# BLF7G20L-160P; BLF7G20LS-160P

## Power LDMOS transistor

Rev. 01 — 22 June 2010 Objective data sheet

## 1. Product profile

### 1.1 General description

160 W LDMOS power transistor for base station applications at frequencies from 1800 MHz to 2000 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) | $\eta_D$ (%) | $ACPR_{400k}$ (dBc) | $ACPR_{600k}$ (dBc) | $EVM_{rms}$ (%) |
|---|---|---|---|---|---|---|---|---|---|
| CW | 1805 to 1880 | 850 | 28 | 135 | 17.5 | 57 | - | - | - |
| GSM EDGE | 1805 to 1880 | 850 | 28 | 65 | 18.5 | 43 | –61 | –74 | 2.5 |

### 1.2 Features and benefits

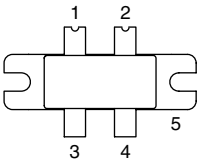
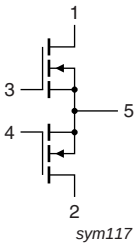
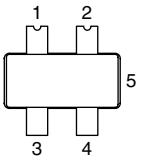
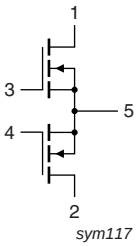
- Excellent ruggedness
- High efficiency
- Low $R_{th}$ providing excellent thermal stability
- Designed for broadband operation (1800 MHz to 2000 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low-memory effects providing excellent digital pre-distortion capability
- Internally matched for ease of use
- Integrated ESD protection
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

### 1.3 Applications

- RF power amplifiers for base stations and multi carrier applications in the 1800 MHz to 2000 MHz frequency range

## 2. Pinning information

**Table 2. Pinning**

| Pin | Description | | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| **BLF7G20L-160P (SOT1121A)** | | | | |
| 1 | drain1 | |  |  |
| 2 | drain2 | | | |
| 3 | gate1 | | | |
| 4 | gate2 | | | |
| 5 | source | [1] | | |
| **BLF7G20LS-160P (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 |
| BLF7G20L-160P | - | flanged LDMOST ceramic package; 2 mounting holes; 4 leads | SOT1121A |
| BLF7G20LS-160P | - | 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 | | - | <tbd> | A |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | - | 200 | °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; $P_L$ = 100 W | 0.41 | 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; $I_D$ = 0.9 mA | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS}$ = 10 V; $I_D$ = 90 mA | 1.5 | 1.9 | 2.3 | V |
| $I_{DSS}$ | drain leakage current | $V_{GS}$ = 0 V; $V_{DS}$ = 28 V | - | - | 2 | μA |
| $I_{DSX}$ | drain cut-off current | $V_{GS}$ = $V_{GS(th)}$ + 3.75 V; $V_{DS}$ = 10 V | 14 | - | - | A |
| $I_{GSS}$ | gate leakage current | $V_{GS}$ = 11 V; $V_{DS}$ = 0 V | - | - | 200 | nA |
| $g_{fs}$ | forward transconductance | $V_{DS}$ = 10 V; $I_D$ = 2.5 A | - | <tbd> | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS}$ = $V_{GS(th)}$ + 3.75 V; $I_D$ = 3.15 A | - | 0.15 | - | Ω |

## 7. Test information

**Table 7. Application information**

*f = 1805 MHz and 1880 MHz; RF performance at $V_{DS}$ = 28 V; $I_{Dq}$ = 850 mA; $T_{case}$ = 25 °C; 2 sections combined unless otherwise specified; in a class-AB production test circuit.*

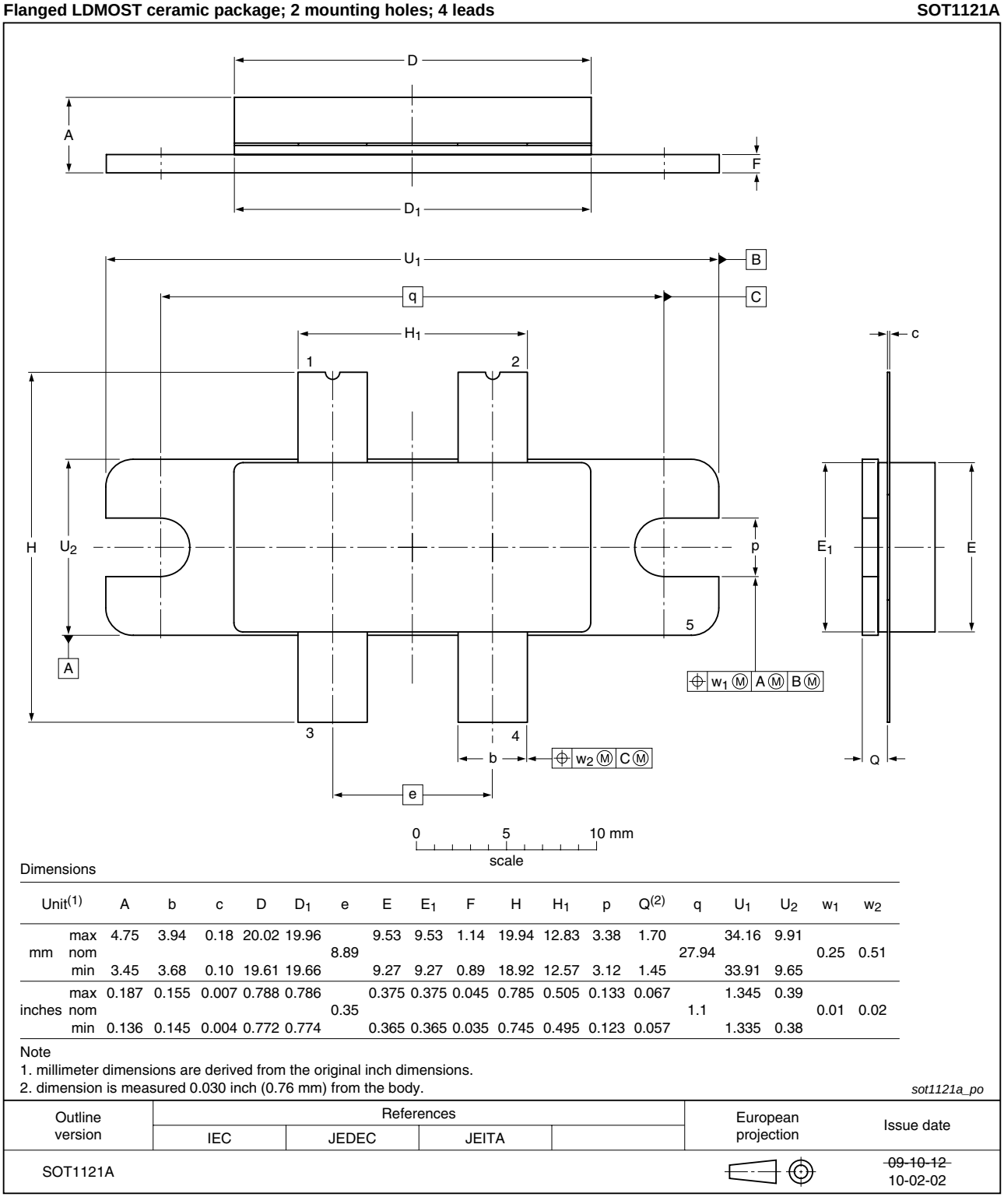
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Mode of operation: GSM EDGE; $P_{L(AV)}$ = 65 W** | | | | | | |
| $G_p$ | power gain | | 17.3 | 18.5 | - | dB |
| $RL_{in}$ | input return loss | | - | –15 | –8 | dB |
| $\eta_D$ | drain efficiency | | 40 | 43 | - | % |
| $ACPR_{400k}$ | adjacent channel power ratio (400 kHz) | | - | –61 | –58 | dBc |
| $ACPR_{600k}$ | adjacent channel power ratio (600 kHz) | | - | –74 | –70.5 | dBc |
| $EVM_{rms}$ | RMS EDGE signal distortion error | | - | 2.5 | 3.8 | % |
| $EVM_M$ | peak EDGE signal distortion error | | - | 8 | 12.5 | % |
| **Mode of operation: CW; $P_{L(AV)}$ = 135 W** | | | | | | |
| $G_p$ | power gain | | 16.8 | 17.5 | - | dB |
| $\eta_D$ | drain efficiency | | 52 | 57 | - | % |

### 7.1 Ruggedness in class-AB operation

The BLF7G20L-160P and BLF7G20LS-160P are capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS}$ = 28 V; $I_{Dq}$ = 850 mA; $P_L$ = 160 W (CW); f = 1805 MHz.

## 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 | | |

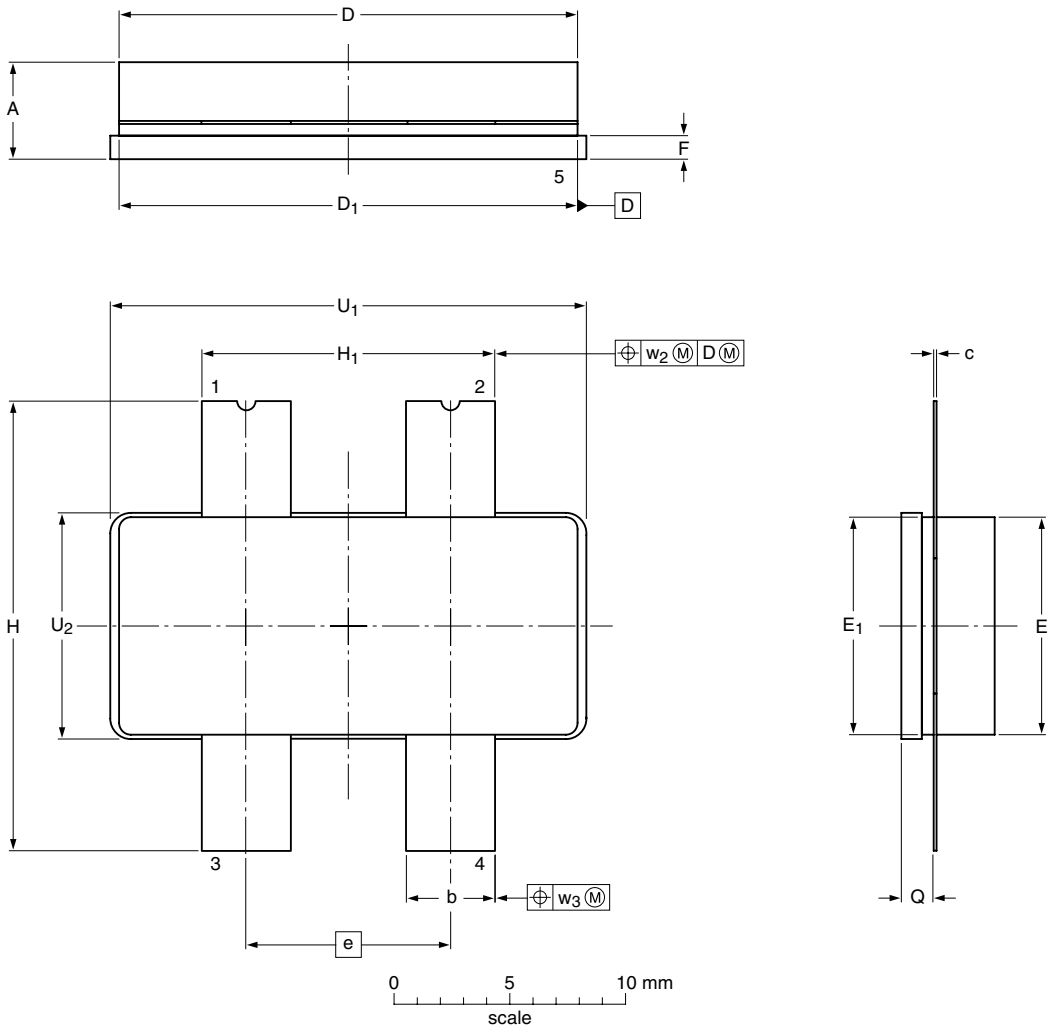
Note
1. millimeter dimensions are derived from the original inch dimensions.
2. dimension is measured 0.030 inch (0.76 mm) from the body.

*sot1121a_po*

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

**Fig 1. 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 2. Package outline SOT1121B**

## 9. Abbreviations

Table 8. Abbreviations

| Acronym | Description |
|---|---|
| CW | Continuous Wave |
| EDGE | Enhanced Data rates for GSM Evolution |
| ESD | ElectroStatic Discharge |
| IS-95 | Interim Standard 95 |
| LDMOS | Laterally Diffused Metal Oxide Semiconductor |
| LDMOST | Laterally Diffused Metal Oxide Semiconductor Transistor |
| RF | Radio Frequency |
| SMD | Surface Mounted Device |
| 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 |
|---|---|---|---|---|
| BLF7G20L-160P_7G20LS-160P v.1 | 20100622 | Objective data sheet | - | - |

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| Document status[1][2] | Product status[3] | Definition |
|---|---|---|
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**Date of release: 22 June 2010**

**Document identifier: BLF7G20L-160P_7G20LS-160P**