



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

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.

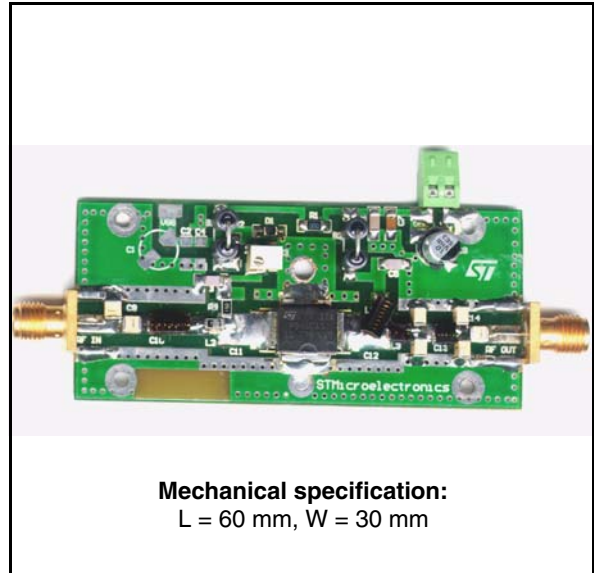


Table 1. Device summary

| Order code |
|-----------------|
| STEVAL-TDR016V1 |

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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

$T_A = +25\text{ °C}$, $V_{DD} = 20\text{V}$, $I_{DQ} = 150\text{ mA}$

Table 3. Electrical specification

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

3 Typical performance

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

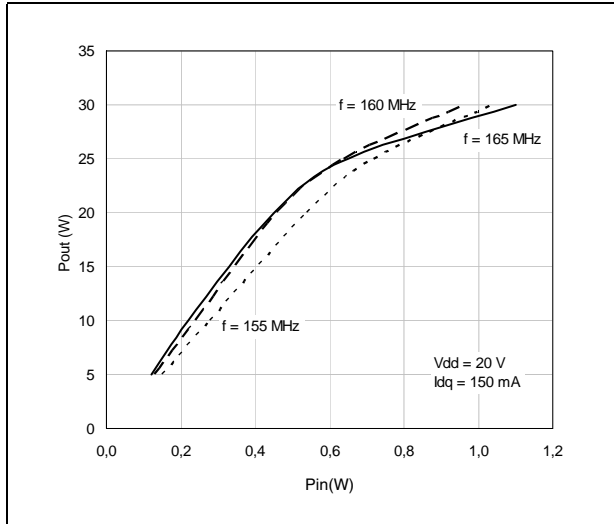


Figure 2. Efficiency vs P_{OUT} and frequency @ V_{dd} = 20 V

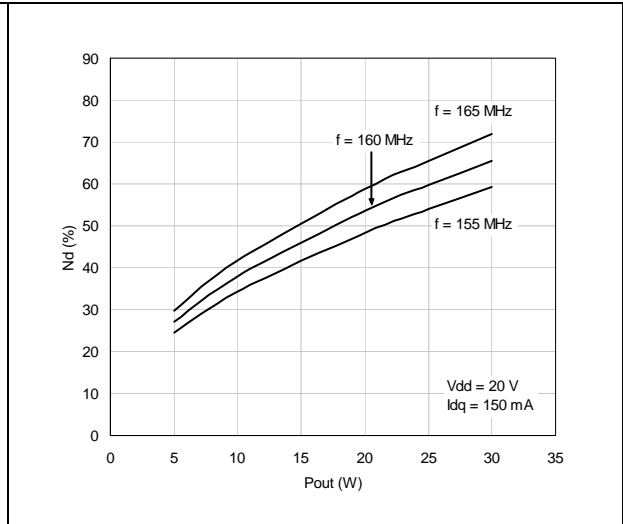


Figure 3. Gain vs P_{OUT} and frequency @ V_{dd} = 20 V

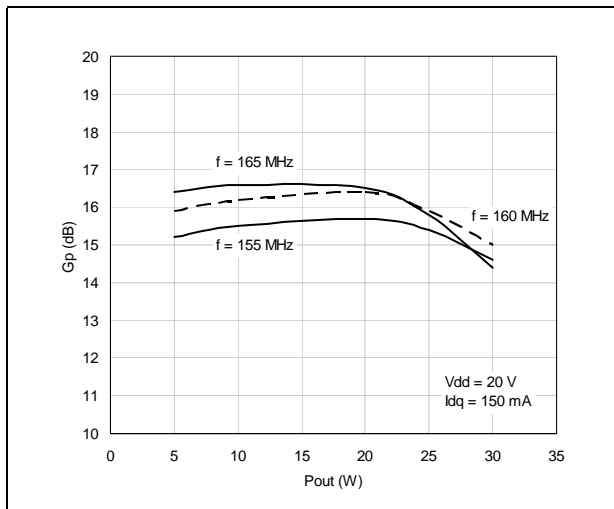


Figure 4. Harmonics vs frequency @ V_{dd} = 20 V

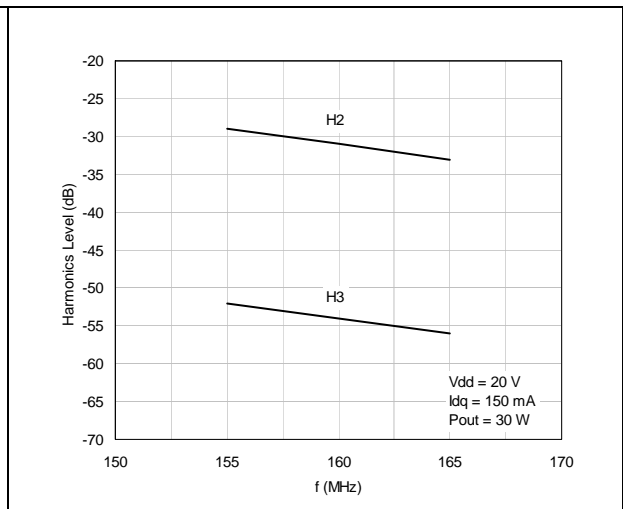


Figure 5. P_{OUT} and current vs drain voltage @ f = 165 MHz

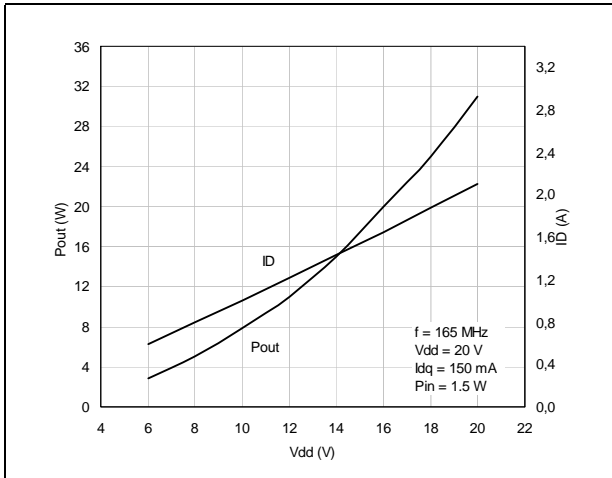


Figure 6. P_{OUT} and current vs drain voltage @ f = 155 MHz

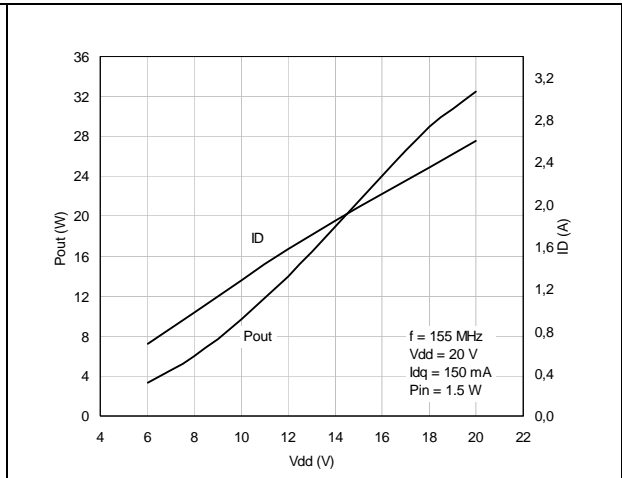


Figure 7. P_{OUT} vs pin and frequency @ V_{dd} = 13.6 V

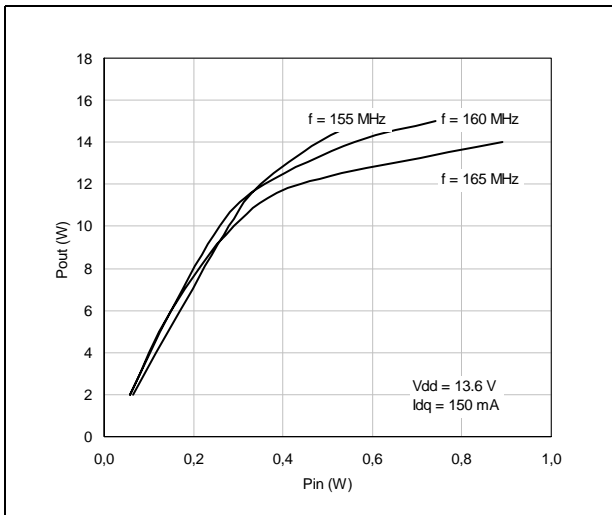


Figure 8. Efficiency vs P_{OUT} and frequency @ V_{dd} = 13.6 V

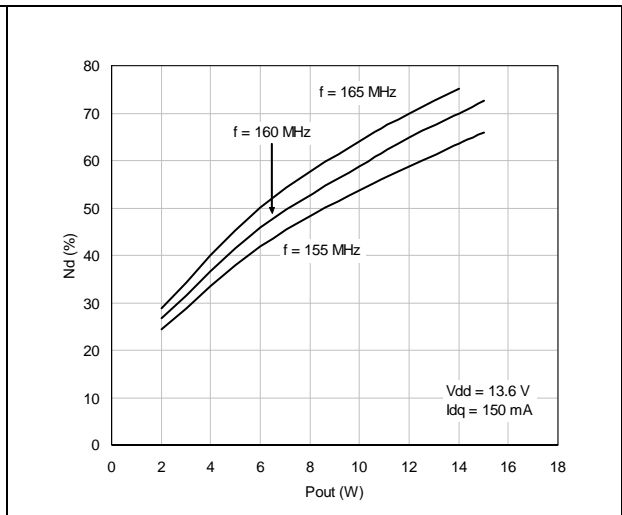


Figure 9. Gain vs P_{OUT} and frequency @ V_{dd}= 13.6 V

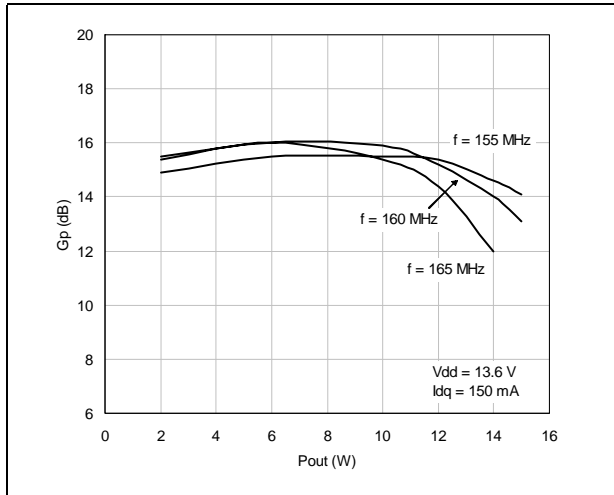
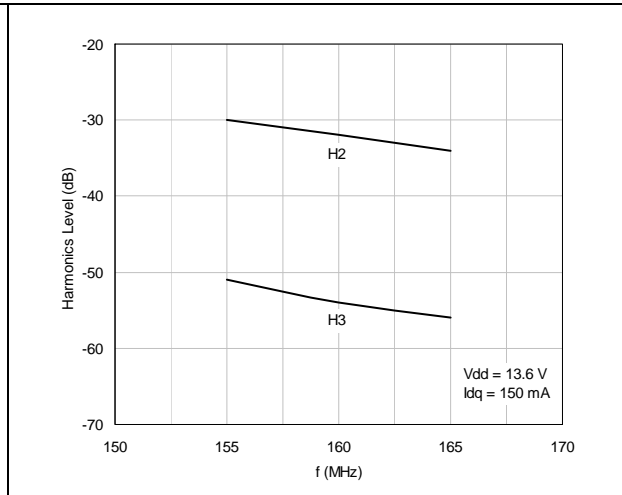
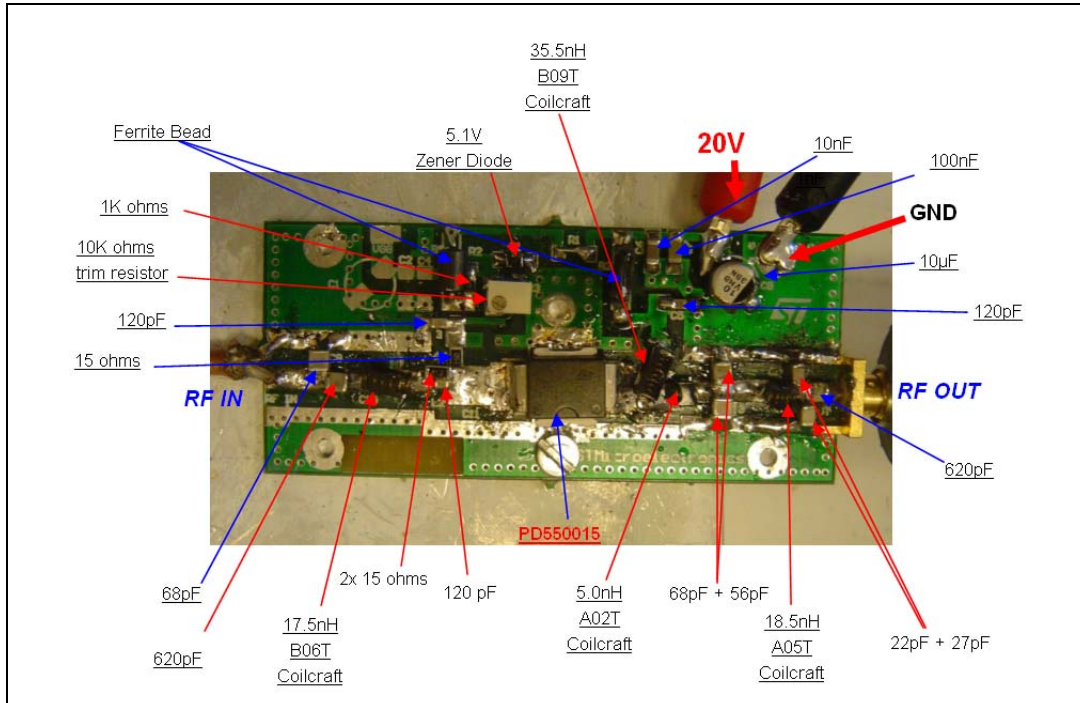


Figure 10. Harmonics vs frequency @ V_{dd} = 13.6 V



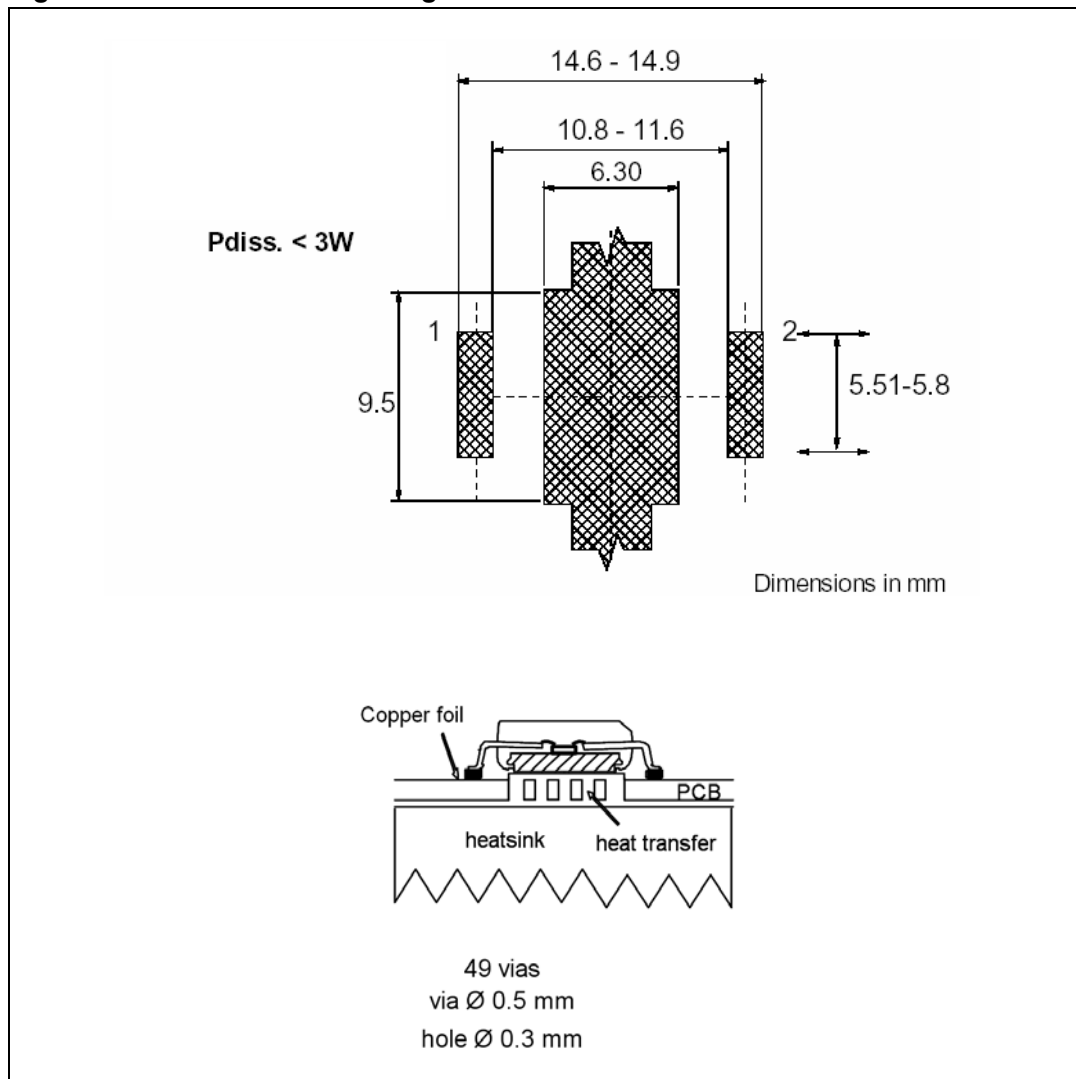
4 Circuit layout

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)

7 Revision history

Table 5. Document revision history

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

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