# DB-54003L-930

## RF POWER amplifier using 1 x PD54003L N-Channel enhancement-mode lateral MOSFETs

## General feature

- Excellent thermal stability
- Frequency: 860 - 930 MHz
- Supply voltage: 5V
- Output power: 1.5W
- Efficiency: 51% - 55%
- Load mismatch: 20:1
- Beo free amplifier

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

## Description

The DB-54003L-930 is a common source N-Channel Enhancement-Mode Lateral Field Effect RF power amplifier designed for UHF portable RFID reader covering Europe & USA/CANADA frequency bands.

## Order code

- DB-54003L-930

# Contents

# 1 Electrical data

## 1.1 Maximum ratings

**Table 1. Absolute maximum ratings**

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{DD}$ | Supply voltage | 16 | V |
| $I_D$ | Drain current | 1.3 | A |
| $P_{DISS}$ | Power dissipation | 6 | W |
| $T_{CASE}$ | Operating case temperature | -20 to +85 | °C |
| $T_A$ | Max. ambient temperature | +55 | °C |

# 2 Electrical characteristics

$T_A$ = +25 $^oC$, $V_{DD}$ = 5V, $I_{DQ}$ = 100 mA

**Table 2. Electrical Specification**

| Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Freq | Frequency range | 860 | | 930 | MHz |
| $P_{OUT}$ | | | 1.5 | | W |
| Gain | @ $P_{OUT}$ = 1.5W | | 6.8 | | dB |
| ND | @ $P_{OUT}$ = 1.5W | 51 | | 55 | % |
| Gain Flatness | @ $P_{OUT}$ = 1.5W | | | ±0.6 | dB |
| H2 | $2^{ND}$ Harmonic @ $P_{OUT}$ = 1.5W | | -56 | -50 | dBc |
| H3 | $3^{RD}$ Harmonic @ $P_{OUT}$ = 1.5W | | -38 | -35 | dBc |
| VSWR | Load mismatch all phases @ $P_{OUT}$ = 1.5W | | | 20:1 | |

# 3 Impedance

**Figure 1. Impedance graphic**

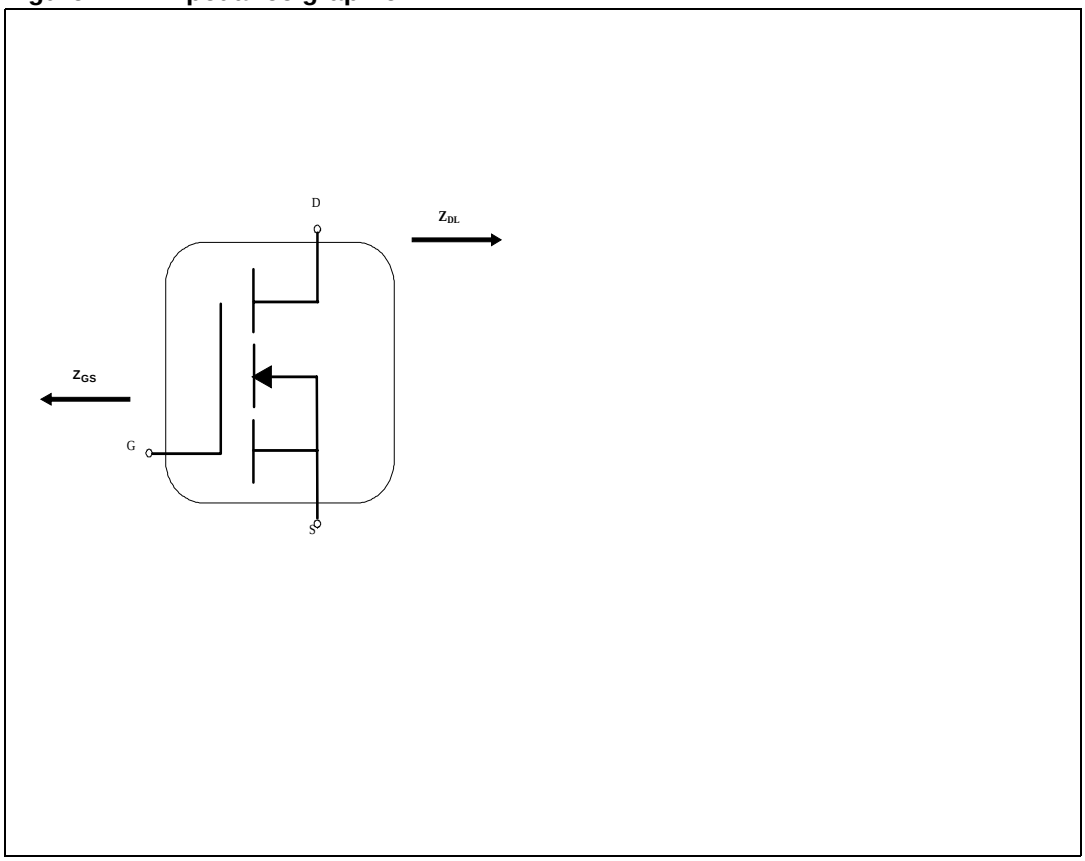



**Table 3. Impedance data**

| F(MHz) | $Z_{GS}$ | $Z_{DL}$ |
|---|---|---|
| 840 | 1.7 + J1.6 | 3.4 + J1.3 |
| 860 | 1.5 + J1.8 | 3.8 + J1.1 |
| 880 | 1.3 + J1.9 | 4.1 + J0.6 |
| 900 | 1.1 + J2.2 | 4.0 - J0.2 |
| 920 | TBD | TBD |
| 940 | TBD | TBD |
| 960 | TBD | TBD |

# 4 Typical performance

**Figure 2. Output power vs. input power**

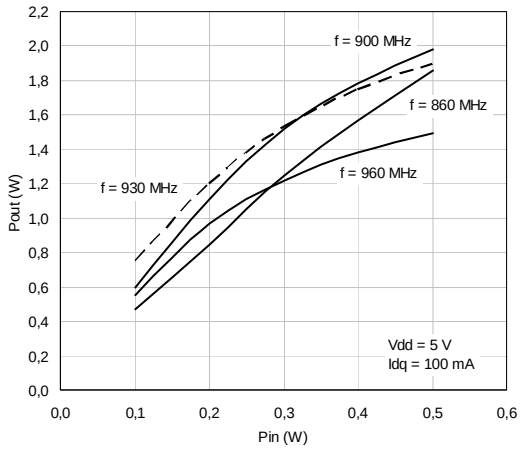



**Figure 3. Efficiency vs. output power**

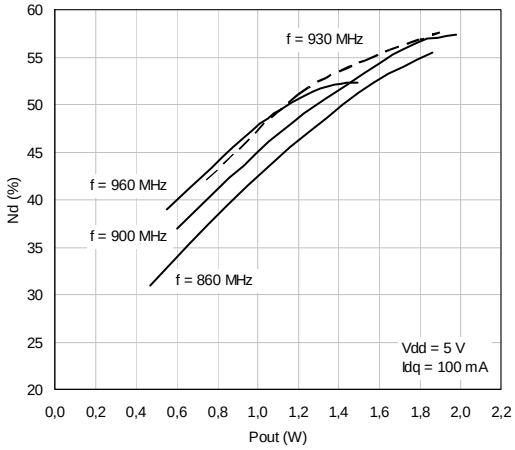



**Figure 4. Gain & efficiency vs. frequency**

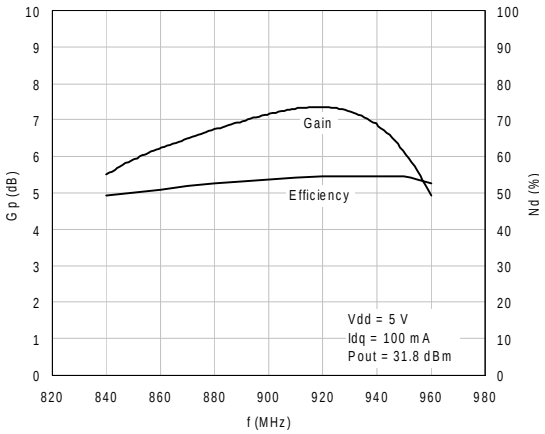



**Figure 5. Input return loss vs. frequency**

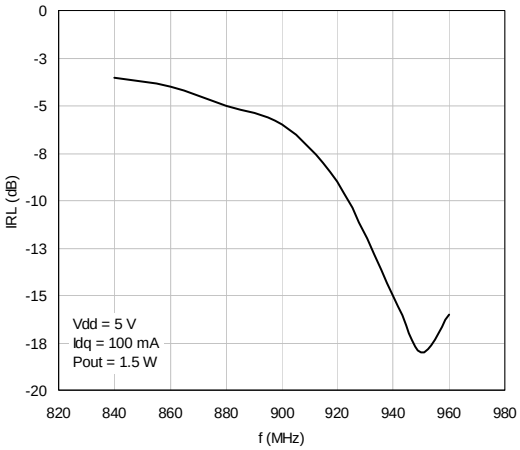


**Figure 6. Harmonics vs. frequency**

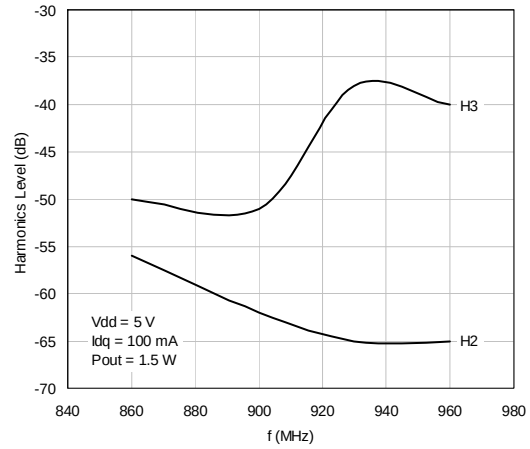



**Figure 7. Output power vs. drain voltage**

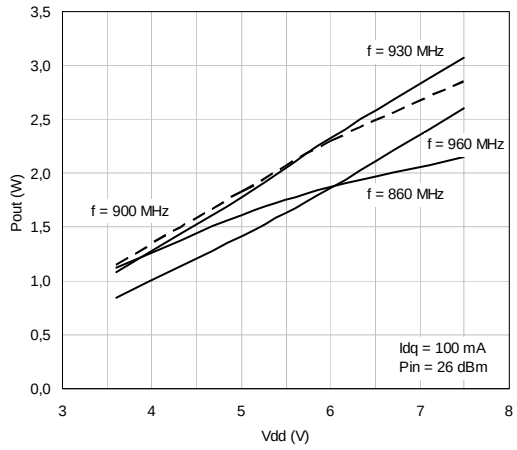



**Figure 8. Power gain & efficiency vs. frequency**

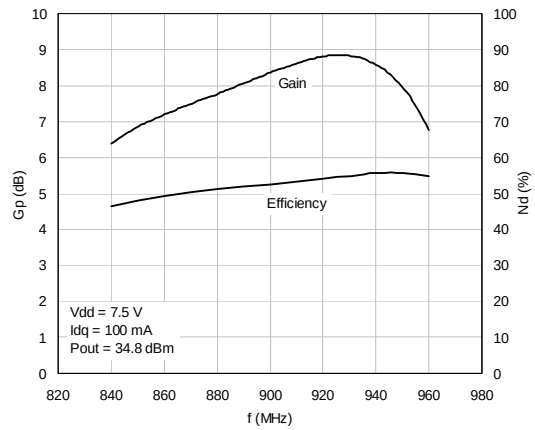



**Figure 9. Power gain & efficiency vs. frequency**

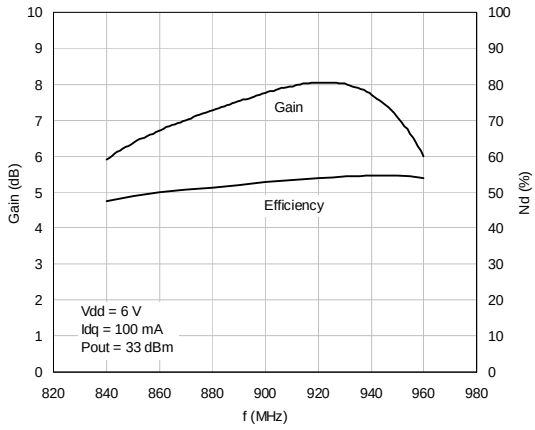
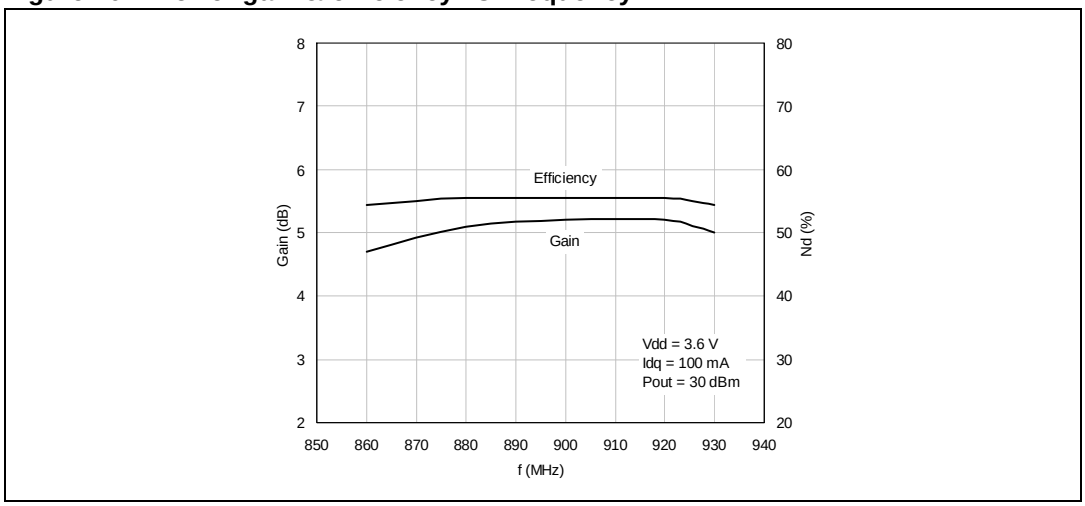


**Figure 10. Power gain & efficiency vs. frequency**



# 5 Circuit layout

**Figure 11. Circuit layout**

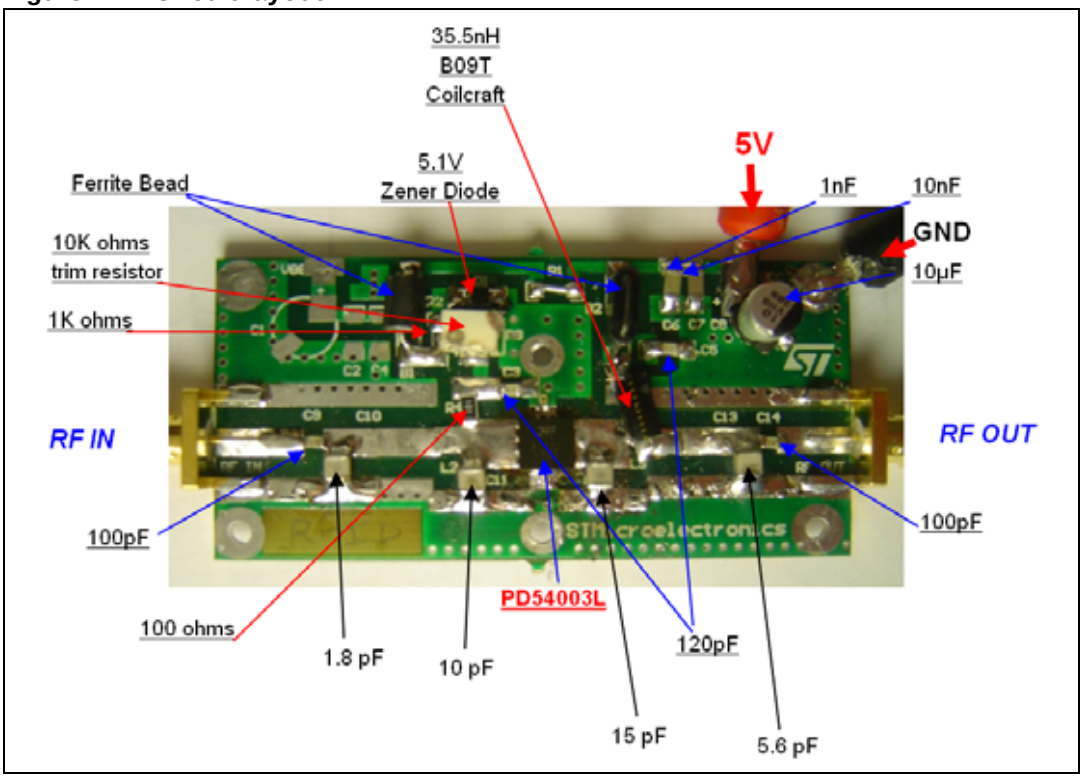
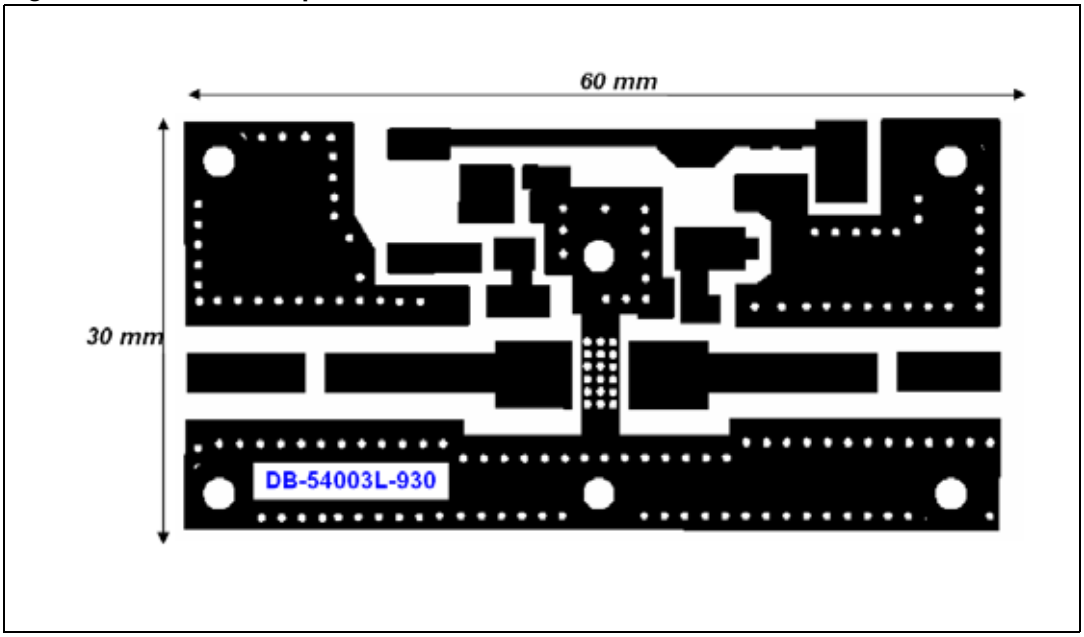
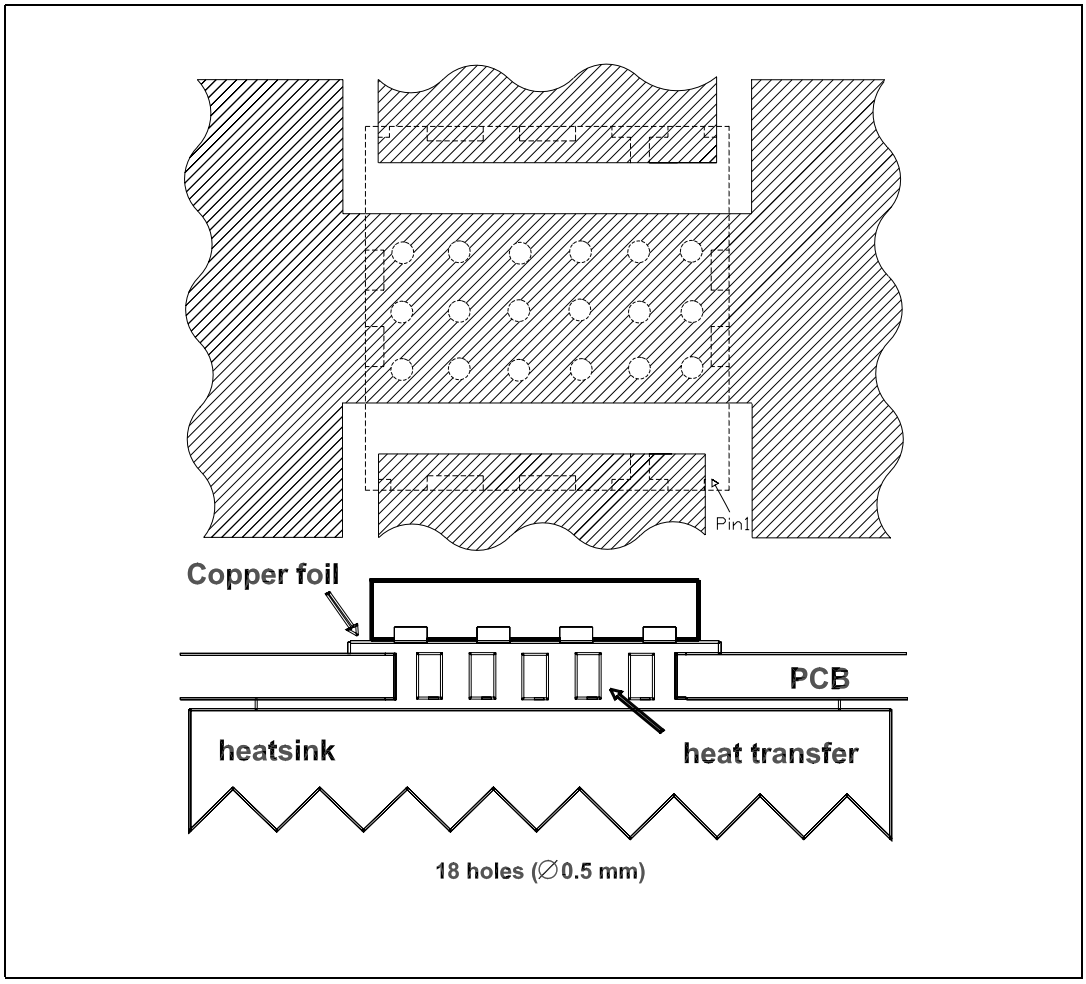



**Figure 12. Test circuit photomaster**



# 6 Mounting indications

**Figure 13. Standard SMD mounting**



# 7 Mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

**Table 4. PowerFLAT™ Mechanical data**

| Dim. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | 0.90 | 1.00 | | 0.035 | 0.039 |
| A1 | | 0.02 | 0.05 | | 0.001 | 0.002 |
| A3 | | 0.24 | | | 0.009 | |
| AA | 0.15 | 0.25 | 0.35 | 0.006 | 0.01 | 0.014 |
| b | 0.43 | 0.51 | 0.58 | 0.017 | 0.020 | 0.023 |
| c | 0.64 | 0.71 | 0.79 | 0.025 | 0.028 | 0.031 |
| D | | 5.00 | | | 0.197 | |
| d | | 0.30 | | | 0.011 | |
| E | | 5.00 | | | 0.197 | |
| E2 | 2.49 | 2.57 | 2.64 | 0.098 | 0.101 | 0.104 |
| e | | 1.27 | | | 0.050 | |
| f | | 3.37 | | | 0.132 | |
| g | | 0.74 | | | 0.03 | |
| h | | 0.21 | | | 0.008 | |

**Figure 14. PowerFLAT™ Package dimensions**

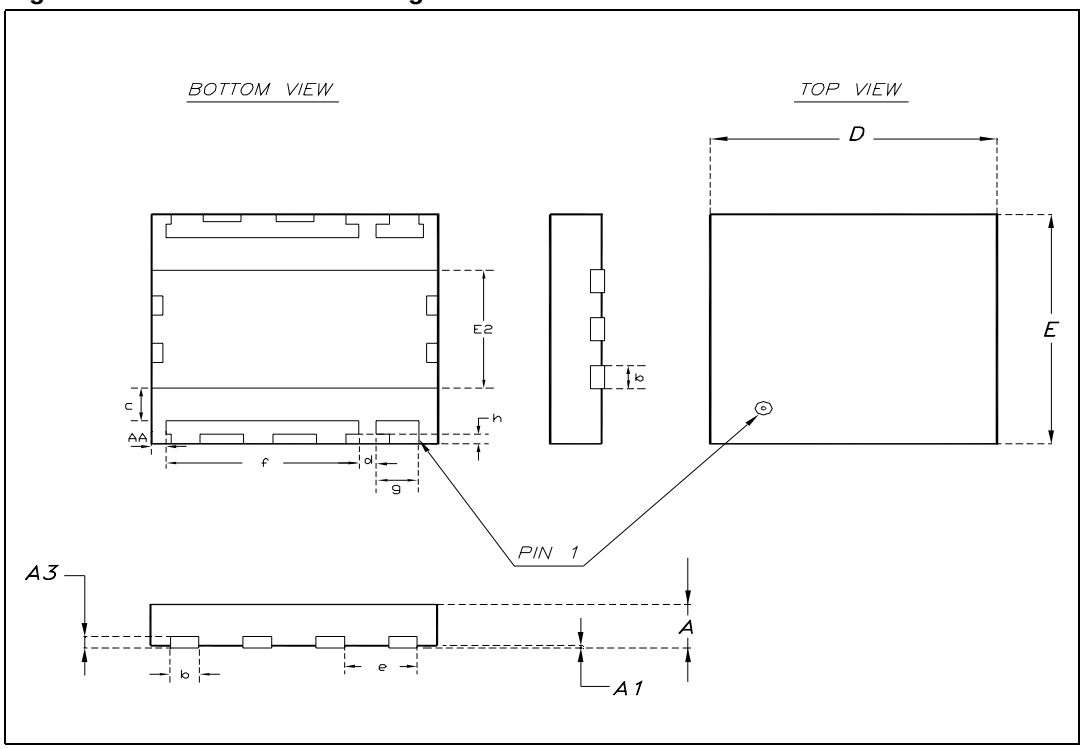
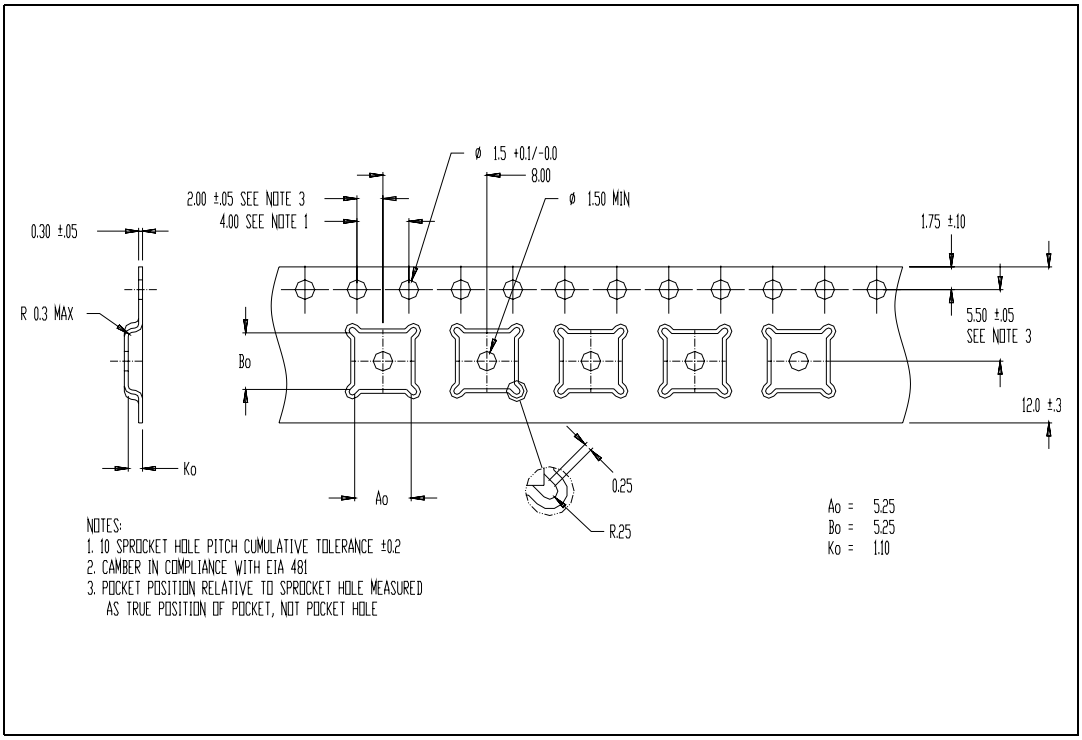


**Table 5. PowerFLAT™ Tape & reel dimensions**

| Dim. | mm. | | | inch | | |
|---|---|---|---|---|---|---|
| | Min. | Typ | Max. | Min. | Typ | Max. |
| Ao | 5.15 | 5.25 | 5.35 | 0.12 | 0.13 | 0.13 |
| Bo | 5.15 | 5.25 | 5.35 | 0.12 | 0.13 | 0.13 |
| Ko | 1.0 | 1.1 | 1.2 | 0.02 | 0.02 | 0.02 |

**Figure 15. PowerFLAT™ Tape & reel**



# 8 Revision history

**Table 6. Revision history**

| Date | Revision | Changes |
|---|---|---|
| 16-Mar-2006 | 1 | Initial release. |

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