

BLF6G22LS-75

Power LDMOS transistor

Rev. 02 — 14 April 2010

Product data sheet

1. Product profile

1.1 General description

75 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 | 17 | 18.7 | 30.5 | -37.5 ^[1] | -41.5 ^[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 690 mA:
 - ◆ Average output power = 17 W
 - ◆ Gain = 18.7 dB
 - ◆ Efficiency = 30.5 %
 - ◆ IMD3 = -37.5 dBc
 - ◆ ACPR = -41.5 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)

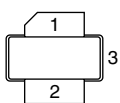
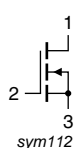


1.3 Applications

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

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------|---|---|
| 1 | drain |  |  sym112 |
| 2 | gate | | |
| 3 | source | | |

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|--------------|---------|---|---------|
| | Name | Description | Version |
| BLF6G22LS-75 | - | 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 | | - | 18 | 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 | $T_{case} = 80\text{ °C}; P_L = 17\text{ W}$ | 0.75 | K/W |

6. Characteristics

Table 6. Characteristics

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|----------------------------------|---|------|------|------|---------------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS} = 0\text{ V}; I_D = 0.5\text{ mA}$ | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS} = 10\text{ V}; I_D = 100\text{ mA}$ | 1.4 | 2 | 2.4 | V |
| V_{GSq} | gate-source quiescent voltage | $V_{DS} = 28\text{ V}; I_D = 690\text{ mA}$ | 1.75 | 2.16 | 2.75 | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$ | - | - | 3 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$ | 14.9 | 18.7 | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 300 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}; I_D = 5\text{ A}$ | - | 7.3 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 3.5\text{ A}$ | - | 0.14 | 0.24 | Ω |
| C_{rs} | feedback capacitance | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}; f = 1\text{ MHz}$ | - | 1.5 | - | pF |

7. Application information

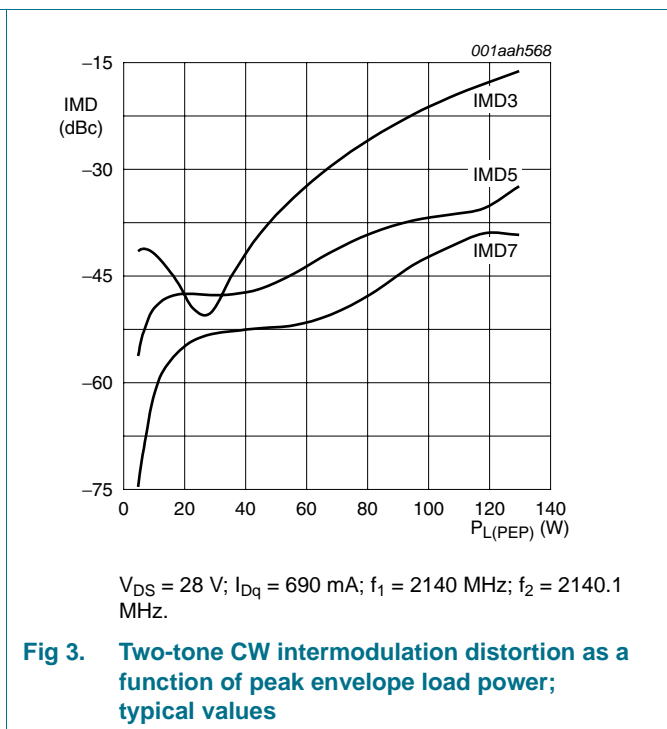
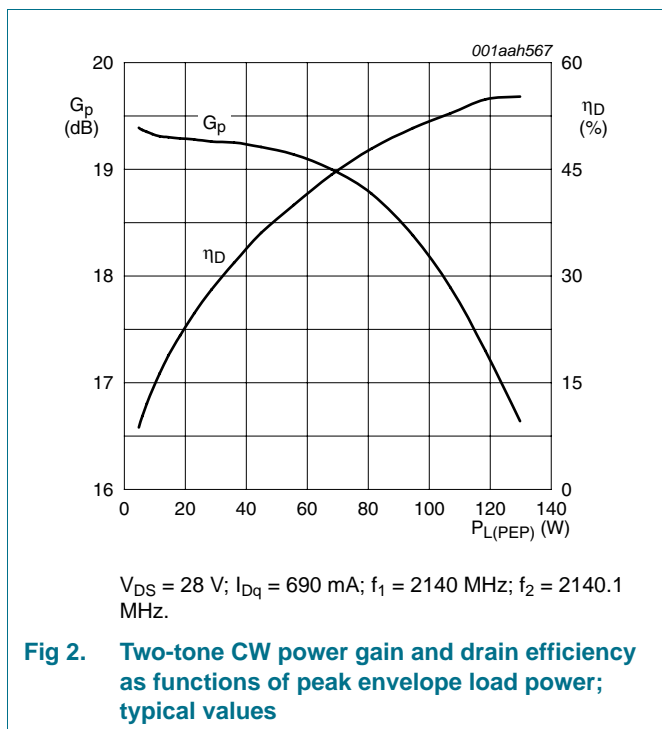
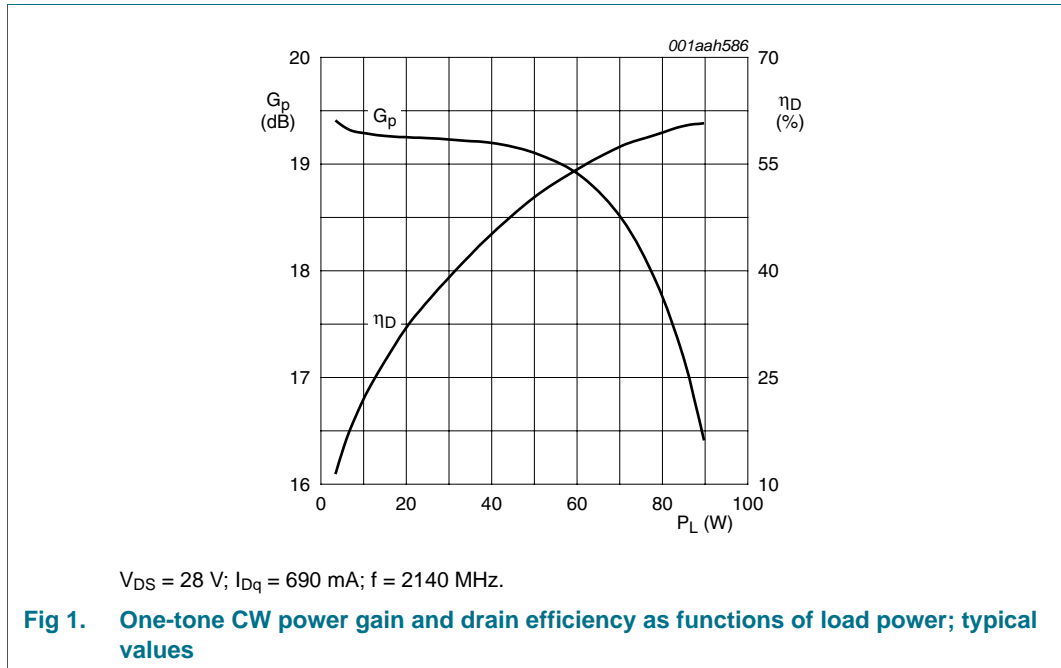
Table 7. Application information

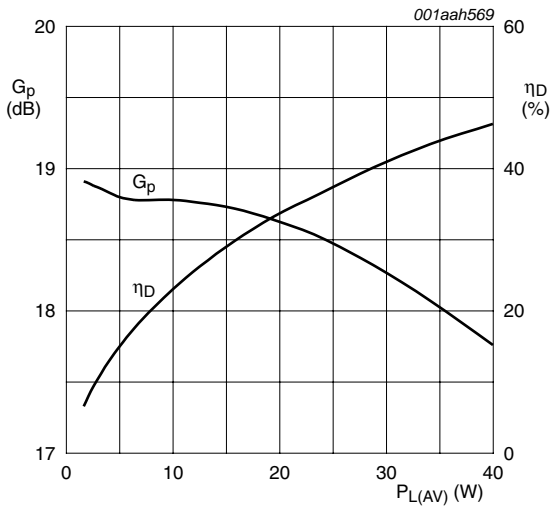
Mode of operation: 2-carrier W-CDMA; PAR 7 dB at 0.01 % probability on CCDF; 3GPP test model 1; 1-64 PDPCH; $f_1 = 2112.5\text{ MHz}; f_2 = 2122.5\text{ MHz}; f_3 = 2157.5\text{ MHz}; f_4 = 2167.5\text{ MHz}$; RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 690\text{ mA}; T_{case} = 25\text{ }^\circ\text{C}$; unless otherwise specified; in a class-AB production test circuit.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------|--|---------------------------|------|-------|-------|------|
| G_p | power gain | $P_{L(AV)} = 17\text{ W}$ | 17.6 | 18.7 | - | dB |
| IRL | input return loss | $P_{L(AV)} = 17\text{ W}$ | - | -9.5 | -6.5 | dB |
| η_D | drain efficiency | $P_{L(AV)} = 17\text{ W}$ | 28 | 30.5 | - | % |
| IMD3 | third order intermodulation distortion | $P_{L(AV)} = 17\text{ W}$ | - | -37.5 | -34 | dBc |
| ACPR | adjacent channel power ratio | $P_{L(AV)} = 17\text{ W}$ | - | -41.5 | -38.5 | dBc |

7.1 Ruggedness in class-AB operation

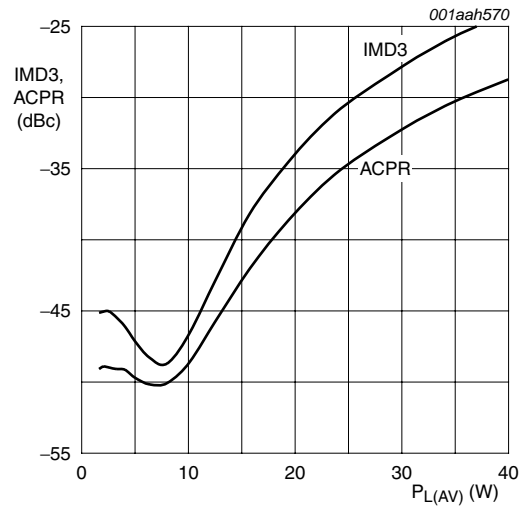
The BLF6G22LS-75 is capable of withstanding a load mismatch corresponding to $V_{SWR} = 10 : 1$ through all phases under the following conditions: $V_{DS} = 28\text{ V}; I_{Dq} = 690\text{ mA}; P_L = 75\text{ W (CW)}; f = 2170\text{ MHz}$.





$V_{DS} = 28$ V; $I_{Dq} = 690$ mA; $f_1 = 2135$ MHz;
 $f_2 = 2145$ MHz; carrier spacing 10 MHz.

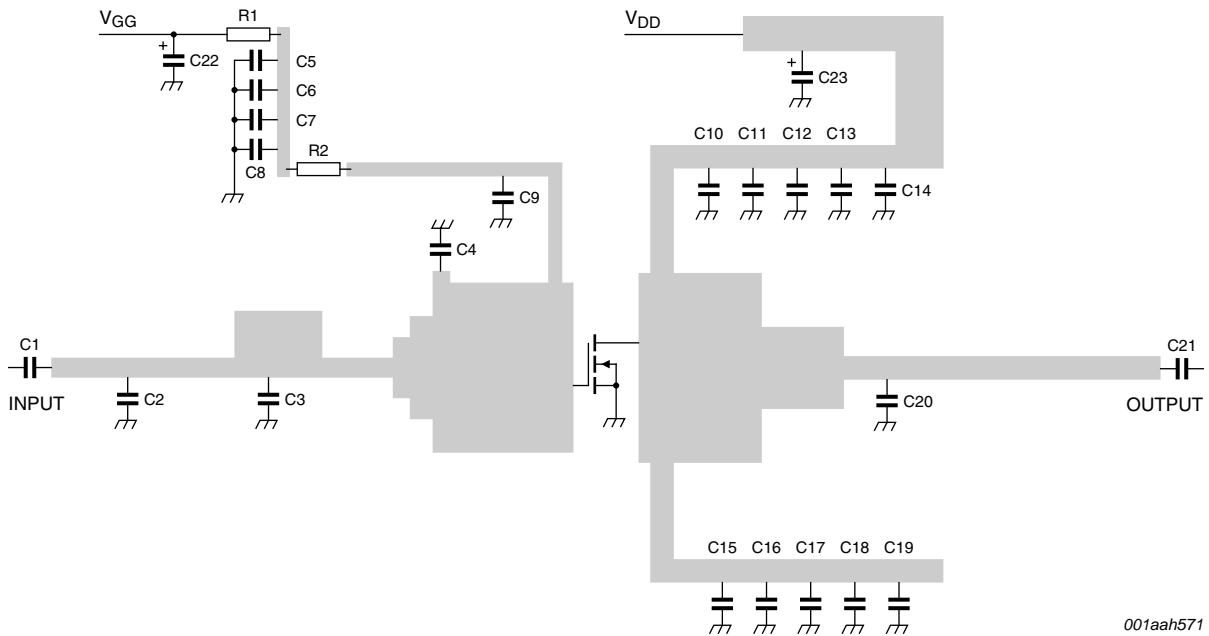
Fig 4. 2-carrier W-CDMA power gain and drain efficiency as functions of average load power; typical values



$V_{DS} = 28$ V; $I_{Dq} = 690$ mA; $f_1 = 2135$ MHz;
 $f_2 = 2145$ MHz; carrier spacing 10 MHz.

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

8. Test information



The drawing is not to scale.

Fig 6. Test circuit for operation at 800 MHz

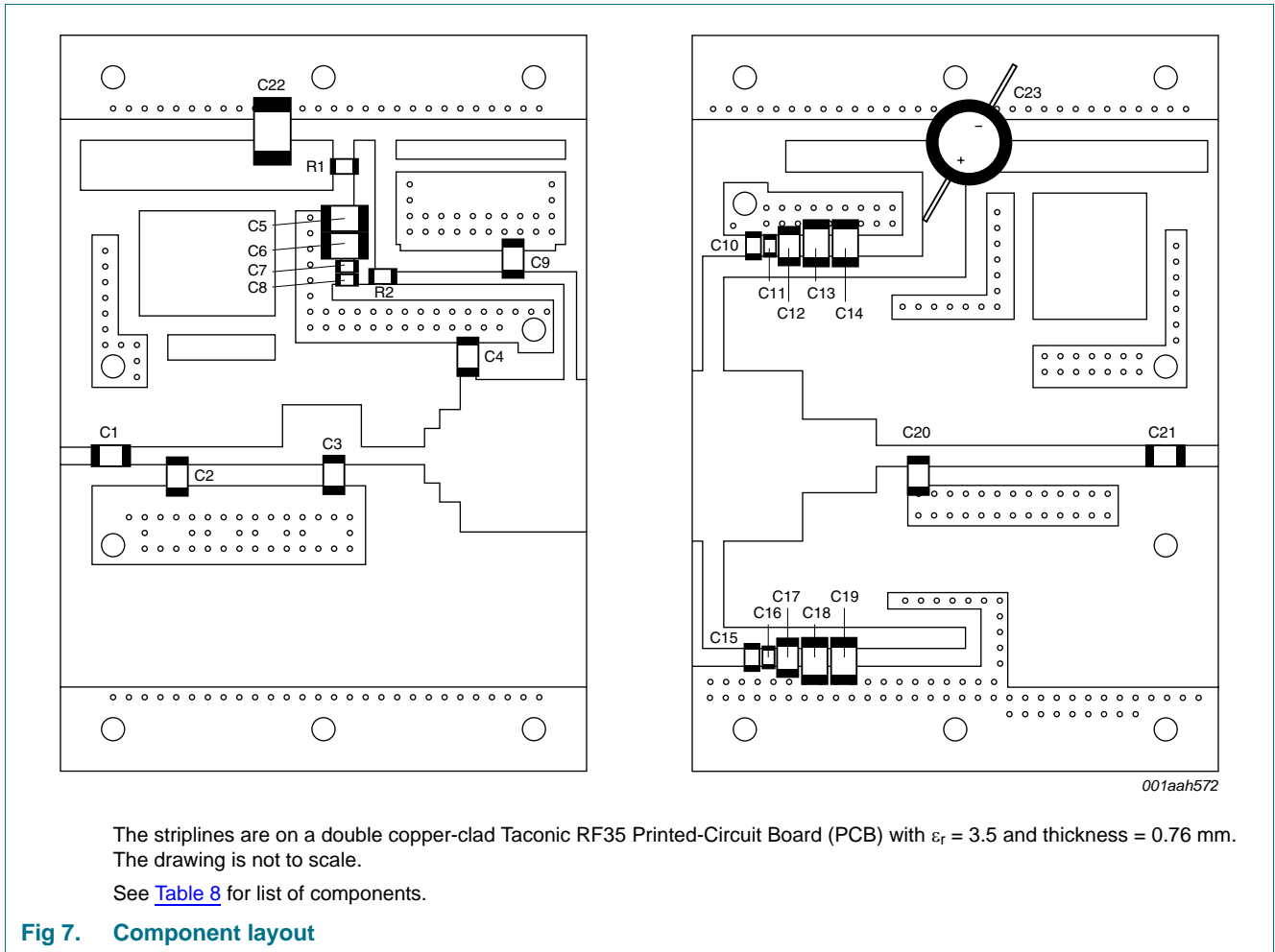


Table 8. List of components (see [Figure 6](#) and [Figure 7](#))

| Component | Description | Value | Remarks |
|----------------------------|-----------------------------------|-------------------|--|
| C1 | multilayer ceramic chip capacitor | 5.6 pF | [1] |
| C2, C3 | multilayer ceramic chip capacitor | 0.5 pF | [1] |
| C4 | multilayer ceramic chip capacitor | 0.6 pF | [1] |
| C5, C6, C13, C14, C18, C19 | multilayer ceramic chip capacitor | 1.5 μ F | TDK 1206 or capacitor of same quality |
| C7, C8, C11, C16 | multilayer ceramic chip capacitor | 100 nF | Murata 0603 or capacitor of same quality |
| C9 | multilayer ceramic chip capacitor | 15 pF | [1] |
| C10, C15 | multilayer ceramic chip capacitor | 220 nF | AVX 0805 or capacitor of same quality |
| C12, C17 | multilayer ceramic chip capacitor | 10 pF | [1] |
| C20 | multilayer ceramic chip capacitor | 0.7 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 | 3.3 Ω | |
| R2 | SMD resistor | 5.1 Ω | |

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

9. Package outline

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

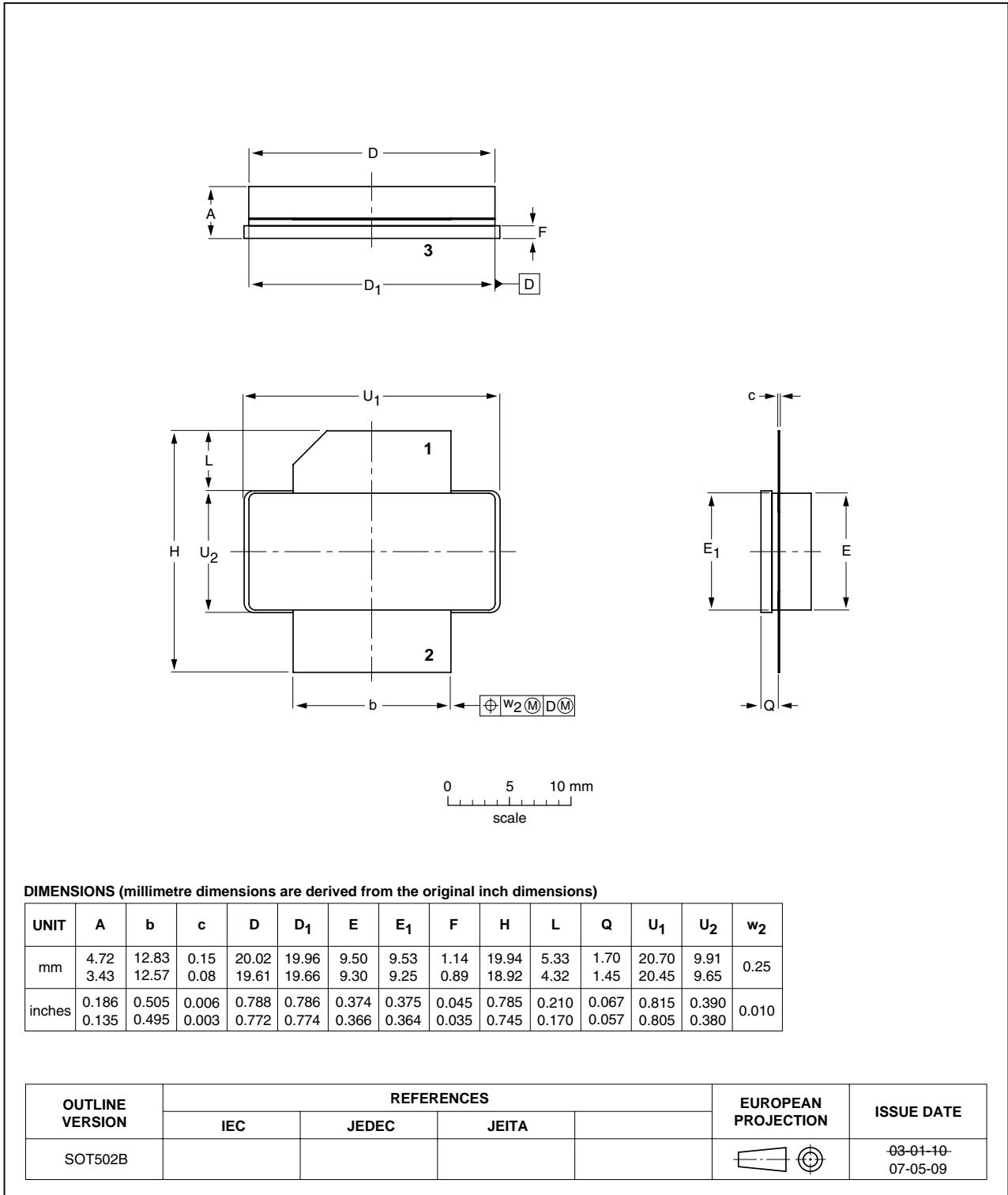


Fig 8. Package outline SOT502B

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-75_2 | 20100414 | Product data sheet | - | BLF6G22LS-75_1 |
| Modifications: | <ul style="list-style-type: none"> The status of this document has been changed to "Product data sheet". | | | |
| BLF6G22LS-75_1 | 20080208 | Preliminary data sheet | - | - |

12. Legal information

12.1 Data sheet status

| Document status ^{[1][2]} | Product status ^[3] | Definition |
|-----------------------------------|-------------------------------|---|
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| 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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