



# STEVAL-TDR016V1

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

## Features

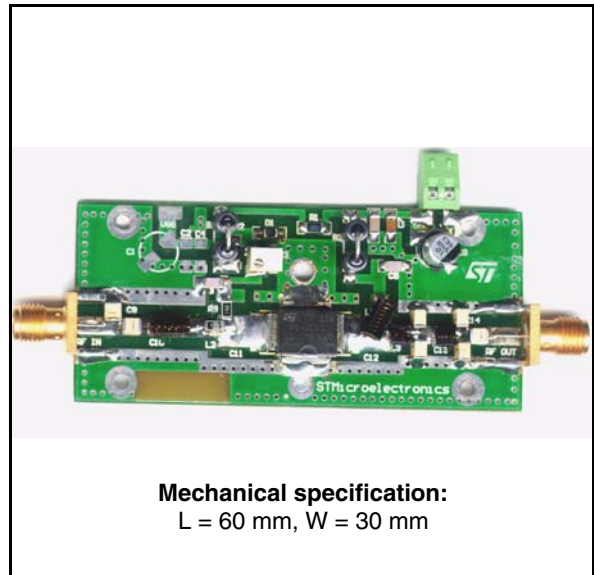
- Excellent thermal stability
- Frequency: 155 - 165 MHz
- Supply voltage: 20 V
- Output power: 30 W
- Power gain:  $14.7 \pm 0.3$  dB
- Efficiency: 60% - 72%
- Load mismatch: 20:1
- Beo free amplifier

## 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

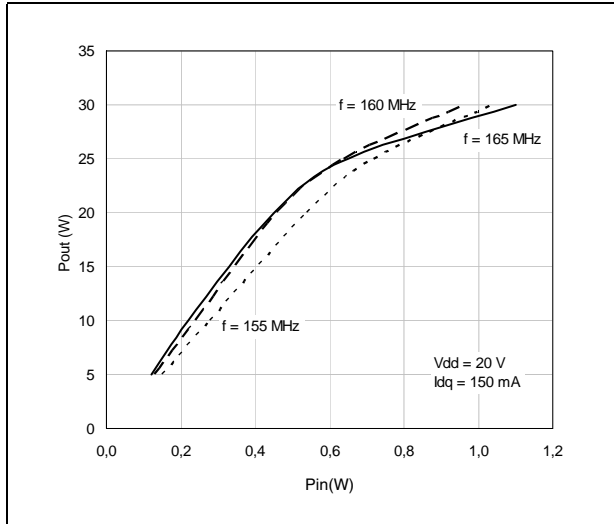
$T_A = +25\text{ °C}$ ,  $V_{DD} = 20\text{V}$ ,  $I_{DQ} = 150\text{ mA}$

**Table 3. Electrical specification**

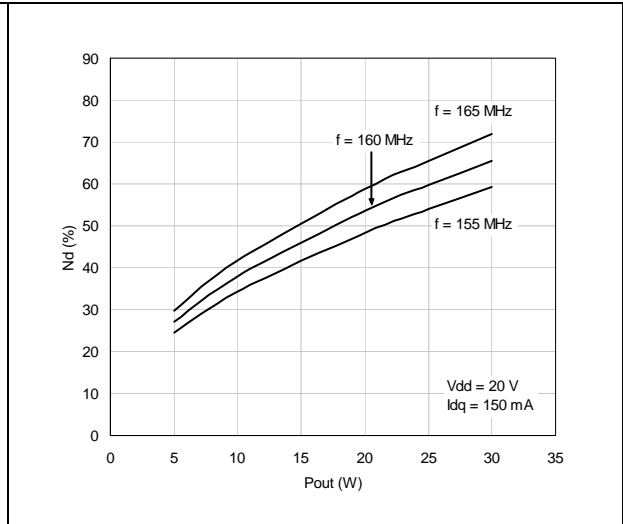
| Symbol        | Test conditions                                    | Min. | Typ. | Max.      | Unit |
|---------------|--|------|------|-----------|------|
| Freq          | Frequency range                                    | 155  |      | 165       | MHz  |
| $P_{OUT}$     |  |      | 30   |    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

### 3 Typical performance

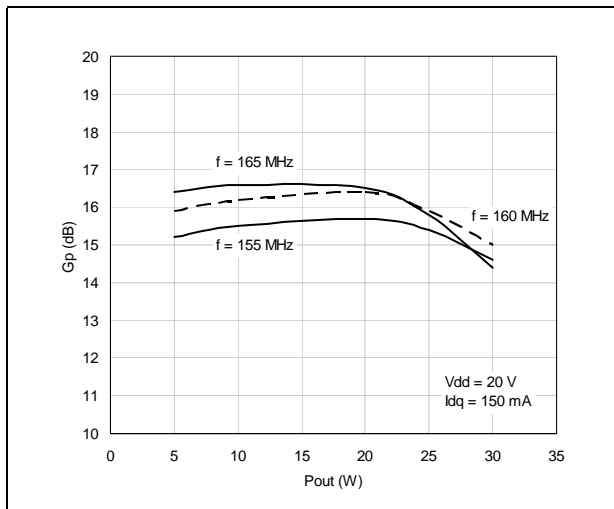
**Figure 1.  $P_{OUT}$  vs  $P_{in}$  and frequency @  $V_{dd} = 20\text{ V}$**



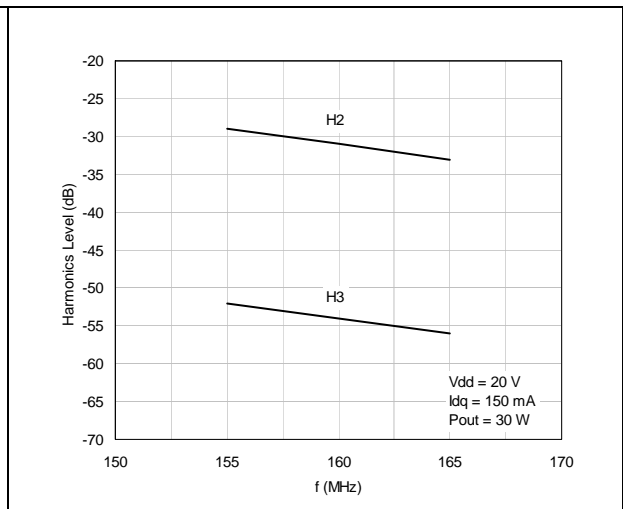
**Figure 2. Efficiency vs  $P_{OUT}$  and frequency @  $V_{dd} = 20\text{ V}$**



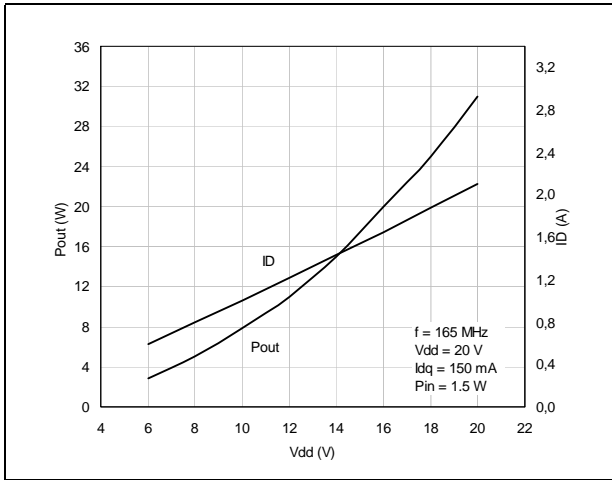
**Figure 3. Gain vs  $P_{OUT}$  and frequency @  $V_{dd} = 20\text{ V}$**



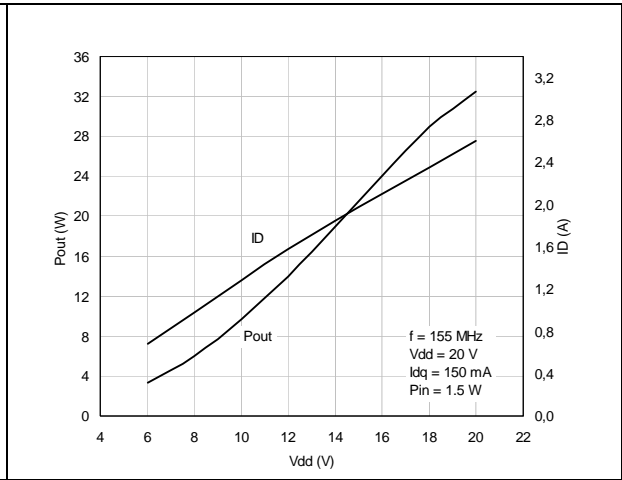
**Figure 4. Harmonics vs frequency @  $V_{dd} = 20\text{ V}$**



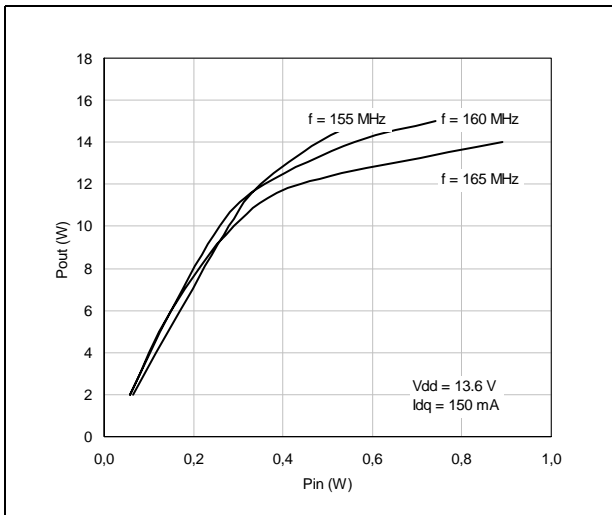
**Figure 5. P<sub>OUT</sub> and current vs drain voltage @ f = 165 MHz**



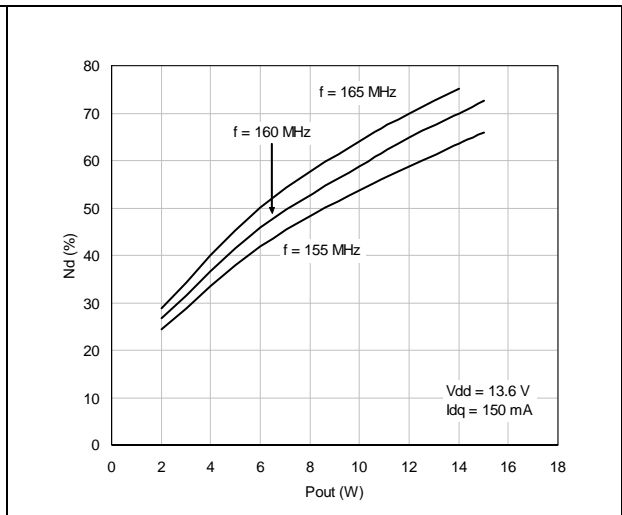
**Figure 6. P<sub>OUT</sub> and current vs drain voltage @ f = 155 MHz**



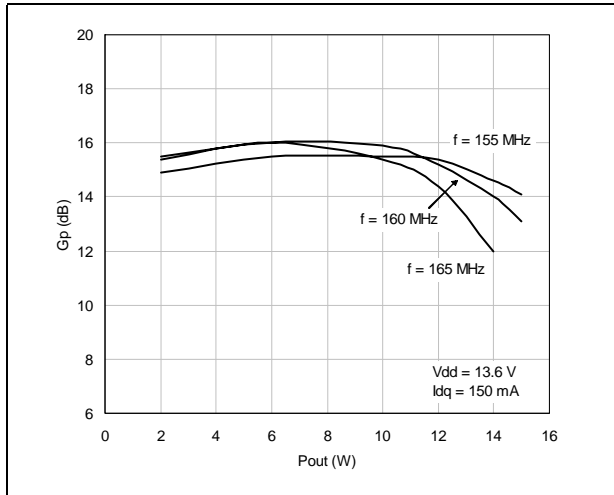
**Figure 7. P<sub>OUT</sub> vs pin and frequency @ V<sub>DD</sub> = 13.6 V**



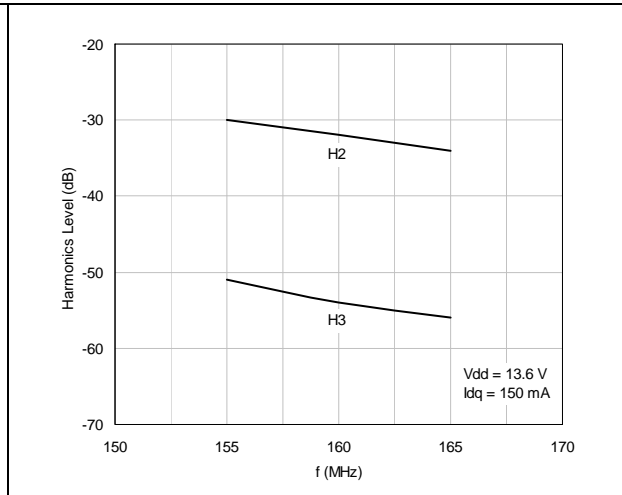
**Figure 8. Efficiency vs P<sub>OUT</sub> and frequency @ V<sub>DD</sub> = 13.6 V**



**Figure 9. Gain vs P<sub>OUT</sub> and frequency @ V<sub>dd</sub>= 13.6 V**

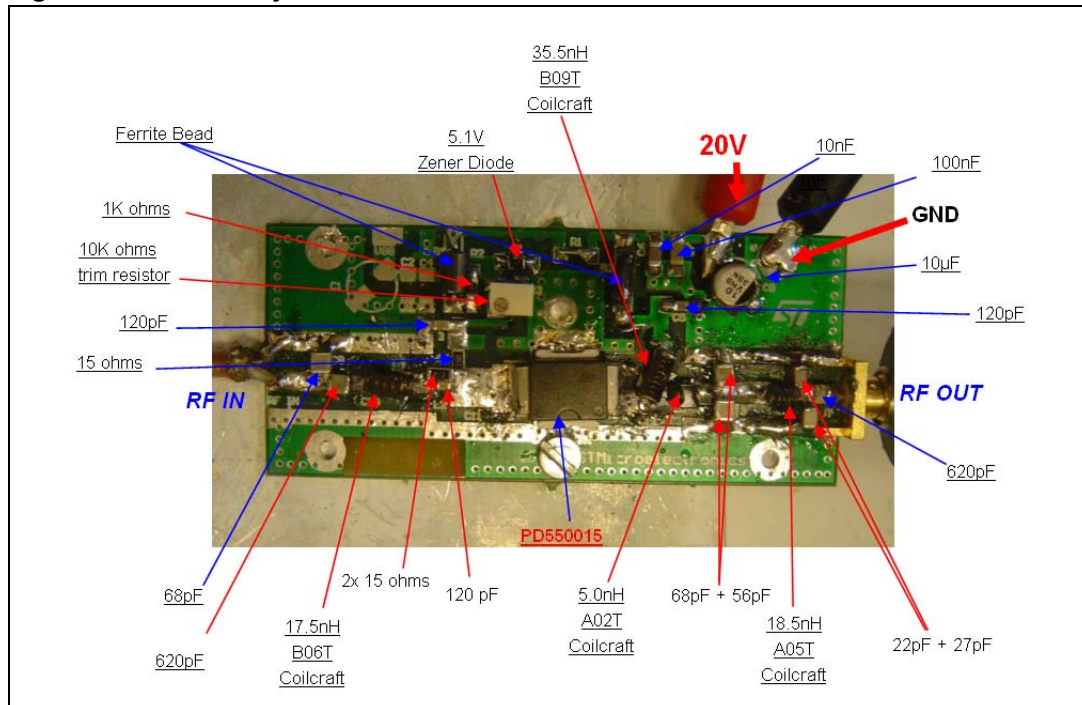


**Figure 10. Harmonics vs frequency @ V<sub>dd</sub> = 13.6 V**



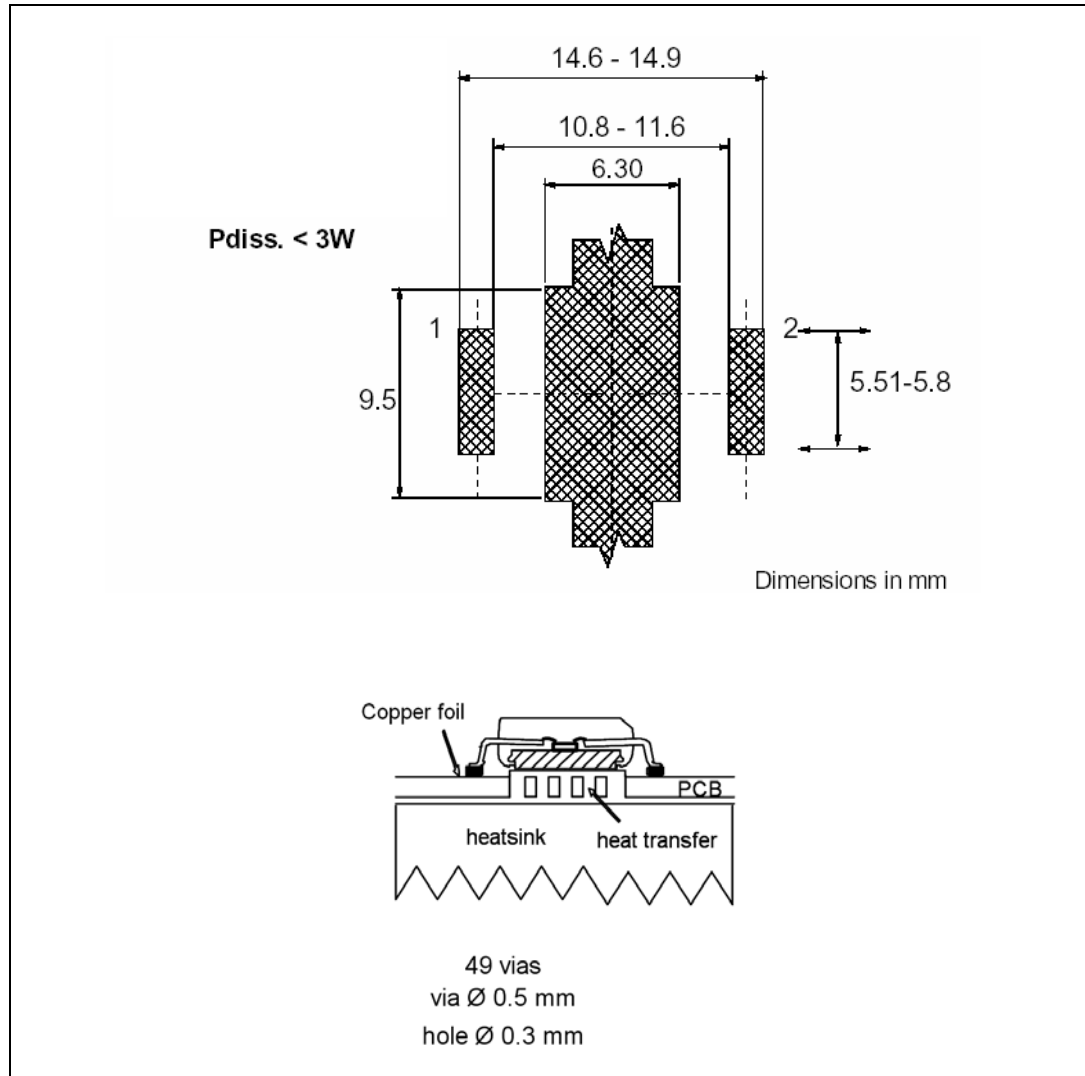
## 4 Circuit layout

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](http://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

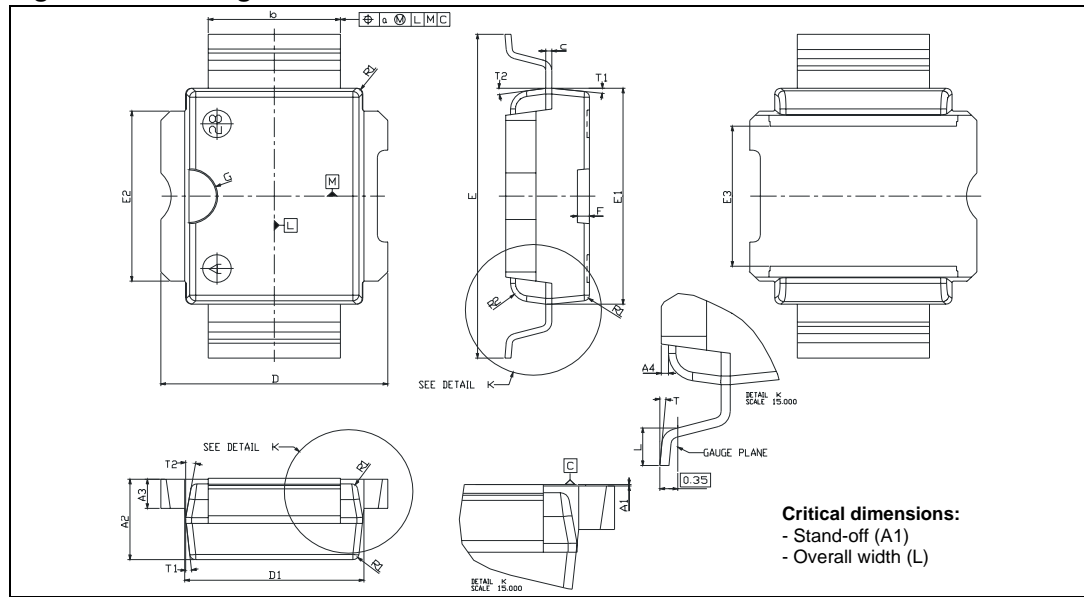
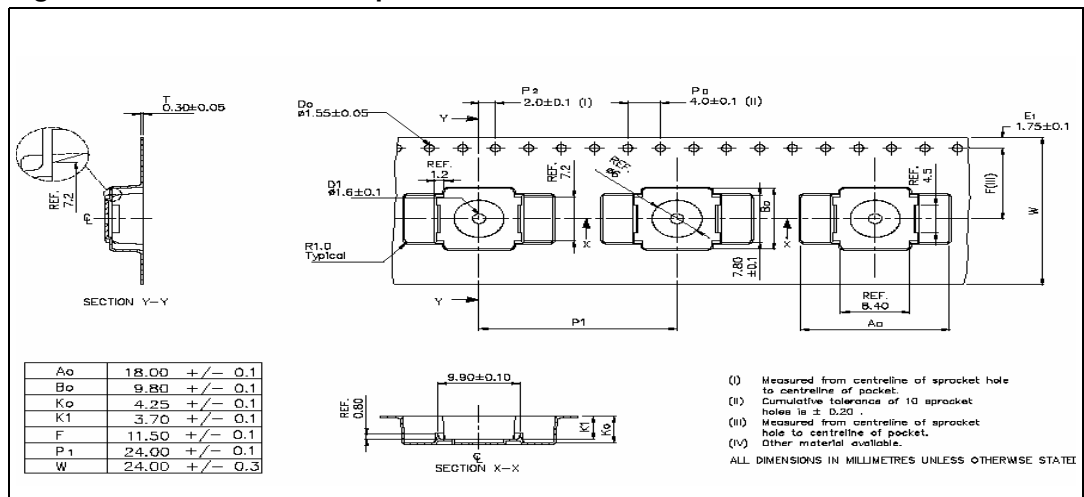


Figure 14. PowerSO-10RF tape and reel



## 7 Revision history

**Table 5. Document revision history**

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

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