

BLF6G27-100; BLF6G27LS-100

WiMAX power LDMOS transistor

Rev. 02 — 8 July 2010

Product data sheet

1. Product profile

1.1 General description

100 W LDMOS power transistor for base station applications at frequencies from 2500 MHz to 2700 MHz.

Table 1. Typical performance

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

| Mode of operation | f (MHz) | V _{DS} (V) | P _{L(AV)} (W) | G _p (dB) | η _D (%) | ACPR _{885k} (dBc) | ACPR _{1980k} (dBc) | ACPR _{5M} (dBc) | ACPR _{10M} (dBc) |
|----------------------|--------------|---------------------|------------------------|---------------------|--------------------|----------------------------|-----------------------------|--------------------------|---------------------------|
| BLF6G27-100 | | | | | | | | | |
| 1-carrier W-CDMA [1] | 2500 to 2700 | 28 | 14 | 16.5 | 23 | - | - | -40 | -59 |
| 1-carrier N-CDMA [2] | 2500 to 2700 | 28 | 14 | 17 | 23 | -50 [3] | -65 [3] | - | - |
| BLF6G27LS-100 | | | | | | | | | |
| 1-carrier W-CDMA [1] | 2500 to 2700 | 28 | 14 | 17 | 23 | - | - | -41 | -60 |
| 1-carrier N-CDMA [2] | 2500 to 2700 | 28 | 14 | 17 | 23 | -50 [3] | -65 [3] | - | - |

[1] Signal is a one carrier, TM1 W-CDMA signal with 64 DPCH and 100 % clipping. PAR is 9.65 dB at 0.01 % probability on CCDF.

[2] Single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13). PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz.

[3] Measured within 30 kHz bandwidth.

1.2 Features and benefits

- Typical 1-carrier W-CDMA performance (single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability on the CCDF; channel bandwidth is 3.84 MHz) at a frequency of 2500 MHz, 2600 MHz and 2700 MHz, a supply voltage of 28 V and an I_{Dq} of 900 mA:
 - ◆ Average output power = 14 W
 - ◆ Power gain = 17 dB
 - ◆ Drain efficiency = 23 %
 - ◆ ACPR_{5M} = -41 dBc
- Typical 1-carrier N-CDMA performance (single carrier IS-95 with pilot, paging, sync and 6 traffic channels [Walsh codes 8 to 13]. PAR = 9.7 dB at 0.01 % probability on the CCDF. Channel bandwidth is 1.2288 MHz) at a frequency of 2500 MHz, 2600 MHz and 2700 MHz, a supply voltage of 28 V and an I_{Dq} of 900 mA:
 - ◆ Average output power = 14 W
 - ◆ Power gain = 17 dB
 - ◆ Drain efficiency = 23 %
 - ◆ ACPR_{885k} = -50 dBc (within 30 kHz bandwidth)



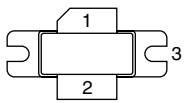
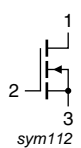
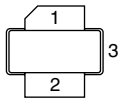
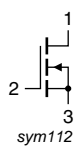
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (2500 MHz to 2700 MHz)
- Internally matched for ease of use

1.3 Applications

- RF power amplifiers for base stations and multicarrier applications in the 2500 MHz to 2700 MHz frequency range

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|--------------------------------|-------------|---|---|
| BLF6G27-100 (SOT502A) | | | |
| 1 | drain |  |  sym112 |
| 2 | gate | | |
| 3 | source | | |
| BLF6G27LS-100 (SOT502B) | | | |
| 1 | drain |  |  sym112 |
| 2 | gate | | |
| 3 | source | | |

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | Version |
|---------------|---------|---|---------|
| | Name | Description | |
| BLF6G27-100 | - | flanged LDMOST ceramic package; 2 mounting holes; 2 leads | SOT502A |
| BLF6G27LS-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 | 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 | - | 200 | °C |

5. Thermal characteristics

Table 5. Thermal characteristics

| Symbol | Parameter | Conditions | Type | Typ | Unit |
|------------------|--|--|---------------|------|------|
| $R_{th(j-case)}$ | thermal resistance from junction to case | $T_{case} = 80\text{ °C}$; $P_L = 100\text{ W}$ | BLF6G27-100 | 0.68 | K/W |
| | | | BLF6G27LS-100 | 0.5 | K/W |

6. Characteristics

Table 6. Characteristics

$T_j = 25\text{ °C}$ 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 | $V_{DS} = 10\text{ V}$; $I_D = 150\text{ mA}$ | 1.4 | 2 | 2.4 | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$ | - | - | 5 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $V_{DS} = 10\text{ V}$ | 22.3 | 27 | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 11\text{ V}$; $V_{DS} = 0\text{ V}$ | - | - | 450 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}$; $I_D = 5.25\text{ A}$ | - | 10.5 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS} = V_{GS(th)} + 3.75\text{ V}$; $I_D = 5.25\text{ A}$ | - | 0.1 | 0.16 | Ω |
| C_{rs} | feedback capacitance | $V_{GS} = 0\text{ V}$; $V_{DS} = 28\text{ V}$; $f = 1\text{ MHz}$ | - | 2.4 | - | pF |

7. Application information

Table 7. Application information

Mode of operation: 1-carrier W-CDMA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability on the CCDF; carrier channel bandwidth is 3.84 MHz; $f_1 = 2500$ MHz; $f_2 = 2600$ MHz, $f_3 = 2700$ MHz; RF performance at $V_{DS} = 28$ V; $I_{Dq} = 900$ mA; $T_{case} = 25$ °C; unless otherwise specified, in a class-AB production circuit.

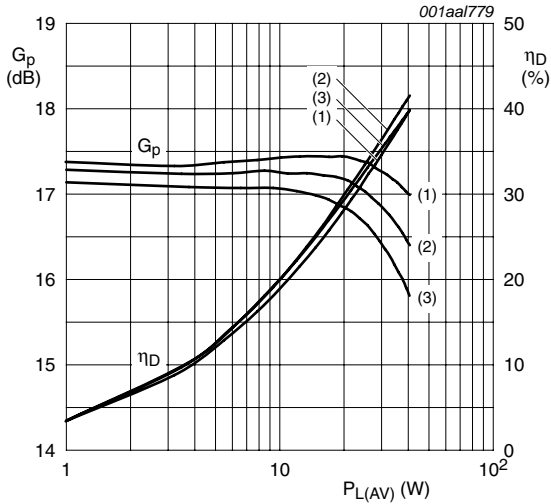
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------|---------------------------------------|--------------------|------|------|-----|------|
| G_p | power gain | $P_{L(AV)} = 14$ W | | | | |
| | | BLF6G27-100 | 14.8 | 16.5 | - | dB |
| | | BLF6G27LS-100 | 15 | 17 | - | dB |
| RL_{in} | input return loss | $P_{L(AV)} = 14$ W | - | -10 | -6 | dB |
| η_D | drain efficiency | $P_{L(AV)} = 14$ W | 20 | 23 | - | % |
| $ACPR_{5M}$ | adjacent channel power ratio (5 MHz) | $P_{L(AV)} = 14$ W | [1] | | | |
| | | BLF6G27-100 | - | -40 | -36 | dBc |
| | | BLF6G27LS-100 | - | -41 | -37 | dBc |
| $ACPR_{10M}$ | adjacent channel power ratio (10 MHz) | $P_{L(AV)} = 14$ W | [1] | | | |
| | | BLF6G27-100 | - | -59 | -56 | dBc |
| | | BLF6G27LS-100 | - | -60 | -57 | dBc |

[1] ACPR measured in 3.84 MHz channel bandwidth at ± 5 MHz and ± 10 MHz.

7.1 Ruggedness in class-AB operation

The BLF6G27-100 and BLF6G27LS-100 are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28$ V; $I_{Dq} = 900$ mA; $P_L = 100$ W (CW); $f = 2500$ MHz.

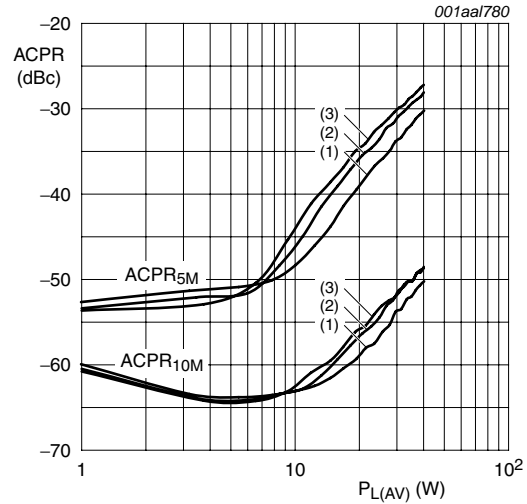
7.2 Single carrier W-CDMA performance



$V_{DS} = 28\text{ V}$; $I_{Dq} = 900\text{ mA}$; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

- (1) $f = 2500\text{ MHz}$
- (2) $f = 2600\text{ MHz}$
- (3) $f = 2700\text{ MHz}$

Fig 1. Power gain and drain efficiency as a function of average output power; typical values

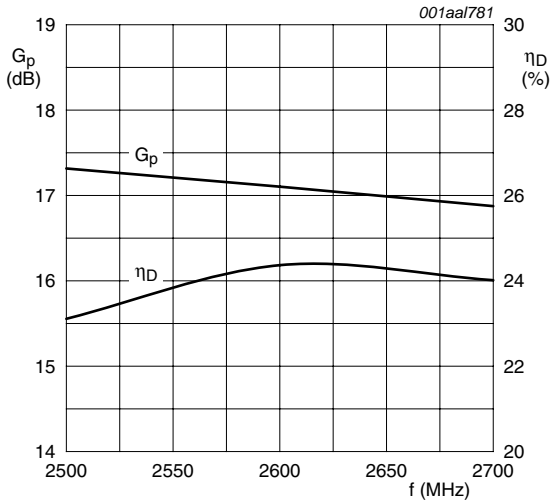


$V_{DS} = 28\text{ V}$; $I_{Dq} = 900\text{ mA}$; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

- (1) $f = 2500\text{ MHz}$
- (2) $f = 2600\text{ MHz}$
- (3) $f = 2700\text{ MHz}$

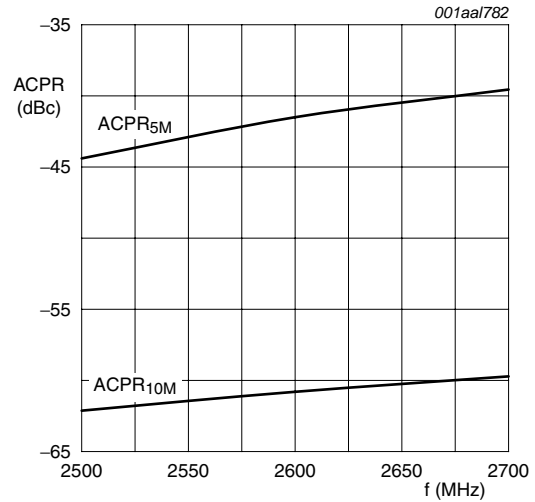
Fig 2. ACPR at 5 MHz and at 10 MHz as a function of average output power; typical values

7.3 Single carrier W-CDMA broadband performance at 14 W average power



$V_{DS} = 28$ V; $I_{Dq} = 900$ mA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

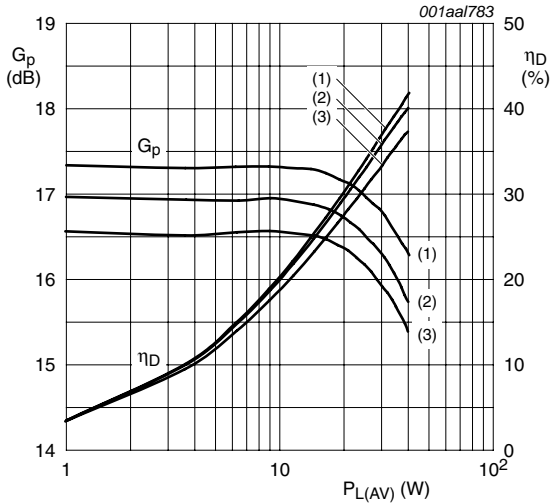
Fig 3. Power gain and drain efficiency as a function of frequency; typical values



$V_{DS} = 28$ V; $I_{Dq} = 900$ mA; single carrier W-CDMA TM1 with 64 DPCH and 100 % clipping; PAR = 9.65 dB at 0.01 % probability; channel bandwidth = 3.84 MHz.

Fig 4. ACPR at 5 MHz and at 10 MHz as a function of frequency; typical values

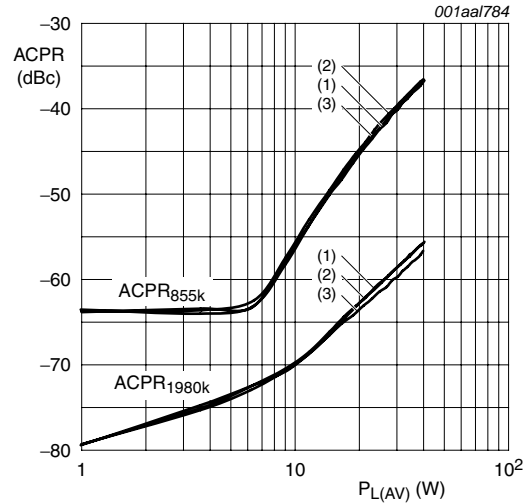
7.4 IS-95 performance



$V_{DS} = 28$ V; $I_{DQ} = 900$ mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

- (1) $f = 2500$ MHz
- (2) $f = 2600$ MHz
- (3) $f = 2700$ MHz

Fig 5. Power gain and drain efficiency as a function of average output power; typical values

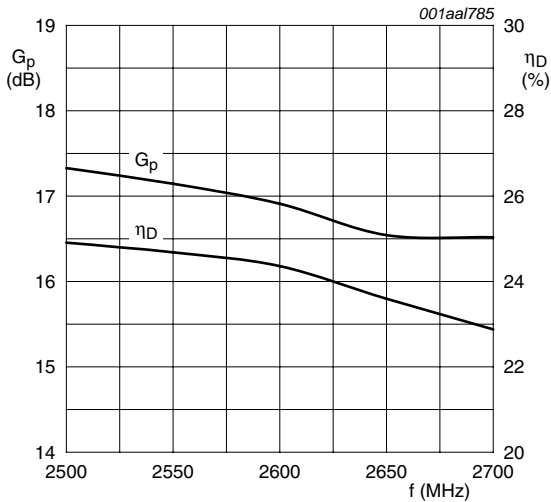


$V_{DS} = 28$ V; $I_{DQ} = 900$ mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

- (1) $f = 2500$ MHz
- (2) $f = 2600$ MHz
- (3) $f = 2700$ MHz

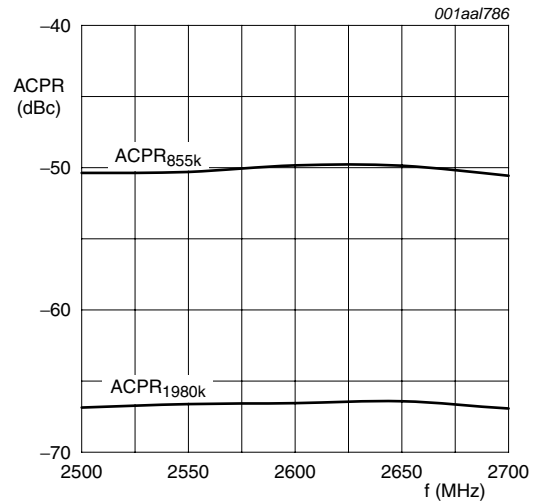
Fig 6. ACPR at 885 kHz and at 1980 kHz as a function of average output power; typical values

7.5 IS-95 broadband performance at 14 W average power



$V_{DS} = 28$ V; $I_{Dq} = 900$ mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

Fig 7. Power gain and drain efficiency as a function of frequency; typical values



$V_{DS} = 28$ V; $I_{Dq} = 900$ mA; IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 to 13); PAR = 9.7 dB at 0.01 % probability on the CCDF; channel bandwidth = 1.2288 MHz.

Fig 8. ACPR at 855 kHz and at 1980 kHz as a function of frequency; typical values

8. Package outline

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT502A

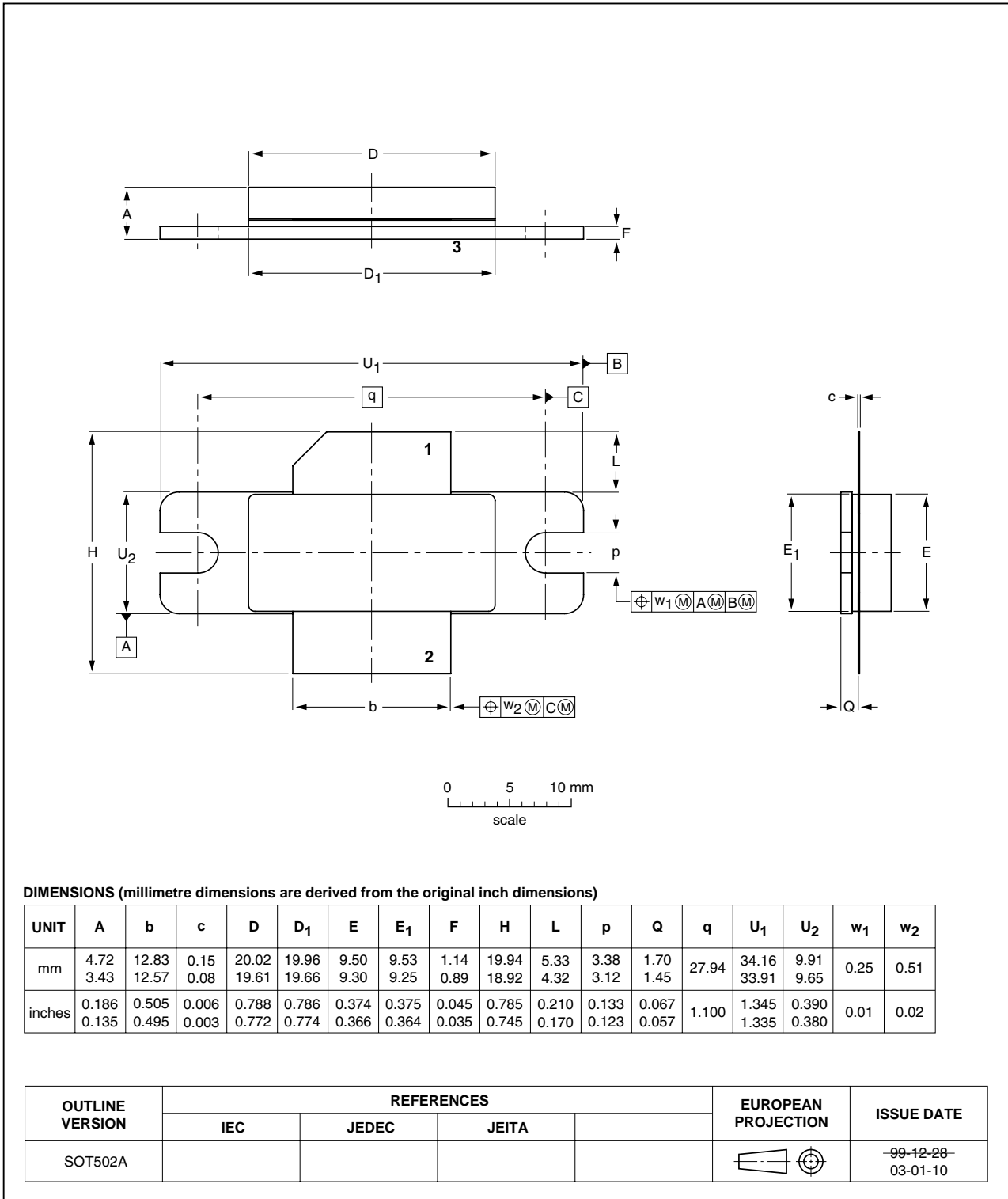


Fig 9. Package outline SOT502A

Earless flanged LDMOST ceramic package; 2 leads

SOT502B

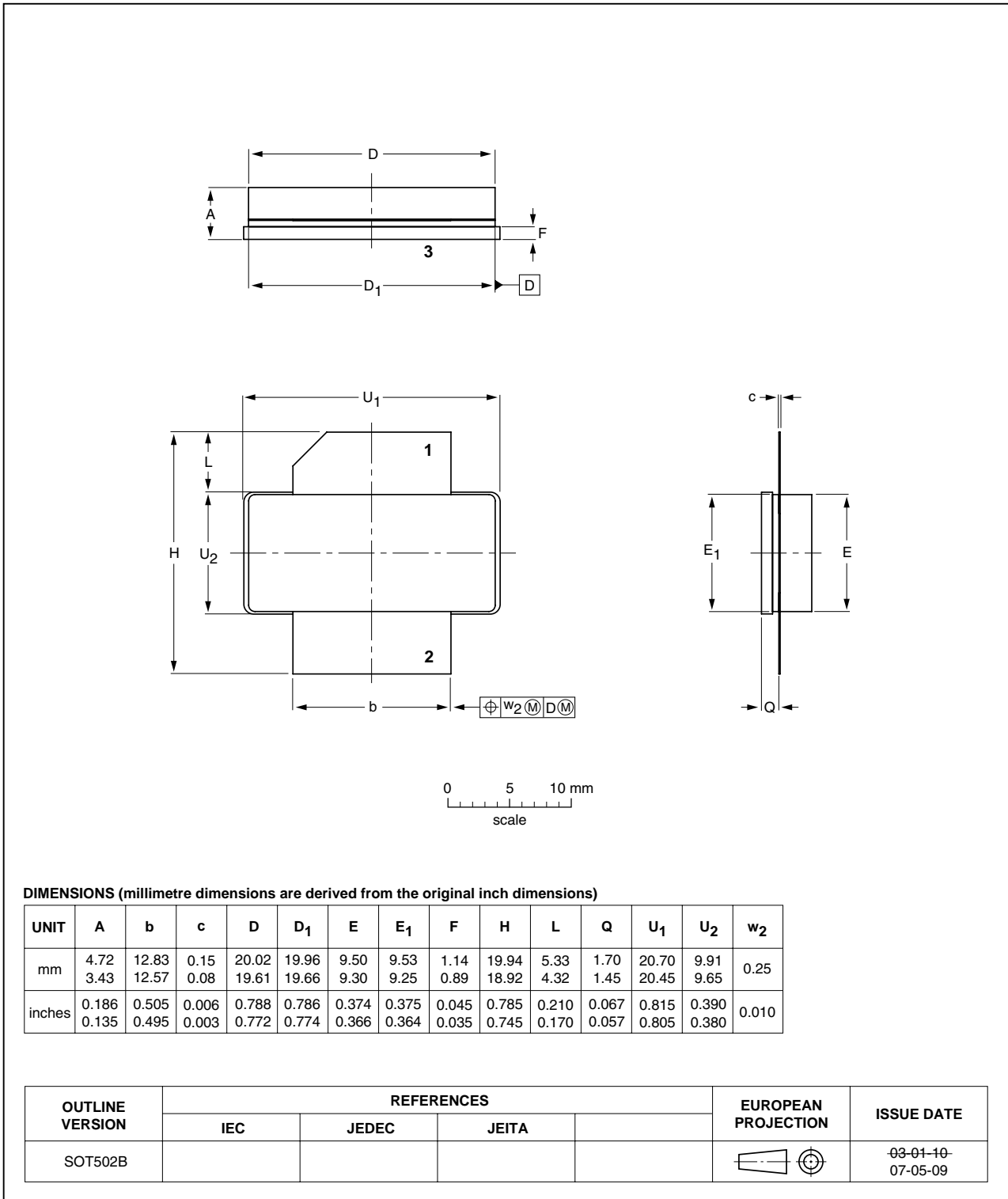


Fig 10. Package outline SOT502B

9. Abbreviations

Table 8. Abbreviations

| Acronym | Description |
|---------|---|
| CCDF | Complementary Cumulative Distribution Function |
| CW | Continuous Wave |
| DPCH | Dedicated Physical CHannel |
| ESD | ElectroStatic Discharge |
| FCH | Frame Control Header |
| FFT | Fast Fourier Transform |
| IBW | Instantaneous BandWidth |
| IS-95 | Interim Standard 95 |
| LDMOS | Laterally Diffused Metal-Oxide Semiconductor |
| N-CDMA | Narrowband Code Division Multiple Access |
| PAR | Peak-to-Average power Ratio |
| PUSC | Partial Usage of SubChannels |
| RF | Radio Frequency |
| TM1 | Test Model 1 |
| VSWR | Voltage Standing-Wave Ratio |
| W-CDMA | Wideband Code Division Multiple Access |
| WCS | Wireless Communications Service |
| WiMAX | Worldwide interoperability for Microwave Access |

10. Revision history

Table 9. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-------------------------------|--------------|---|---------------|---------------------------------|
| BLF6G27-100_BLF6G27LS-100 v.2 | 20100708 | Product data sheet | - | BLF6G27-100_ BLF6G27LS-100_1 |
| Modifications: | | <ul style="list-style-type: none"> Data sheet status change to Product data sheet. Table 1 on page 1: A distinction has been made between BLF6G27-100 and BLF6G27LS-100 Table 7 on page 4: A distinction has been made between BLF6G27-100 and BLF6G27LS-100 | | |
| BLF6G27-100_BLF6G27LS-100_1 | 20100503 | Preliminary data sheet | - | - |

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|-----------------------------------|-------------------------------|---|
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| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
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[2] The term 'short data sheet' is explained in section "Definitions".

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