## FEATURES

- High power gain
- Low noise figure
- Easy power control
- Good thermal stability
- Withstands full load mismatch
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Silicon N-channel enhancement mode vertical D-MOS transistor designed for large signal amplifier applications in the VHF frequency range.

The transistor is encapsulated in a 4-lead SOT123A flange package, with a ceramic cap. All leads are isolated from the flange.

Matched gate-source voltage ($V_{GS}$) groups are available on request.

## PINNING - SOT123A

| PIN | DESCRIPTION |
|---|---|
| 1 | drain |
| 2 | source |
| 3 | gate |
| 4 | source |

## PIN CONFIGURATION

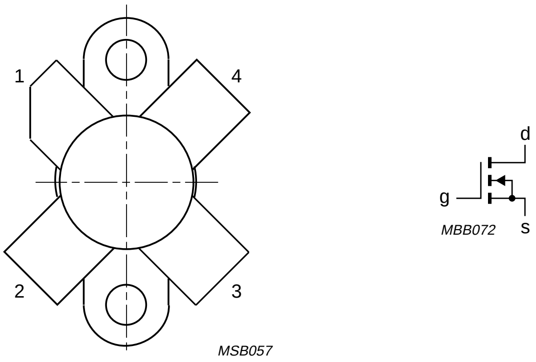


Fig.1 Simplified outline and symbol.

| 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. |

| WARNING |
|---|
| **Product and environmental safety - toxic materials** |
| This product contains beryllium oxide. The product is entirely safe provided that the BeO disc is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with the general or domestic waste. |

## QUICK REFERENCE DATA

RF performance at $T_h$ = 25 °C in a common source test circuit.

| MODE OF OPERATION | f (MHz) | $V_{DS}$ (V) | $P_L$ (W) | $G_p$ (dB) | $\eta_D$ (%) |
|---|---|---|---|---|---|
| CW, class-B | 175 | 28 | 15 | >13 | >50 |

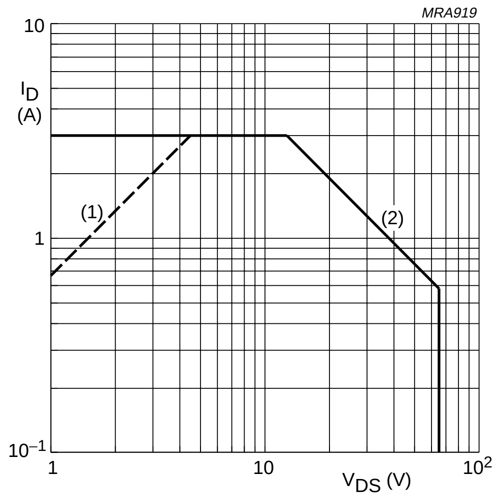
## LIMITING VALUES

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 | | – | ±20 | V |
| $I_D$ | drain current (DC) | | – | 3 | A |
| $P_{tot}$ | total power dissipation | $T_{mb} \leq 25$ °C | – | 38 | W |
| $T_{stg}$ | storage temperature | | –65 | 150 | °C |
| $T_j$ | junction temperature | | – | 200 | °C |

## THERMAL CHARACTERISTICS

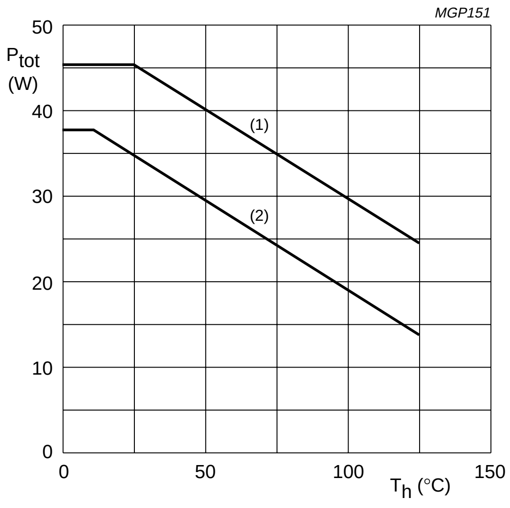
| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th\ j\text{-}mb}$ | thermal resistance from junction to mounting base | $T_{mb} = 25$ °C; $P_{tot} = 38$ W | 4.6 | K/W |
| $R_{th\ mb\text{-}h}$ | thermal resistance from mounting base to heatsink | $T_{mb} = 25$ °C; $P_{tot} = 38$ W | 0.3 | K/W |



(1) Current is this area may be limited by $R_{DSon}$.

(2) $T_{mb}$ = 25 °C.

Fig.2 DC SOAR.



(1) Short-time operation during mismatch.

(2) Continuous operation.

Fig.3 Power derating curves.

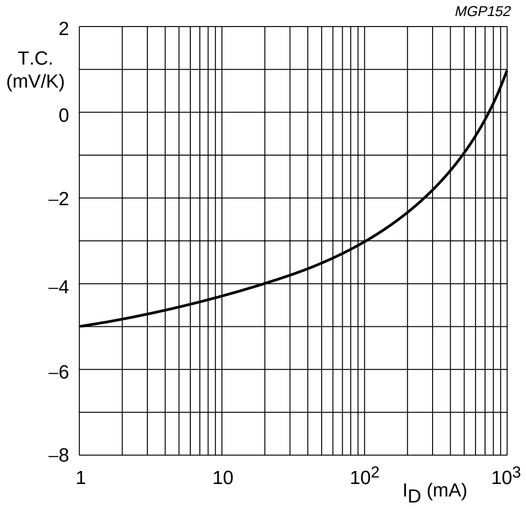
## CHARACTERISTICS

$T_j$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | drain-source breakdown voltage | $V_{GS} = 0$; $I_D = 5$ mA | 65 | – | – | V |
| $I_{DSS}$ | drain-source leakage current | $V_{GS} = 0$; $V_{DS} = 28$ V | – | – | 1 | mA |
| $I_{GSS}$ | gate-source leakage current | $V_{GS} = \pm20$ V; $V_{DS} = 0$ | – | – | 1 | µA |
| $V_{GSth}$ | gate-source threshold voltage | $I_D = 5$ mA; $V_{DS} = 10$ V | 2 | – | 4.5 | V |
| $\Delta V_{GS}$ | gate-source voltage difference of matched devices | $I_D = 5$ mA; $V_{DS} = 10$ V | – | – | 100 | mV |
| $g_{fs}$ | forward transconductance | $I_D = 0.75$ A; $V_{DS} = 10$ V | 0.6 | – | – | S |
| $R_{DSon}$ | drain-source on-state resistance | $I_D = 0.75$ A; $V_{GS} = 10$ V | – | 0.8 | 1.5 | Ω |
| $I_{DSX}$ | on-state drain current | $V_{GS} = 10$ V; $V_{DS} = 10$ V | – | 5 | – | A |
| $C_{is}$ | input capacitance | $V_{GS} = 0$; $V_{DS} = 28$ V; f = 1 MHz | – | 60 | – | pF |
| $C_{os}$ | output capacitance | $V_{GS} = 0$; $V_{DS} = 28$ V; f = 1 MHz | – | 40 | – | pF |
| $C_{rs}$ | feedback capacitance | $V_{GS} = 0$; $V_{DS} = 28$ V; f = 1 MHz | – | 4.5 | – | pF |
| F | noise figure; see Fig.13 | $I_D = 0.5$ A; $V_{DS} = 28$ V; R1 = 23 Ω;<br>$T_h = 25$ °C; f = 175 MHz;<br>$R_{th\ mb-h} = 0.3$ K/W | – | 4.3 | – | dB |

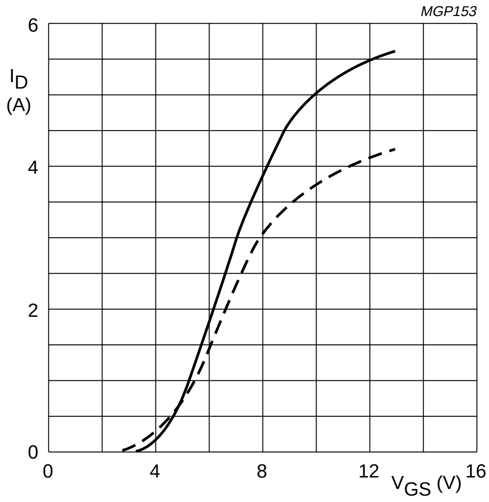
### $V_{GS}$ group indicator

| GROUP | LIMITS (V) | | GROUP | LIMITS (V) | |
|---|---|---|---|---|---|
| | MIN. | MAX. | | MIN. | MAX. |
| A | 2.0 | 2.1 | O | 3.3 | 3.4 |
| B | 2.1 | 2.2 | P | 3.4 | 3.5 |
| C | 2.2 | 2.3 | Q | 3.5 | 3.6 |
| D | 2.3 | 2.4 | R | 3.6 | 3.7 |
| E | 2.4 | 2.5 | S | 3.7 | 3.8 |
| F | 2.5 | 2.6 | T | 3.8 | 3.9 |
| G | 2.6 | 2.7 | U | 3.9 | 4.0 |
| H | 2.7 | 2.8 | V | 4.0 | 4.1 |
| J | 2.8 | 2.9 | W | 4.1 | 4.2 |
| K | 2.9 | 3.0 | X | 4.2 | 4.3 |
| L | 3.0 | 3.1 | Y | 4.3 | 4.4 |
| M | 3.1 | 3.2 | Z | 4.4 | 4.5 |
| N | 3.2 | 3.3 | | | |



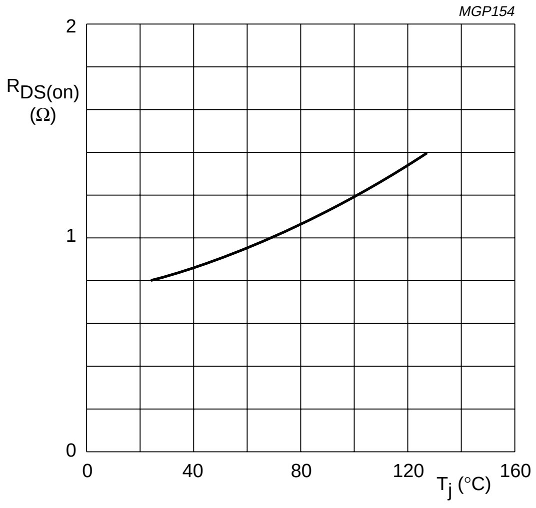
$V_{DS}$ = 10 V; valid for $T_j$ = 25 to 125 °C.

Fig.4 Temperature coefficient of gate-source voltage as a function of drain current, typical values.



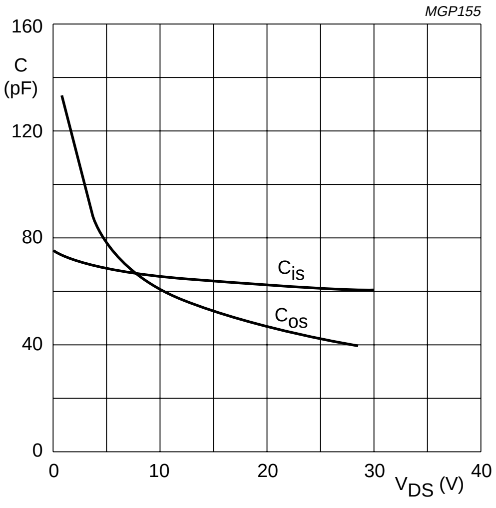
$V_{DS}$ = 10 V.
solid line: $T_j$ = 25 °C.
dotted line: $T_j$ = 125 °C.

Fig.5 Drain current as a function of gate-source voltage, typical values.



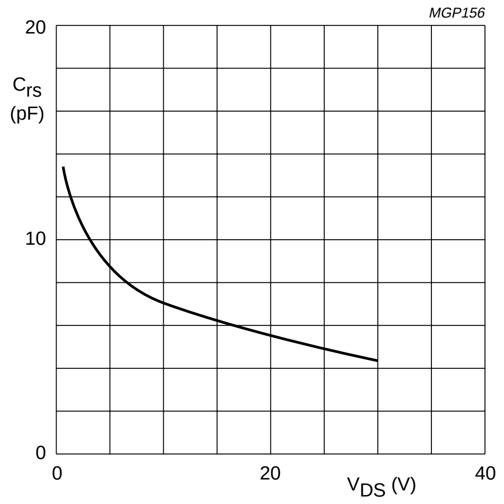
$V_{GS}$ = 10 V; $I_D$ = 0.75 A.

Fig.6 Drain-source on-state resistance as a function of junction temperature, typical values.



$V_{GS}$ = 0; f = 1 MHz.

Fig.7 Input and output capacitance as functions of drain-source voltage, typical values.



$V_{GS}$ = 0; f = 1 MHz.

Fig.8 Feedback capacitance as a function of drain-source voltage; typical values.

## APPLICATION INFORMATION FOR CLASS-B OPERATION

$T_h$ = 25 °C; $R_{th\ mb-h}$ = 3 K/W; unless otherwise specified.
RF performance in CW operation in a common source class-B circuit.

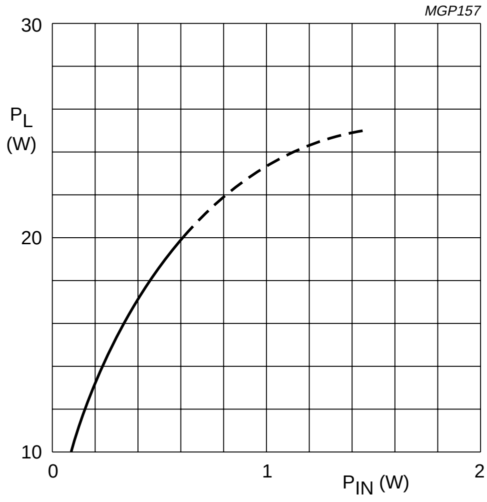
| MODE OF OPERATION | f (MHz) | $V_{DS}$ (V) | $I_{DQ}$ (mA) | $P_L$ (W) | $G_P$ (dB) | $\eta_D$ (%) | $Z_i$ ($\Omega$)[1] | $Z_L$ ($\Omega$) | R1 ($\Omega$) |
|---|---|---|---|---|---|---|---|---|---|
| CW, class-B | 175 | 28 | 25 | 15 | >13<br>typ. 17 | >50<br>typ. 65 | 3.0 – j4.0 | 6.3 + j9.8 | 46.4//46.4 |
| | 175 | 12.5 | 25 | 6 | typ. 15 | typ. 60 | 3.0 – j4.0 | 4.5 + j3.3 | 100 |

**Note**

1. R1 included.

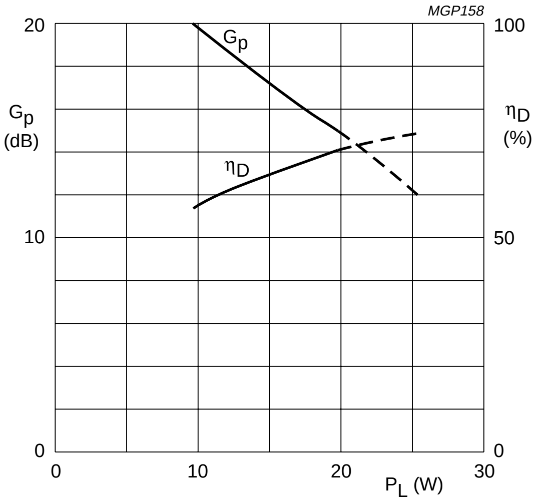
### Ruggedness in class-B operation

The BLF244 is capable of withstanding a load mismatch corresponding to VSWR = 50 through all phases under the following conditions: $T_h$ = 25 °C; $R_{th\ mb-h}$ = 0.3 K/W; at rated load power.



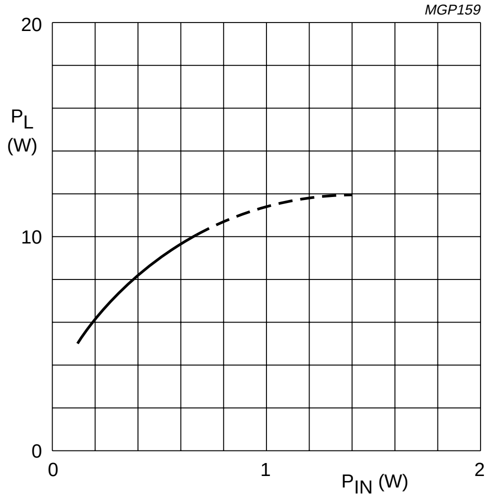
Class-B operation; $V_{DS}$ = 28 V; $I_{DQ}$ = 25 mA; f = 175 MHz; $T_h$ = 25 °C; $R_{th\ mb\text{-}h}$ = 0.3 K/W.

Fig.9 Load power as a function of input power; typical values.



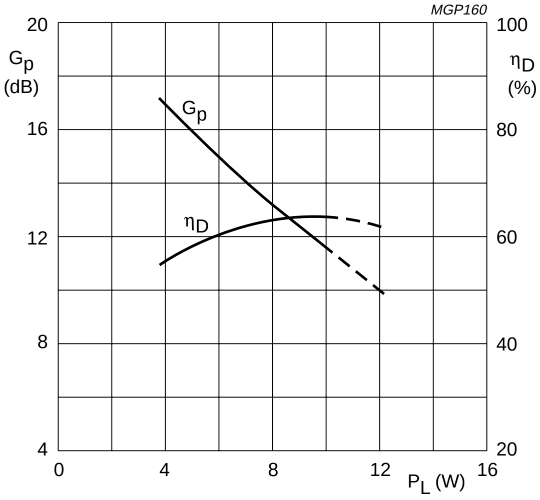
Class-B operation; $V_{DS}$ = 28 V; $I_{DQ}$ = 25 mA; f = 175 MHz; $T_h$ = 25 °C; $R_{th\ mb\text{-}h}$ = 0.3 K/W.

Fig.10 Power gain and efficiency as functions of load power; typical values.



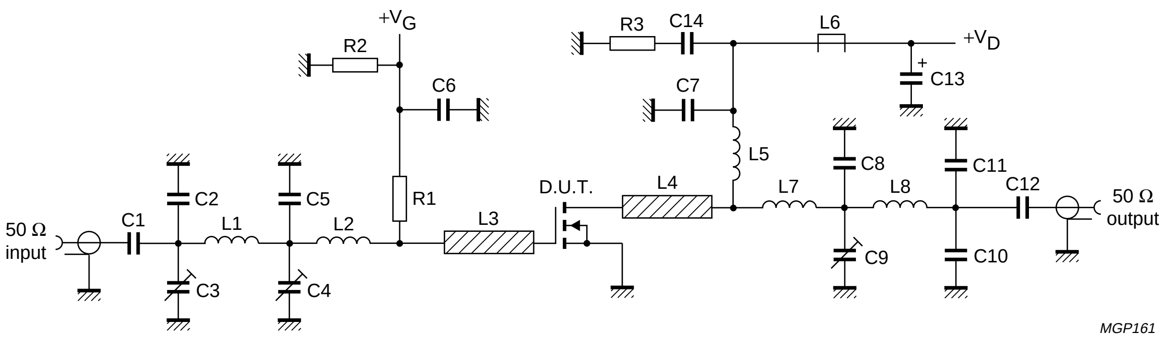
Class-B operation; $V_{DS}$ = 12.5 V; $I_{DQ}$ = 25 mA; f = 175 MHz; $T_h$ = 25 °C; $R_{th\ mb\text{-}h}$ = 0.3 K/W.

Fig.11 Load power as a function of input power; typical values.



Class-B operation; $V_{DS}$ = 12.5 V; $I_{DQ}$ = 25 mA; f = 175 MHz; $T_h$ = 25 °C; $R_{th\ mb\text{-}h}$ = 0.3 K/W.

Fig.12 Power gain and efficiency as functions of load power; typical values.



f = 175 MHz.

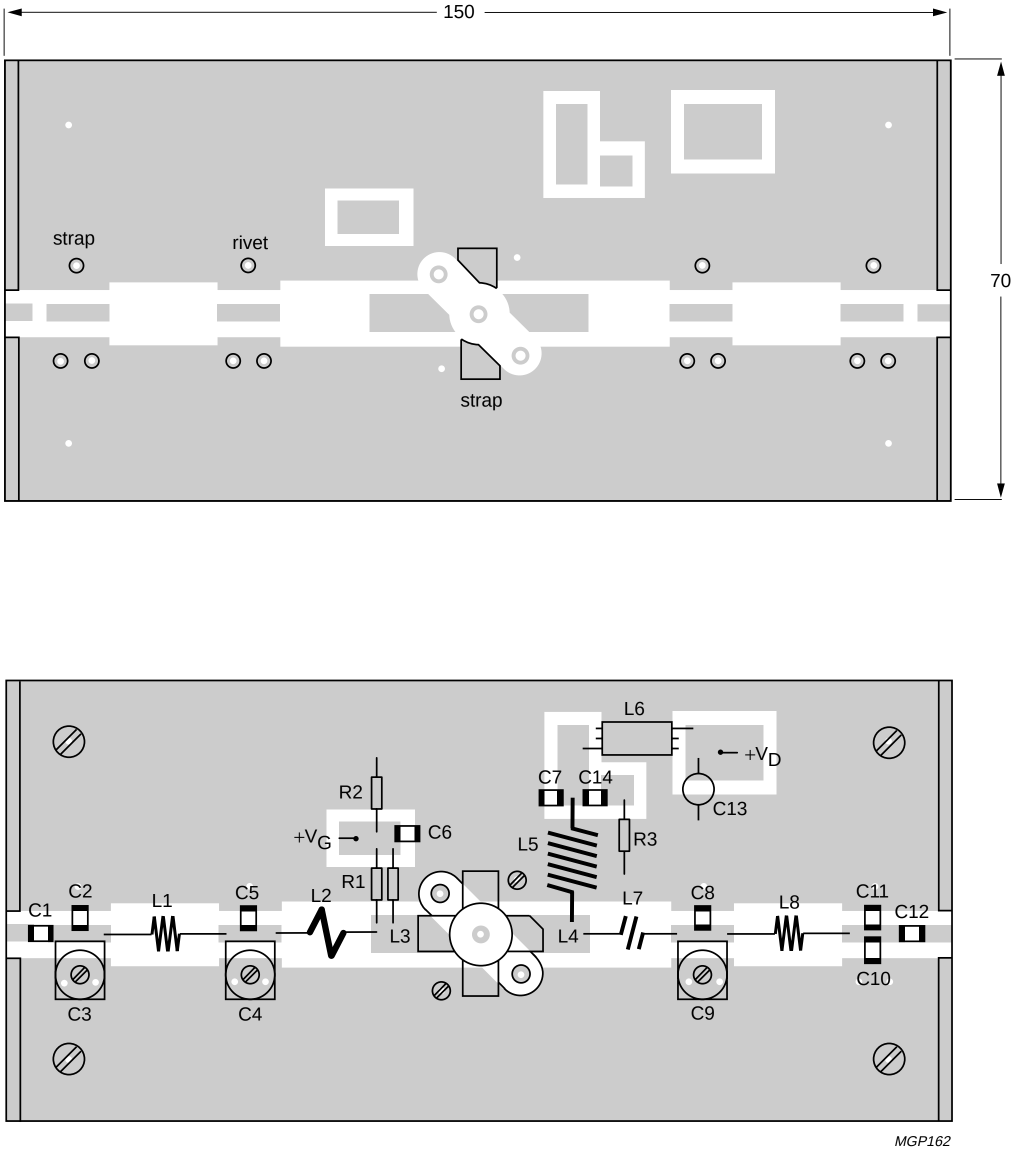
Fig.13 Test circuit for class-B operation.

**List of components** (see Fig.13)

| COMPONENT | DESCRIPTION | VALUE | DIMENSIONS | CATALOGUE NO. |
|---|---|---|---|---|
| C1, C12 | multilayer ceramic chip capacitor; note 1 | 680 nF | | |
| C2 | multilayer ceramic chip capacitor; note 1 | 20 pF | | |
| C3, C4, C9 | film dielectric trimmer | 5 to 60 pF | | 2222 809 08003 |
| C5 | multilayer ceramic chip capacitor; note 1 | 75 pF | | |
| C6 | multilayer ceramic chip capacitor | 10 nF | | 2222 852 47103 |
| C7 | multilayer ceramic chip capacitor; note 1 | 100 pF | | |
| C8 | multilayer ceramic chip capacitor; note 1 | 47 pF | | |
| C10, C11 | multilayer ceramic chip capacitor; note 1 | 11 pF | | |
| C13 | solid tantalum capacitor | 2.2 µF | | |
| C14 | multilayer ceramic chip capacitor | 100 nF | | 2222 852 47104 |
| L1 | 4 turns enamelled 1 mm copper wire | 32 nH | length 6.3 mm<br>int. dia. 3 mm<br>leads 2 × 5 mm | |
| L2 | 1 turn enamelled 1 mm copper wire | 12.2 nH | int. dia. 5.6 mm<br>leads 2 × 5 mm | |
| L3, L4 | stripline; note 2 | 30 Ω | 15 × 6 mm | |
| L5 | 6 turns enamelled 1 mm copper wire | 119 nH | length 10.4 mm<br>int. dia. 6 mm<br>leads 2 × 5 mm | |
| L6 | grade 3B Ferroxcube RF choke | | | 4312 020 36640 |
| L7 | 2 turns enamelled 1 mm copper wire | 19 nH | length 2.4 mm<br>int. dia. 3 mm<br>leads 2 × 5 mm | |
| L8 | 4 turns enamelled 1 mm copper wire | 28.5 nH | length 8.5 mm<br>int. dia. 3 mm<br>leads 2 × 5 mm | |
| R1 | metal film resistor; note 3 | | | |
| R2 | 0.4 W metal film resistor | 1 MΩ | | |
| R3 | 0.4 W metal film resistor | 10 Ω | | |

**Notes**

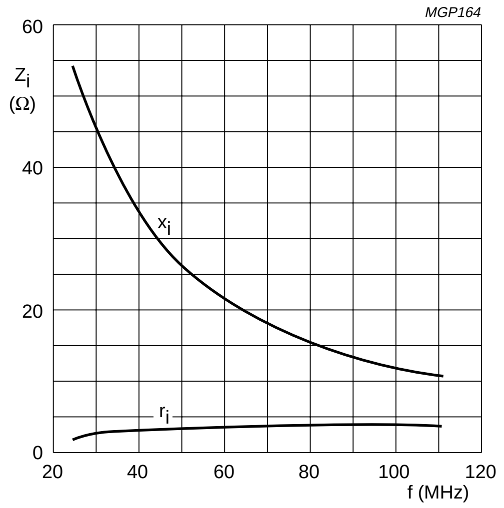
1. American Technical Ceramics (ATC) capacitor, type 100B or other capacitor of the same quality.
2. The striplines are on a double copper-clad printed circuit board, with epoxy fibre-glass dielectric ($\varepsilon_r$ = 4.5), thickness $^1/_{16}$ inch.
3. Refer to Application Information for value.



Dimensions in mm.

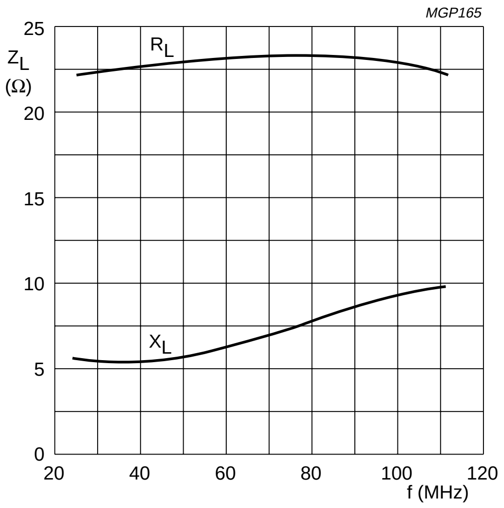
The circuit and components are situated on one side of the epoxy fibre-glass board, the other side being unetched copper to serve as ground plane. Earth connections are made by fixing screws, copper straps and hollow rivets under the sources and around the edges to provide a direct contact between the copper on the component side and the ground plane.

Fig.14 Component layout for 175 MHz class-B test circuit.



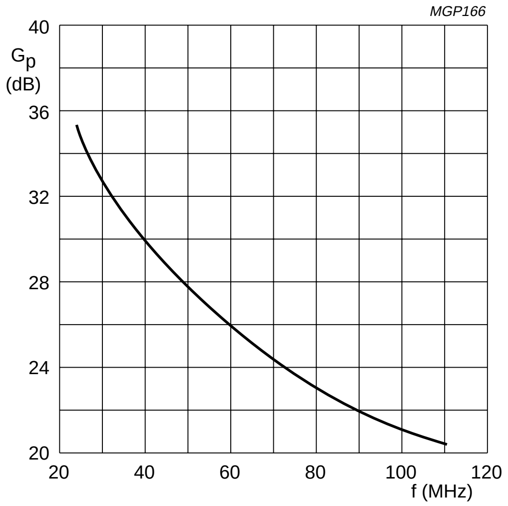
Class-B operation; $V_{DS}$ = 28 V; $I_{DQ}$ = 25 mA;
$P_L$ = 15 W; $T_h$ = 25 °C; $R_{th\ mb\text{-}h}$ = 0.3 K/W.

Fig.15 Input impedance as a function of frequency (series components); typical values.



Class-B operation; $V_{DS}$ = 28 V; $I_{DQ}$ = 25 mA;
$P_L$ = 15 W; $T_h$ = 25 °C; $R_{th\ mb\text{-}h}$ = 0.3 K/W.

Fig.16 Load impedance as a function of frequency (series components); typical values.



Class-B operation; $V_{DS}$ = 28 V; $I_{DQ}$ = 25 mA;
$P_L$ = 15 W; $T_h$ = 25 °C; $R_{th\ mb\text{-}h}$ = 0.3 K/W.

Fig.17 Power gain as function of frequency; typical values.

**BLF244 scattering parameters**

$V_{DS}$ = 12.5 V; $I_D$ = 25 mA; note 1

| f (MHz) | $s_{11}$ | | $s_{21}$ | | $s_{12}$ | | $s_{22}$ | |
|---|---|---|---|---|---|---|---|---|
| | $\lvert s_{11}\rvert$ | $\angle\Phi$ | $\lvert s_{21}\rvert$ | $\angle\Phi$ | $\lvert s_{12}\rvert$ | $\angle\Phi$ | $\lvert s_{22}\rvert$ | $\angle\Phi$ |
| 5 | 0.98 | –18.6 | 15.11 | 165.1 | 0.02 | 75.8 | 0.98 | –18.9 |
| 10 | 0.93 | –35.0 | 14.06 | 152.3 | 0.04 | 63.1 | 0.95 | –36.5 |
| 20 | 0.84 | –63.4 | 11.55 | 130.0 | 0.06 | 42.1 | 0.86 | –65.1 |
| 30 | 0.77 | –83.3 | 9.20 | 114.5 | 0.07 | 27.3 | 0.80 | –85.7 |
| 40 | 0.73 | –97.6 | 7.41 | 102.8 | 0.07 | 16.5 | 0.76 | –99.8 |
| 50 | 0.72 | –107.9 | 6.09 | 93.7 | 0.07 | 8.5 | 0.74 | –109.8 |
| 60 | 0.71 | –115.7 | 5.09 | 86.2 | 0.07 | 2.0 | 0.74 | –117.3 |
| 70 | 0.72 | –121.4 | 4.32 | 80.1 | 0.07 | –3.1 | 0.74 | –123.1 |
| 80 | 0.72 | –126.0 | 3.72 | 74.8 | 0.07 | –7.2 | 0.75 | –127.8 |
| 90 | 0.74 | –130.0 | 3.26 | 70.1 | 0.006 | –10.9 | 0.76 | –131.9 |
| 100 | 0.75 | –133.8 | 2.88 | 65.6 | 0.06 | –14.3 | 0.78 | –135.4 |
| 125 | 0.78 | –142.0 | 2.16 | 55.5 | 0.05 | –20.6 | 0.81 | –142.4 |
| 150 | 0.81 | –147.9 | 1.66 | 48.1 | 0.04 | –22.9 | 0.84 | –147.8 |
| 175 | 0.85 | –152.7 | 1.33 | 42.2 | 0.03 | –21.0 | 0.86 | –152.4 |
| 200 | 0.87 | –157.6 | 1.09 | 36.7 | 0.02 | –12.8 | 0.88 | –156.4 |
| 250 | 0.90 | –165.1 | 0.75 | 28.8 | 0.01 | 46.1 | 0.92 | –162.9 |
| 300 | 0.92 | –171.5 | 0.56 | 23.8 | 0.03 | 80.9 | 0.94 | –168.1 |
| 350 | 0.94 | –176.8 | 0.42 | 21.4 | 0.04 | 88.3 | 0.95 | –172.4 |
| 400 | 0.94 | 178.3 | 0.34 | 20.8 | 0.06 | 89.0 | 0.96 | –176.2 |
| 450 | 0.95 | 174.0 | 0.28 | 21.9 | 0.07 | 88.8 | 0.96 | –179.6 |
| 500 | 0.95 | 169.9 | 0.24 | 24.8 | 0.09 | 86.9 | 0.96 | 177.3 |
| 600 | 0.95 | 162.4 | 0.19 | 33.8 | 0.12 | 83.5 | 0.97 | 171.8 |
| 700 | 0.94 | 155.4 | 0.18 | 42.8 | 0.14 | 79.9 | 0.96 | 166.8 |
| 800 | 0.94 | 148.6 | 0.19 | 50.1 | 0.17 | 77.1 | 0.96 | 162.1 |
| 900 | 0.93 | 142.0 | 0.21 | 54.4 | 0.19 | 71.6 | 0.94 | 157.9 |
| 1000 | 0.92 | 135.5 | 0.23 | 59.6 | 0.22 | 73.5 | 0.93 | 162.9 |

**Note**

1. For more extensive s-parameters see internet: http://www.semiconductors.philips.com/markets/communications/wirelesscommunication/broadcast.

**BLF244 scattering parameters**

$V_{DS}$ = 28 V; $I_D$ = 25 mA; note 1

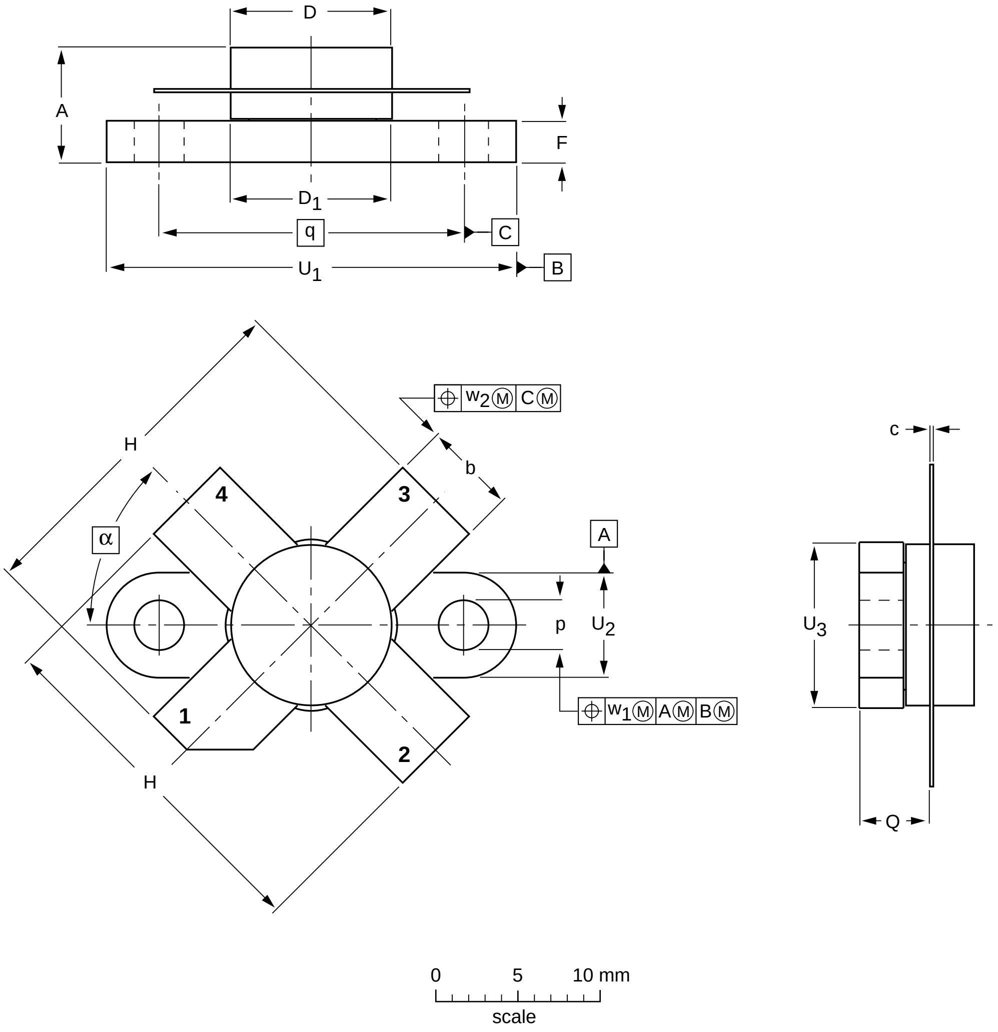
| f (MHz) | $s_{11}$ | | $s_{21}$ | | $s_{12}$ | | $s_{22}$ | |
|---|---|---|---|---|---|---|---|---|
| | $\|s_{11}\|$ | $\angle\Phi$ | $\|s_{21}\|$ | $\angle\Phi$ | $\|s_{12}\|$ | $\angle\Phi$ | $\|s_{22}\|$ | $\angle\Phi$ |
| 5 | 0.99 | –15.9 | 15.62 | 167.8 | 0.01 | 78.5 | 0.98 | –13.8 |
| 10 | 0.96 | –30.1 | 14.85 | 157.2 | 0.03 | 68.0 | 0.96 | –27.1 |
| 20 | 0.89 | –56.5 | 12.92 | 137.3 | 0.04 | 49.3 | 0.88 | –50.1 |
| 30 | 0.83 | –76.5 | 10.79 | 122.3 | 0.06 | 35.1 | 0.81 | –68.2 |
| 40 | 0.79 | –91.7 | 8.98 | 110.5 | 0.06 | 24.1 | 0.76 | –81.7 |
| 50 | 0.77 | –103.1 | 7.55 | 101.1 | 0.06 | 15.8 | 0.73 | –91.9 |
| 60 | 0.76 | –111.8 | 6.40 | 93.4 | 0.06 | 9.1 | 0.72 | –99.9 |
| 70 | 0.75 | –118.3 | 5.50 | 87.1 | 0.06 | 3.8 | 0.72 | –106.4 |
| 80 | 0.76 | –123.5 | 4.79 | 81.7 | 0.06 | –0.5 | 0.72 | –111.8 |
| 90 | 0.76 | –127.9 | 4.24 | 76.8 | 0.06 | –4.3 | 0.73 | –116.6 |
| 100 | 0.77 | –132.0 | 3.77 | 72.2 | 0.06 | –7.7 | 0.74 | –120.8 |
| 125 | 0.79 | –140.7 | 2.88 | 61.9 | 0.05 | –14.3 | 0.77 | –129.3 |
| 150 | 0.82 | –146.7 | 2.24 | 54.2 | 0.04 | –16.8 | 0.80 | –135.8 |
| 175 | 0.85 | –151.6 | 1.82 | 47.9 | 0.03 | –15.2 | 0.83 | –141.4 |
| 200 | 0.87 | –156.5 | 1.50 | 42.0 | 0.02 | –7.5 | 0.85 | –146.3 |
| 250 | 0.89 | –164.0 | 1.04 | 33.2 | 0.01 | 48.5 | 0.89 | –154.2 |
| 300 | 0.92 | –170.5 | 0.78 | 27.0 | 0.03 | 83.8 | 0.92 | –160.5 |
| 350 | 0.93 | –175.8 | 0.59 | 23.1 | 0.04 | 91.3 | 0.93 | –165.7 |
| 400 | 0.94 | 179.1 | 0.47 | 20.9 | 0.06 | 91.9 | 0.95 | –170.1 |
| 450 | 0.95 | 174.8 | 0.38 | 20.0 | 0.07 | 91.5 | 0.95 | –174.1 |
| 500 | 0.94 | 170.7 | 0.32 | 20.8 | 0.09 | 89.4 | 0.96 | –177.6 |
| 600 | 0.94 | 163.1 | 0.25 | 26.1 | 0.12 | 85.7 | 0.96 | 176.1 |
| 700 | 0.94 | 156.0 | 0.22 | 33.7 | 0.14 | 81.9 | 0.96 | 170.6 |
| 800 | 0.93 | 149.2 | 0.21 | 41.9 | 0.17 | 78.9 | 0.96 | 165.5 |
| 900 | 0.93 | 142.5 | 0.22 | 47.9 | 0.19 | 73.1 | 0.94 | 160.9 |
| 1000 | 0.92 | 136.1 | 0.23 | 57.3 | 0.17 | 75.3 | 0.93 | 165.9 |

**Note**

1. For more extensive s-parameters see internet: http://www.semiconductors.philips.com/markets/communications/wirelesscommunication/broadcast.

## PACKAGE OUTLINE

### Flanged ceramic package; 2 mounting holes; 4 leads SOT123A



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

| UNIT | A | b | c | D | $D_1$ | F | H | p | Q | q | $U_1$ | $U_2$ | $U_3$ | $w_1$ | $w_2$ | α |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 7.47<br>6.37 | 5.82<br>5.56 | 0.18<br>0.10 | 9.73<br>9.47 | 9.78<br>9.42 | 2.72<br>2.31 | 20.71<br>19.93 | 3.33<br>3.04 | 4.63<br>4.11 | 18.42 | 24.87<br>24.64 | 6.48<br>6.22 | 9.78<br>9.39 | 0.25 | 0.51 | 45° |
| inches | 0.294<br>0.251 | 0.229<br>0.219 | 0.007<br>0.004 | 0.383<br>0.373 | 0.385<br>0.371 | 0.107<br>0.091 | 0.815<br>0.785 | 0.131<br>0.120 | 0.182<br>0.162 | 0.725 | 0.980<br>0.970 | 0.255<br>0.245 | 0.385<br>0.370 | 0.010 | 0.020 | |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT123A | | | | | | 99-03-29 |

## DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS(1) | PRODUCT STATUS(2)(3) | DEFINITION |
|---|---|---|---|
| I | 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. |
| II | Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product. |
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**Notes**

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.
3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## DEFINITIONS

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**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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