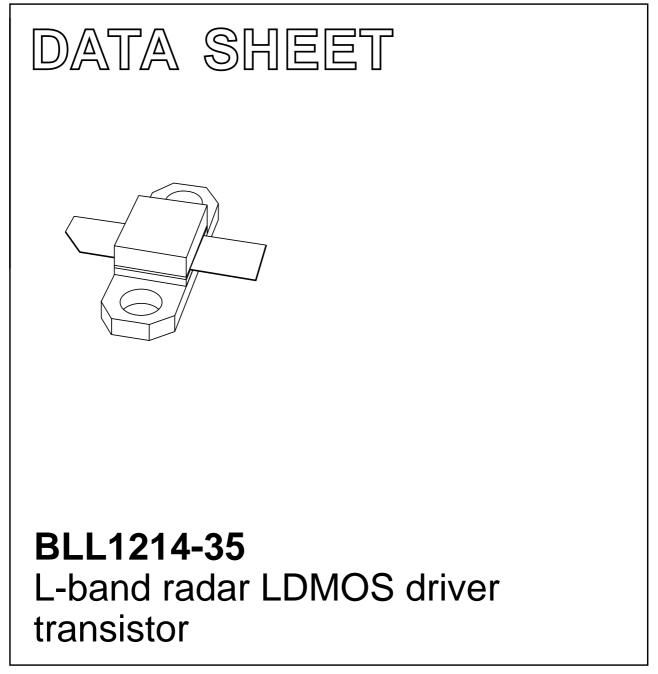
# DISCRETE SEMICONDUCTORS



Product specification

2002 Sep 27



## **FEATURES**

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

## **APPLICATIONS**

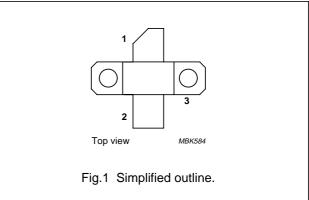
· L-band radar applications in the 1200 to 1400 MHz frequency range.

## 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  $T_h = 25$  °C in a common source test circuit.

| MODE OF OPERATION                             | f            | V <sub>DS</sub> | P <sub>L</sub> | G <sub>p</sub> | ղը  |
|---|--------------|-----------------|----------------|----------------|-----|
|   | (MHz)        | (V)             | (W)            | (dB)           | (%) |
| Pulsed class-AB;<br>t = 1 ms; $\delta$ = 10 % | 1200 to 1400 | 36              | 35             | >13            | >43 |

## LIMITING VALUES

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

| SYMBOL           | PARAMETER               | CONDITIONS                                    | MIN. | MAX. | UNIT |
|------------------|-------------------------|---|------|------|------|
| V <sub>DS</sub>  | drain-source voltage    |   | -    | 75   | V    |
| V <sub>GS</sub>  | gate-source voltage     |   | -    | ±15  | V    |
| P <sub>tot</sub> | total power dissipation | under RF conditions; $T_h \le 25 \ ^{\circ}C$ | _    | 110  | W    |
| T <sub>stg</sub> | storage temperature     |   | -65  | +150 | °C   |
| Tj               | junction temperature    |   | _    | 200  | °C   |

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## THERMAL CHARACTERISTICS

| SYMBOL              | PARAMETER                                   | CONDITIONS                     | VALUE | UNIT |
|---------------------|---|--------------------------------|-------|------|
| Z <sub>th j-h</sub> | thermal impedance from junction to heatsink | T <sub>h</sub> = 25 °C; note 1 | 1.1   | K/W  |

#### Note

1. Thermal resistance is determined under RF operating conditions;  $t_p = 1 \text{ ms}, \delta = 10 \%$ .

## **CHARACTERISTICS**

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

| SYMBOL               | PARAMETER                        | CONDITIONS                                     | MIN. | TYP. | MAX. | UNIT |
|----------------------|----------------------------------|--|------|------|------|------|
| V <sub>(BR)DSS</sub> | drain-source breakdown voltage   | $V_{GS} = 0; I_D = 0.7 \text{ mA}$             | 75   | -    | _    | V    |
| V <sub>GSth</sub>    | gate-source threshold voltage    | V <sub>DS</sub> = 10 V; I <sub>D</sub> = 70 mA | 4.5  | -    | 5.5  | V    |
| I <sub>DSS</sub>     | drain-source leakage current     | V <sub>GS</sub> = 0; V <sub>DS</sub> = 36 V    | -    | -    | 10   | μA   |
| I <sub>DSX</sub>     | on-state drain current           | $V_{GS} = V_{GSth} + 9 V; V_{DS} = 10 V$       | 10   | -    | _    | А    |
| I <sub>GSS</sub>     | gate leakage current             | $V_{GS} = \pm 20 \text{ V}; V_{DS} = 0$        | -    | -    | 125  | nA   |
| <b>g</b> fs          | forward transconductance         | V <sub>DS</sub> = 10 V; I <sub>D</sub> = 2.5 A | -    | 2    | -    | S    |
| R <sub>DSon</sub>    | drain-source on-state resistance | V <sub>GS</sub> = 10 V; I <sub>D</sub> = 2.5 A | -    | 300  | _    | mΩ   |

## **APPLICATION INFORMATION**

RF performance in a common source class-AB circuit. T<sub>h</sub> = 25 °C;  $Z_{th mb-h}$  = 0.65 K/W, unless otherwise specified.

| MODE OF OPERATION                             | f            | V <sub>DS</sub> | I <sub>DQ</sub> | P <sub>L</sub> | G <sub>p</sub> | η <sub>D</sub> |
|---|--------------|-----------------|-----------------|----------------|----------------|----------------|
|   | (MHz)        | (V)             | (mA)            | (W)            | (dB)           | (%)            |
| Pulsed class-AB;<br>t = 1 ms; $\delta$ = 10 % | 1200 to 1400 | 36              | 50              | 35             | >13            | >43            |

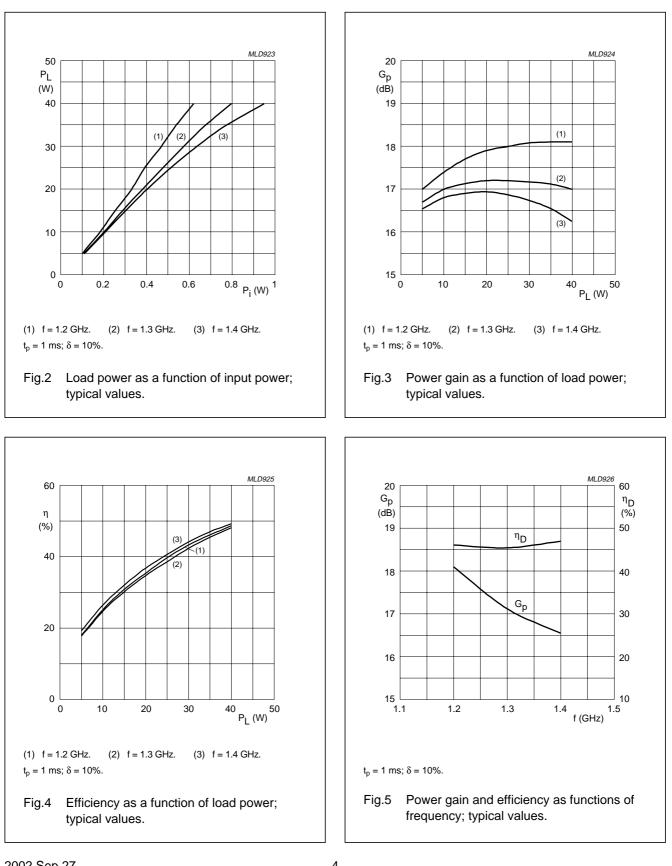
## **Ruggedness in class-AB operation**

The BLL1214-35 is capable of withstanding a load mismatch corresponding to VSWR = 5 : 1 through all phases under the following conditions:  $V_{DS}$  = 36 V; frequency from 1200 MHz to 1400 MHz at rated load power.

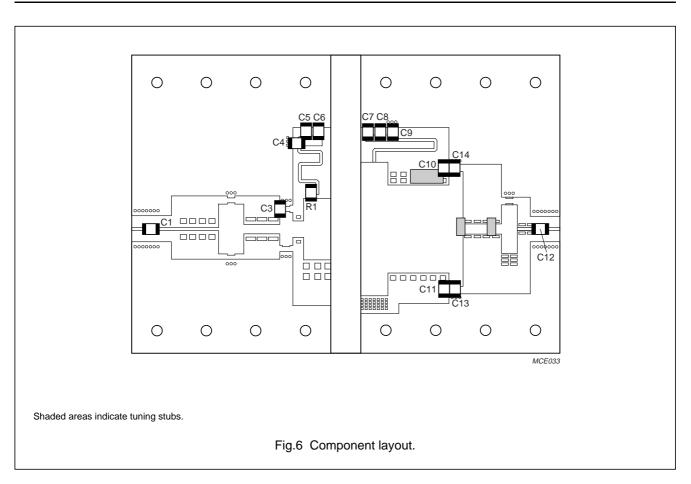
#### **Typical impedance**

| FREQUENCY<br>(GHZ) | Z <sub>S</sub><br>(Ω) | Z <sub>L</sub><br>(Ω) |
|--------------------|-----------------------|-----------------------|
| 1.20               | 6.48 – j 3.9          | 1.95 + j 3.27         |
| 1.25               | 3.88 – j 3.2          | 1.90 + j 2.57         |
| 1.30               | 3.28 – j 2.4          | 2.01 + j 2.27         |
| 1.35               | 2.55 – j 1.48         | 2.20 + j 2.26         |
| 1.40               | 1.69 – j 0.51         | 1.72 + j 2.35         |

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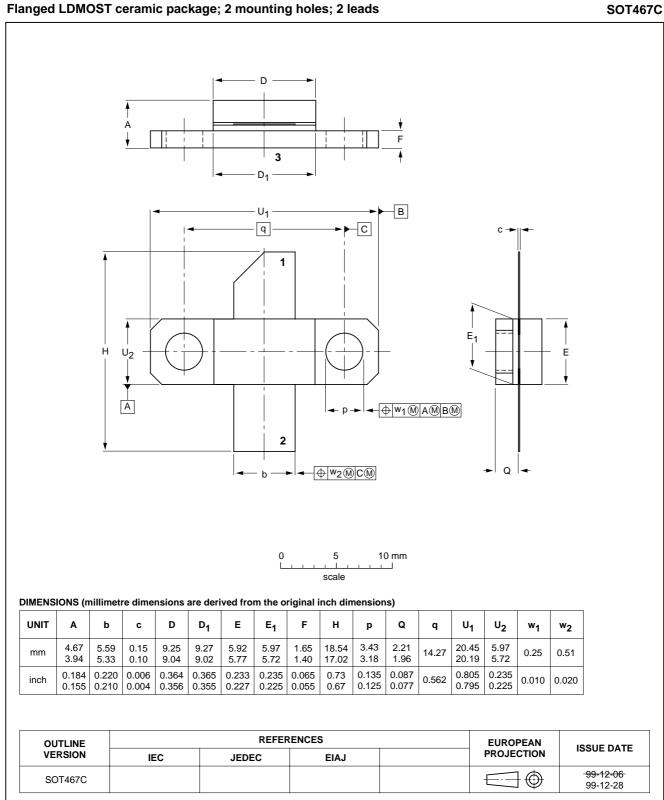
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## List of components (see Fig.6)

| COMPONENT | DESCRIPTION   | VALUE       | CATALOGUE NO. |
|-----------|---------------|-------------|---------------|
| C1, C12   | capacitor     | 51 pF       | ATC100A       |
| C3        | capacitor     | 6.8 pF      | ATC100A       |
| C4, C9    | capacitor     | 47 pF       | ATC100A       |
| C6, C7    | capacitor     | 4.7 μF/50 V | 475 50k 952   |
| C5, C8    | capacitor     | 2.3 nF      | ATC100B       |
| C10       | capacitor     | 2.7 pF      | ATC100A       |
| C11       | capacitor     | 1.0 pF      | ATC100A       |
| C13, C14  | capacitor     | 1.5 pF      | ATC100A       |
| R1        | chip resistor | 82 Ω        |               |

## PACKAGE OUTLINE



BLL1214-35

## DATA SHEET STATUS

| DATA SHEET STATUS <sup>(1)</sup> | PRODUCT<br>STATUS <sup>(2)</sup> | DEFINITIONS  |
|----------------------------------|----------------------------------|--|
| Objective data                   | Development                      | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.  |
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#### Notes

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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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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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#### **Contact information**

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