# BLF7G27L-75P; BLF7G27LS-75P

## Power LDMOS transistor

Rev. 2 — 14 July 2010 Product data sheet

## 1. Product profile

### 1.1 General description

75 W LDMOS power transistor for base station applications at frequencies from 2300 MHz to 2700 MHz.

**Table 1. Typical performance**

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

| Mode of operation | f (MHz) | $I_{Dq}$ (mA) | $V_{DS}$ (V) | $P_{L(AV)}$ (W) | $G_p$ (dB) | $\eta_D$ (%) | $ACPR_{885k}$ (dBc) |
|---|---|---|---|---|---|---|---|
| IS-95 | 2300 to 2400 | 650 | 28 | 12 | 17 | 26 | –46[1] |

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

### 1.2 Features and benefits

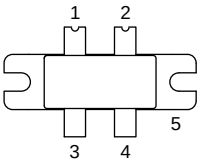
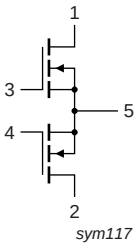
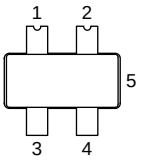
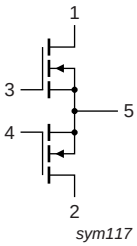
- Excellent ruggedness
- High efficiency
- Low $R_{th}$ providing excellent thermal stability
- Designed for broadband operation (2300 MHz to 2700 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- Internally matched for ease of use
- Integrated ESD protection
- 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 2300 MHz to 2700 MHz frequency range

## 2. Pinning information

**Table 2. Pinning**

| Pin | Description | | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| **BLF7G27L-75P (SOT1121A)** | | | | |
| 1 | drain1 | |  |  |
| 2 | drain2 | | | |
| 3 | gate1 | | | |
| 4 | gate2 | | | |
| 5 | source | [1] | | |
| **BLF7G27LS-75P (SOT1121B)** | | | | |
| 1 | drain1 | |  |  |
| 2 | drain2 | | | |
| 3 | gate1 | | | |
| 4 | gate2 | | | |
| 5 | source | [1] | | |



[1] Connected to flange.

## 3. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BLF7G27L-75P | - | flanged LDMOST ceramic package; 2 mounting holes; 4 leads | SOT1121A |
| BLF7G27LS-75P | - | earless flanged LDMOST ceramic package; 4 leads | SOT1121B |

## 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 |
|---|---|---|---|---|
| $R_{th(j-c)}$ | thermal resistance from junction to case | $T_{case}$ = 80 °C; $P_L$ = 10 W | 0.5 | K/W |

## 6. Characteristics

**Table 6. Characteristics**

*$T_j$ = 25 °C; per section 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; $I_D$ = 50 mA | 1.3 | 1.8 | 2.3 | 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 | - | 9.5 | - | A |
| $I_{GSS}$ | gate leakage current | $V_{GS}$ = 11 V; $V_{DS}$ = 0 V | - | - | 500 | nA |
| $g_{fs}$ | forward transconductance | $V_{DS}$ = 10 V; $I_D$ = 2.5 A | - | 3.8 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS}$ = $V_{GS(th)}$ + 3.75 V; $I_D$ = 3.5 A | - | 0.29 | - | Ω |

## 7. Test information

**Table 7. Functional test information**

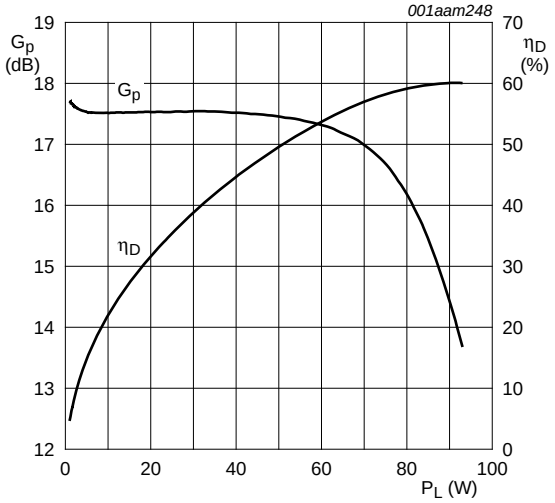
*Mode of operation: 1-carrier N-CDMA, single carrier IS-95 with pilot, paging, sync and 6 traffic channels (Walsh codes 8 - 13). PAR = 9.7 dB at 0.01 % probability on the CCDF, channel bandwidth is 1.2288 MHz; $f_1$ = 2300 MHz; $f_2$ = 2400 MHz; RF performance at $V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; $T_{case}$ = 25 °C; 2 sections combined unless otherwise specified; in a class-AB production test circuit.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $P_{L(AV)}$ | average output power | | - | 12 | - | W |
| $G_p$ | power gain | $P_{L(AV)}$ = 12 W | 15.8 | 17 | - | dB |
| $RL_{in}$ | input return loss | $P_{L(AV)}$ = 12 W | - | –12 | –8 | dB |
| $\eta_D$ | drain efficiency | $P_{L(AV)}$ = 12 W | 23 | 26 | - | % |
| $ACPR_{885k}$ | adjacent channel power ratio (885 kHz) | $P_{L(AV)}$ = 12 W | - | –46 | –42 | dBc |

### 7.1 Ruggedness in class-AB operation

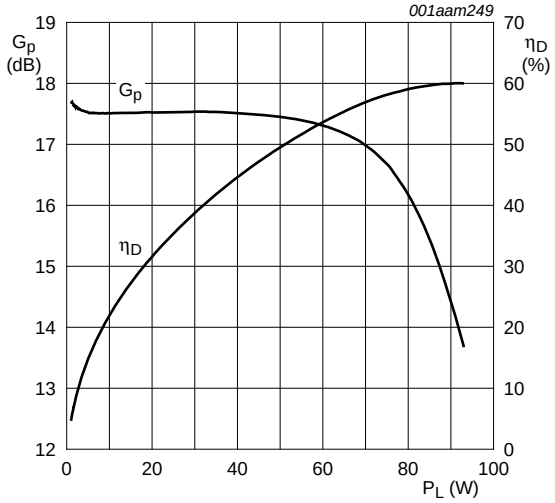
The BLF7G27L-75P and BLF7G27LS-75P are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; $P_L$ = 75 W (CW); f = 2300 MHz.

## 7.2 One-tone CW




$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2300 MHz.

**Fig 1. One-tone CW power gain and drain efficiency as function of load power; typical values**

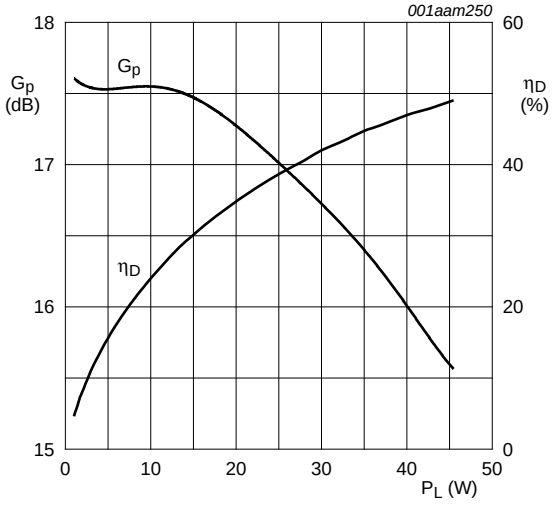



$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2400 MHz.

**Fig 2. One-tone CW power gain and drain efficiency as function of load power; typical values**

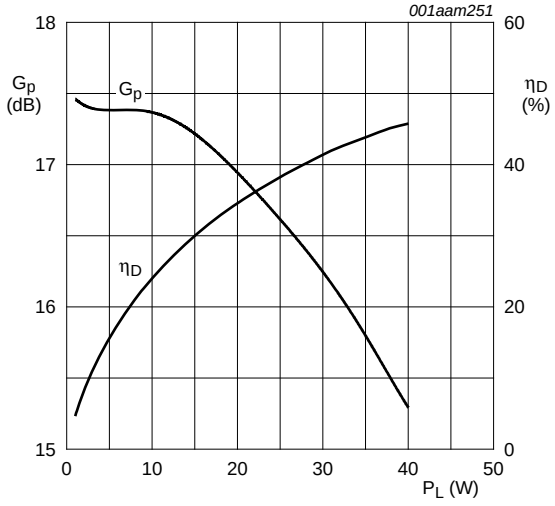
## 7.3 Single carrier IS-95

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



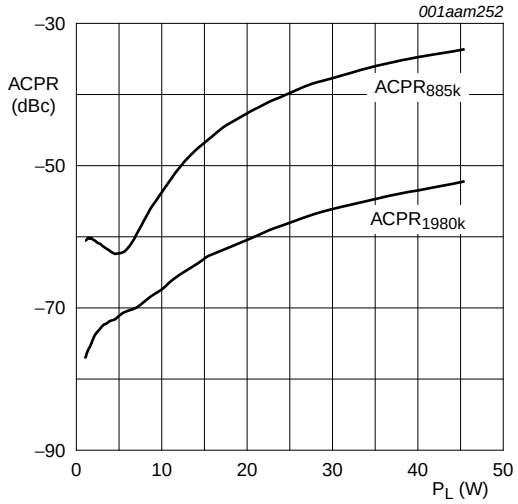

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2300 MHz.

**Fig 3. Single carrier IS-95 power gain and drain efficiency as function of load power; typical values**



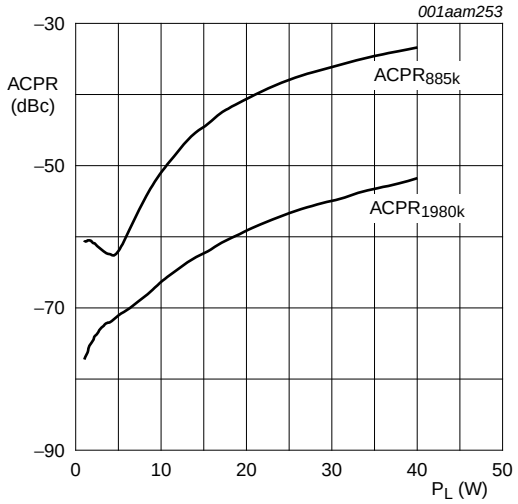

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2400 MHz.

**Fig 4. Single carrier IS-95 power gain and drain efficiency as function of load power; typical values**



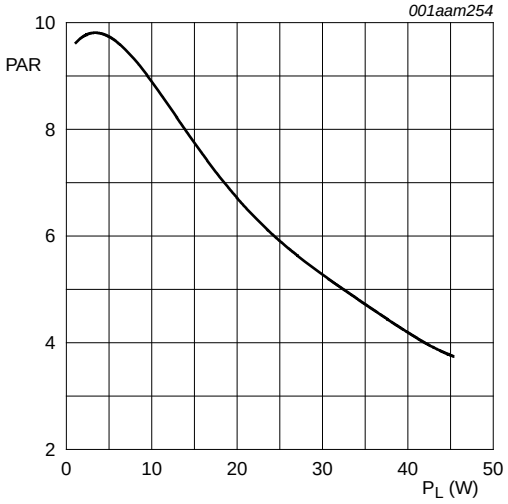

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2300 MHz.

**Fig 5. Single carrier IS-95 ACPR at 885 kHz and at 1980 kHz as function of load power; typical values**



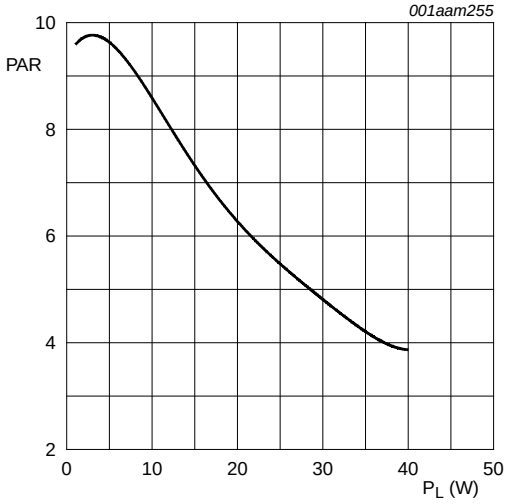

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2400 MHz.

**Fig 6. Single carrier IS-95 ACPR at 885 kHz and at 1980 kHz as function of load power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2300 MHz.

**Fig 7. Single carrier IS-95 peak-to-average power ratio as a function of load power; typical values**

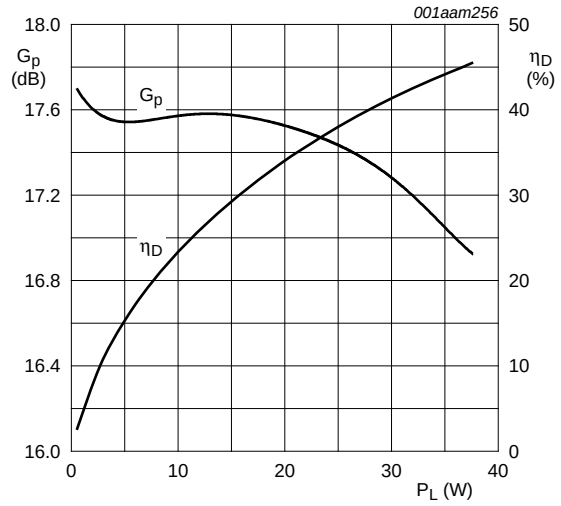



$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2400 MHz.

**Fig 8. Single carrier IS-95 peak-to-average power ratio as a function of load power; typical values**

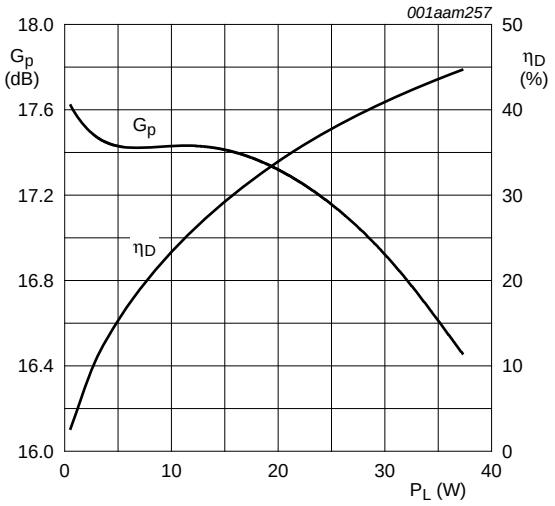
## 7.4 Single carrier W-CDMA

3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF. Channel bandwidth is 3.84 MHz.



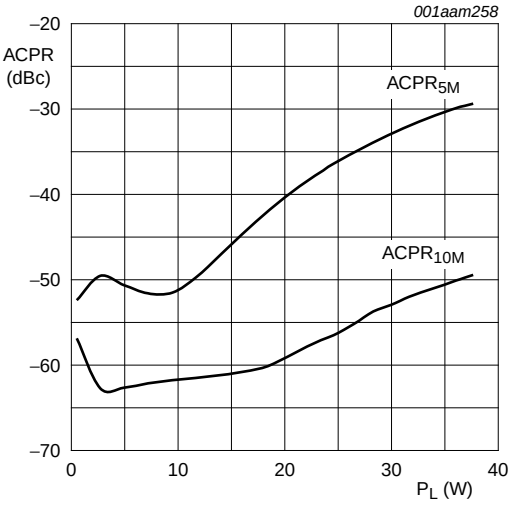

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2300 MHz.

**Fig 9. Single carrier W-CDMA power gain and drain efficiency as function of load power; typical values**



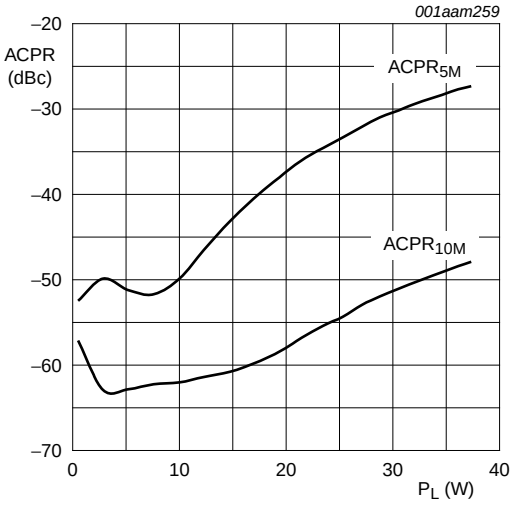

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2400 MHz.

**Fig 10. Single carrier W-CDMA power gain and drain efficiency as function of load power; typical values**



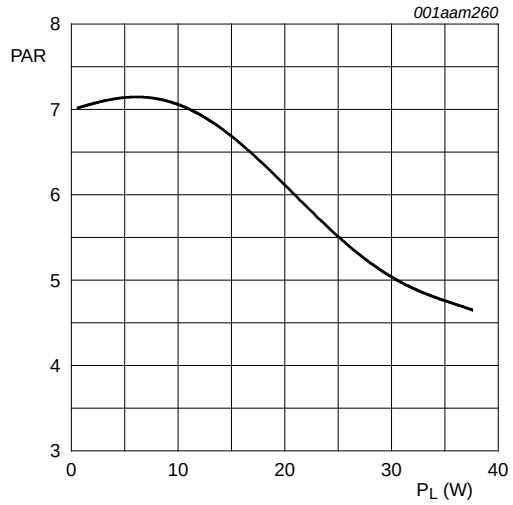

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2300 MHz.

**Fig 11. Single carrier W-CDMA ACPR at 5 MHz and at 10 MHz as function of load power; typical values**



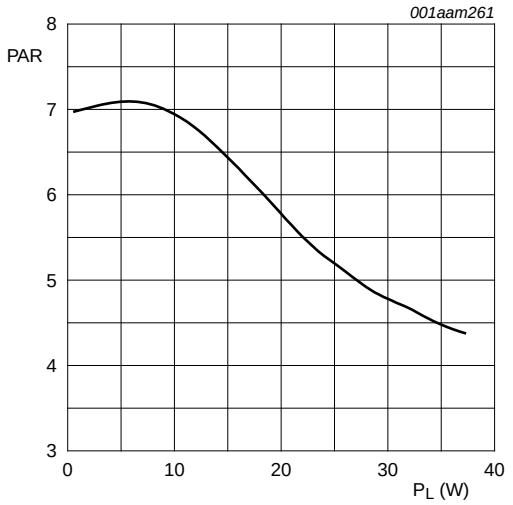

$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2400 MHz.

**Fig 12. Single carrier W-CDMA ACPR at 5 MHz and at 10 MHz as function of load power; typical values**




$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2300 MHz.

**Fig 13. Single carrier W-CDMA peak-to-average power ratio as a function of load power; typical values**

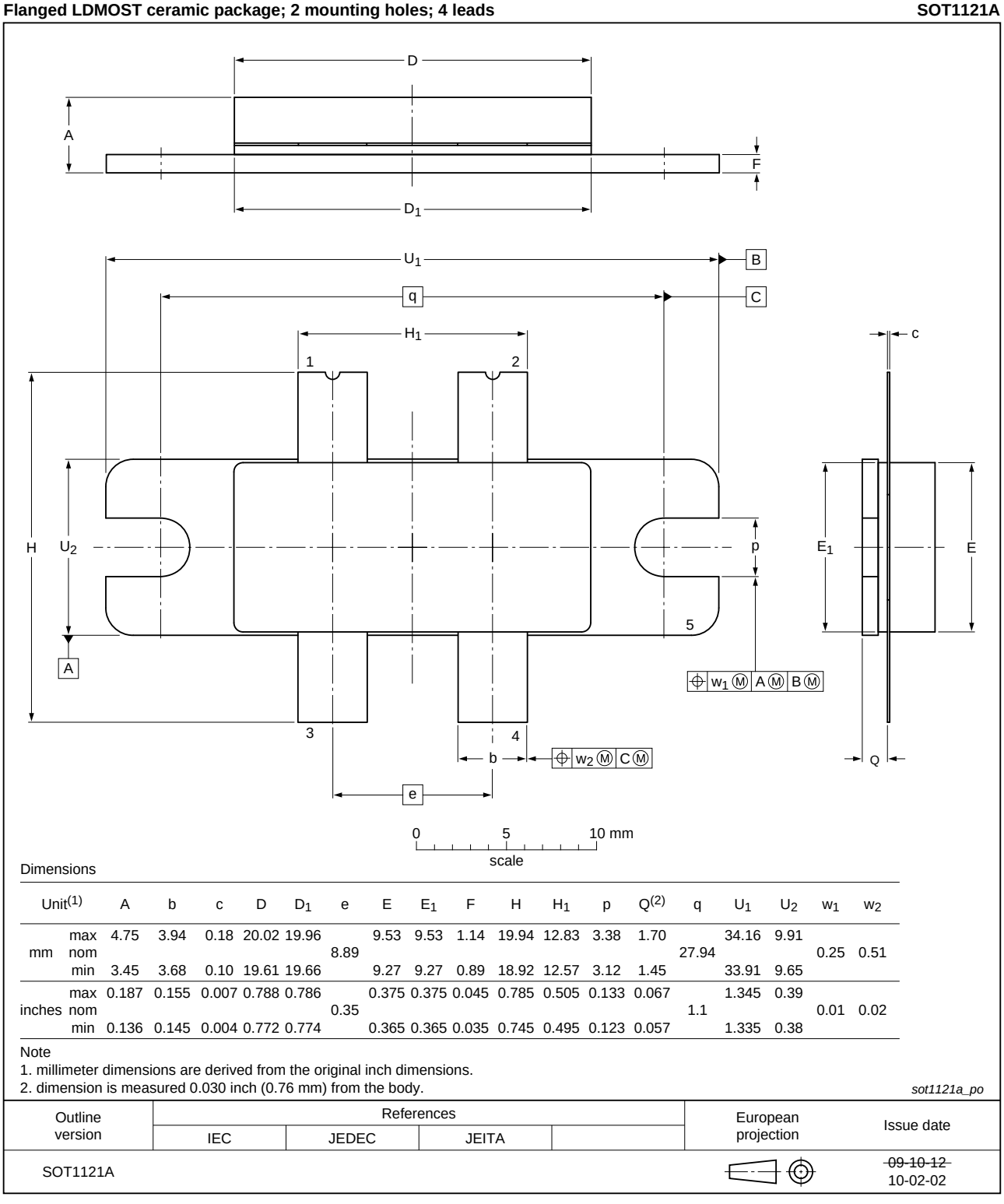



$V_{DS}$ = 28 V; $I_{Dq}$ = 650 mA; f = 2400 MHz.

**Fig 14. Single carrier W-CDMA peak-to-average power ratio as a function of load power; typical values**

## 8. Package outline

**Flanged LDMOST ceramic package; 2 mounting holes; 4 leads** **SOT1121A**




Dimensions

| Unit[1] | | A | b | c | D | D1 | e | E | E1 | F | H | H1 | p | Q[2] | q | U1 | U2 | w1 | w2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 4.75 | 3.94 | 0.18 | 20.02 | 19.96 | | 9.53 | 9.53 | 1.14 | 19.94 | 12.83 | 3.38 | 1.70 | | 34.16 | 9.91 | | |
| | nom | | | | | | 8.89 | | | | | | | | 27.94 | | | 0.25 | 0.51 |
| | min | 3.45 | 3.68 | 0.10 | 19.61 | 19.66 | | 9.27 | 9.27 | 0.89 | 18.92 | 12.57 | 3.12 | 1.45 | | 33.91 | 9.65 | | |
| inches | max | 0.187 | 0.155 | 0.007 | 0.788 | 0.786 | | 0.375 | 0.375 | 0.045 | 0.785 | 0.505 | 0.133 | 0.067 | | 1.345 | 0.39 | | |
| | nom | | | | | | 0.35 | | | | | | | | 1.1 | | | 0.01 | 0.02 |
| | min | 0.136 | 0.145 | 0.004 | 0.772 | 0.774 | | 0.365 | 0.365 | 0.035 | 0.745 | 0.495 | 0.123 | 0.057 | | 1.335 | 0.38 | | |

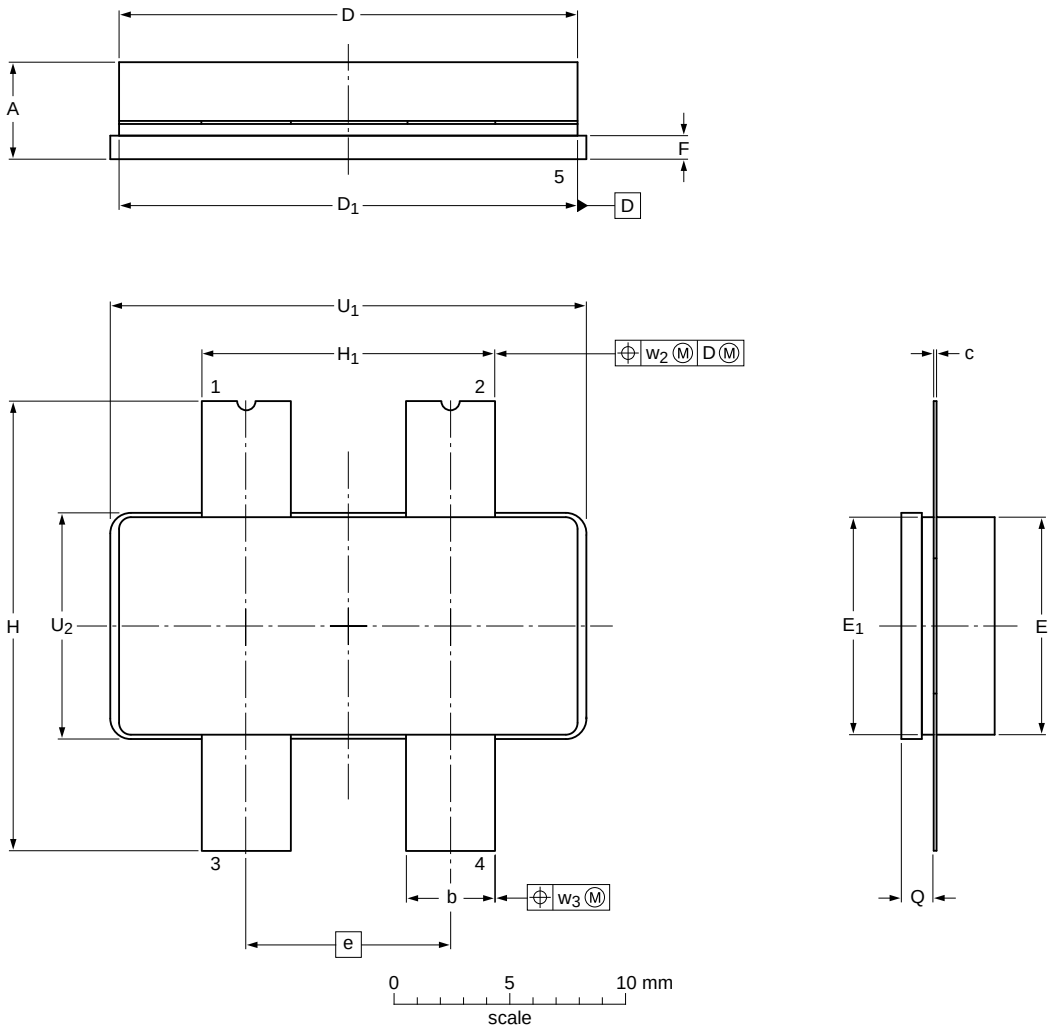
Note
1. millimeter dimensions are derived from the original inch dimensions.
2. dimension is measured 0.030 inch (0.76 mm) from the body.

*sot1121a_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1121A | | | | | | ~~09-10-12~~ 10-02-02 |

**Fig 15. Package outline SOT1121A**

**Earless flanged LDMOST ceramic package; 4 leads** **SOT1121B**




Dimensions

| Unit[1] | | A | b | c | D | $D_1$ | e | E | $E_1$ | F | H | $H_1$ | Q | $U_1$ | $U_2$ | $w_2$ | $w_3$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 4.75 | 3.94 | 0.18 | 20.02 | 19.96 | | 9.53 | 9.53 | 1.14 | 19.94 | 12.83 | 1.70 | 20.70 | 9.91 | | |
| | nom | | | | | | 8.89 | | | | | | | | | 0.51 | 0.25 |
| | min | 3.45 | 3.68 | 0.08 | 19.61 | 19.66 | | 9.27 | 9.27 | 0.89 | 18.92 | 12.57 | 1.45 | 20.45 | 9.65 | | |
| inches | max | 0.187 | 0.155 | 0.007 | 0.788 | 0.786 | | 0.375 | 0.375 | 0.045 | 0.785 | 0.505 | 0.067 | 0.815 | 0.39 | | |
| | nom | | | | | | 0.35 | | | | | | | | | 0.02 | 0.01 |
| | min | 0.136 | 0.145 | 0.003 | 0.772 | 0.774 | | 0.365 | 0.365 | 0.035 | 0.745 | 0.495 | 0.057 | 0.805 | 0.38 | | |

Note
1. millimeter dimensions are derived from the original inch dimensions.
2. dimension is measured 0.030 inch (0.76 mm) from the body.

*sot1121b_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT1121B | | | | | | ~~09-10-12~~ 09-12-14 |

**Fig 16. Package outline SOT1121B**

## 9. Abbreviations

**Table 8. Abbreviations**

| Acronym | Description |
|---|---|
| CCDF | Complementary Cumulative Distribution Function |
| CW | Continuous Wave |
| DPCH | Dedicated Physical CHannel |
| 3GPP | 3rd Generation Partnership Project |
| IS-95 | Interim Standard 95 |
| ESD | ElectroStatic Discharge |
| LDMOS | Laterally Diffused Metal Oxide Semiconductor |
| LDMOST | Laterally Diffused Metal Oxide Semiconductor Transistor |
| N-CDMA | Narrowband Code Division Multiple Access |
| PAR | Peak-to-Average power Ratio |
| RF | Radio Frequency |
| VSWR | Voltage Standing Wave Ratio |
| W-CDMA | Wideband Code Division Multiple Access |

## 10. Revision history

**Table 9. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BLF7G27L-75P_BLF7G27LS-75P v.2 | 20100714 | Product data sheet | - | BLF7G27L-75P_ BLF7G27LS-75P v.1 |
| Modifications: | • The status of this document has been changed to “Preliminary data sheet”.<br>• Table 1 on page 1: changed the value of $ACPR_{885k}$ to –46 dBc.<br>• Table 4 on page 2: added the maximum value of $I_D$.<br>• Table 5 on page 3: changed several values.<br>• Table 6 on page 3: changed several values.<br>• Table 7 on page 3: changed several values.<br>• Section 7.1 on page 3: changed the value of $P_L$.<br>• Added Section 7.2 on page 4.<br>• Added Section 7.3 on page 4.<br>• Added Section 7.4 on page 6. | | | |
| BLF7G27L-75P_BLF7G27LS-75P v.1 | 20100329 | Objective data sheet | - | - |

# 11. Legal information

## 11.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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