

BLF7G27L-150P; BLF7G27LS-150P

Power LDMOS transistor

Rev. 1 — 12 November 2010

Product data sheet

1. Product profile

1.1 General description

150 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 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) | η_D (%) | ACPR _{885k} (dBc) | ACPR _{5M} (dBc) |
|-----------------------|--------------|------------------|-----------------|--------------------|---------------|-----------------|-------------------------------|-----------------------------|
| IS-95 | 2500 to 2700 | 1200 | 28 | 30 | 16.5 | 26 | -47 ^[1] | - |
| Single carrier W-CDMA | 2500 to 2700 | 1200 | 28 | 45 | 16.5 | 31 | - | -38 ^[2] |

[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.

[2] 3GPP; test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF. Channel bandwidth is 3.84 MHz.

1.2 Features and benefits

- Excellent ruggedness
- High efficiency
- Low R_{th} providing excellent thermal stability
- Designed for broadband operation (2500 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)

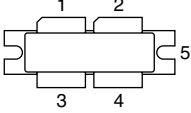
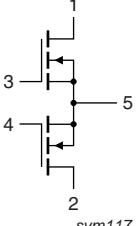
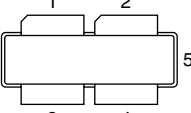
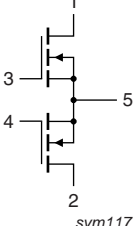
1.3 Applications

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



2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|---------------------------------|-------------|---|--|
| BLF7G27L-150P (SOT539A) | | | |
| 1 | drain1 |  |  sym117 |
| 2 | drain2 | | |
| 3 | gate1 | | |
| 4 | gate2 | | |
| 5 | source | | |
| BLF7G27LS-150P (SOT539B) | | | |
| 1 | drain1 |  |  sym117 |
| 2 | drain2 | | |
| 3 | gate1 | | |
| 4 | gate2 | | |
| 5 | source | | |

[1] Connected to flange.

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|----------------|---------|--|---------|
| | Name | Description | Version |
| BLF7G27L-150P | - | flanged balanced LDMOST ceramic package; 2 mounting holes; 4 leads | SOT539A |
| BLF7G27LS-150P | - | earless flanged balanced LDMOST ceramic package; 4 leads | SOT539B |

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 | | - | 37 | 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 | $T_{case} = 80\text{ °C}; P_L = 30\text{ W}$ | 0.25 | 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 | $V_{GS} = 0\text{ V}; I_D = 1\text{ mA}$ | 65 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS} = 10\text{ V}; I_D = 100\text{ mA}$ | 1.3 | 1.9 | 2.3 | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$ | - | - | 5 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$ | 16.75 | 19 | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 500 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}; I_D = 3.57\text{ A}$ | - | 0.86 | - | 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 | - | Ω |

7. Test information

Remark: All testing performed in a class-AB production test circuit.

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; $f_1 = 2500\text{ MHz}; f_2 = 2700\text{ MHz};$ RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 1200\text{ mA}; T_{case} = 25\text{ °C};$ unless otherwise specified.

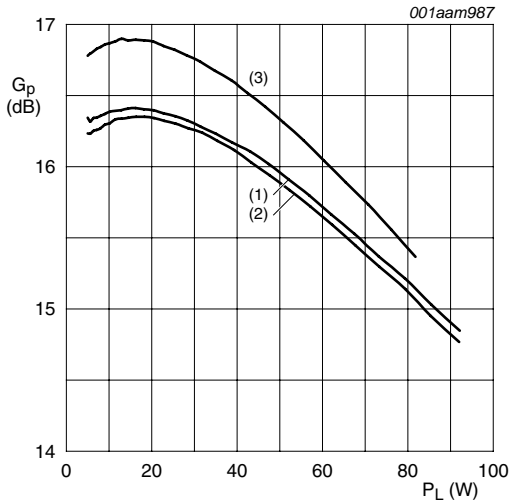
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|--|------------|------|------|-----|------|
| $P_{L(AV)}$ | average output power | | - | 30 | - | W |
| G_p | power gain | | 14.8 | 16.5 | - | dB |
| RL_{in} | input return loss | | - | -10 | - | dB |
| η_D | drain efficiency | | 22 | 26 | - | % |
| $ACPR_{885k}$ | adjacent channel power ratio (885 kHz) | | -43 | -47 | - | dBc |

7.1 Ruggedness in class-AB operation

The BLF7G27L-150P and BLF7G27LS-150P are capable of withstanding a load mismatch corresponding to VSWR = 20 : 1 through all phases under the following conditions: $V_{DS} = 28\text{ V}; I_{Dq} = 1200\text{ mA}; P_L = 35\text{ W (IS-95)}; f = 2500\text{ MHz}.$

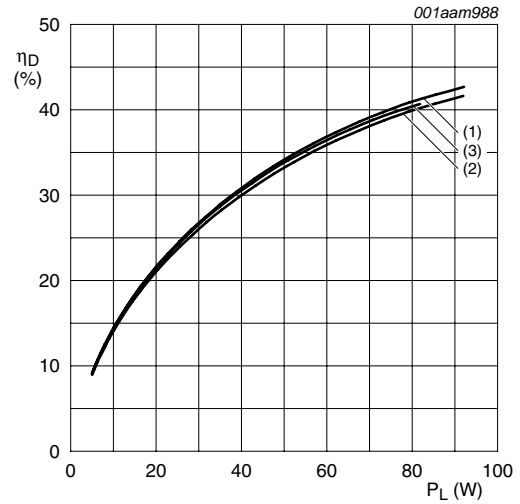
7.2 Single carrier IS-95

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.



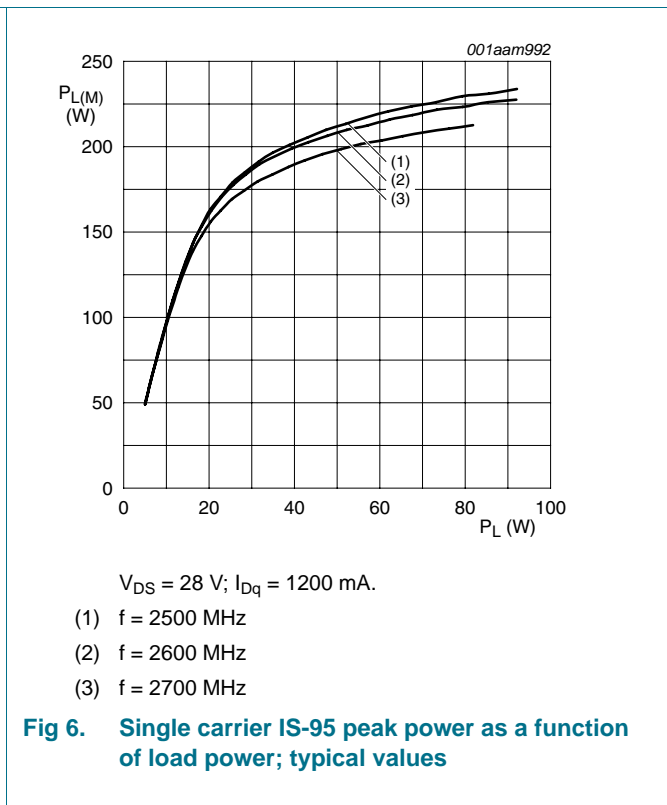
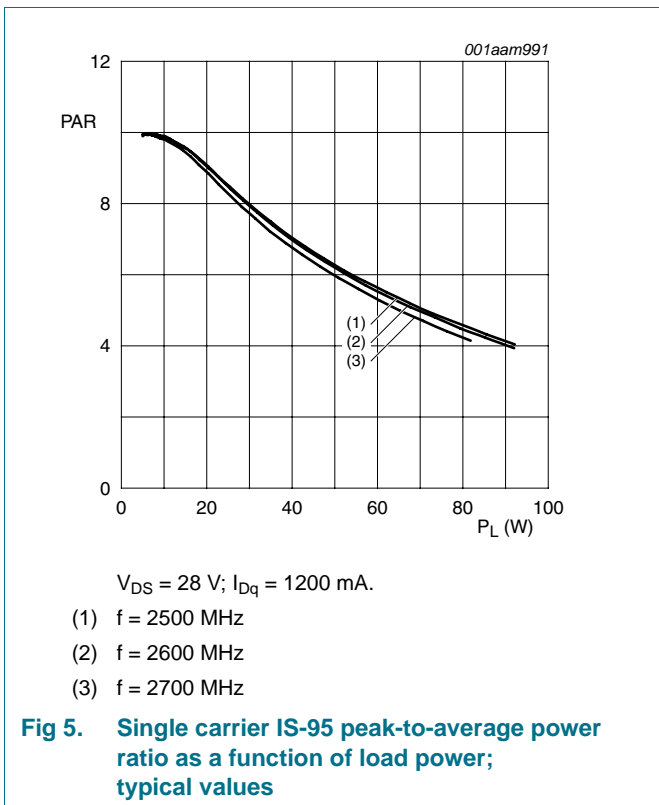
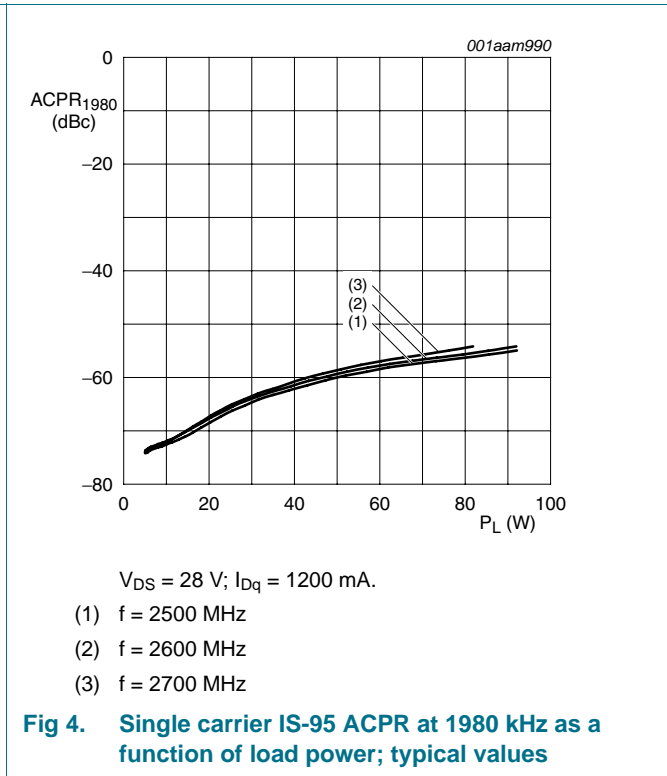
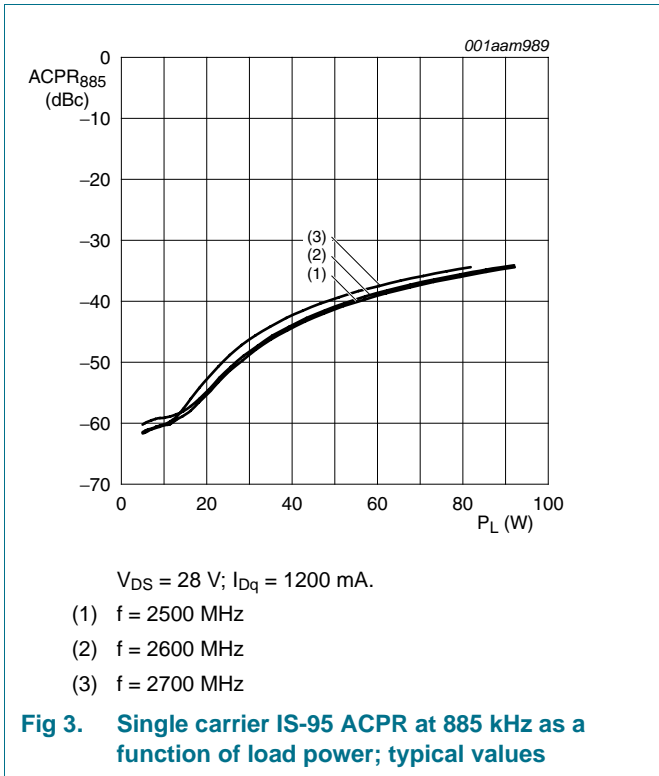
$V_{DS} = 28\text{ V}; I_{Dq} = 1200\text{ mA}$.
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

Fig 1. Single carrier IS-95 power gain as a function of load power; typical values

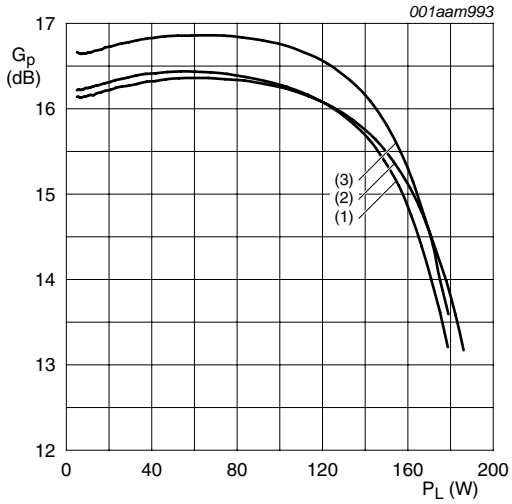


$V_{DS} = 28\text{ V}; I_{Dq} = 1200\text{ mA}$.
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

Fig 2. Single carrier IS-95 drain efficiency as a function of load power; typical values

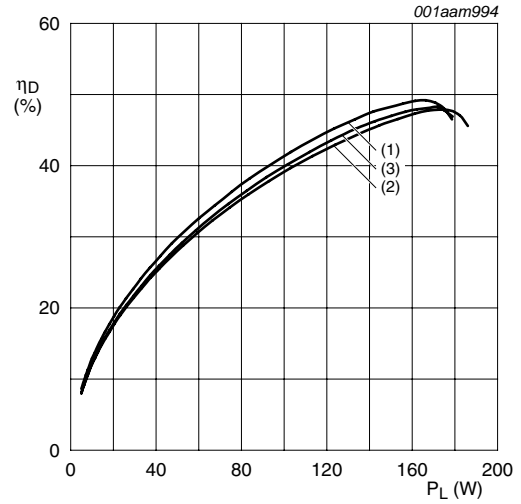


7.3 Pulsed CW



$V_{DS} = 28\text{ V}; I_{Dq} = 1200\text{ mA}.$
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

Fig 7. Pulsed CW power gain as a function of load power; typical values

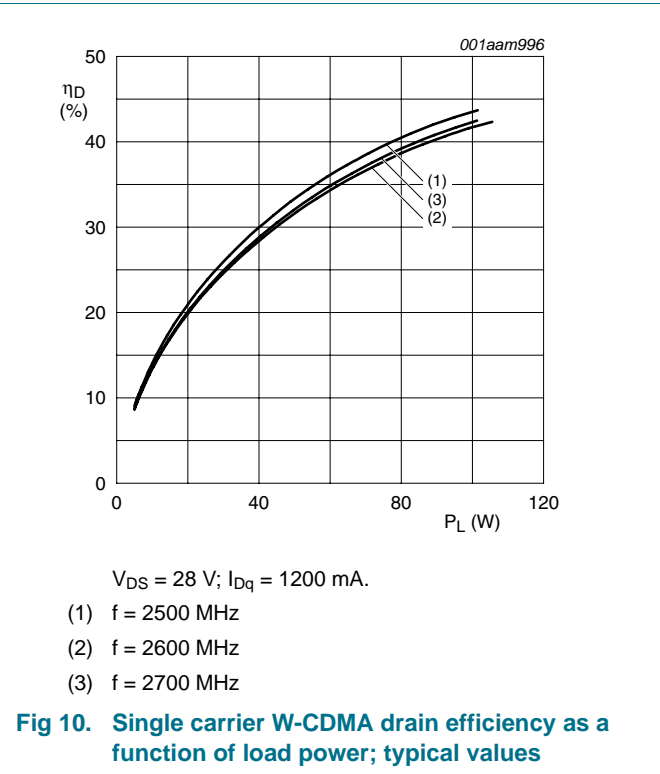
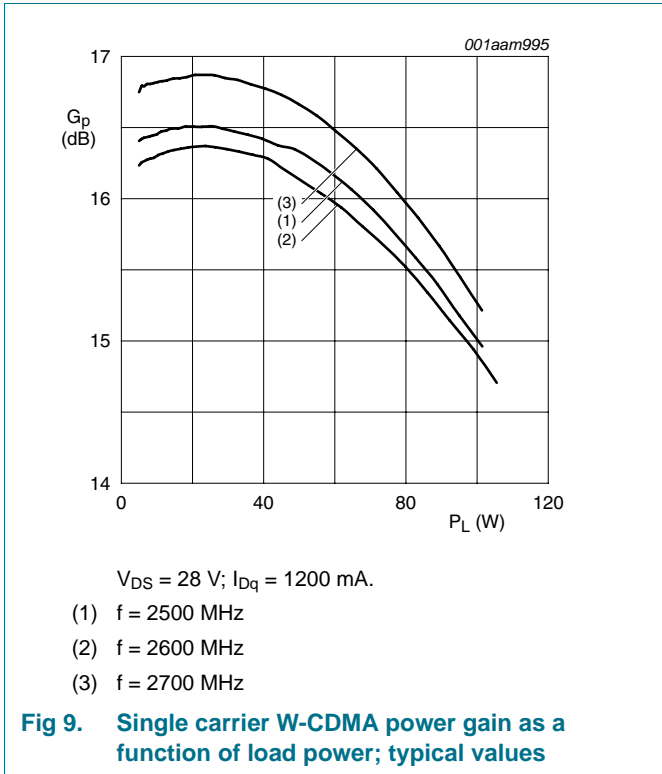


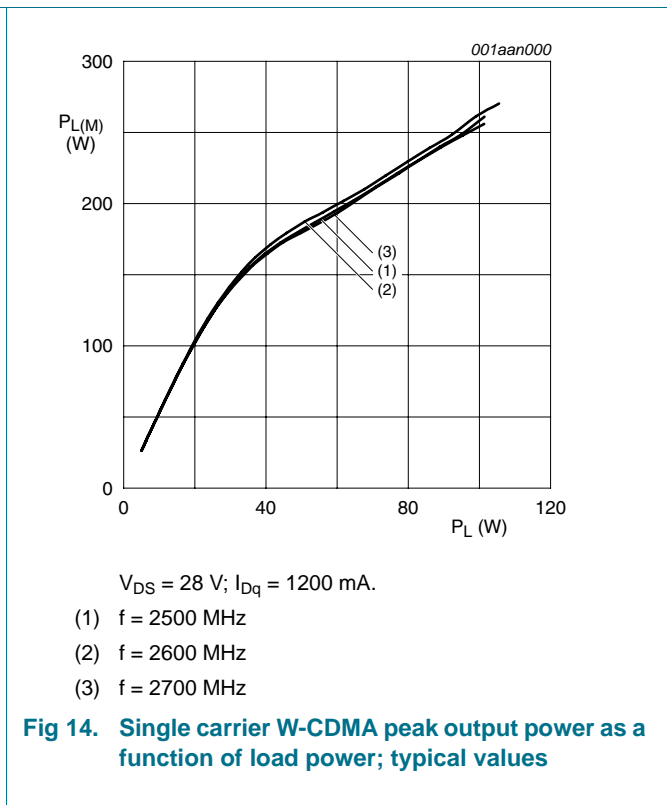
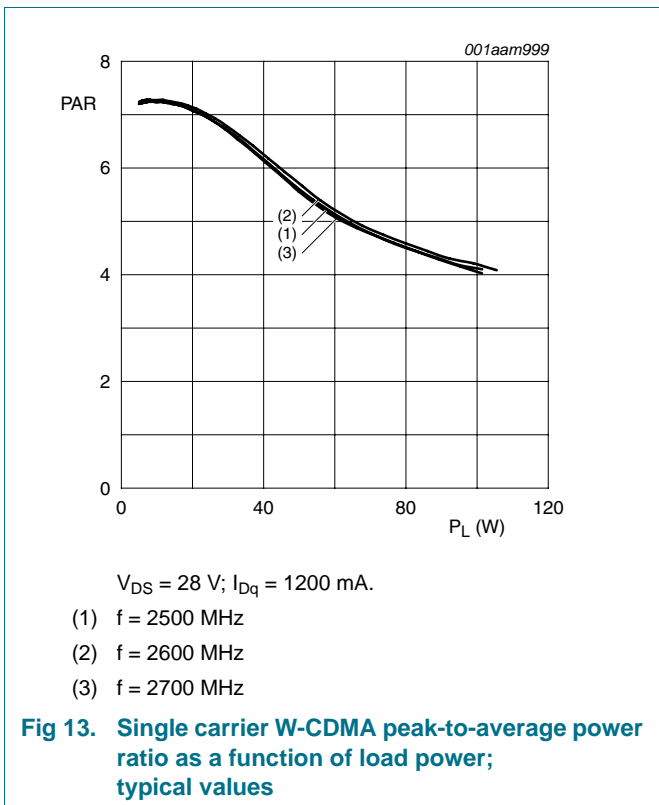
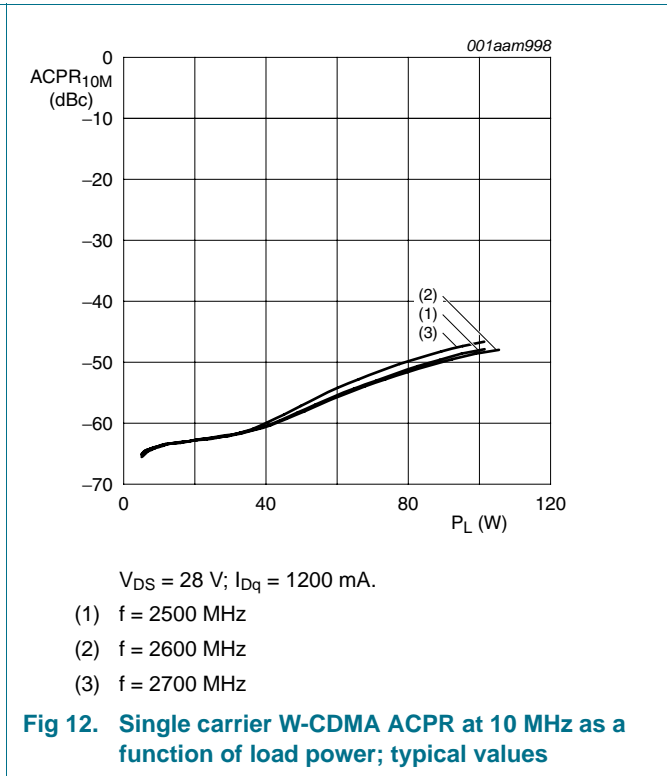
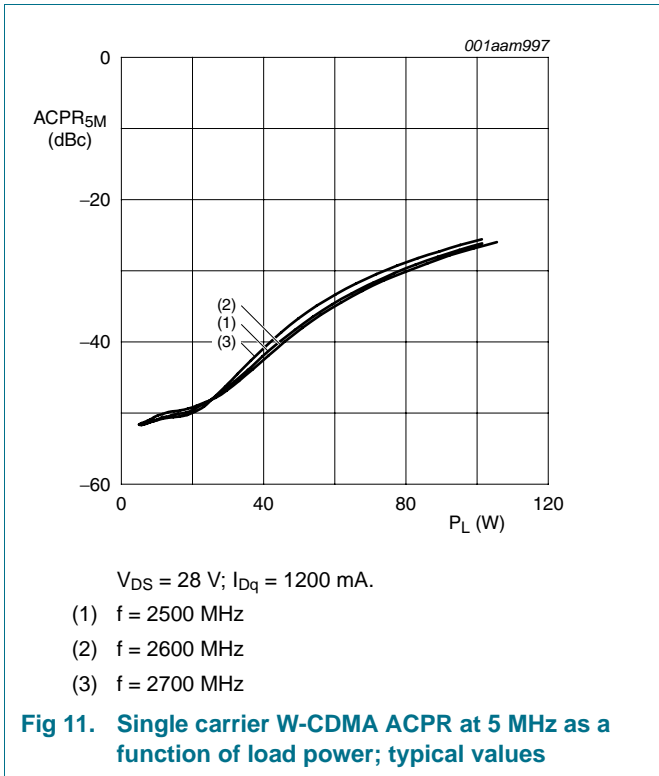
$V_{DS} = 28\text{ V}; I_{Dq} = 1200\text{ mA}.$
 (1) $f = 2500\text{ MHz}$
 (2) $f = 2600\text{ MHz}$
 (3) $f = 2700\text{ MHz}$

Fig 8. Pulsed CW drain efficiency 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.





8. Package outline

Flanged balanced LDMOST ceramic package; 2 mounting holes; 4 leads

SOT539A

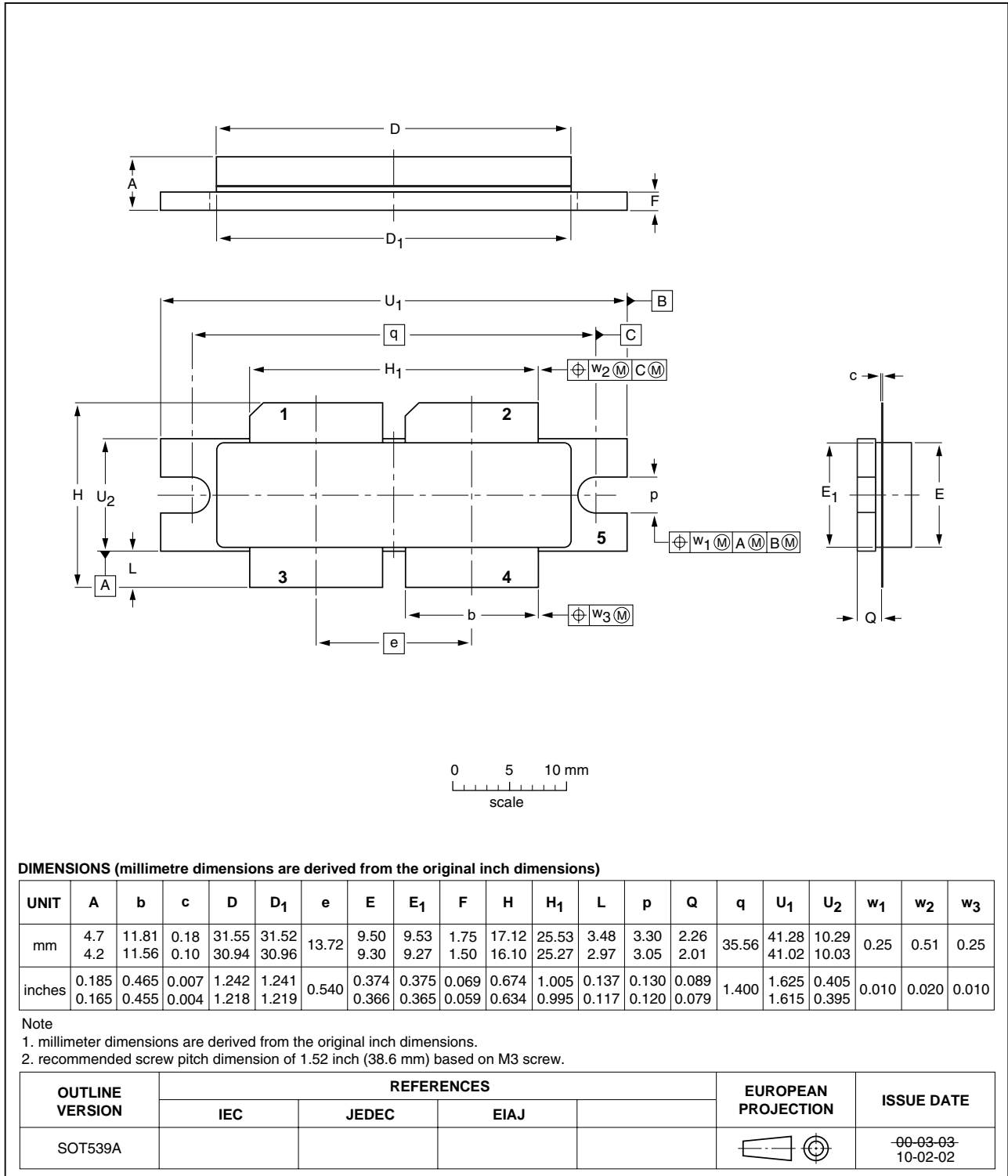


Fig 15. Package outline SOT539A

Earless flanged balanced LDMOST ceramic package; 4 leads

SOT539B

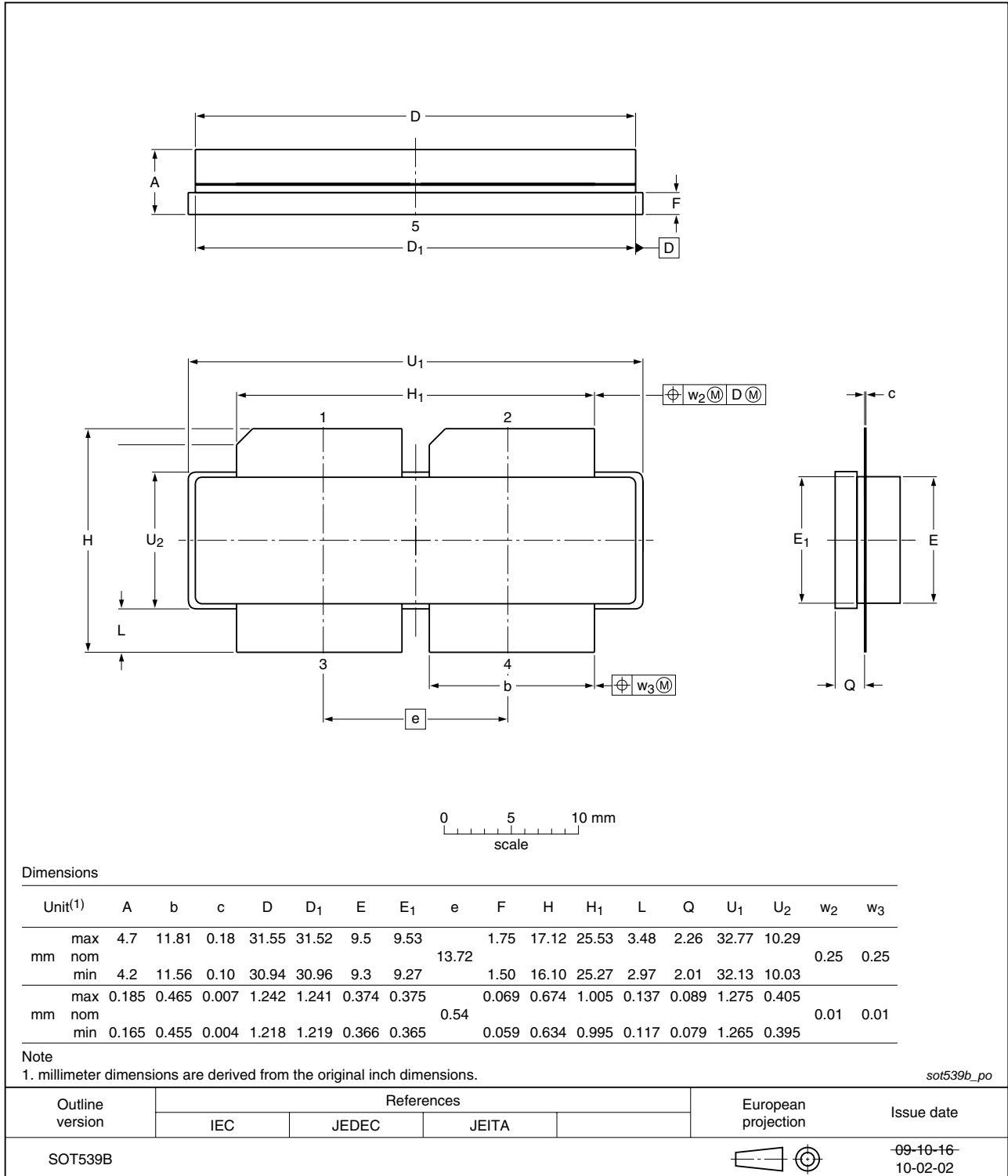


Fig 16. Package outline SOT539B

9. Abbreviations

Table 8. Abbreviations

| Acronym | Description |
|---------|---|
| CCDF | Complementary Cumulative Distribution Function |
| CW | Continuous Wave |
| 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-150P_7G27LS-150P v.1 | 20101112 | Product data sheet | - | - |

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