

BLF8G24LS-200PN

Power LDMOS transistor

Rev. 3 — 1 December 2016

AMPLEON

Product data sheet

1. Product profile

1.1 General description

200 W LDMOS power transistor for base station applications at frequencies from 2300 MHz to 2400 MHz.

Table 1. Typical performance

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

| Test signal | f | I_{DQ} | V_{DS} | $P_{L(AV)}$ | G_p | η_D | $ACPR_{5M}$ |
|------------------|--------------|----------|----------|-------------|-------|----------|-------------|
| | (MHz) | (mA) | (V) | (W) | (dB) | (%) | (dBc) |
| 1-carrier W-CDMA | 2300 to 2400 | 1740 | 28 | 60 | 17.2 | 32 | -37 [1] |

[1] Test signal: 3GPP test model 1; 64 DPCH; PAR = 7.2 dB at 0.01 % probability on CCDF.

1.2 Features and benefits

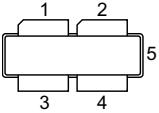
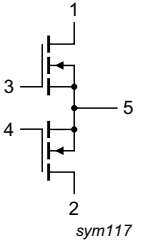
- Excellent ruggedness
- High efficiency
- Low thermal resistance providing excellent thermal stability
- Designed for broadband operation (2300 MHz to 2400 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- 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 2300 MHz to 2400 MHz frequency range

2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-----------------------|---|---|
| 1 | drain1 |  |  sym117 |
| 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 |
| BLF8G24LS-200PN | - | earless flanged balanced 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 |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| T_j | junction temperature | | - | 200 | °C |
| T_{case} | case temperature | | ^[1] - | 150 | °C |

[1] Continuous use at maximum temperature will affect the MTTF.

5. Thermal characteristics

Table 5. Thermal characteristics

| Symbol | Parameter | Conditions | Typ | Unit |
|---------------|--|--|-------|------|
| $R_{th(j-c)}$ | thermal resistance from junction to case | $T_{case} = 80\text{ °C}; P_L = 60\text{ W}$ | 0.217 | K/W |

6. Characteristics

Table 6. DC characteristics

$T_j = 25\text{ °C}$ per section, 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 | $V_{DS} = 10\text{ V}; I_D = 100\text{ mA}$ | 1.5 | 1.9 | 2.3 | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}; V_{DS} = 28\text{ V}$ | - | - | 2.8 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$ | - | 26.8 | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 280 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}; I_D = 5.1\text{ A}$ | - | 1.2 | - | S |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 5.04\text{ A}$ | - | 0.1 | - | Ω |

Table 7. RF characteristics

Test signal: 1-carrier W-CDMA; PAR = 7.2 dB at 0.01 % probability on the CCDF; 3GPP test model 1; 64 DPCH; $f_1 = 2300\text{ MHz}; f_2 = 2400\text{ MHz}$; RF performance at $V_{DS} = 28\text{ V}; I_{Dq} = 1740\text{ mA}; T_{case} = 25\text{ °C}$; unless otherwise specified; in a class-AB production test circuit.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|--------------------------------------|---------------------------|------|------|-----|------|
| G_p | power gain | $P_{L(AV)} = 60\text{ W}$ | 15.8 | 17.2 | - | dB |
| RL_{in} | input return loss | $P_{L(AV)} = 60\text{ W}$ | - | -11 | -8 | dB |
| η_D | drain efficiency | $P_{L(AV)} = 60\text{ W}$ | 27 | 32 | - | % |
| $ACPR_{5M}$ | adjacent channel power ratio (5 MHz) | $P_{L(AV)} = 60\text{ W}$ | - | -37 | -34 | dBc |

7. Test information

7.1 Ruggedness in class-AB operation

The BLF8G24LS-200PN is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: $V_{DS} = 28\text{ V}; I_{Dq} = 1740\text{ mA}; P_L = 200\text{ W (CW)}; f = 2300\text{ MHz}$.

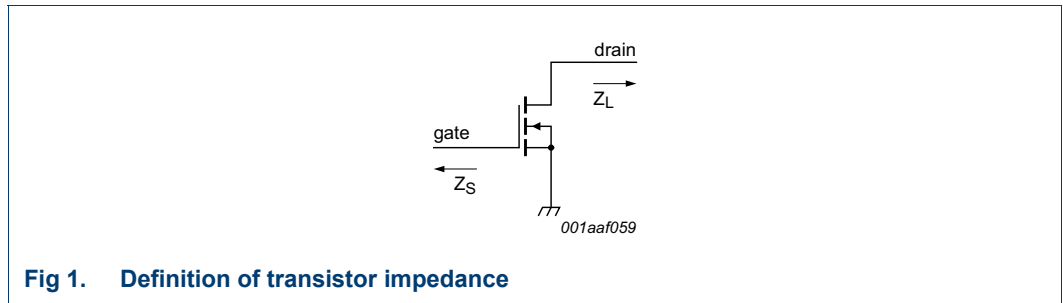
7.2 Impedance information

Table 8. Typical impedance

Measured load-pull data per section; $V_{DS} = 28\text{ V}; I_{Dq} = 860\text{ mA}$; typical values unless otherwise specified.

| f (MHz) | Z_S ^[1] (Ω) | Z_L ^[1] (Ω) |
|------------|--------------------------------------|--------------------------------------|
| 2300 | 4.24 – j6.5 | 1.5 – j5.4 |
| 2400 | 7.47 – j6.07 | 1.5 – j5.5 |

[1] Z_S and Z_L defined in [Figure 1](#).



7.3 Test circuit

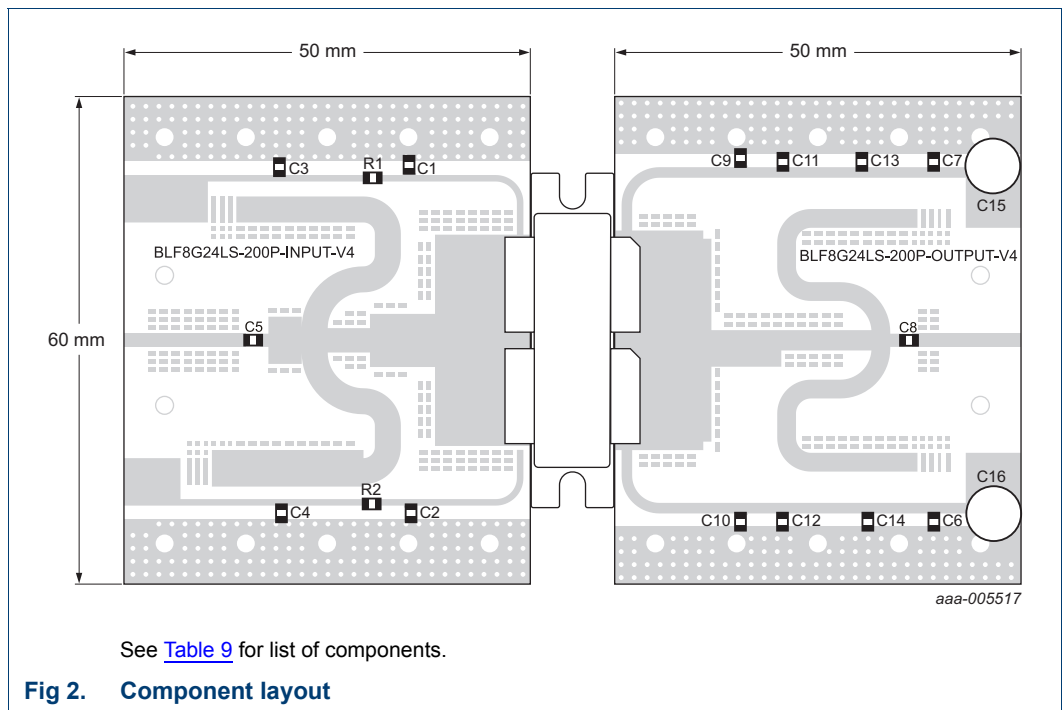


Table 9. List of components

See [Figure 2](#) for component layout.

The used PCB material is Rogers RO4350B with a thickness of 0.76 mm.

| Component | Description | Value | Remarks |
|--------------------|-----------------------------------|--------------------|---------|
| C1, C2, C9, C10 | multilayer ceramic chip capacitor | 6.8 μ F | [1] |
| C3, C4, C6, C7 | multilayer ceramic chip capacitor | 1 μ F | [2] |
| C5, C8 | multilayer ceramic chip capacitor | 33 pF | [1] |
| C11, C12, C13, C14 | multilayer ceramic chip capacitor | 0.1 μ F | [2] |
| C15, C16 | electrolytic capacitor | 1000 μ F; 50 V | |
| R1, R2 | chip resistor | 5.1 Ω | [3] |

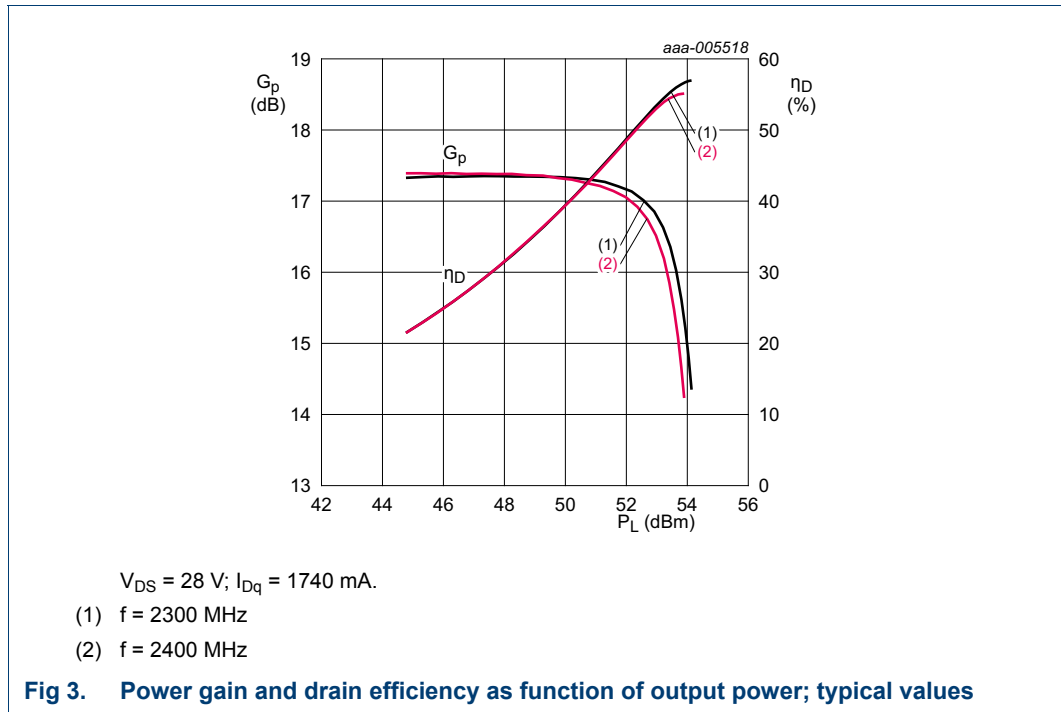
[1] American Technical Ceramics type 100B or capacitor of same quality.

[2] Murata or capacitor of same quality.

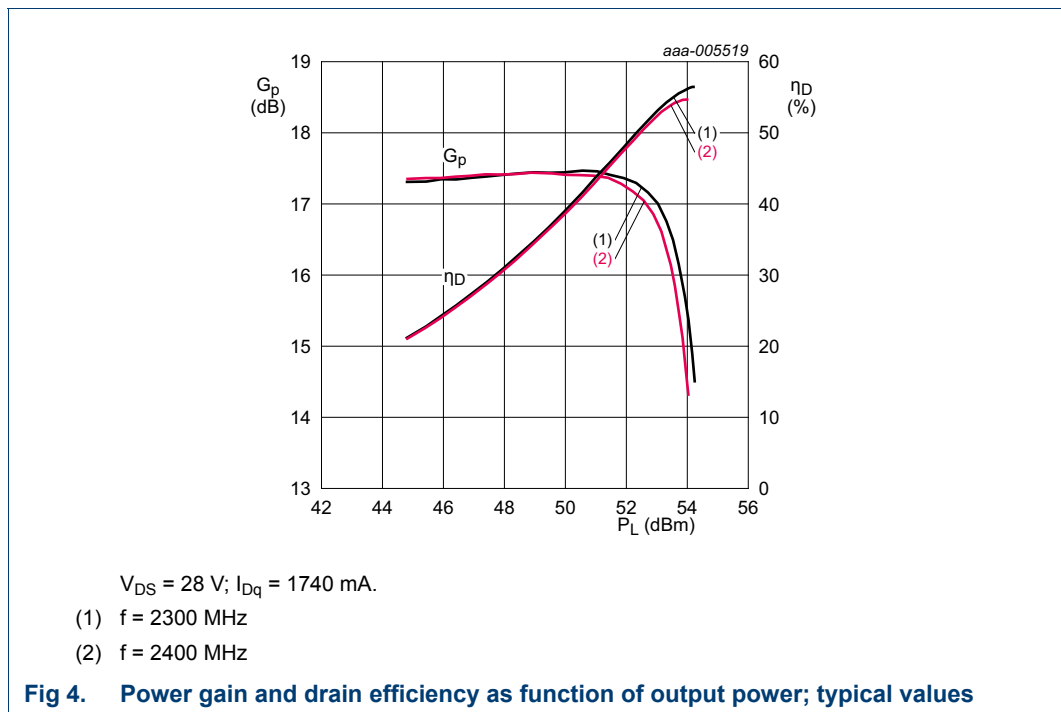
[3] Vishay Dale or resistor of same quality.

7.4 Graphical data

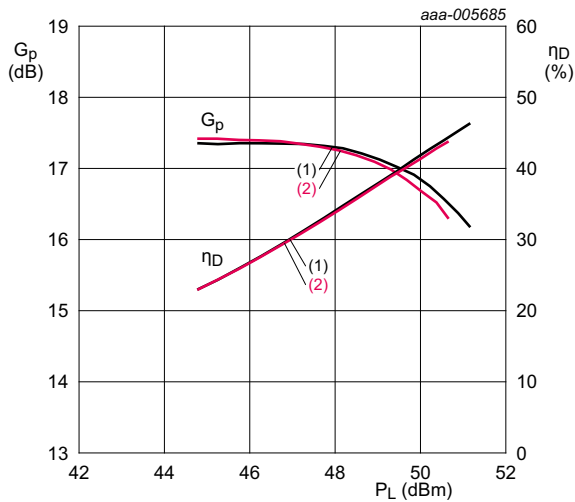
7.4.1 1-Tone CW



7.4.2 1-Tone CW pulsed

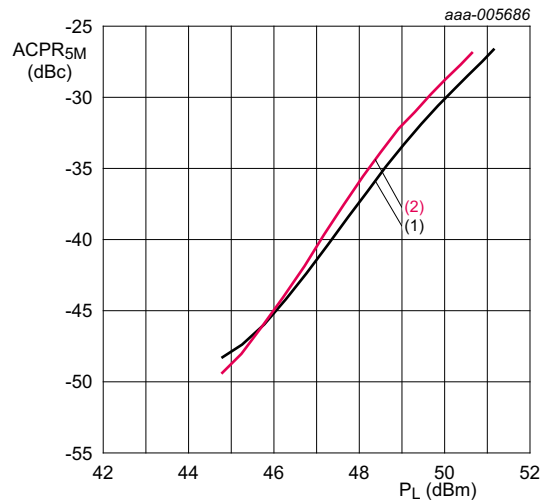


7.4.3 1-Carrier W-CDMA



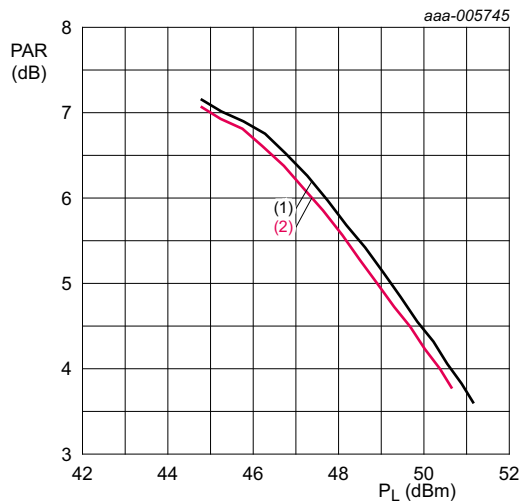
$V_{DS} = 28$ V; $I_{DQ} = 1740$ mA.
 (1) $f = 2300$ MHz
 (2) $f = 2400$ MHz

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



$V_{DS} = 28$ V; $I_{DQ} = 1740$ mA.
 (1) $f = 2300$ MHz
 (2) $f = 2400$ MHz

Fig 6. Adjacent power channel ratio (5 MHz) as a function of output power; typical values



$V_{DS} = 28$ V; $I_{DQ} = 1740$ mA.
 (1) $f = 2300$ MHz
 (2) $f = 2400$ MHz

Fig 7. Peak-to-average ratio as a function of output power; typical values

8. Package outline

Earless flanged balanced ceramic package; 4 leads

SOT539B

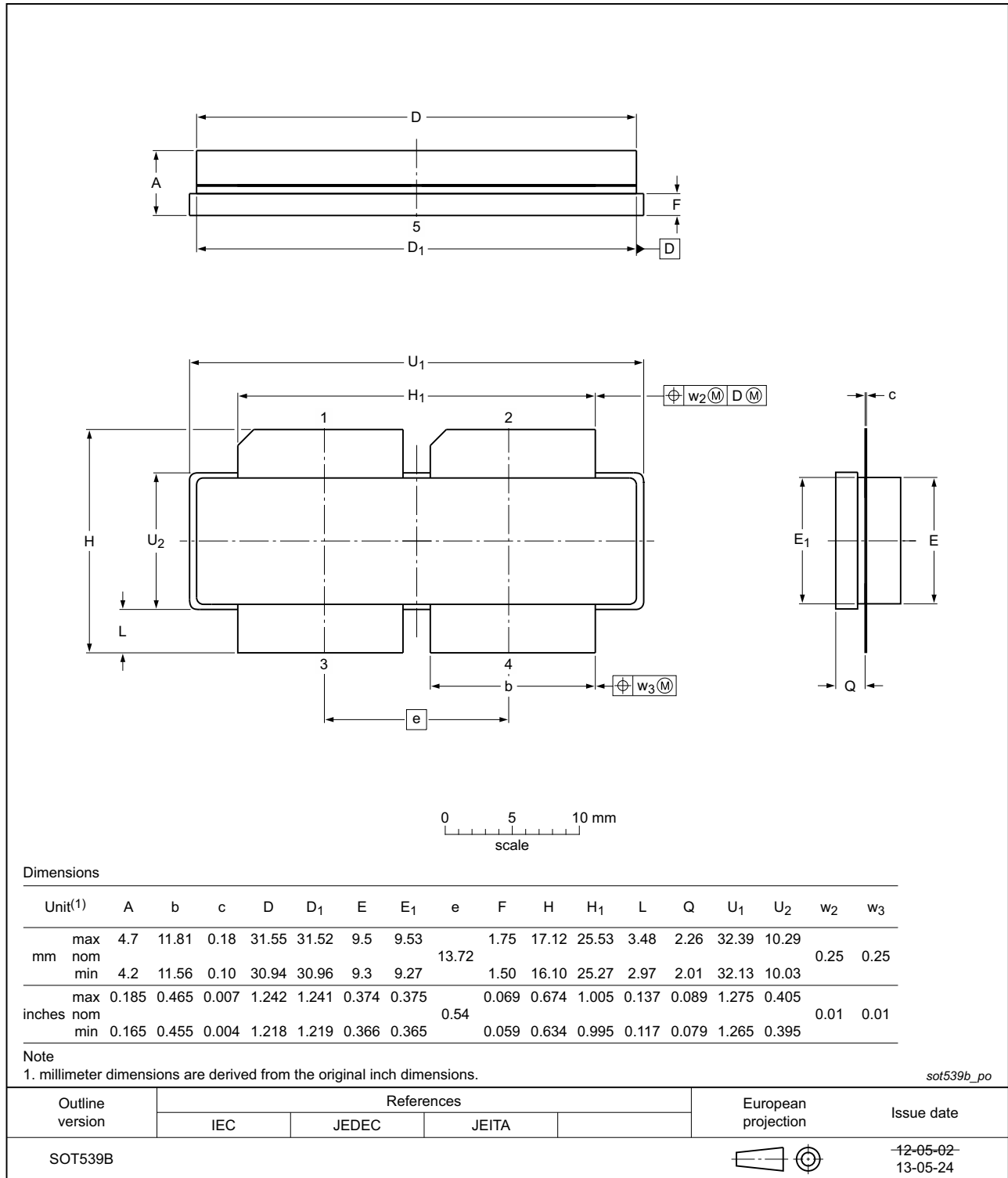


Fig 8. Package outline SOT539B

9. Handling information


| CAUTION | |
|---|---|
|  | <p>This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.</p> <p>Such precautions are described in the <i>ANSI/ESD S20.20</i>, <i>IEC/ST 61340-5</i>, <i>JESD625-A</i> or equivalent standards.</p> |

Table 10. ESD sensitivity

| ESD model | Class |
|--|-------------------------|
| Charged Device Model (CDM); According to ANSI/ESDA/JEDEC standard JS-002 | C2A [1] |
| Human Body Model (HBM); According to ANSI/ESDA/JEDEC standard JS-001 | 2 [2] |

- [1] CDM classification C2A is granted to any part that passes after exposure to an ESD pulse of 500 V, but fails after exposure to an ESD pulse of 750 V.
- [2] HBM classification 2 is granted to any part that passes after exposure to an ESD pulse of 2000 V, but fails after exposure to an ESD pulse of 4000 V.

10. Abbreviations

Table 11. Abbreviations

| Acronym | Description |
|---------|--|
| 3GPP | 3rd Generation Partnership Project |
| CCDF | Complementary Cumulative Distribution Function |
| DPCH | Dedicated Physical Channel |
| CW | Continuous Wave |
| ESD | ElectroStatic Discharge |
| LDMOS | Laterally Diffused Metal Oxide Semiconductor |
| MTTF | Mean Time To Failure |
| PAR | Peak-to-Average Ratio |
| VSWR | Voltage Standing Wave Ratio |
| W-CDMA | Wideband Code Division Multiple Access |

11. Revision history

Table 12. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------------|---|--------------------|---------------|---------------------|
| BLF8G24LS-200PN v.3 | 20161201 | Product data sheet | - | BLF8G24LS-200PN v.2 |
| Modifications: | <ul style="list-style-type: none"> • Section 9 on page 8: updated Handling information | | | |
| BLF8G24LS-200PN v.2 | 20150901 | Product data sheet | - | BLF8G24LS-200PN v.1 |
| BLF8G24LS-200PN v.1 | 20140120 | Product data sheet | - | - |

12. Legal information

12.1 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".

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