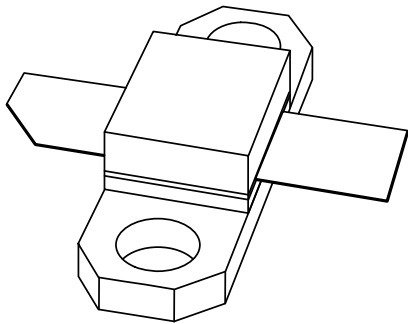


DISCRETE SEMICONDUCTORS

DATA SHEET



BLA1011-10 Avionics LDMOS transistor

Product specification
Supersedes data of 2002 Oct 02

2003 Nov 19

Avionics LDMOS transistor

BLA1011-10

FEATURES

- High power gain
- Easy power control
- Excellent ruggedness
- Source on mounting base eliminates DC isolators, reducing common mode inductance.

APPLICATIONS

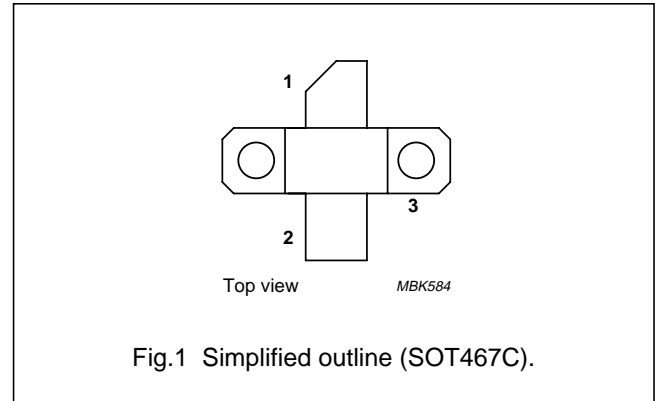
- Avionics transmitter applications in the 1030 to 1090 MHz frequency range.

DESCRIPTION

Silicon N-channel enhancement mode lateral D-MOS transistor encapsulated in a 2-lead flange package (SOT467C) with a ceramic cap. The common source is connected to the flange.

PINNING - SOT467C

| PIN | DESCRIPTION |
|-----|-----------------------------|
| 1 | drain |
| 2 | gate |
| 3 | source, connected to flange |



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 (%) |
|--|--------------|--------------|-----------|------------|--------------|
| Pulsed class-AB; $t_p = 50\text{ }\mu\text{s}$; $\delta = 2\%$ | 1030 to 1090 | 36 | 10 | >15 | >40 |

ORDERING INFORMATION

| TYPE NUMBER | PACKAGE | | |
|-------------|---------|---|---------|
| | NAME | DESCRIPTION | VERSION |
| BLA1011-10 | – | flanged LDMOST ceramic package; 2 mounting holes; 2 leads | SOT467C |

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| 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 | $T_h \leq 25\text{ }^\circ\text{C}$ | – | 25 | W |
| T_{stg} | storage temperature | | –65 | +150 | $^\circ\text{C}$ |
| T_j | junction temperature | | – | 200 | $^\circ\text{C}$ |

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THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------|---|--|-------|------|
| $Z_{th(j-mb)}$ | thermal impedance from junction to mounting base | $T_{mb} = 25\text{ }^{\circ}\text{C}$; note 1 | 1.2 | K/W |
| $R_{th(mb-h)}$ | thermal resistance from mounting base to heatsink | note 2 | 0.55 | K/W |

Notes

1. Thermal impedance is determined under RF operating conditions with pulsed bias.
2. Typical value for SOT467C mounted with thermal compound and 0.6 Nm fastening torque.

CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------|----------------------------------|---|------|------|------|----------|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS} = 0$; $I_D = 0.7\text{ mA}$ | 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 | $V_{GS} = 0$; $V_{DS} = 28\text{ V}$ | – | – | 0.1 | mA |
| I_{DSX} | on-state drain current | $V_{GS} = V_{GSth} + 9\text{ V}$; $V_{DS} = 10\text{ V}$ | 2.8 | – | – | 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 |

APPLICATION INFORMATION

RF performance in a common source class-AB circuit. $T_h = 25\text{ }^{\circ}\text{C}$; $R_{th\text{ }mb-h} = 0.55\text{ K/W}$ unless otherwise specified.

| MODE OF OPERATION | f (MHz) | V_{DS} (V) | I_{DQ} (mA) | P_L (W) | G_p (dB) | η_D (%) | t_r (ns) | t_f (ns) | PULSE DROOP (dB) |
|--|--------------|--------------|---------------|-----------|------------|--------------|------------|------------|------------------|
| Pulsed class-AB; $t_p = 50\text{ }\mu\text{s}$; $\delta = 2\%$ | 1030 to 1090 | 36 | 50 | 10 | >15 | >40 | <20 | <20 | <0.5 |

Ruggedness in class-AB operation

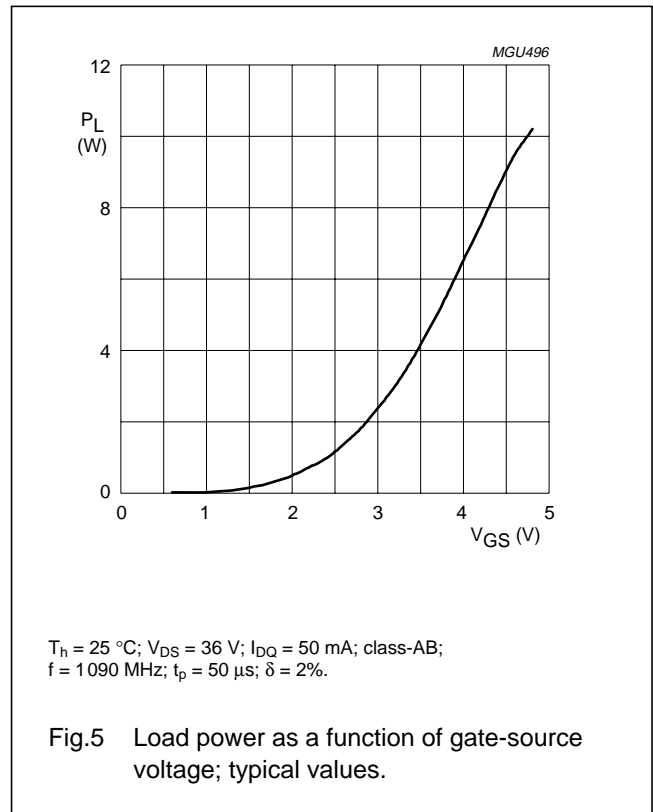
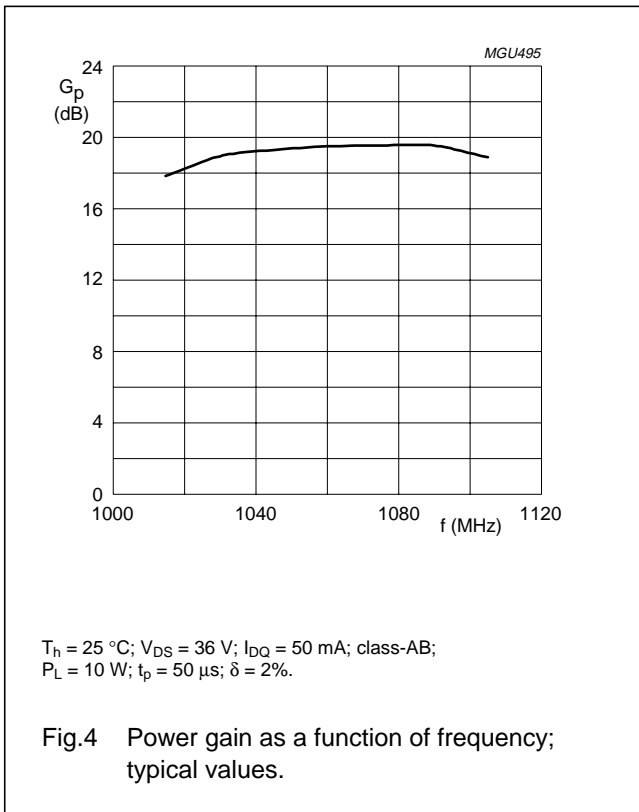
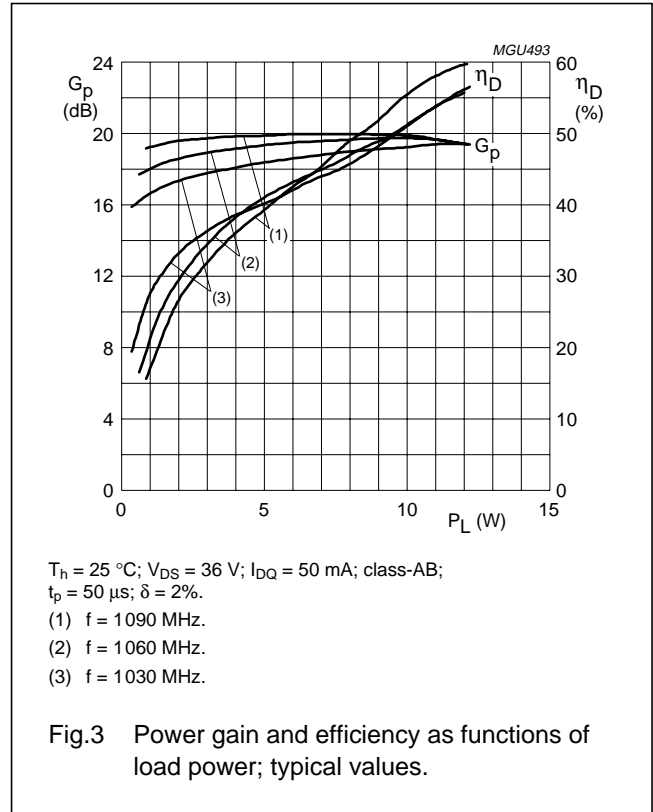
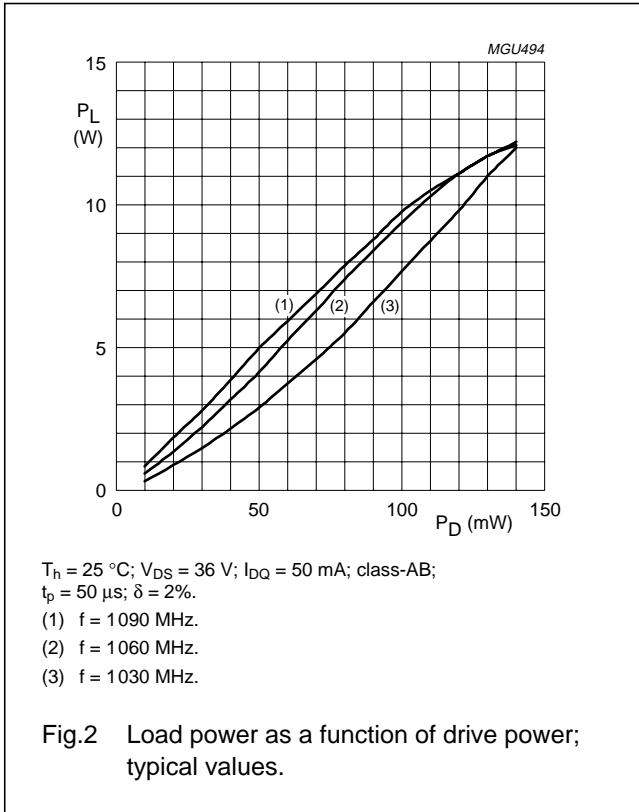
The BLA1011-10 is capable of withstanding a load mismatch corresponding to $V_{SWR} = 5 : 1$ through all phases under the operating conditions.

Typical impedance values

| FREQUENCY (MHz) | Z_S (Ω) | Z_L (Ω) |
|-----------------|--------------------|--------------------|
| 1030 | $1 + j 10.6$ | $4.3 + j 7$ |
| 1060 | $1.3 + j 6.99$ | $5.99 + j 13.98$ |
| 1090 | $1.42 + j 7$ | $7 + j 11.58$ |

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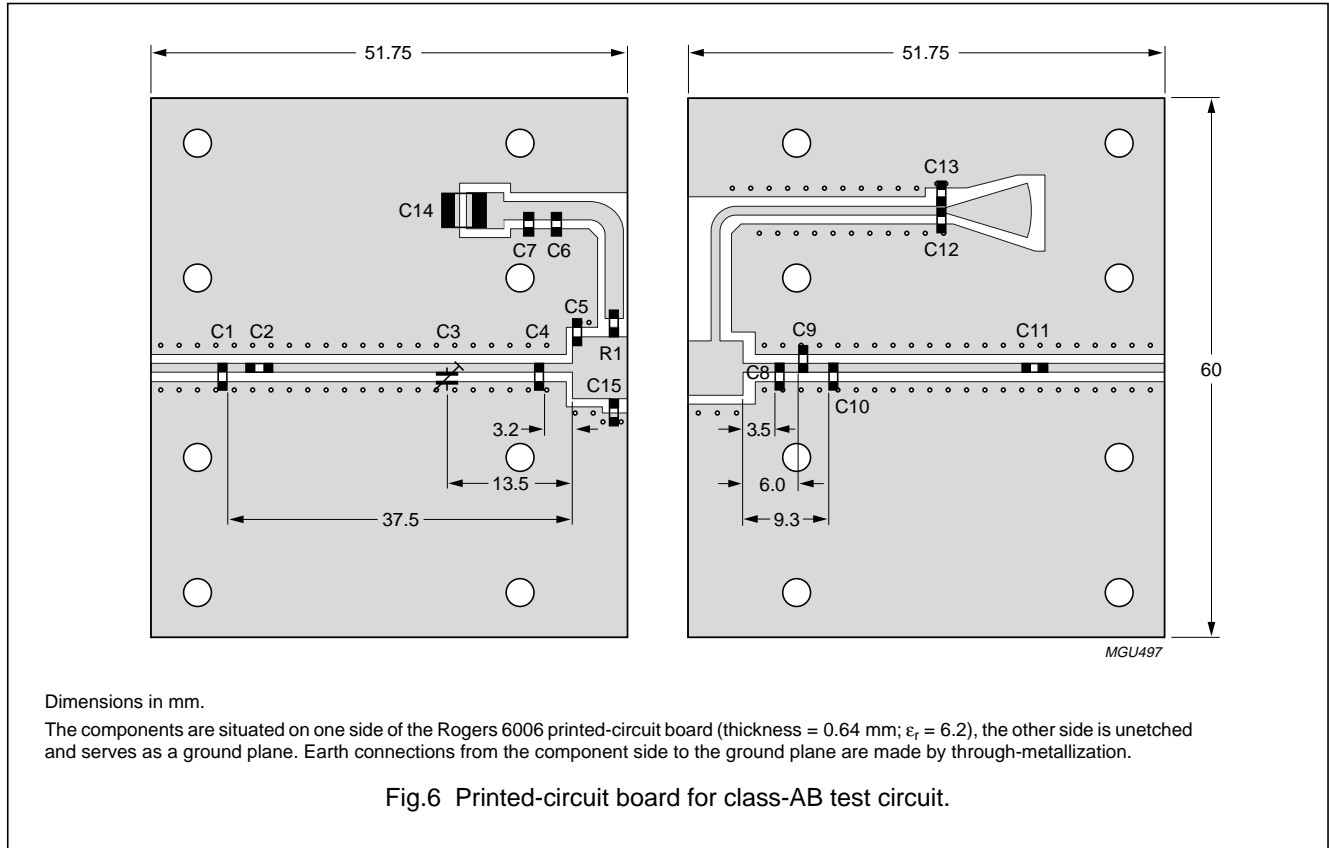


Fig.6 Printed-circuit board for class-AB test circuit.

List of components for class-AB test circuit (see Fig.6)

| COMPONENT | DESCRIPTION | VALUE |
|-----------|---|-------------------|
| C1 | multilayer ceramic chip capacitor; note 1 | 2.7 pF |
| C2, C11 | multilayer ceramic chip capacitor; note 1 | 56 pF |
| C3 | tekelec trimmer; type 37293 | 0.8 to 8 pF |
| C4 | multilayer ceramic chip capacitor; note 1 | 3.6 pF |
| C5 | multilayer ceramic chip capacitor; note 1 | 6.2 pF |
| C6 | multilayer ceramic chip capacitor; note 1 | 2 pF |
| C7, C13 | multilayer ceramic chip capacitor; note 1 | 62 pF |
| C8 | multilayer ceramic chip capacitor; note 1 | 11 pF |
| C9 | multilayer ceramic chip capacitor; note 1 | 1.5 pF |
| C10 | multilayer ceramic chip capacitor; note 1 | 6.2 pF |
| C12 | multilayer ceramic chip capacitor; note 2 | 20 nF |
| C14 | electrolytic capacitor | 4.7 μ F; 50 V |
| C15 | multilayer ceramic chip capacitor; note 1 | 36 pF |
| R1 | SMD resistor (0805) | 22 Ω |

Notes

- American Technical Ceramics type 100A or capacitor of same quality.
- American Technical Ceramics type 200B or capacitor of same quality.

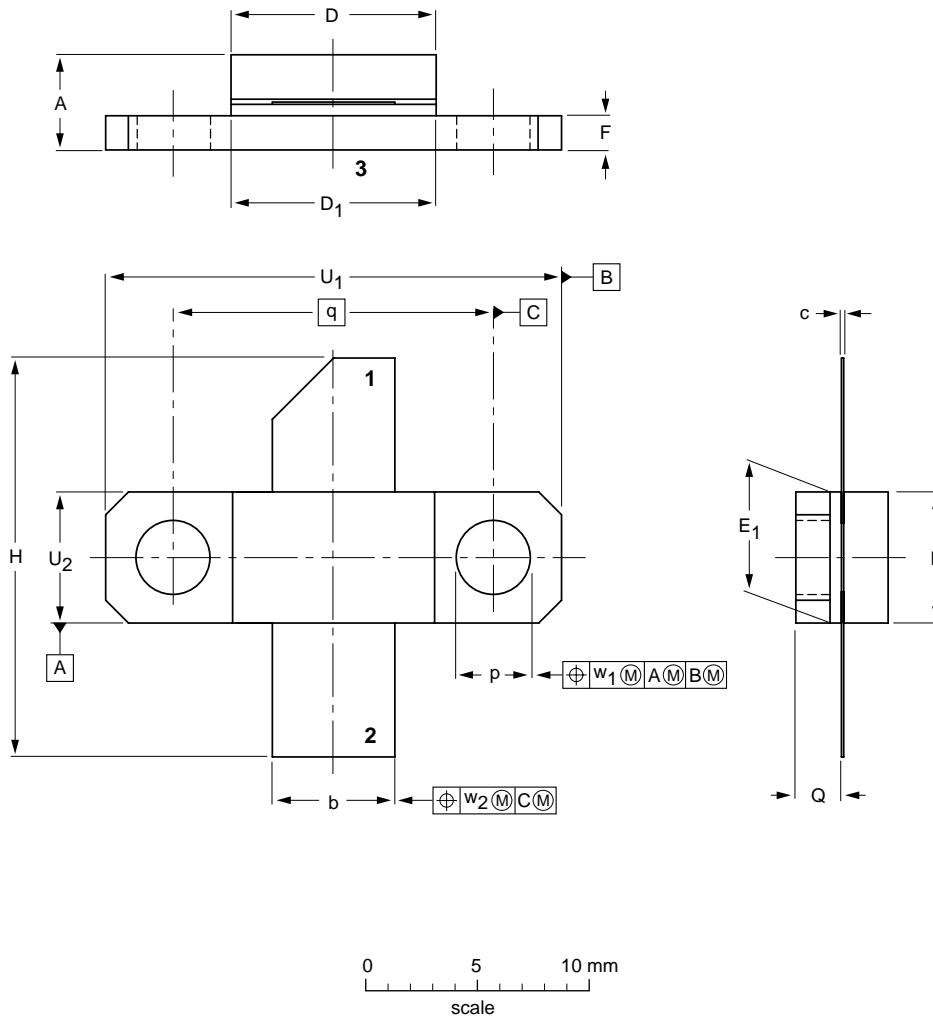
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PACKAGE OUTLINE

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads

SOT467C



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

| UNIT | A | b | c | D | D ₁ | E | E ₁ | F | H | p | Q | q | U ₁ | U ₂ | w ₁ | w ₂ |
|------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|
| mm | 4.67 3.94 | 5.59 5.33 | 0.15 0.10 | 9.25 9.04 | 9.27 9.02 | 5.92 5.77 | 5.97 5.72 | 1.65 1.40 | 18.54 17.02 | 3.43 3.18 | 2.21 1.96 | 14.27 | 20.45 20.19 | 5.97 5.72 | 0.25 | 0.51 |
| inch | 0.184 0.155 | 0.220 0.210 | 0.006 0.004 | 0.364 0.356 | 0.365 0.355 | 0.233 0.227 | 0.235 0.225 | 0.065 0.055 | 0.73 0.67 | 0.135 0.125 | 0.087 0.077 | 0.562 | 0.805 0.795 | 0.235 0.225 | 0.010 | 0.020 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|----------------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT467C | | | | | | 99-12-06 99-12-28 |

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DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾⁽³⁾ | DEFINITION |
|-------|----------------------------------|----------------------------------|--|
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Avionics LDMOS transistor

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| |
|----------------|
| 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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