

BLF6G22LS-100

Power LDMOS transistor

Rev. 4 — 1 September 2015

AMPLEON

Product data sheet

1. Product profile

1.1 General description

100 W LDMOS power transistor for base station applications at frequencies from 2000 MHz to 2200 MHz.

Table 1. Typical performance

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

| Mode of operation | f (MHz) | V _{DS} (V) | P _{L(AV)} (W) | G _p (dB) | η _D (%) | IMD3 (dBc) | ACPR (dBc) |
|-------------------|--------------|------------------------|---------------------------|------------------------|-----------------------|--------------------|--------------------|
| 2-carrier W-CDMA | 2110 to 2170 | 28 | 25 | 18.2 | 29 | -37 ^[1] | -41 ^[1] |

[1] Test signal: 3GPP; test model 1; 64 DPCH; PAR = 7 dB at 0.01 % probability on CCDF per carrier; carrier spacing 10 MHz.

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features and benefits

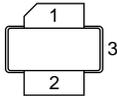
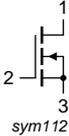
- Typical 2-carrier W-CDMA performance at frequencies of 2110 MHz and 2170 MHz, a supply voltage of 28 V and an I_{DQ} of 950 mA:
 - ◆ Average output power = 25 W
 - ◆ Gain = 18.2 dB
 - ◆ Efficiency = 29 %
 - ◆ IMD3 = -37 dBc
 - ◆ ACPR = -41 dBc
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2000 MHz to 2200 MHz)
- Internally matched for ease of use
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

1.3 Applications

- RF power amplifiers for W-CDMA base stations and multi carrier applications in the 2000 MHz to 2200 MHz frequency range

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------|---|---|
| 1 | drain |  |  |
| 2 | gate | | |
| 3 | source | | |

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|---------------|---------|---|---------|
| | Name | Description | Version |
| BLF6G22LS-100 | - | earless flanged LDMOST ceramic package; 2 leads | SOT502B |

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 | | -0.5 | +13 | V |
| I_D | drain current | | - | 29 | A |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| T_j | junction temperature | | - | 225 | °C |

5. Thermal characteristics

Table 5. Thermal characteristics

| Symbol | Parameter | Conditions | Typ | Unit |
|------------------|--|--|------|------|
| $R_{th(j-case)}$ | thermal resistance from junction to case | $T_{case} = 80\text{ °C}; P_L = 25\text{ W}$ | 0.43 | K/W |

6. Characteristics

Table 6. Characteristics
T_j = 25 °C unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------------|----------------------------------|---|------|------|------|------|
| V _{(BR)DSS} | drain-source breakdown voltage | V _{GS} = 0 V; I _D = 0.5 mA | 65 | - | - | V |
| V _{GS(th)} | gate-source threshold voltage | V _{DS} = 10 V; I _D = 150 mA | 1.4 | 1.9 | 2.4 | V |
| V _{GSq} | gate-source quiescent voltage | V _{DS} = 28 V; I _D = 900 mA | 1.76 | 2.26 | 2.76 | V |
| I _{DSS} | drain leakage current | V _{GS} = 0 V; V _{DS} = 28 V | - | - | 5 | μA |
| I _{DSX} | drain cut-off current | V _{GS} = V _{GS(th)} + 3.75 V; V _{DS} = 10 V | 22 | 28 | - | A |
| I _{GSS} | gate leakage current | V _{GS} = 11 V; V _{DS} = 0 V | - | - | 450 | nA |
| g _{fs} | forward transconductance | V _{DS} = 10 V; I _D = 7.5 A | - | 11 | - | S |
| R _{DS(on)} | drain-source on-state resistance | V _{GS} = V _{GS(th)} + 3.75 V; I _D = 5.25 A | - | 0.1 | 0.16 | Ω |
| C _{rs} | feedback capacitance | V _{GS} = 0 V; V _{DS} = 28 V; f = 1 MHz | - | 2.1 | - | pF |

7. Application information

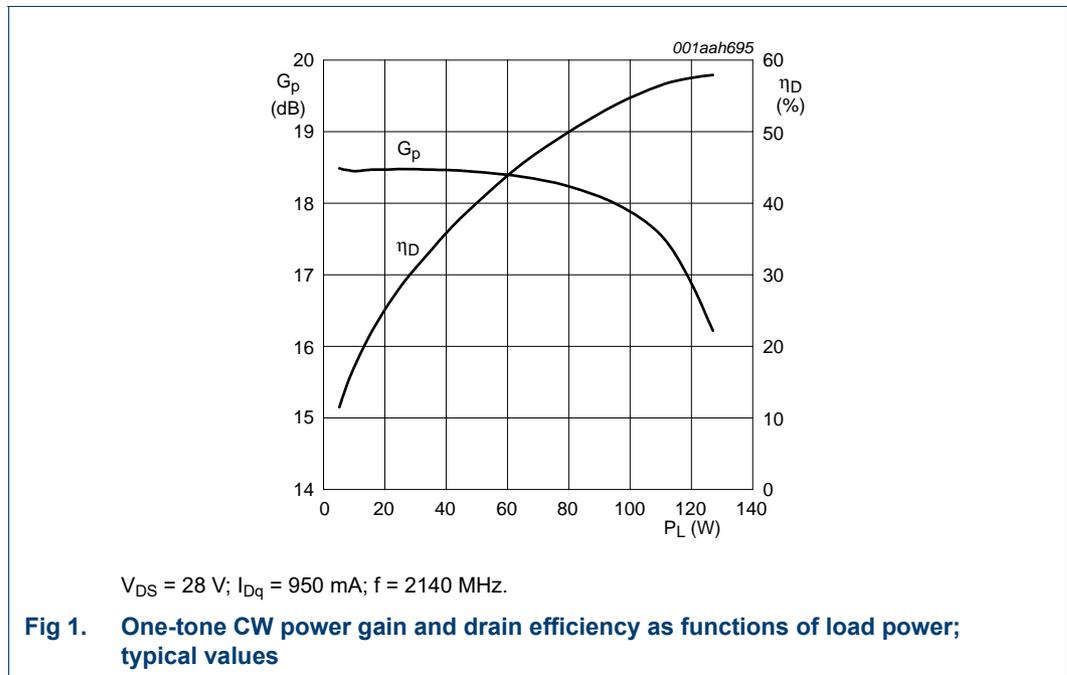
Table 7. Application information
Mode of operation: 2-carrier W-CDMA; PAR 7 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 PDPCH; f₁ = 2112.5 MHz; f₂ = 2122.5 MHz; f₃ = 2157.5 MHz; f₄ = 2167.5 MHz; RF performance at V_{DS} = 28 V; I_{Dq} = 950 mA; T_{case} = 25 °C; unless otherwise specified; in a class-AB production test circuit.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------|--|---------------------------|------|------|-------|------|
| P _{L(AV)} | average output power | | - | 25 | - | W |
| G _p | power gain | P _{L(AV)} = 25 W | 17 | 18.2 | - | dB |
| IRL | input return loss | P _{L(AV)} = 25 W | - | -9 | -7 | dB |
| η _D | drain efficiency | P _{L(AV)} = 25 W | 27.5 | 29 | - | % |
| IMD3 | third-order intermodulation distortion | P _{L(AV)} = 25 W | - | -37 | -34.5 | dBc |
| ACPR | adjacent channel power ratio | P _{L(AV)} = 25 W | - | -41 | -38.5 | dBc |

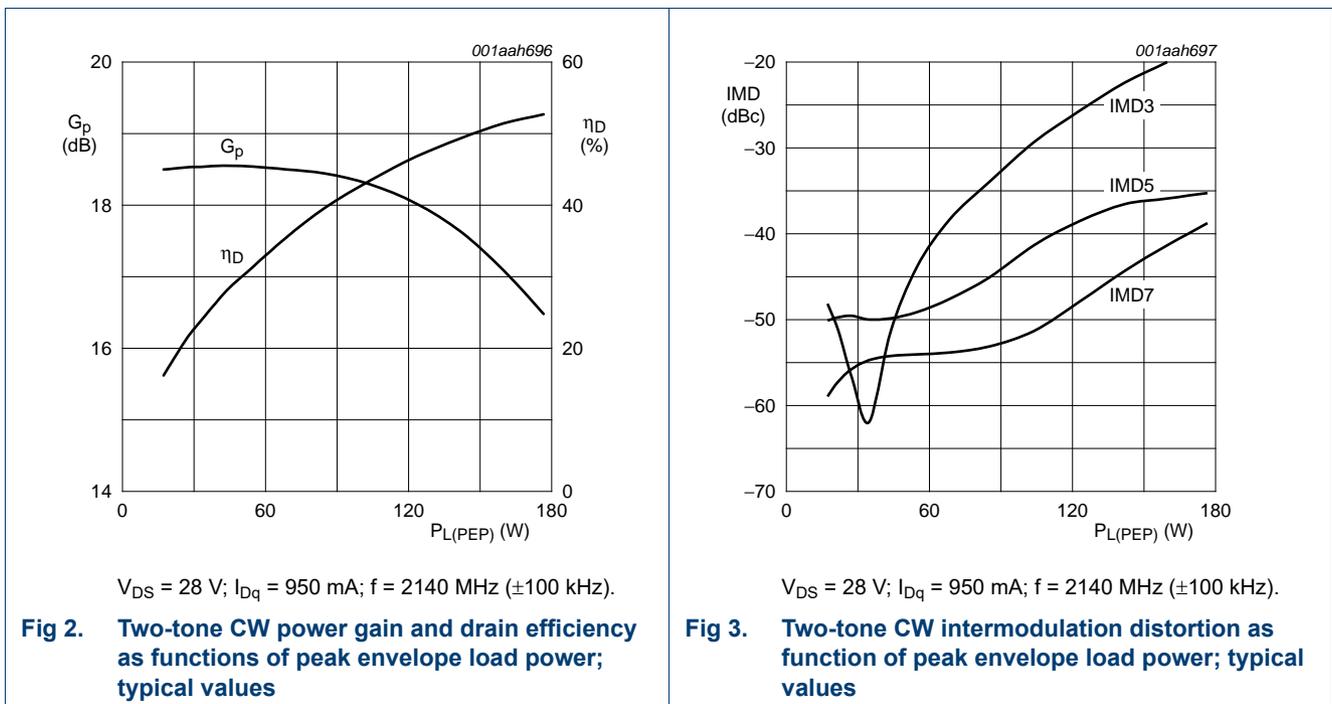
7.1 Ruggedness in class-AB operation

The BLF6G22LS-100 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 28 V; I_{Dq} = 950 mA; P_L = 100 W (CW); f = 2170 MHz.

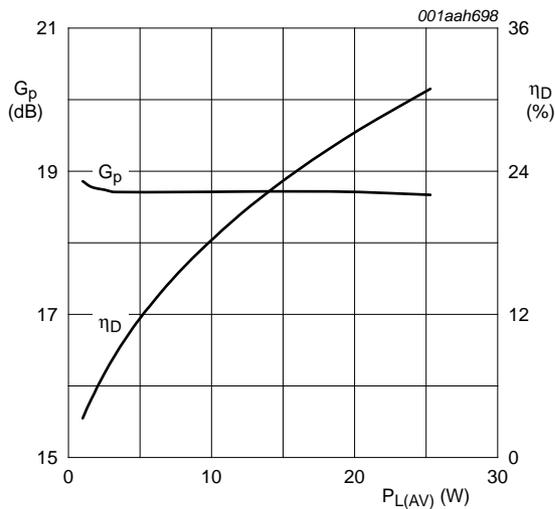
7.2 One-tone CW



7.3 Two-tone CW

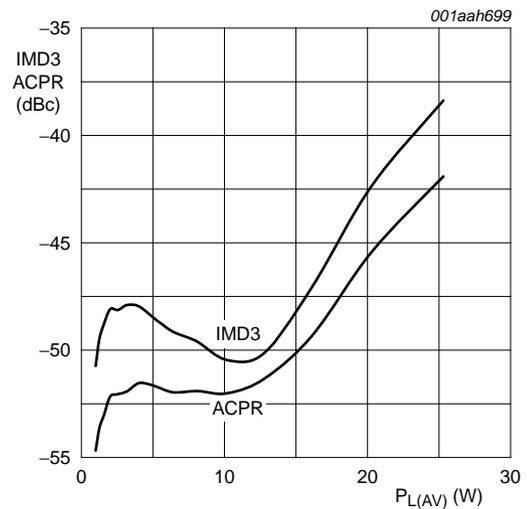


7.4 2-carrier W-CDMA



$V_{DS} = 28\text{ V}$; $I_{Dq} = 950\text{ mA}$; $f = 2140\text{ MHz}$ ($\pm 5\text{ MHz}$);
carrier spacing 10 MHz.

Fig 4. 2-carrier W-CDMA power gain and drain efficiency as functions of average load power; typical values



$V_{DS} = 28\text{ V}$; $I_{Dq} = 950\text{ mA}$; $f = 2140\text{ MHz}$ ($\pm 5\text{ MHz}$);
carrier spacing 10 MHz.

Fig 5. 2-carrier W-CDMA adjacent channel power ratio and third order intermodulation distortion as functions of average load power; typical values

8. Test information

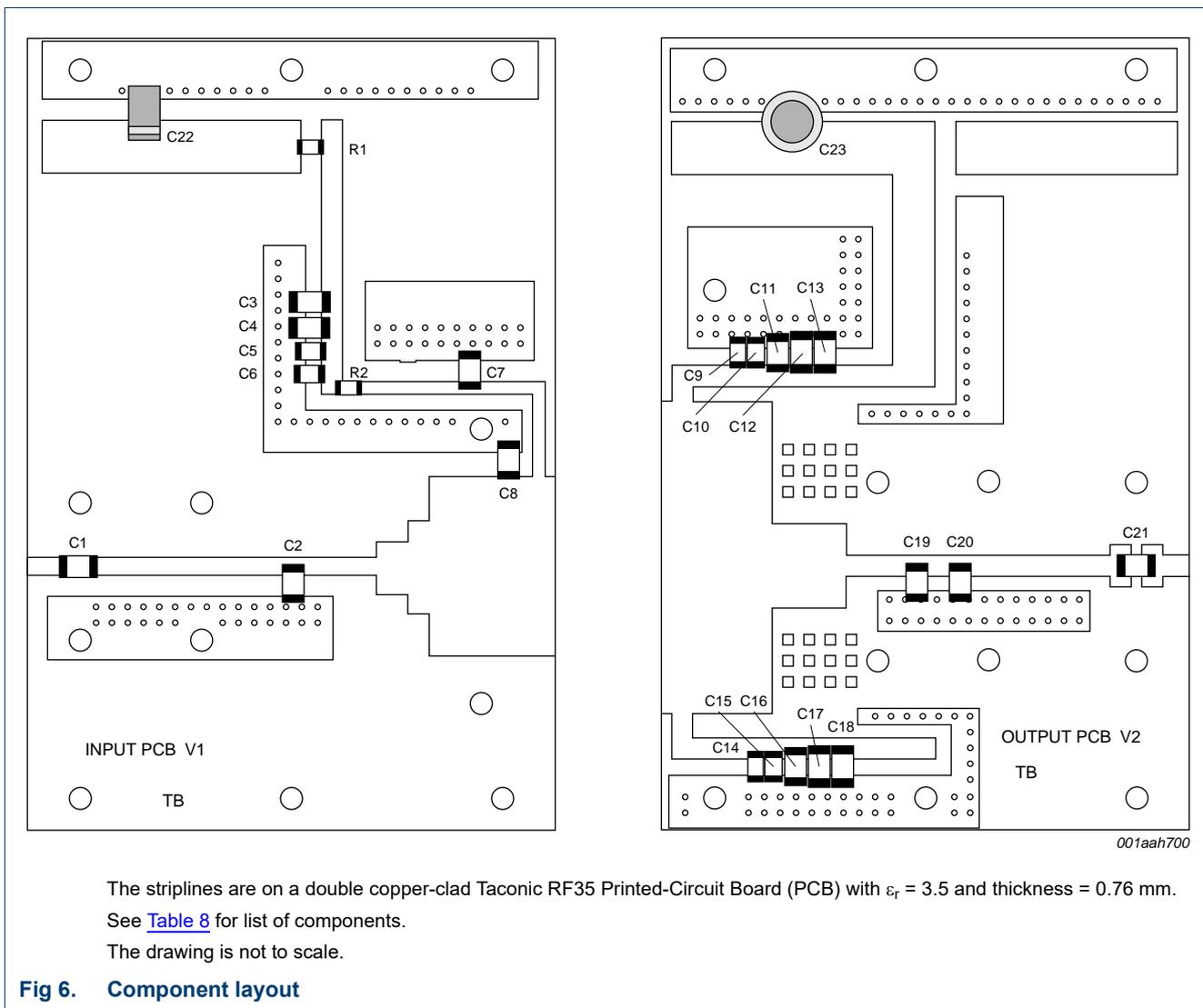


Table 8. List of components (see [Figure 6](#))

| Component | Description | Value | Remarks |
|----------------------------|-----------------------------------|-------------|---|
| C1 | multilayer ceramic chip capacitor | 5.6 pF | [1] |
| C2 | multilayer ceramic chip capacitor | 1.0 pF | [1] |
| C3, C4, C12, C13, C17, C18 | multilayer ceramic chip capacitor | 1.5 μ F | SMD 0805; TDK or capacitor of same quality |
| C5, C6, C10, C15 | multilayer ceramic chip capacitor | 100 nF | SMD 0603; Murata or capacitor of same quality |
| C7 | multilayer ceramic chip capacitor | 1.5 pF | [1] |
| C8 | multilayer ceramic chip capacitor | 0.6 pF | [1] |

Table 8. List of components (see [Figure 6](#)) ...continued

| Component | Description | Value | Remarks |
|-----------|-----------------------------------|-------------------|--|
| C9, C14 | multilayer ceramic chip capacitor | 220 nF | SMD 1206; AVX or capacitor of same quality |
| C11, C16 | multilayer ceramic chip capacitor | 10 pF | [1] |
| C19 | multilayer ceramic chip capacitor | 1.1 pF | [1] |
| C20 | multilayer ceramic chip capacitor | 0.5 pF | [1] |
| C21 | multilayer ceramic chip capacitor | 20 pF | [1] |
| C22 | tantalum capacitor | 10 μ F; 35 V | |
| C23 | electrolytic capacitor | 220 μ F; 35 V | |
| R1 | SMD resistor | 3.6 Ω | |
| R2 | SMD resistor | 5.1 Ω | |

[1] American Technical Ceramics type 100B or capacitor of same quality.

9. Package outline

Earless flanged ceramic package; 2 leads

SOT502B

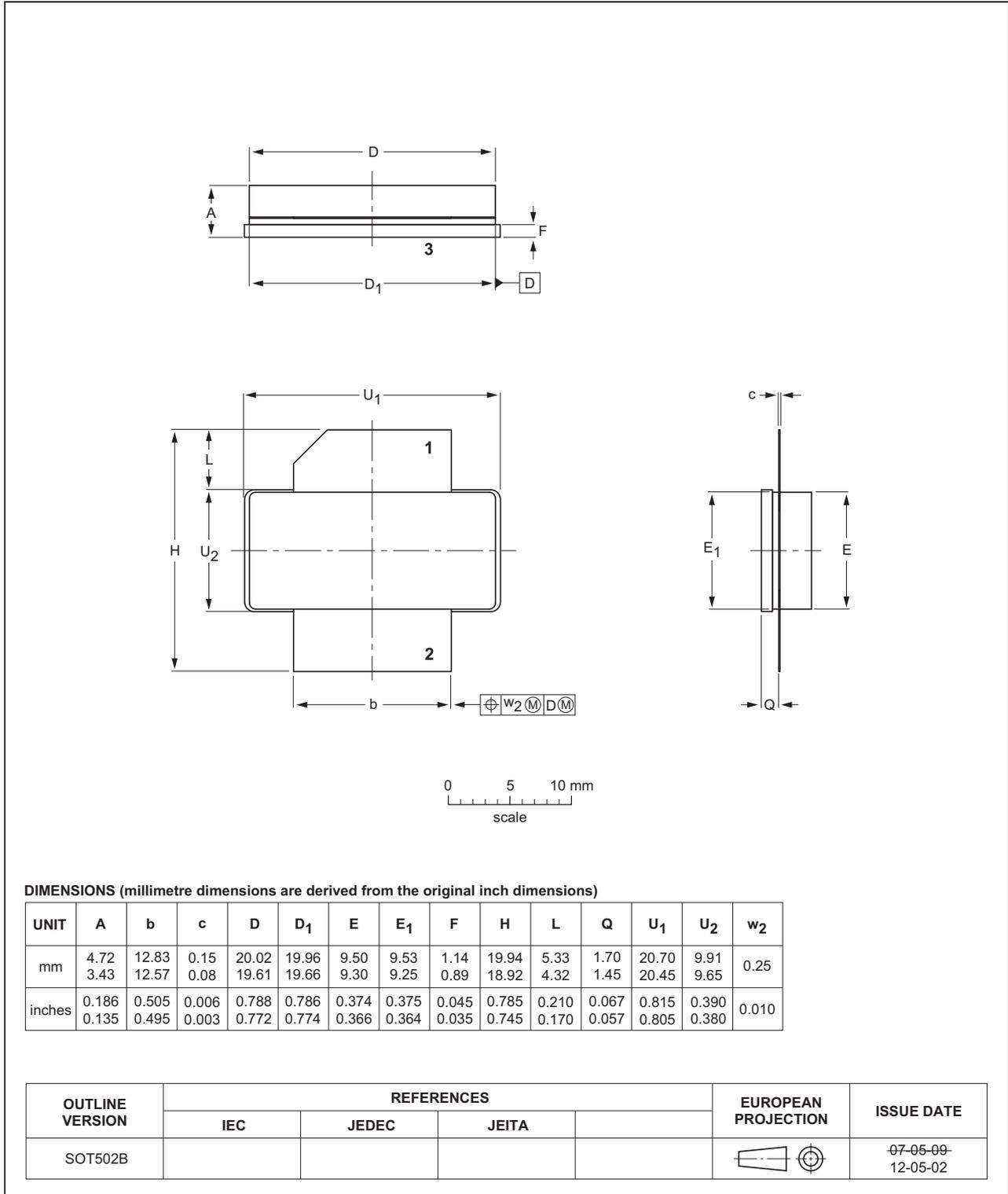


Fig 7. Package outline SOT502B

10. Abbreviations

Table 9. Abbreviations

| Acronym | Description |
|---------|---|
| 3GPP | Third Generation Partnership Project |
| CCDF | Complementary Cumulative Distribution Function |
| CW | Continuous Wave |
| DPCH | Dedicated Physical CHannel |
| LDMOS | Laterally Diffused Metal Oxide Semiconductor |
| LDMOST | Laterally Diffused Metal-Oxide Semiconductor Transistor |
| PAR | Peak-to-Average power Ratio |
| PDPCH | transmission Power of the Dedicated Physical CHannel |
| RF | Radio Frequency |
| VSWR | Voltage Standing Wave Ratio |
| W-CDMA | Wideband Code Division Multiple Access |

11. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-------------------|--|------------------------|---------------|-------------------|
| BLF6G22LS-100#4 | 20150901 | Product data sheet | - | BLF6G22LS-100 v.3 |
| Modifications: | <ul style="list-style-type: none"> The format of this document has been redesigned to comply with the new identity guidelines of Ampleon. Legal texts have been adapted to the new company name where appropriate. | | | |
| BLF6G22LS-100 v.3 | 20101112 | Product data sheet | - | BLF6G22LS-100 v.2 |
| BLF6G22LS-100 v.2 | 20100331 | Product data sheet | - | BLF6G22LS-100 v.1 |
| BLF6G22LS-100 v.1 | 20080218 | Preliminary 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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