

BLF2425M9L30; BLF2425M9LS30

Power LDMOS transistor

Rev. 4 — 21 October 2016

AMM[®]PLEON

Product data sheet

1. Product profile

1.1 General description

30 W LDMOS power transistor for Industrial, Scientific and Medical (ISM) applications at frequencies from 2400 MHz to 2500 MHz.

The BLF2425M9L30 and BLF2425M9LS30 are drivers designed for high power CW applications and are assembled in a high performance ceramic package.

Table 1. Typical performance

RF performance at $T_{case} = 25\text{ °C}$ in a common source class-AB production test circuit.

| Test signal | f | V _{DS} | P _{L(AV)} | G _p | η _D |
|-------------|-------|-----------------|--------------------|----------------|----------------|
| | (MHz) | (V) | (W) | (dB) | (%) |
| CW | 2450 | 32 | 30 | 18.5 | 61 |

1.2 Features and benefits

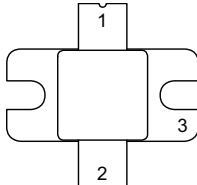
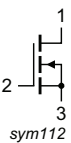
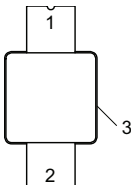
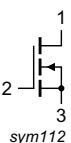
- High efficiency
- High power gain
- Excellent ruggedness
- Excellent thermal stability
- Integrated ESD protection
- Designed for broadband operation (2400 MHz to 2500 MHz)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- Industrial, scientific and medical applications in the frequency range from 2400 MHz to 2500 MHz

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|--------------------------|-----------------------|--|---|
| BLF2425M9L30 (SOT1135A) | | | |
| 1 | drain |  |  |
| 2 | gate | | |
| 3 | source ^[1] | | |
| BLF2425M9LS30 (SOT1135B) | | | |
| 1 | drain |  |  |
| 2 | gate | | |
| 3 | source ^[1] | | |

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|---------------|---------|--|----------|
| | Name | Description | Version |
| BLF2425M9L30 | - | flanged ceramic package; 2 mounting holes; 2 leads | SOT1135A |
| BLF2425M9LS30 | - | earless flanged ceramic package; 2 leads | SOT1135B |

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|-------------------------------------|------------|-----|------|------|
| V_{DS} | drain-source voltage | | - | 65 | V |
| V_{GS} | gate-source voltage | | -6 | +13 | V |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| T_j | junction temperature ^[1] | | - | 225 | °C |

[1] Continuous use at maximum temperature will affect the reliability, for details refer to the online MTF calculator.

5. Thermal characteristics

Table 5. Thermal characteristics

| Symbol | Parameter | Conditions | Typ | Unit |
|------------------|--|---|-----|------|
| $R_{th(j-case)}$ | thermal resistance from junction to case | $T_{case} = 50\text{ °C}$; $P_L = 30\text{ W}$ [1] | 0.9 | K/W |

[1] When operated with a CW signal.

6. Characteristics

Table 6. DC characteristics

$T_j = 25\text{ °C}$ per section; unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|----------------------------------|---|-----|-------|------|---------------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS} = 0\text{ V}$; $I_D = 0.3\text{ mA}$ | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS} = 10\text{ V}$; $I_D = 30\text{ mA}$ | 1.4 | 1.9 | 2.4 | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}$; $V_{DS} = 32\text{ V}$ | - | - | 1.4 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$ | - | 6.2 | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$ | - | - | 140 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}$; $I_D = 30\text{ mA}$ | - | 0.264 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 1\text{ A}$ | - | 0.41 | 0.76 | Ω |

Table 7. RF characteristics

Test signal: CW at $f = 2450\text{ MHz}$; RF performance at $V_{DS} = 32\text{ V}$; $I_{DQ} = 20\text{ mA}$; $T_{case} = 25\text{ °C}$; unless otherwise specified; in a class-AB production test circuit.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|-------------------|---------------------|-----|------|-----|------|
| G_p | power gain | $P_L = 30\text{ W}$ | 17 | 18.5 | - | dB |
| RL_{in} | input return loss | $P_L = 30\text{ W}$ | - | -10 | -7 | dB |
| η_D | drain efficiency | $P_L = 30\text{ W}$ | 57 | 61 | - | % |

7. Test information

7.1 Ruggedness in class-AB operation

The BLF2425M9L30 and BLF2425M9LS30 are capable of withstanding a load mismatch corresponding to $VSWR = 10 : 1$ through all phases under the following conditions:

$V_{DS} = 32\text{ V}$; $I_{DQ} = 20\text{ mA}$; $P_L = 30\text{ W}$ (CW); $f = 2450\text{ MHz}$.

7.2 Impedance information

Table 8. Typical impedance
Measured load-pull data. Typical values unless otherwise specified.

| f | Z _S | Z _L |
|-------|----------------|----------------|
| (MHz) | (Ω) | (Ω) |
| 2400 | 9.0 – 12.5j | 12.0 – 2.0j |
| 2450 | 9.1 – 17.9j | 10.4 – 4.3j |
| 2500 | 16.0 – 17.3j | 10.3 – 4.2j |

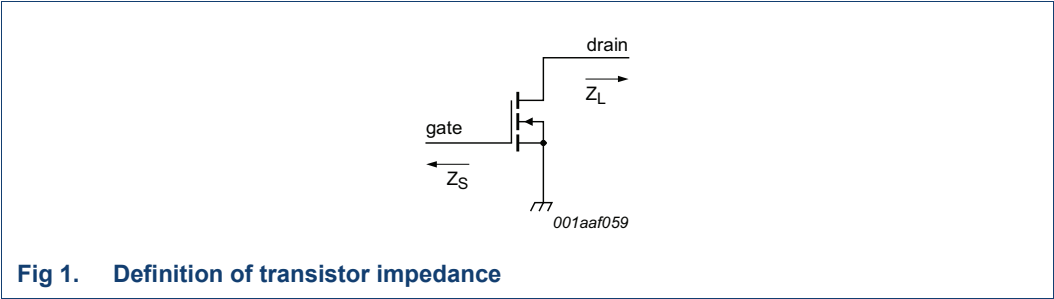


Fig 1. Definition of transistor impedance

7.3 Test circuit

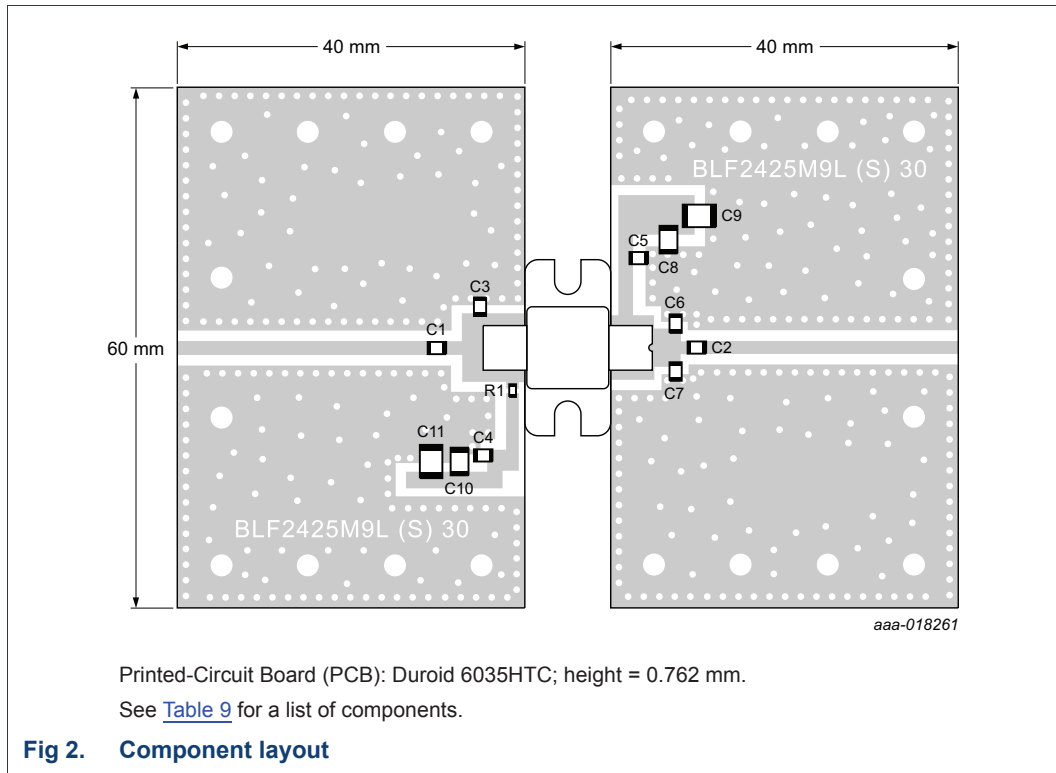
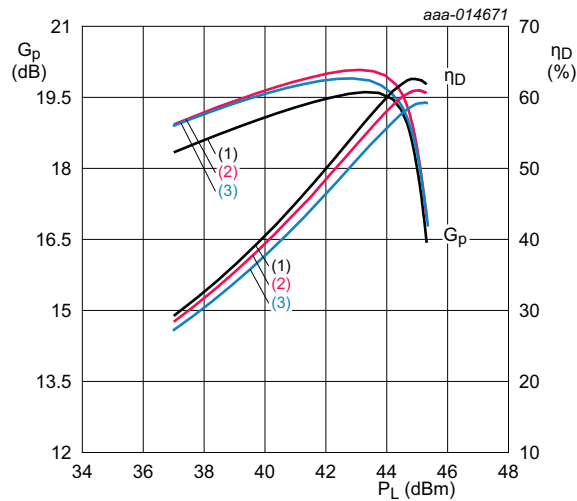


Table 9. List of components

See [Figure 2](#) for component layout.

| Component | Description | Value | Remarks |
|----------------|-----------------------------------|--------------|--------------------|
| C1, C2, C4, C5 | multilayer ceramic chip capacitor | 15 pF | ATC100A150FT150XT |
| C3 | multilayer ceramic chip capacitor | 0.3 pF | ATC100A0R6BT150XTV |
| C6, C7 | multilayer ceramic chip capacitor | 0.8 pF | ATC100A0R8BT150XTV |
| C8, C10 | multilayer ceramic chip capacitor | 100 nF | GRM21BR71H104KA01L |
| C9, C11 | multilayer ceramic chip capacitor | 4.7 μ F | GRM32ER71H475KA88L |
| R1 | SMD resistor | 9.1 Ω | SMD 0603 |

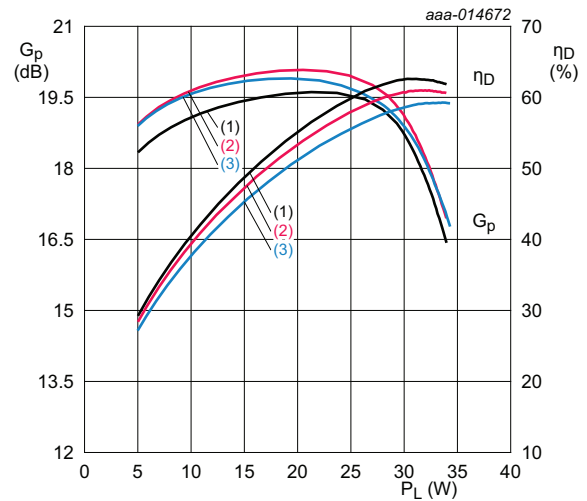
7.4 Graphical data



$V_{DS} = 32 \text{ V}$; $I_{Dq} = 20 \text{ mA}$.

- (1) $f = 2400 \text{ MHz}$
- (2) $f = 2450 \text{ MHz}$
- (3) $f = 2500 \text{ MHz}$

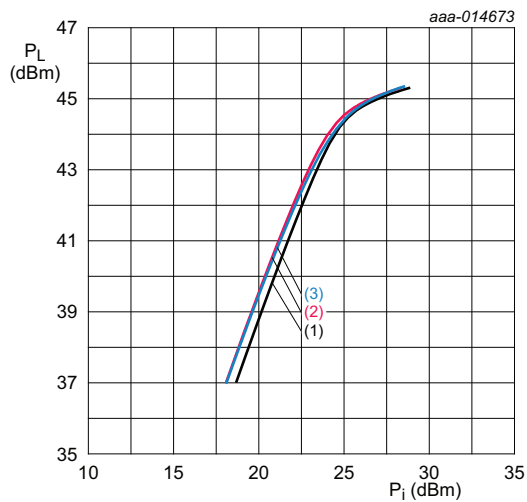
Fig 3. Power gain and drain efficiency as function of output power; typical values



$V_{DS} = 32 \text{ V}$; $I_{Dq} = 20 \text{ mA}$.

- (1) $f = 2400 \text{ MHz}$
- (2) $f = 2450 \text{ MHz}$
- (3) $f = 2500 \text{ MHz}$

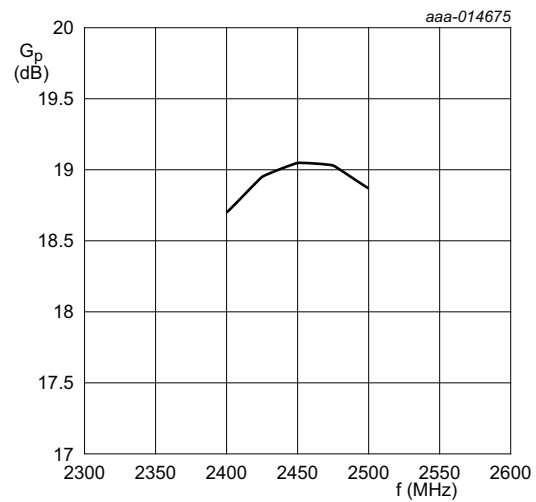
Fig 4. Power gain and drain efficiency as function of output power; typical values



$V_{DS} = 32 \text{ V}$; $I_{Dq} = 20 \text{ mA}$.

- (1) $f = 2400 \text{ MHz}$
- (2) $f = 2450 \text{ MHz}$
- (3) $f = 2500 \text{ MHz}$

Fig 5. Output power as a function of input power; typical values



$V_{DS} = 32 \text{ V}$; $I_{Dq} = 20 \text{ mA}$; $P_L = 30 \text{ W}$.

Fig 6. Power gain as a function of frequency; typical values

8. Package outline

Flanged ceramic package; 2 mounting holes; 2 leads

SOT1135A

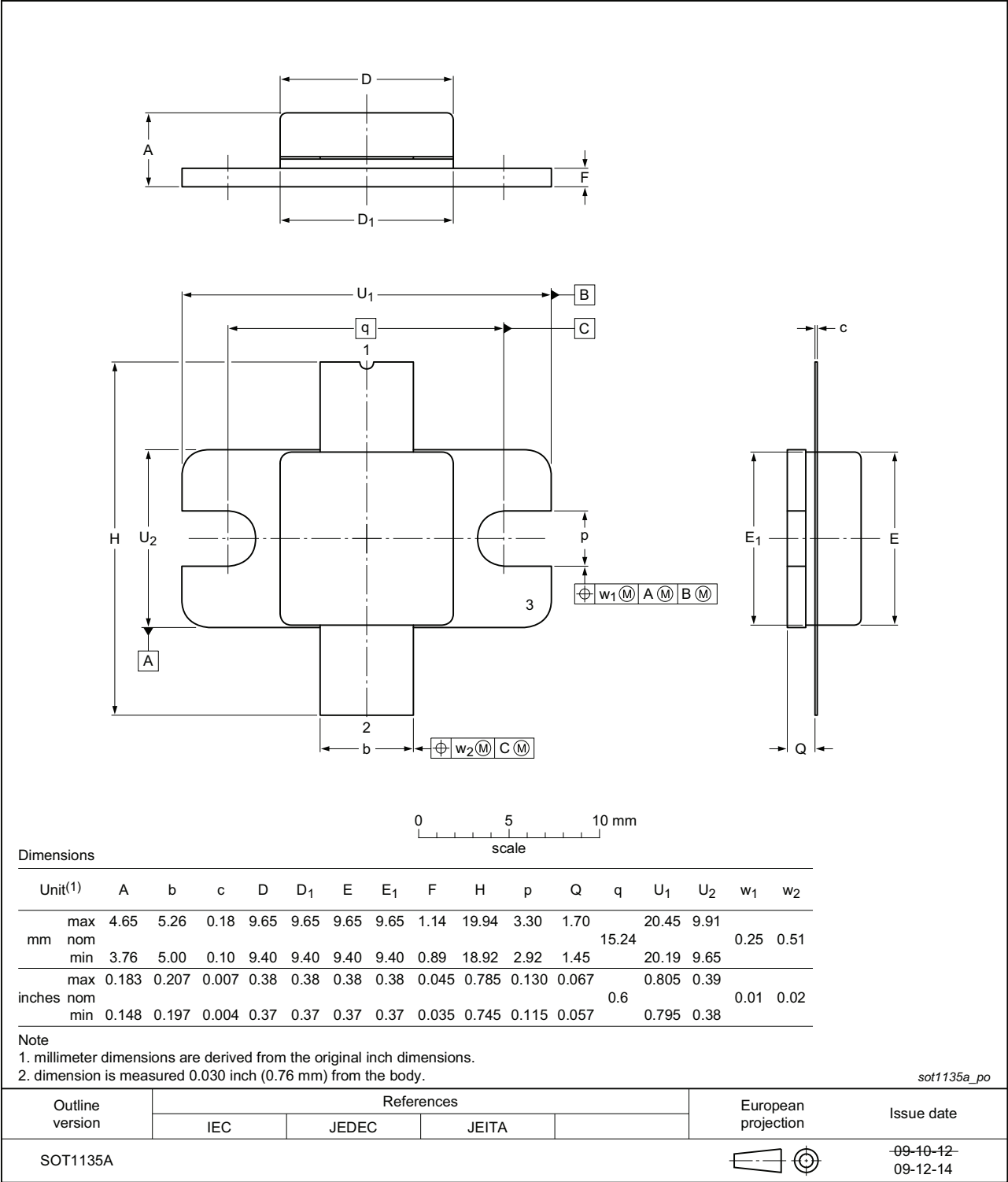


Fig 7. Package outline SOT1135A

Earless flanged ceramic package; 2 leads

SOT1135B

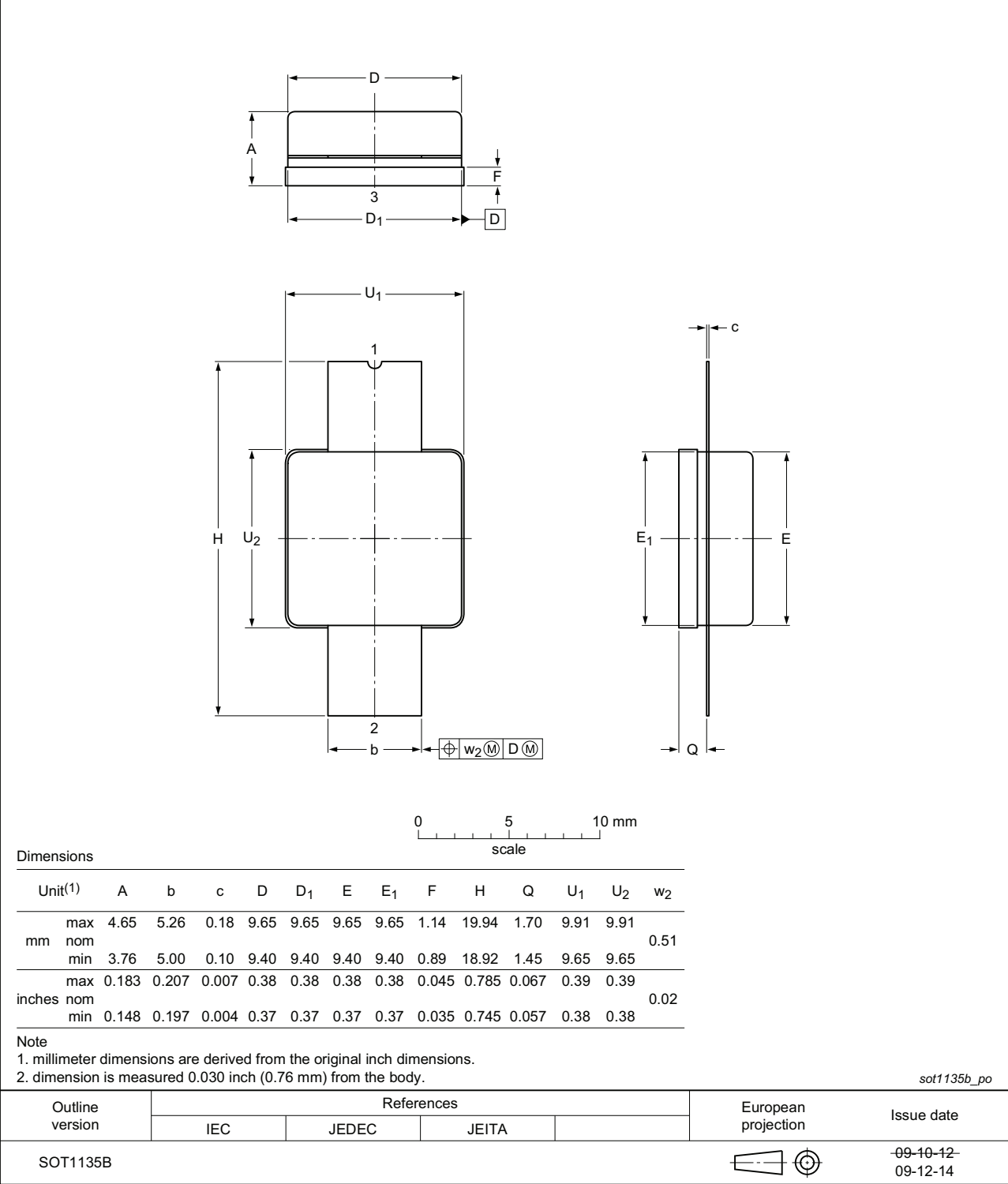


Fig 8. Package outline SOT1135B

9. Handling information

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

10. Abbreviations

Table 10. Abbreviations

| Acronym | Description |
|---------|--|
| CW | Continuous Wave |
| ESD | ElectroStatic Discharge |
| LDMOS | Laterally Diffused Metal-Oxide Semiconductor |
| MTF | Median Time to Failure |
| SMD | Surface Mounted Device |
| VSWR | Voltage Standing-Wave Ratio |

11. Revision history

Table 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-------------------------|--|----------------------|---------------|-------------------------|
| BLF2425M9L30_M9LS30 v.4 | 20161021 | Product data sheet | - | BLF2425M9L30_M9LS30 v.3 |
| Modifications: | <ul style="list-style-type: none"> Table 4 on page 2: changed V_{GS} minimum value from -0.5 V to -6 V | | | |
| BLF2425M9L30_M9LS30 v.3 | 20160218 | Product data sheet | - | BLF2425M9L30_M9LS30#2 |
| BLF2425M9L30_M9LS30#2 | 20150901 | Objective data sheet | - | BLF2425M9L30_M9LS30 v.1 |
| BLF2425M9L30_M9LS30 v.1 | 20150603 | Objective data sheet | - | - |

12. Legal information

12.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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