


Figure 5. Harmonics vs frequency_ $V_{DD} = 13.6\text{ V}$, $I_{DQ} = 200\text{ mA}$, $P_{IN} = 25\text{ dBm}$



5 Circuit photo

Figure 6. Circuit photo

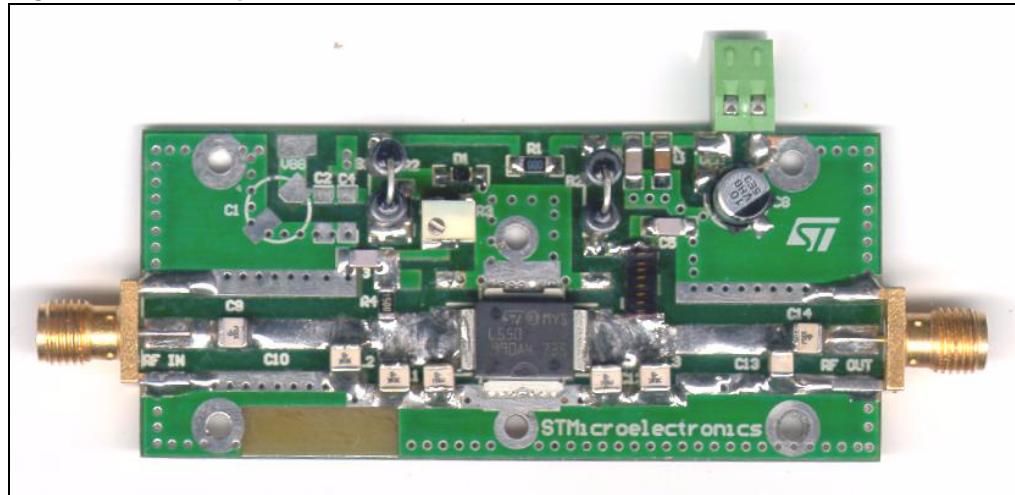
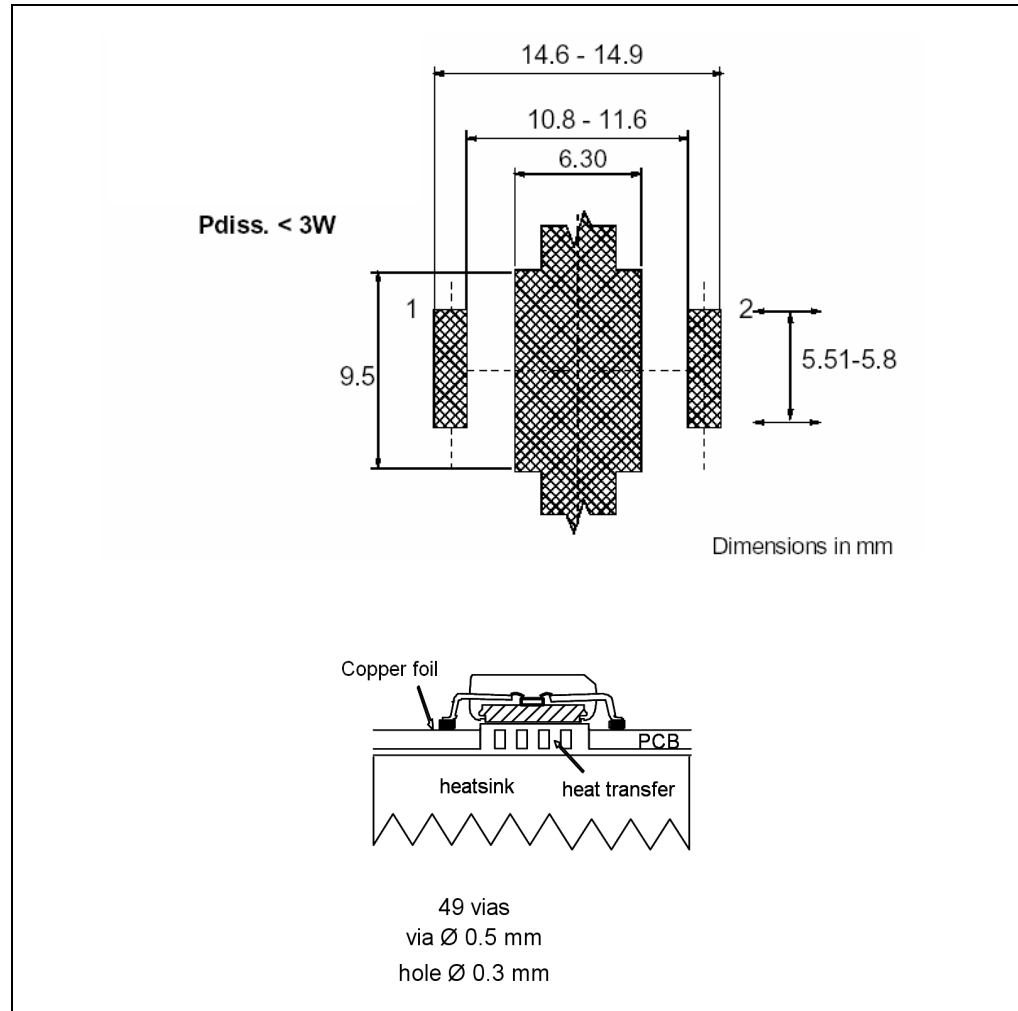


Table 6. Components part list for DB-85015-940 (continued)

Component ID	Description	Value	Case size	Manufacturer	Part code
TL4	Transmission line	W=4.98 mm	L=1,2 mm		
TL5	Transmission line	W=4.98 mm	L=1,3 mm		
TL6	Transmission line	W=2.87 mm	L=9,5 mm		
TL7	Transmission line	W=2.87 mm	L=5,8 mm		
PD85015-E	LDMOS			STMicroelectronics	PD85015-E
Board	FR-4 THk=0.060" 2 OZ Cu both sides				

7 Mounting indications

Figure 7. PowerSO-10 mounting indications



8 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com. ECOPACK is an ST trademark.

Table 7. PowerSO-10RF formed lead (gull wing) mechanical data

Dim.	mm.			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A1	0	0.05	0.1	0.	0.0019	0.0038
A2	3.4	3.5	3.6	0.134	0.137	0.142
A3	1.2	1.3	1.4	0.046	0.05	0.054
A4	0.15	0.2	0.25	0.005	0.007	0.009
a		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
c	0.23	0.27	0.32	0.008	0.01	0.012
D	9.4	9.5	9.6	0.370	0.374	0.377
D1	7.4	7.5	7.6	0.290	0.295	0.298
E	13.85	14.1	14.35	0.544	0.555	0.565
E1	9.3	9.4	9.5	0.365	0.37	0.375
E2	7.3	7.4	7.5	0.286	0.292	0.294
E3	5.9	6.1	6.3	0.231	0.24	0.247
F		0.5			0.019	
G		1.2			0.047	
L	0.8	1	1.1	0.030	0.039	0.042
R1			0.25			0.01
R2		0.8			0.031	
T	2 deg	5 deg	8 deg	2 deg	5 deg	8 deg
T1		6 deg			6 deg	
T2		10 deg			10 deg	

Note: Resin protrusions not included (max value: 0.15 mm per side)

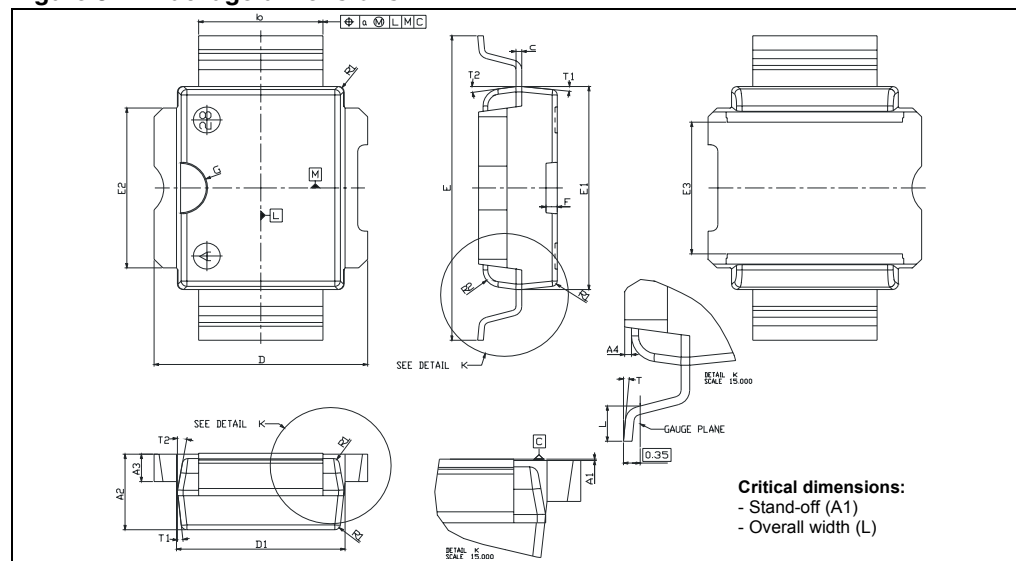
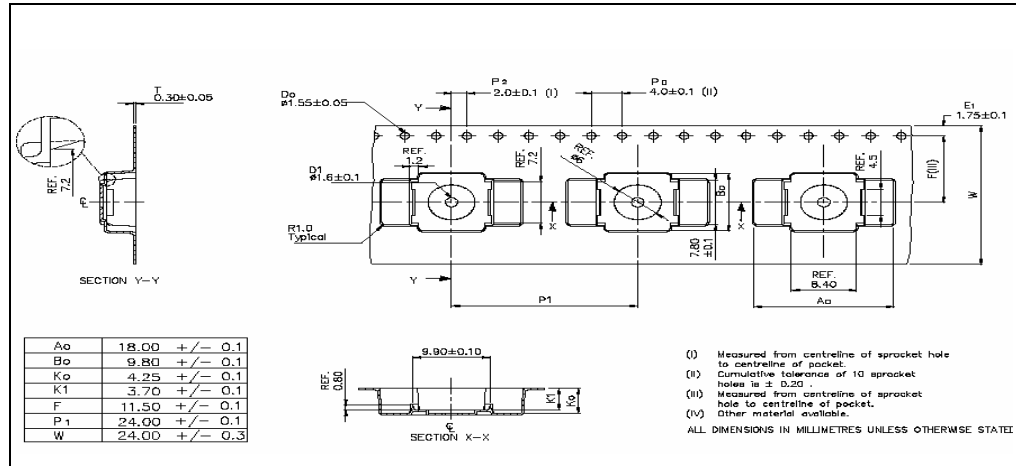
Figure 8. Package dimensions

Figure 9. PowerSO-10RF tape and reel



9 Revision history

Table 8. Document revision history

Date	Revision	Changes
25-Mar-2009	1	Initial release

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