

BLF2324M8LS200P

Power LDMOS transistor

Rev. 2 — 1 September 2015

AMPLEON

Product data sheet

1. Product profile

1.1 General description

200 W LDMOS power transistor for industrial 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

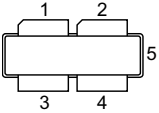
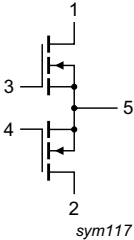
- Excellent ruggedness
- High efficiency
- Low thermal resistance providing excellent thermal stability
- Designed for broadband operation (2300 MHz to 2400 MHz)
- Lower output capacitance for improved performance in Doherty applications
- Designed for low memory effects providing excellent pre-distortability
- 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 industrial 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 |  |  |
| 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 |
| BLF2324M8LS200P | - | 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 BLF2324M8LS200P 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); $f = 2300\text{ MHz}$.

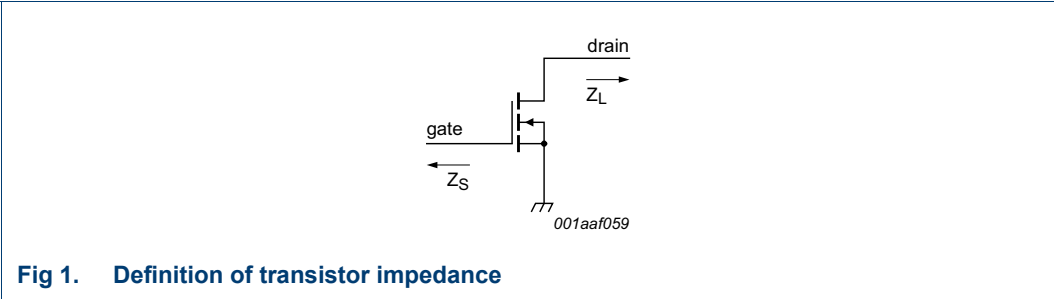
7.2 Impedance information

Table 8. Typical impedance

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

| f | Z_S [1] | Z_L [1] |
|-------|----------------|--------------|
| (MHz) | (Ω) | (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

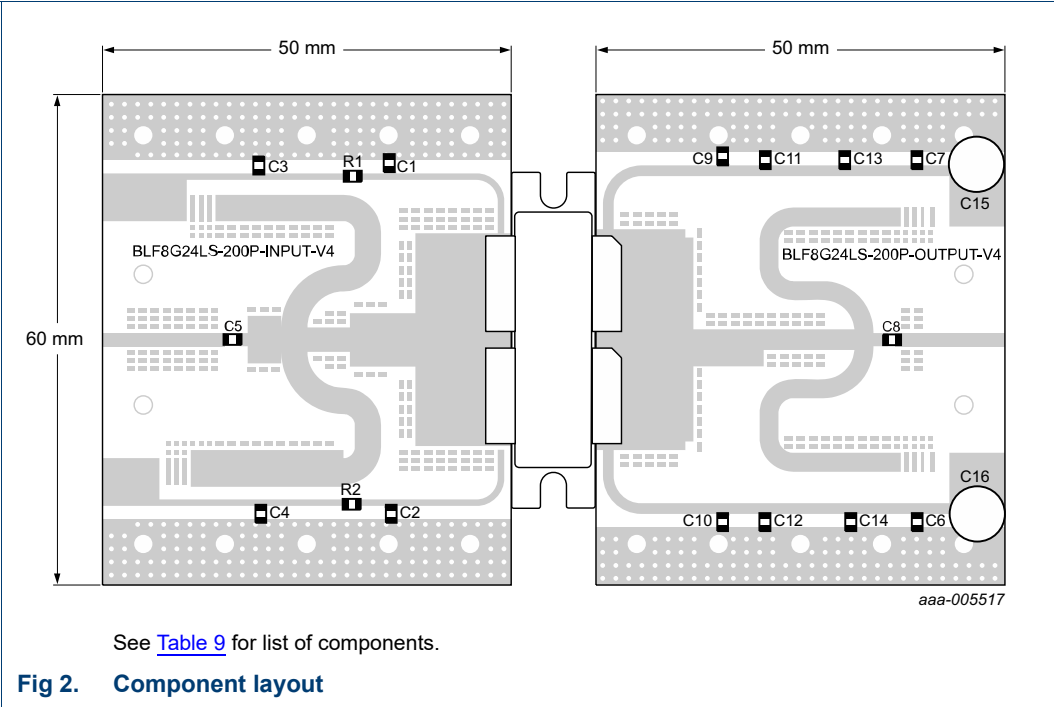


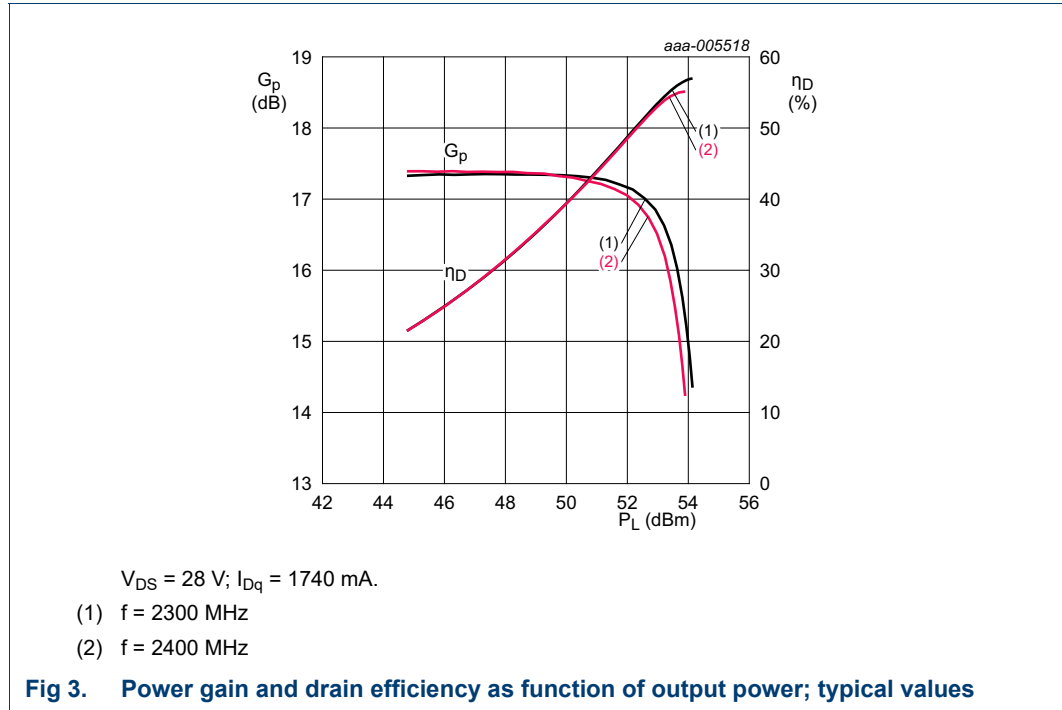
Table 9. List of components
 See [Figure 2](#) for component layout.
 The used PCB material is Rogers RO4350B with a thickness of 0.76 mm.

| 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] | |

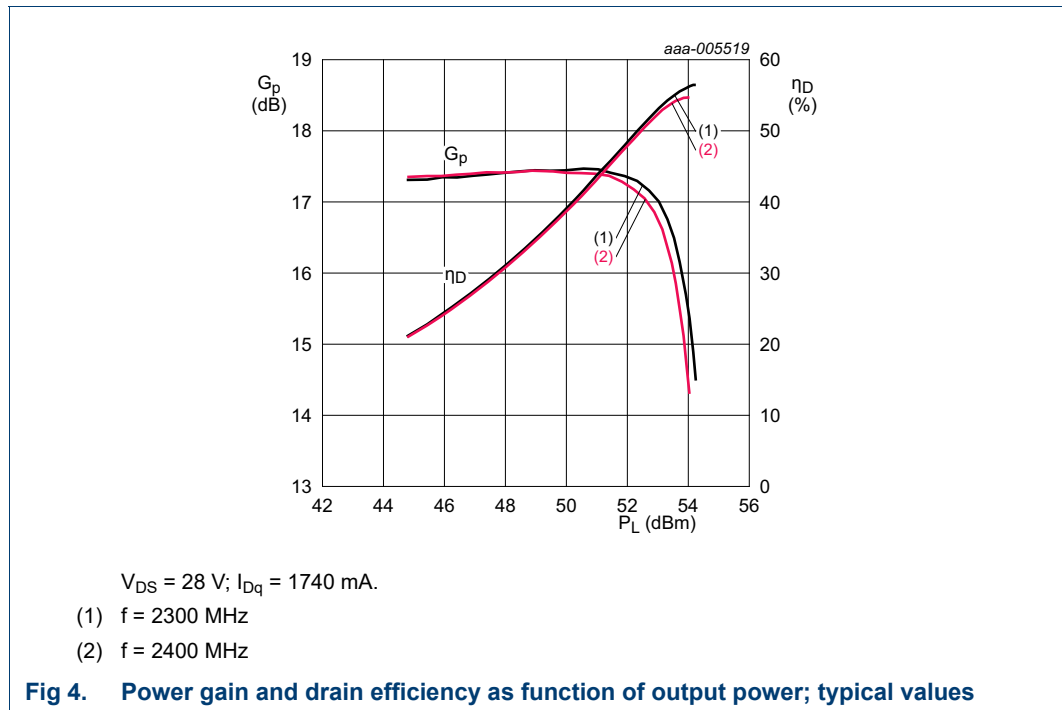
[1] American Technical Ceramics type 100B or capacitor of same quality.
 [2] Murata or capacitor of same quality.
 [3] Vishay Dale or resistor of same quality.

7.4 Graphical data

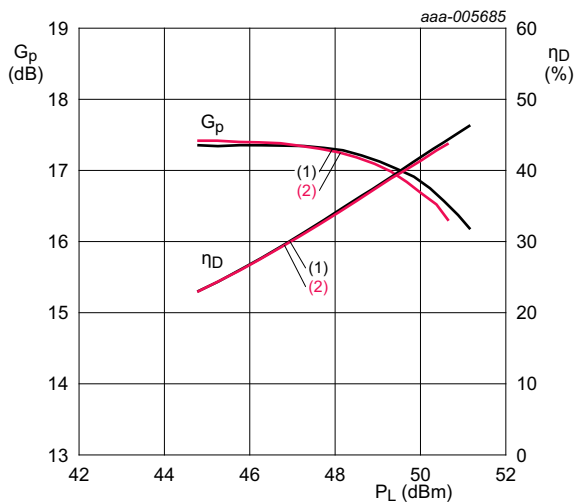
7.4.1 1-Tone CW



7.4.2 1-Tone CW pulsed



7.4.3 1-Carrier W-CDMA

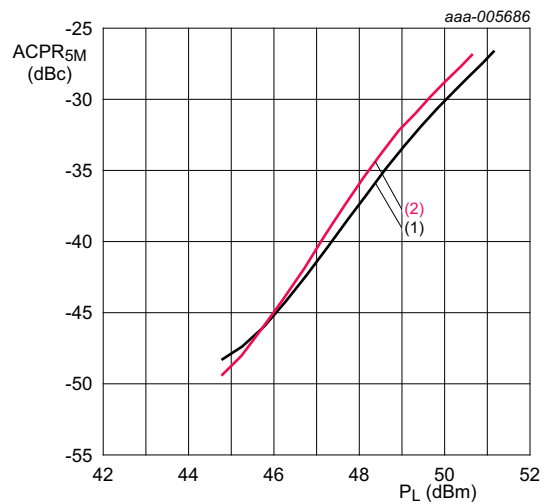


$V_{DS} = 28$ V; $I_{DQ} = 1740$ mA.

(1) $f = 2300$ MHz

(2) $f = 2400$ MHz

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

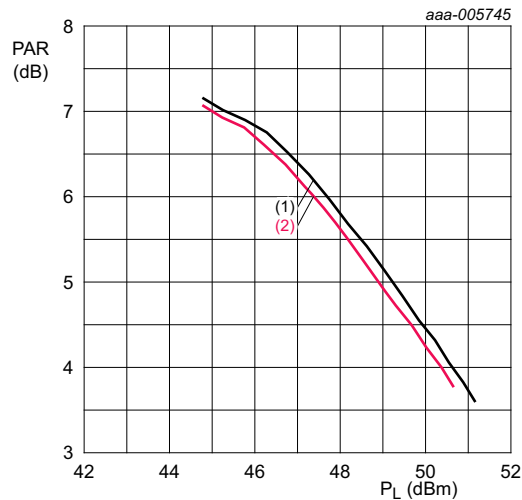


$V_{DS} = 28$ V; $I_{DQ} = 1740$ mA.

(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

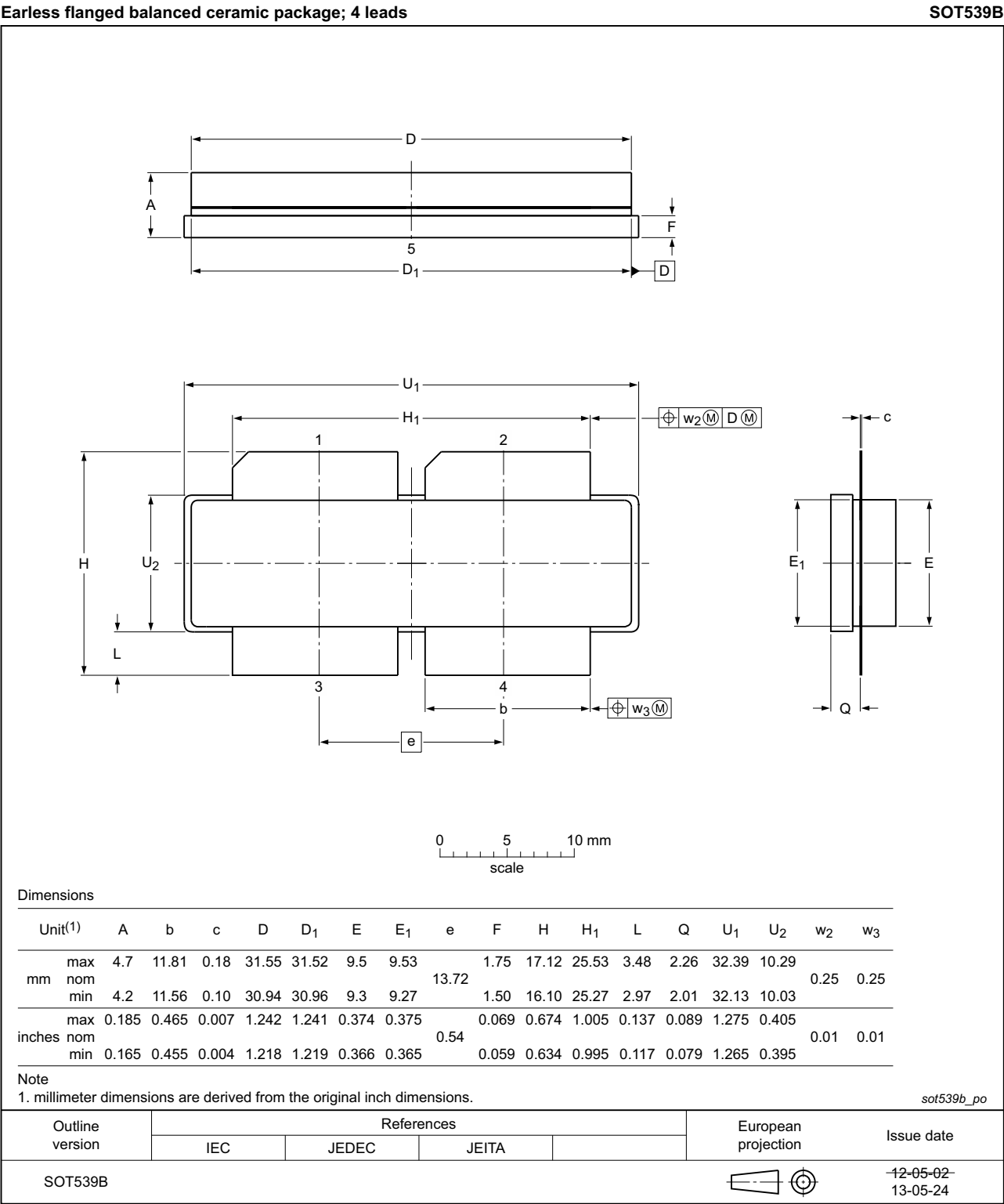


Fig 8. Package outline SOT539B

9. Handling information

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices.

Such precautions are described in the *ANSI/ESD S20.20*, *IEC/ST 61340-5*, *JESD625-A* or equivalent standards.

10. Abbreviations

Table 10. 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 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------------|--|--------------------|---------------|---------------------|
| BLF2324M8LS200P#2 | 20150901 | Product data sheet | - | BLF2324M8LS200P v.1 |
| Modifications: | <ul style="list-style-type: none"> The format of this document has been redesigned to comply with the new identity guidelines of Ampleon. Legal texts have been adapted to the new company name where appropriate. | | | |
| BLF2324M8LS200P v.1 | 20140603 | Product data sheet | - | - |

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| 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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