

BLF578XR

Power LDMOS transistor

Rev. 2 — 4 August 2011

Objective data sheet

1. Product profile

1.1 General description

A 1200 W LDMOS power transistor for broadcast applications and industrial applications in the HF to 500 MHz band.

Table 1. Application information

| Mode of operation | f (MHz) | V _{DS} (V) | P _L (W) | G _p (dB) | η _D (%) |
|-------------------|------------|------------------------|-----------------------|------------------------|-----------------------|
| CW | 108 | 50 | 1200 | 26 | 75 |
| pulsed RF | 225 | 50 | 1400 | 24 | 71 |

1.2 Features and benefits

- Typical pulsed performance at frequency of 225 MHz, a supply voltage of 50 V and an I_{DQ} of 40 mA, a t_p of 100 μs with δ of 20 %:
 - ◆ Output power = 1200 W
 - ◆ Power gain = 24 dB
 - ◆ Efficiency = 71 %
- Easy power control
- Integrated ESD protection
- Excellent ruggedness
- High efficiency
- Excellent thermal stability
- Designed for broadband operation (10 MHz to 500 MHz)
- Compliant to Directive 2002/95/EC, regarding Restriction of Hazardous Substances (RoHS)

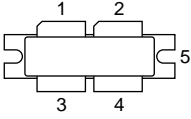
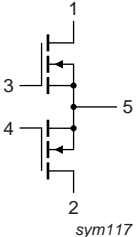
1.3 Applications

- Industrial, scientific and medical applications
- Broadcast transmitter applications



2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|-------------|---|---|
| 1 | drain1 |  |  |
| 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 |
| BLF578XR | - | flanged balanced LDMOST ceramic package; 2 mounting holes; 4 leads | SOT539A |

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 | | - | 110 | V |
| V_{GS} | gate-source voltage | | -6 | +11 | V |
| I_D | drain current | | - | <td> | 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 | $T_j = 150\text{ °C}$ | [1][2] 0.14 | K/W |
| $Z_{th(j-c)}$ | transient thermal impedance from junction to case | $T_j = 150\text{ °C}; t_p = 100\text{ }\mu\text{s}; \delta = 20\%$ | [3] 0.04 | K/W |

[1] T_j is the junction temperature.

[2] $R_{th(j-c)}$ is measured under RF conditions.

[3] See [Figure 1](#).

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 | $V_{GS} = 0\text{ V}; I_D = 2.5\text{ mA}$ | 110 | - | - | V |
| $V_{GS(th)}$ | gate-source threshold voltage | $V_{DS} = 10\text{ V}; I_D = 500\text{ mA}$ | 1.25 | 1.7 | 2.25 | V |
| V_{GSq} | gate-source quiescent voltage | $V_{DS} = 50\text{ V}; I_D = 20\text{ mA}$ | 0.8 | 1.3 | 1.8 | V |
| I_{DSS} | drain leakage current | $V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}$ | - | - | 2.8 | μA |
| I_{DSX} | drain cut-off current | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; V_{DS} = 10\text{ V}$ | - | <td> | - | A |
| I_{GSS} | gate leakage current | $V_{GS} = 11\text{ V}; V_{DS} = 0\text{ V}$ | - | - | 280 | nA |
| $R_{DS(on)}$ | drain-source on-state resistance | $V_{GS} = V_{GS(th)} + 3.75\text{ V}; I_D = 16.66\text{ A}$ | - | <td> | - | Ω |
| C_{rs} | feedback capacitance | $V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}; f = 1\text{ MHz}$ | - | <td> | - | pF |
| C_{iss} | input capacitance | $V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}; f = 1\text{ MHz}$ | - | <td> | - | pF |
| C_{oss} | output capacitance | $V_{GS} = 0\text{ V}; V_{DS} = 50\text{ V}; f = 1\text{ MHz}$ | - | <td> | - | pF |

Table 7. RF characteristics

Mode of operation: pulsed RF; $t_p = 100\text{ }\mu\text{s}$; $\delta = 20\%$; $f = 225\text{ MHz}$; RF performance at $V_{DS} = 50\text{ V}$; $I_{Dq} = 40\text{ mA}$; $T_{case} = 25\text{ °C}$; unless otherwise specified; in a class-AB production test circuit.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|-------------------|-----------------------|------|-------|------|------|
| G_p | power gain | $P_L = 1200\text{ W}$ | <td> | 24 | <td> | dB |
| RL_{in} | input return loss | $P_L = 1200\text{ W}$ | <td> | -17.5 | - | dB |
| η_D | drain efficiency | $P_L = 1200\text{ W}$ | <td> | 71 | - | % |

6.1 Ruggedness in class-AB operation

The BLF578XR is capable of withstanding a load mismatch corresponding to $VSWR = 65 : 1$ through all phases under the following conditions: $V_{DS} = 50\text{ V}$; $I_{Dq} = 40\text{ mA}$; $P_L = 1200\text{ W}$ pulsed; $f = 225\text{ MHz}$.

7. Package outline

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

SOT539A

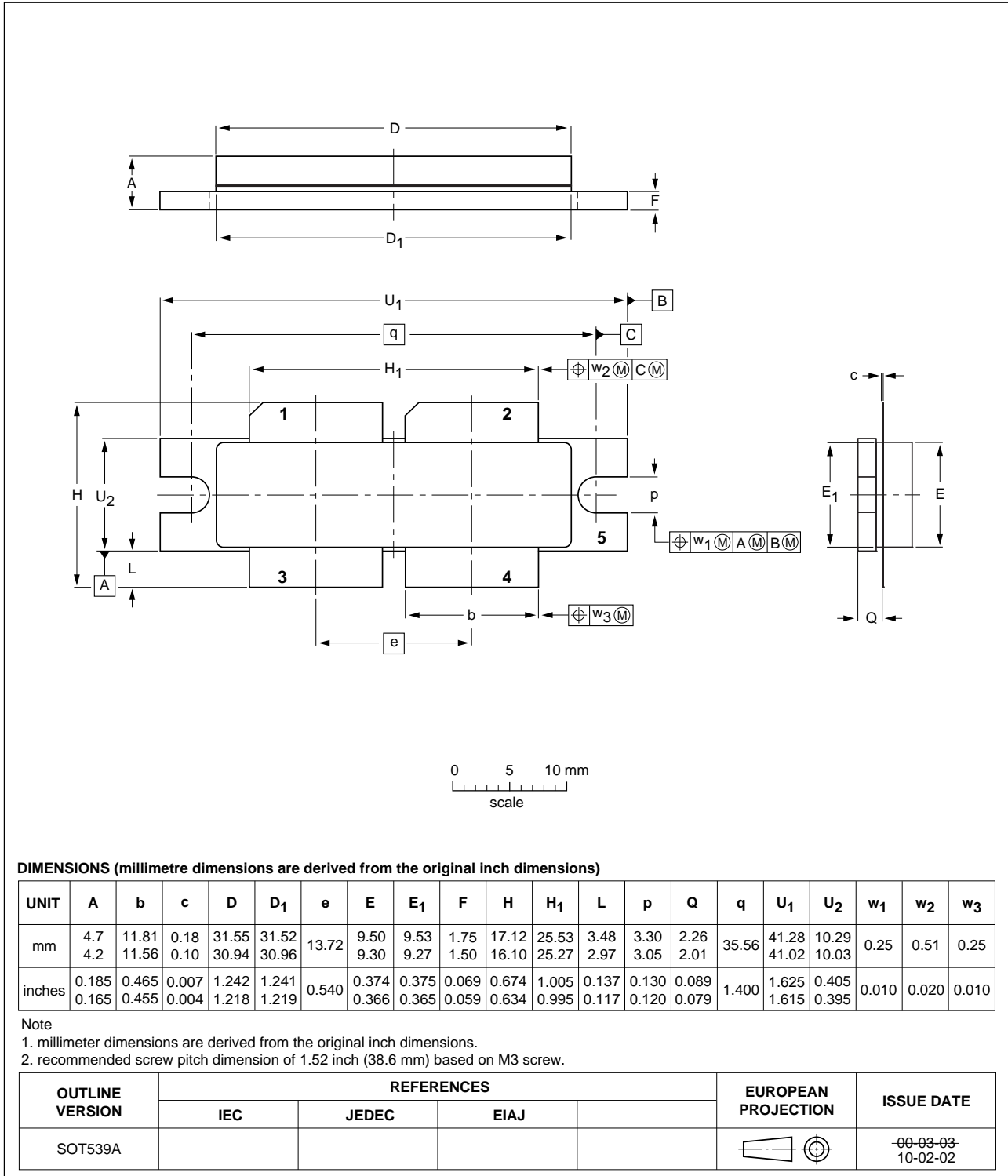


Fig 1. Package outline SOT539A

8. 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.

9. Abbreviations

Table 8. Abbreviations

| Acronym | Description |
|---------|---|
| CW | Continuous Wave |
| HF | High Frequency |
| LDMOS | Laterally Diffused Metal-Oxide Semiconductor |
| LDMOST | Laterally Diffused Metal-Oxide Semiconductor Transistor |
| RF | Radio Frequency |
| VSWR | Voltage Standing-Wave Ratio |

10. Revision history

Table 9. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|----------------------|---------------|--------------|
| BLF578XR v.2 | 20110804 | Objective data sheet | - | BLF578XR v.1 |
| Modifications: | <ul style="list-style-type: none"> • Table 4 on page 2: Minimum and maximum values for V_{GS} have been specified. • Table 5 on page 3: Values for $R_{th(j-c)}$ and $Z_{th(j-c)}$ have been specified. • Table 6 on page 3: No minimum value for I_{DSX} will be specified. | | | |
| BLF578XR v.1 | 20110727 | 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".

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13. Contents

| | | |
|-----------|--|----------|
| 1 | Product profile | 1 |
| 1.1 | General description | 1 |
| 1.2 | Features and benefits | 1 |
| 1.3 | Applications | 1 |
| 2 | Pinning information | 2 |
| 3 | Ordering information | 2 |
| 4 | Limiting values | 2 |
| 5 | Thermal characteristics | 3 |
| 6 | Characteristics | 3 |
| 6.1 | Ruggedness in class-AB operation | 3 |
| 7 | Package outline | 4 |
| 8 | Handling information | 5 |
| 9 | Abbreviations | 5 |
| 10 | Revision history | 5 |
| 11 | Legal information | 6 |
| 11.1 | Data sheet status | 6 |
| 11.2 | Definitions | 6 |
| 11.3 | Disclaimers | 6 |
| 11.4 | Trademarks | 7 |
| 12 | Contact information | 7 |
| 13 | Contents | 8 |

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