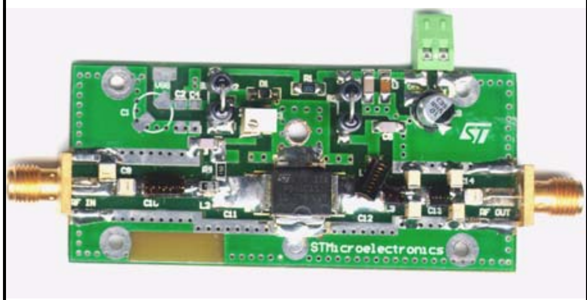
STEVAL-TDR016V1

RF power amplifier using 1 x PD55015E
N-channel enhancement-mode lateral MOSFETs

Features

- Excellent thermal stability
- Frequency: 155 - 165 MHz
- Supply voltage: 20 V
- Output power: 30 W
- Power gain: 14.7 ± 0.3 dB
- Efficiency: 60% - 72%
- Load mismatch: 20:1
- Beo free amplifier



Mechanical specification:
L = 60 mm, W = 30 mm

Application

- Marine radio

Description

The STEVAL-TDR016V1 is a common source N-channel enhancement-mode lateral field effect RF power amplifier designed for VHF marine radio application.

Table 1. Device summary

Order code
STEVAL-TDR016V1

Contents

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 °C, V_{DD} = 20V, I_{DQ} = 150 mA

Table 3. Electrical specification

Symbol	Test conditions	Min.	Typ.	Max.	Unit
Freq	Frequency range	155		165	MHz
P_{OUT}			30		W
Gain	@ P_{OUT} = 30W		14.7		dB
ND	@ P_{OUT} = 30W	60			%
Gain Flatness	@ P_{OUT} = 30W			±0.3	dB
H2	2^{ND} Harmonic @ P_{OUT} = 30 W		-29	-25	dBc
H3	3^{RD} Harmonic @ P_{OUT} = 30 W		-52	-50	dBc
VSWR	Load mismatch all phases @ P_{OUT} = 30 W			20:1	

3 Typical performance

Figure 1. P_{OUT} vs pin and frequency @ Vdd = 20 V

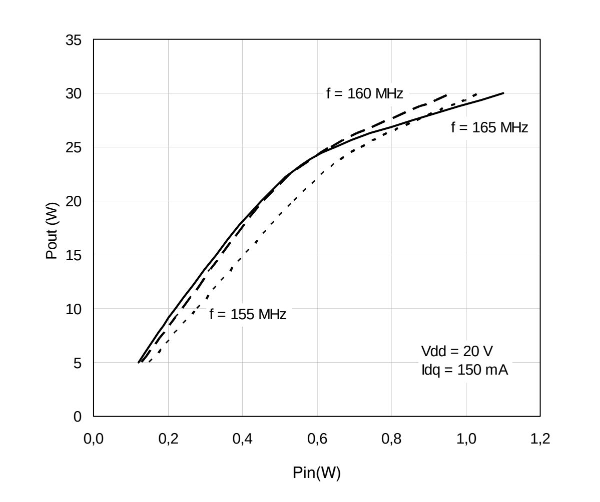


Figure 2. Efficiency vs P_{OUT} and frequency @ Vdd = 20 V

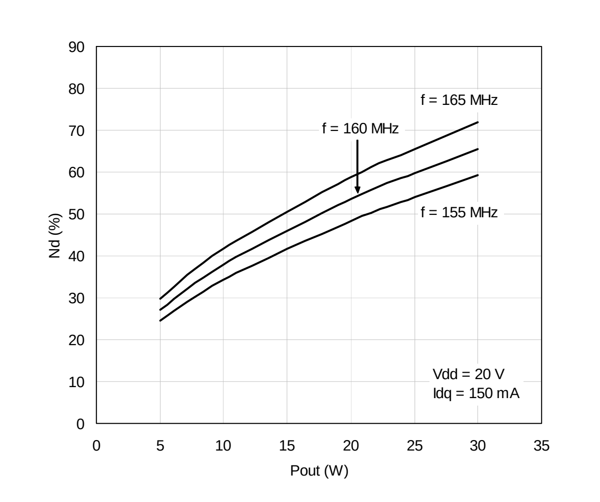


Figure 3. Gain vs P_{OUT} and frequency @ Vdd= 20 V

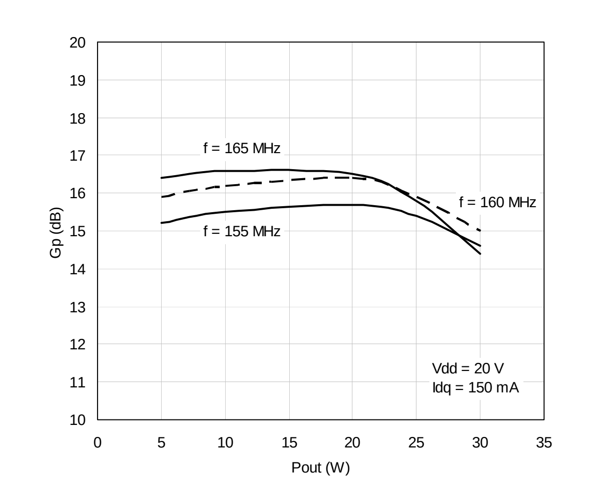


Figure 4. Harmonics vs frequency @ Vdd= 20 V

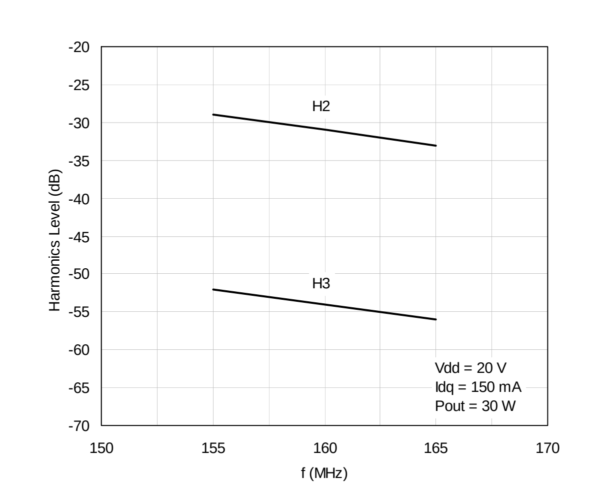


Figure 5. P_{OUT} and current vs drain voltage @ f = 165 MHz

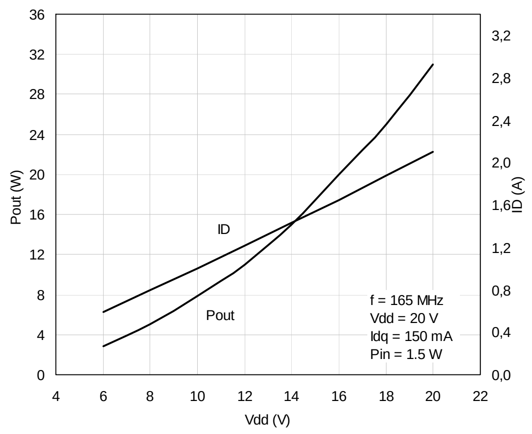


Figure 6. P_{OUT} and current vs drain voltage @ f = 155 MHz

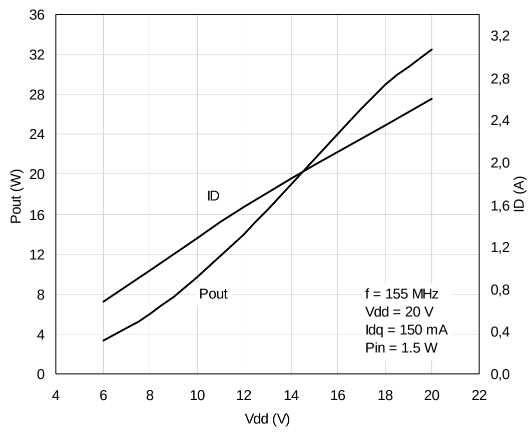


Figure 7. P_{OUT} vs pin and frequency @ Vdd = 13.6 V

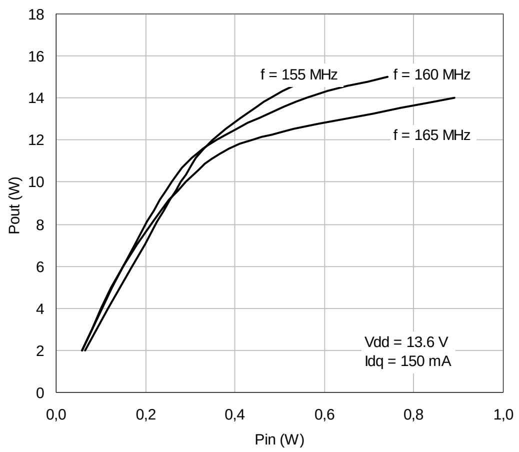


Figure 8. Efficiency vs P_{OUT} and frequency @ Vdd = 13.6 V

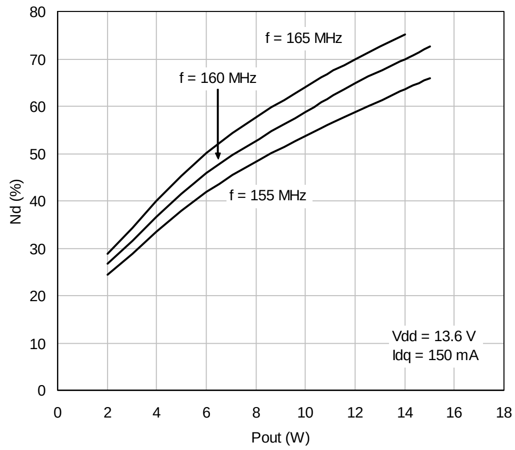


Figure 9. Gain vs P_{OUT} and frequency @ Vdd= 13.6 V

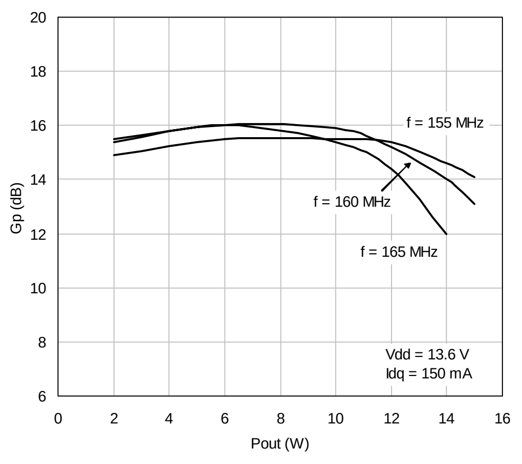
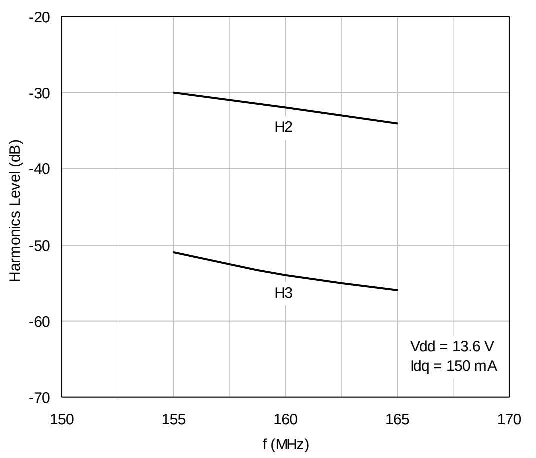
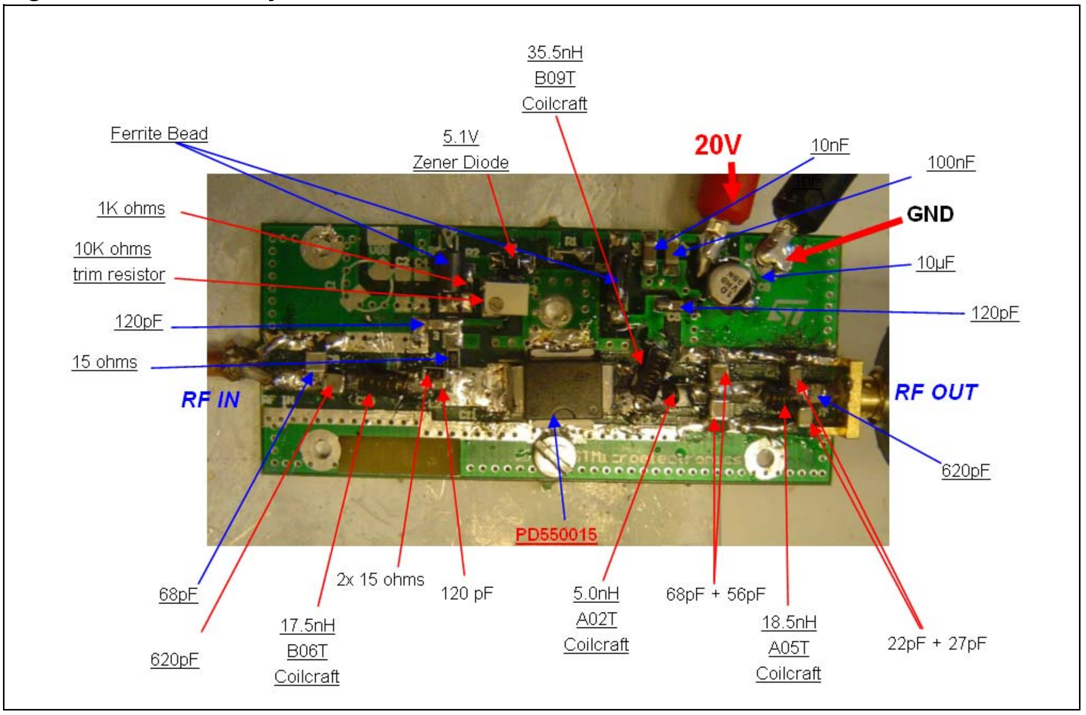


Figure 10. Harmonics vs frequency @ Vdd = 13.6 V



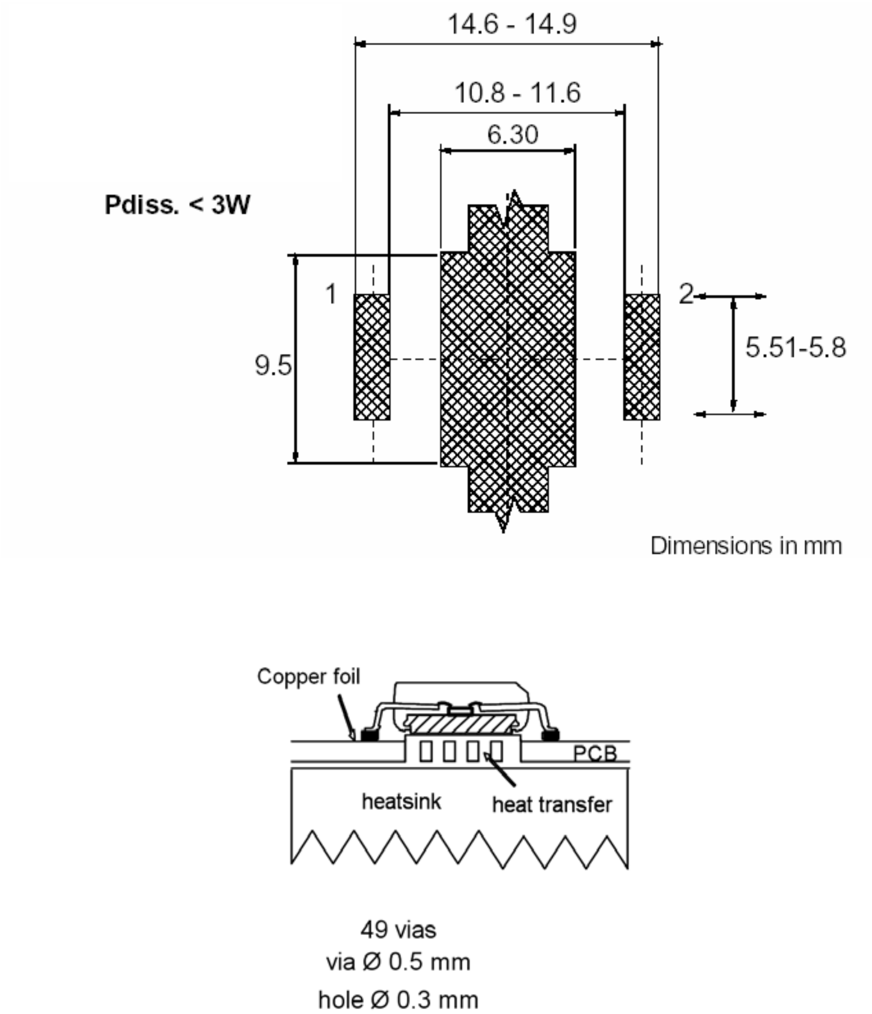
4 Circuit layout

Figure 11. Circuit layout



5 Mounting indications

Figure 12. PowerSO-10 mounting indications



6 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 4. 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 13. Package dimensions

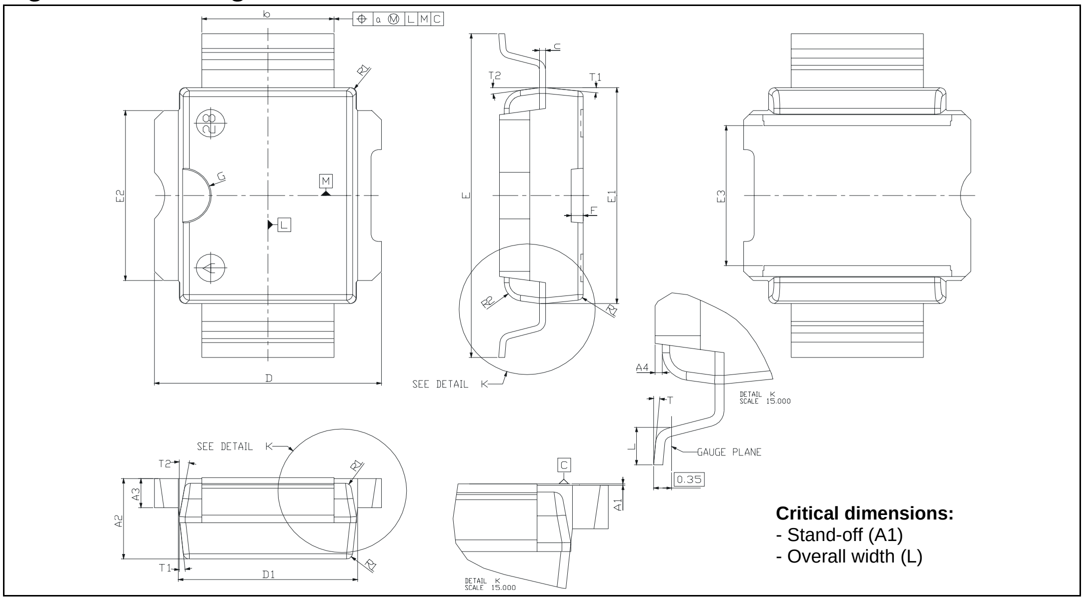
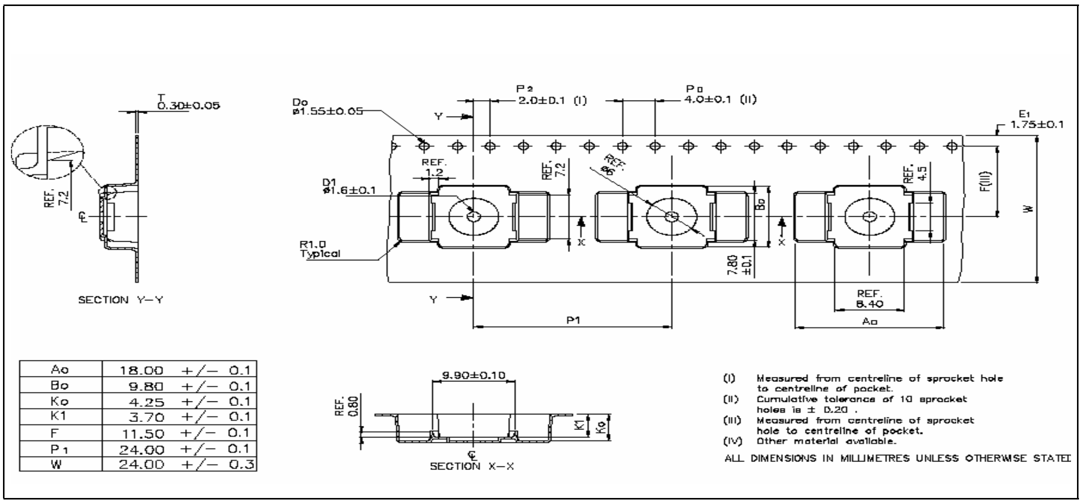


Figure 14. PowerSO-10RF tape and reel



Ao	18.00	+/− 0.1
Bo	9.80	+/− 0.1
Ko	4.25	+/− 0.1
K1	3.70	+/− 0.1
F	11.50	+/− 0.1
P1	24.00	+/− 0.1
W	24.00	+/− 0.3

7 Revision history

Table 5. Document revision history

Date	Revision	Changes
27-Sep-2010	1	Initial release.

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