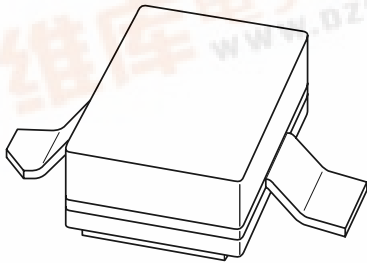


DISCRETE SEMICONDUCTORS

DATA SHEET



BLF2043

UHF power LDMOS transistor

Objective specification
Supersedes data of 2000 Feb 17

2000 Feb 23

UHF power LDMOS transistor

BLF2043

FEATURES

- High power gain
- Easy power control
- Excellent ruggedness
- Source on mounting base eliminates DC isolators, reducing common mode inductance
- Designed for broadband operation (HF to 2.2 GHz).

APPLICATIONS

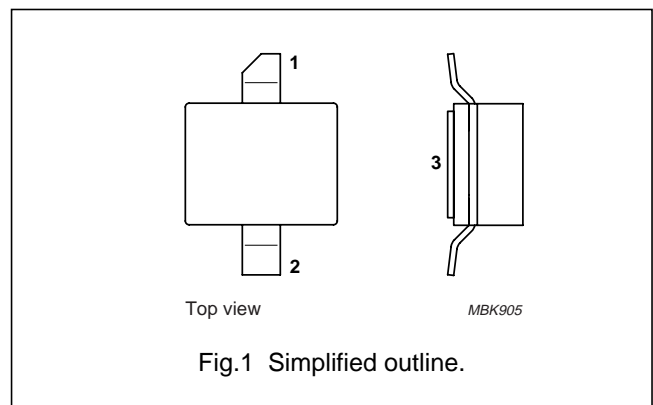
- Communication transmitter applications in the UHF frequency range.

DESCRIPTION

Silicon N-channel enhancement mode lateral D-MOS transistor encapsulated in a 2-lead flangeless package (SOT538A) with a ceramic cap. The common source is connected to the mounting base.

PINNING - SOT538A

| PIN | DESCRIPTION |
|-----|-------------|
| 1 | drain |
| 2 | gate |
| 3 | source |



QUICK REFERENCE DATA

RF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common source test circuit.

| MODE OF OPERATION | f (MHz) | V _{DS} (V) | P _L (W) | G _p (dB) | η_D (%) | d _{im} (dBc) |
|-----------------------|--|---------------------|--------------------|---------------------|--------------|-----------------------|
| CW, class-AB (2-tone) | f ₁ = 2000; f ₂ = 2000.1 | 26 | 10 (PEP) | >12 | >30 | ≤-26 |

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|-------------------------|-------------------------|------|------|------|
| V _{DS} | drain-source voltage | | - | 75 | V |
| V _{GS} | gate-source voltage | | - | ±15 | V |
| I _D | drain current (DC) | | - | 2.2 | A |
| P _{tot} | total power dissipation | T _{mb} ≤ 25 °C | - | tbf | W |
| T _{stg} | storage temperature | | -65 | +150 | °C |
| T _j | junction temperature | | - | 200 | °C |

CAUTION

This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------|---|----------------------------------|-------|------|
| $R_{th\ j-mb}$ | thermal resistance from junction to mounting base | $T_{mb} = 25\text{ °C}$; note 1 | 5 | K/W |
| $R_{th\ mb-h}$ | thermal resistance from mounting base to heatsink | | 0.4 | K/W |

Note

1. Thermal resistance is determined under RF operating conditions.

CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------|----------------------------------|--|------|------|------|---------------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS} = 0$; $I_D = 0.2\text{ mA}$ | 75 | – | – | V |
| V_{GSth} | gate-source threshold voltage | $V_{DS} = 10\text{ V}$; $I_D = 20\text{ mA}$ | 4 | – | 5 | V |
| I_{DSS} | drain-source leakage current | $V_{GS} = 0$; $V_{DS} = 26\text{ V}$ | – | – | 1.5 | μA |
| I_{DSX} | on-state drain current | $V_{GS} = V_{GSth} + 9\text{ V}$; $V_{DS} = 10\text{ V}$ | 3 | – | – | A |
| I_{GSS} | gate leakage current | $V_{GS} = \pm 15\text{ V}$; $V_{DS} = 0$ | – | – | 40 | nA |
| g_{fs} | forward transconductance | $V_{DS} = 10\text{ V}$; $I_D = 0.75\text{ A}$ | – | 0.5 | – | S |
| R_{DSon} | drain-source on-state resistance | $V_{GS} = 10\text{ V}$; $I_D = 0.75\text{ A}$ | – | 1.2 | – | Ω |
| C_{is} | input capacitance | $V_{GS} = 0$; $V_{DS} = 26\text{ V}$; $f = 1\text{ MHz}$ | – | 11 | – | pF |
| C_{os} | output capacitance | $V_{GS} = 0$; $V_{DS} = 26\text{ V}$; $f = 1\text{ MHz}$ | – | 9 | – | pF |
| C_{rs} | feedback capacitance | $V_{GS} = 0$; $V_{DS} = 26\text{ V}$; $f = 1\text{ MHz}$ | – | 0.5 | – | pF |

APPLICATION INFORMATION

RF performance in a common source class-AB circuit. $T_h = 25\text{ °C}$; $R_{th\ mb-h} = 0.4\text{ K/W}$, unless otherwise specified.

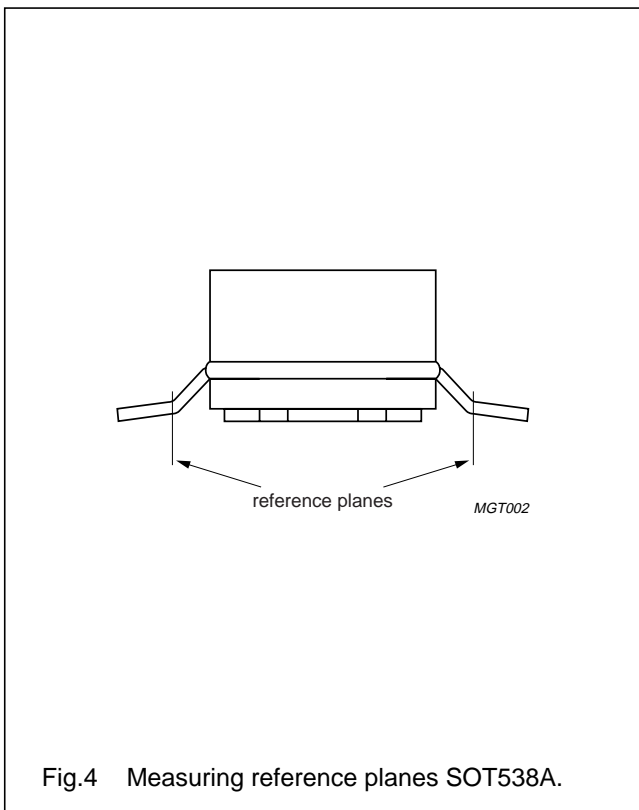
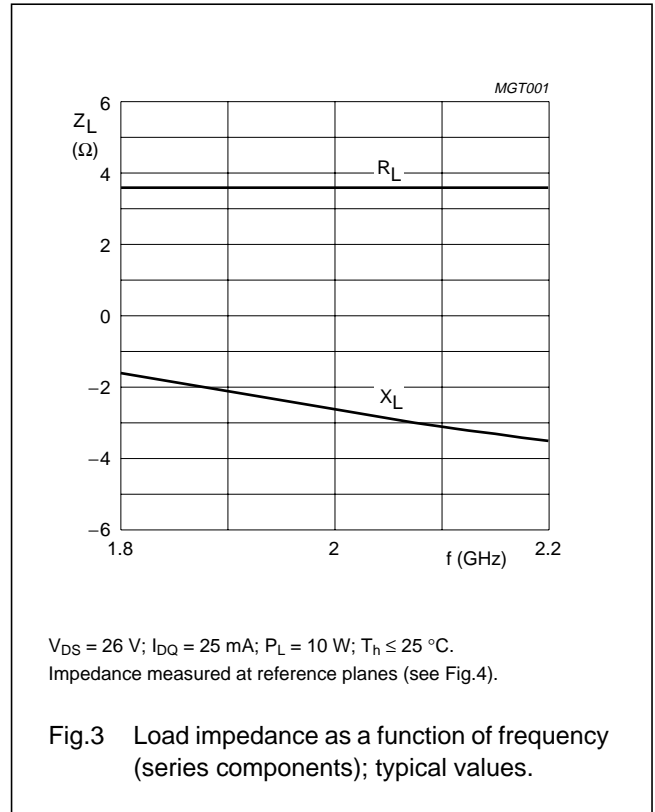
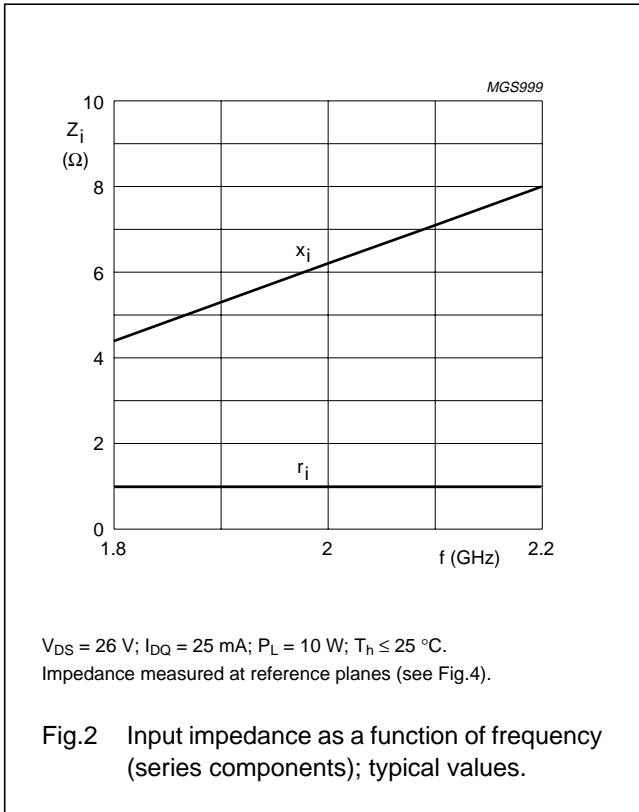
| MODE OF OPERATION | f (MHz) | V_{DS} (V) | I_{DQ} (mA) | P_L (W) | G_p (dB) | η_D (%) | d_{im} (dBc) |
|-----------------------|-------------------------------|--------------|---------------|-----------|------------|--------------|----------------|
| CW, class-AB (2-tone) | $f_1 = 2000$; $f_2 = 2000.1$ | 26 | 25 | 10 (PEP) | >12 | >30 | ≤ -26 |

Ruggedness in class-AB operation

The BLF2043 is capable of withstanding a load mismatch corresponding to $VSWR = 10 : 1$ through all phases under the following conditions: $V_{DS} = 26\text{ V}$; $f = 2000\text{ MHz}$ at rated load power.

UHF power LDMOS transistor

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UHF power LDMOS transistor

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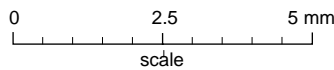
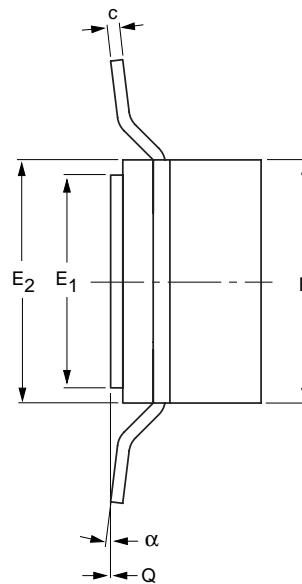
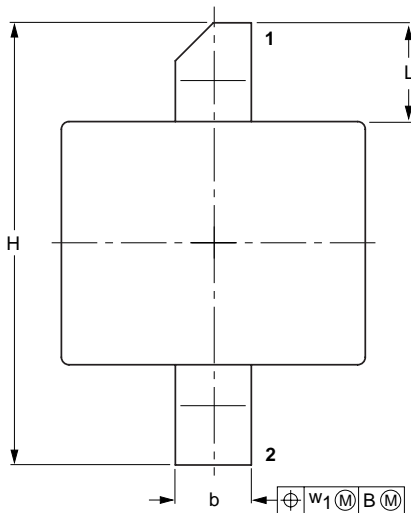
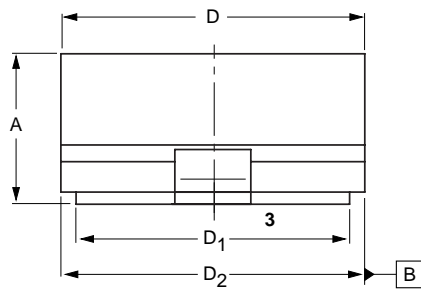
PACKAGE OUTLINE

Ceramic surface mounted package; 2 leads

SOT538A

Package under development

Philips Semiconductors reserves the right to make changes without notice.



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

| UNIT | A | b | c | D | D ₁ | D ₂ | E | E ₁ | E ₂ | H | L | Q | w ₁ | α |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| mm | 2.95 2.29 | 1.35 1.19 | 0.23 0.18 | 5.16 5.00 | 4.65 4.50 | 5.41 5.00 | 4.14 3.99 | 3.63 3.48 | 4.14 3.99 | 7.49 7.24 | 2.03 1.27 | 0.10 0.00 | 0.25 | 7° 0° |
| inches | 0.116 0.090 | 0.053 0.047 | 0.009 0.007 | 0.203 0.197 | 0.183 0.177 | 0.213 0.197 | 0.163 0.157 | 0.143 0.137 | 0.163 0.157 | 0.295 0.285 | 0.080 0.050 | 0.004 0.000 | 0.010 | 7° 0° |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT538A | | | | | | 99-03-30 |

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DEFINITIONS

| Data Sheet Status | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

UHF power LDMOS transistor

BLF2043

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