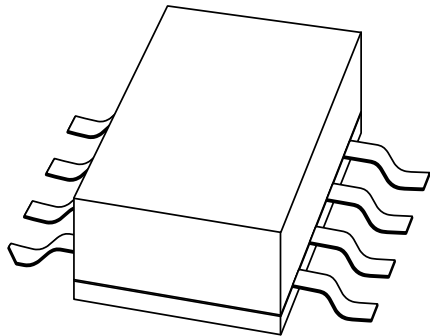


# DATA SHEET



## **BLF202** HF/VHF power MOS transistor

Product specification

1999 Oct 20

# HF/VHF power MOS transistor

# BLF202

### FEATURES

- High power gain
- Easy power control
- Gold metallization
- Good thermal stability
- Withstands full load mismatch.

### APPLICATIONS

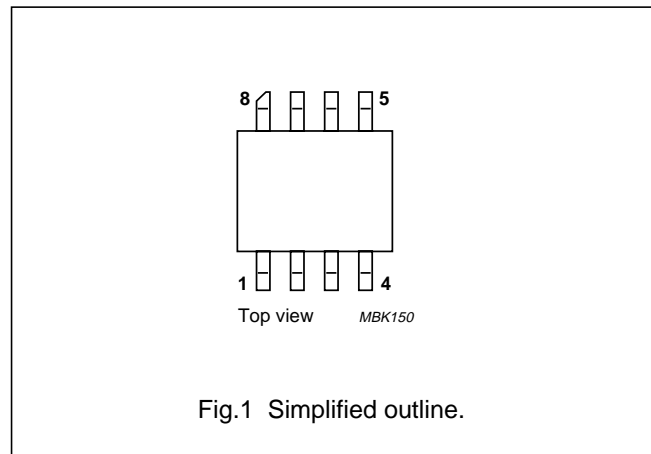
- Communications transmitters in the HF/VHF range with a nominal supply voltage of 12.5 V.

### DESCRIPTION

Silicon N-channel enhancement mode vertical D-MOS transistor in an 8-lead SOT409A SMD package with a ceramic cap.

### PINNING - SOT409A

PIN	DESCRIPTION
1, 8	source
2, 3	gate
4, 5	source
6, 7	drain



### QUICK REFERENCE DATA

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

MODE OF OPERATION	f (MHz)	$V_{DS}$ (V)	$P_L$ (W)	$G_p$ (dB)	$\eta_D$ (%)
CW, class-B	175	12.5	2	>10	>50

**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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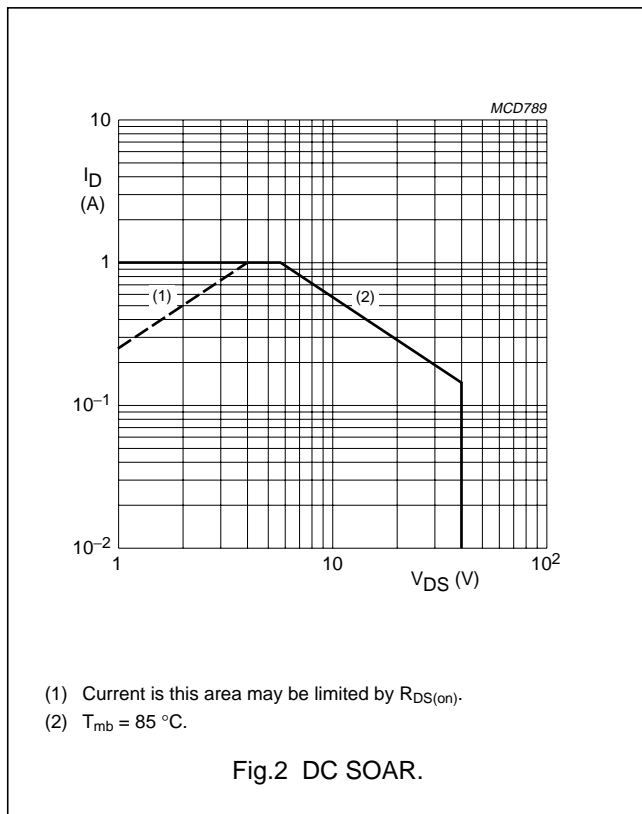
**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	40	V
$V_{GS}$	gate-source voltage		–	20	V
$I_D$	DC drain current		–	1	A
$P_{tot}$	total power dissipation	$T_{mb} \leq 85\text{ °C}$	–	5.7	W
$T_{stg}$	storage temperature		–65	150	°C
$T_j$	junction temperature		–	200	°C

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting base	$T_{mb} \leq 85\text{ °C}, P_{tot} = 5.7\text{ W}$	20.5	K/W



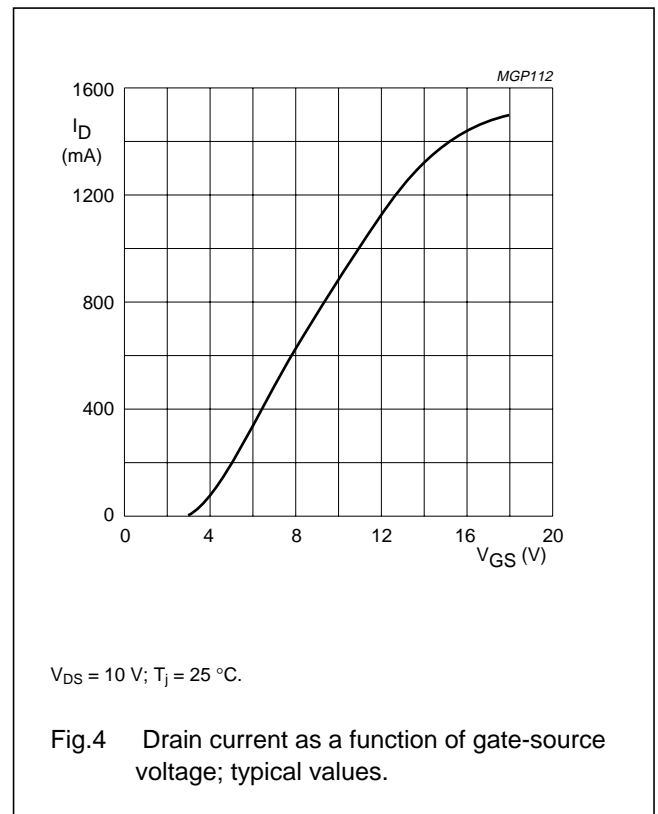
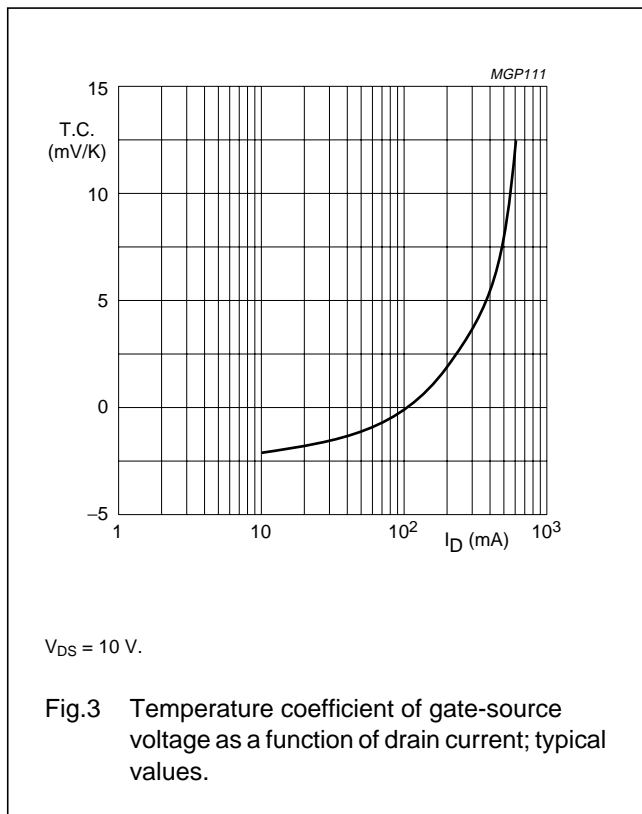
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**CHARACTERISTICS**

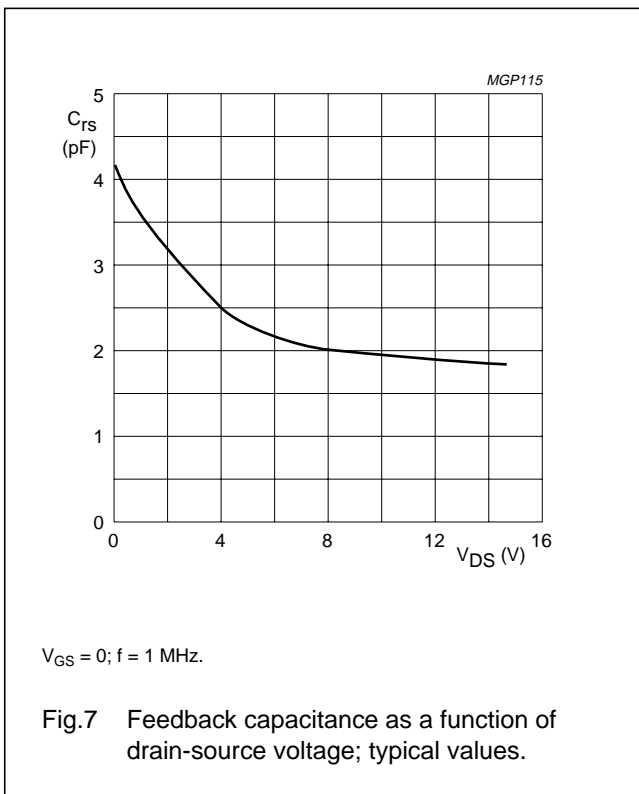
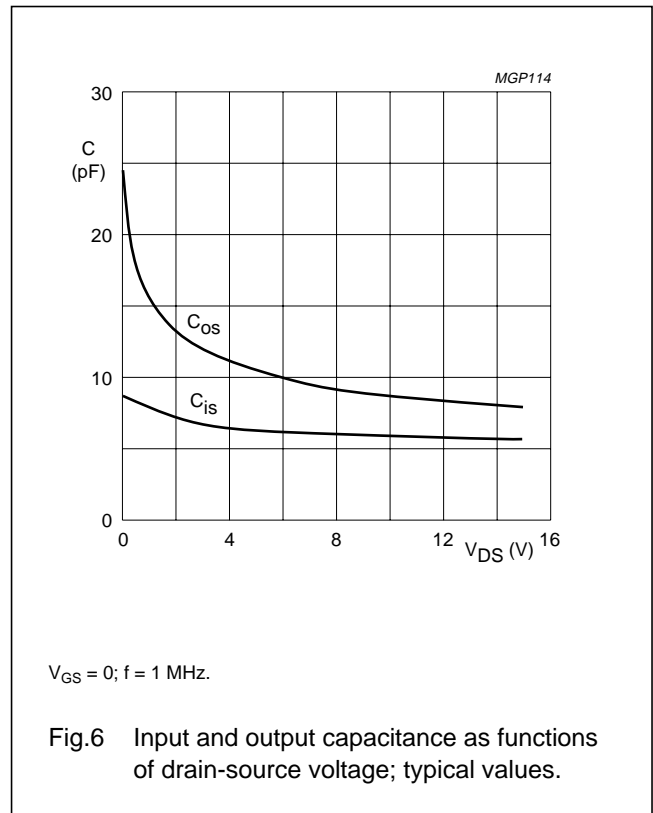
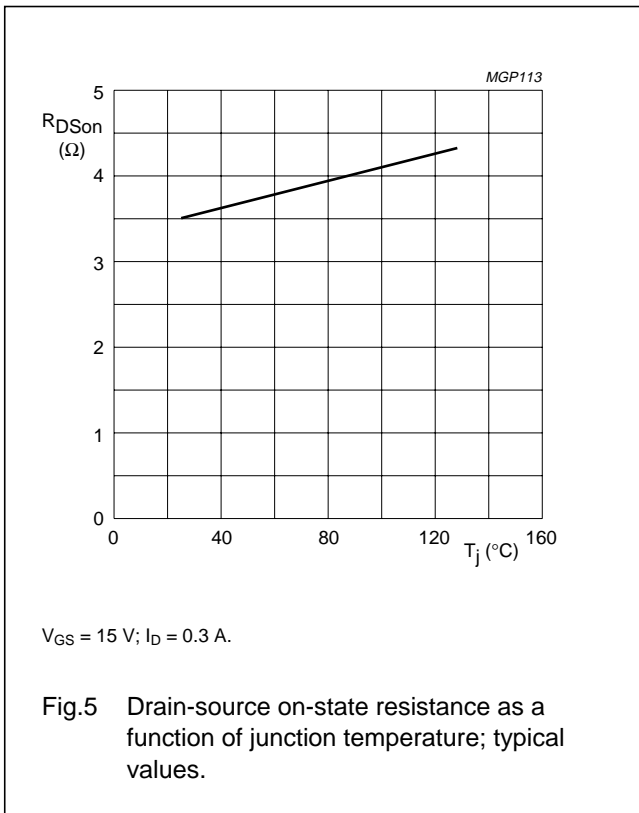
$T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 3\text{ mA}; V_{GS} = 0$	40	–	–	V
$V_{GS(th)}$	gate-source threshold voltage	$I_D = 3\text{ mA}; V_{DS} = 10\text{ V}$	2	–	4.5	V
$I_{DSS}$	drain-source leakage current	$V_{GS} = 0; V_{DS} = 12.5\text{ V}$	–	–	10	$\mu\text{A}$
$I_{GSS}$	gate-source leakage current	$V_{GS} = \pm 20\text{ V}; V_{DS} = 0$	–	–	1	$\mu\text{A}$
$I_{DSX}$	on-state drain current	$V_{GS} = 15\text{ V}; V_{DS} = 10\text{ V}$	–	1.3	–	A
$R_{DS(on)}$	drain-source on-state resistance	$I_D = 0.3\text{ A}; V_{GS} = 15\text{ V}$	–	3.5	4	$\Omega$
$g_{fs}$	forward transconductance	$I_D = 0.3\text{ A}; V_{DS} = 10\text{ V}$	80	135	–	mS
$C_{is}$	input capacitance	$V_{GS} = 0; V_{DS} = 12.5\text{ V}; f = 1\text{ MHz}$	–	5.3	–	pF
$C_{os}$	output capacitance	$V_{GS} = 0; V_{DS} = 12.5\text{ V}; f = 1\text{ MHz}$	–	7.8	–	pF
$C_{rs}$	feedback capacitance	$V_{GS} = 0; V_{DS} = 12.5\text{ V}; f = 1\text{ MHz}$	–	1.8	–	pF



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**APPLICATION INFORMATION FOR CLASS-B OPERATION**

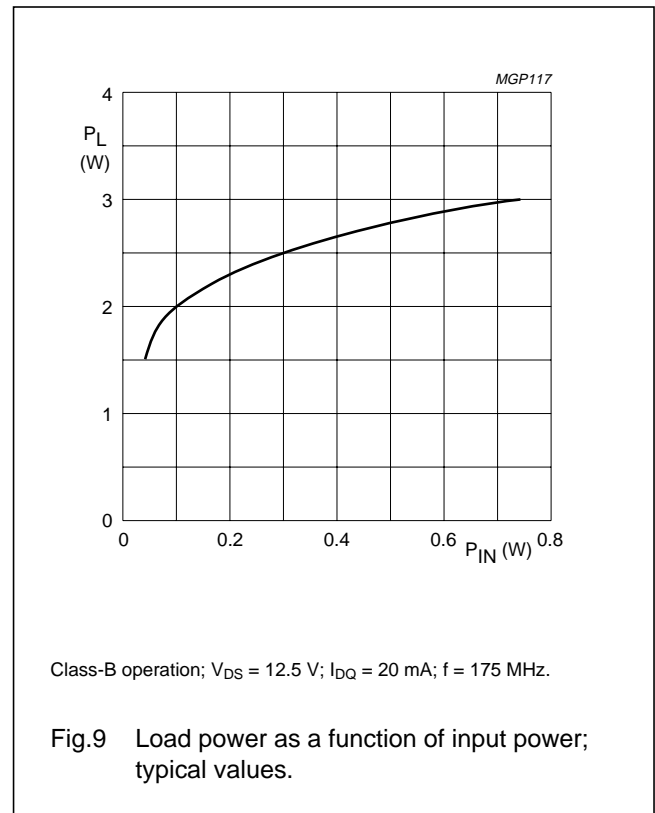
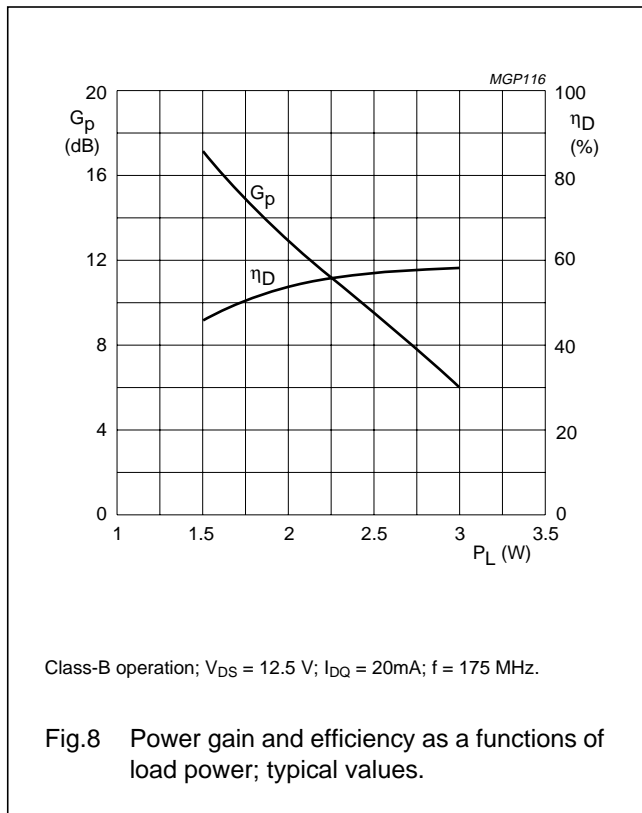
$T_{mb} = 25\text{ }^\circ\text{C}$ ;  $R_{GS} = 237\text{ }\Omega$ ; unless otherwise specified.

RF performance in CW operation in a common source class-B test circuit.

MODE OF OPERATION	f (MHz)	$V_{DS}$ (V)	$I_{DQ}$ (mA)	$P_L$ (W)	$G_p$ (dB)	$\eta_D$ (%)
CW, class-B	175	12.5	20	2	>10; typ. 13	>50; typ. 55

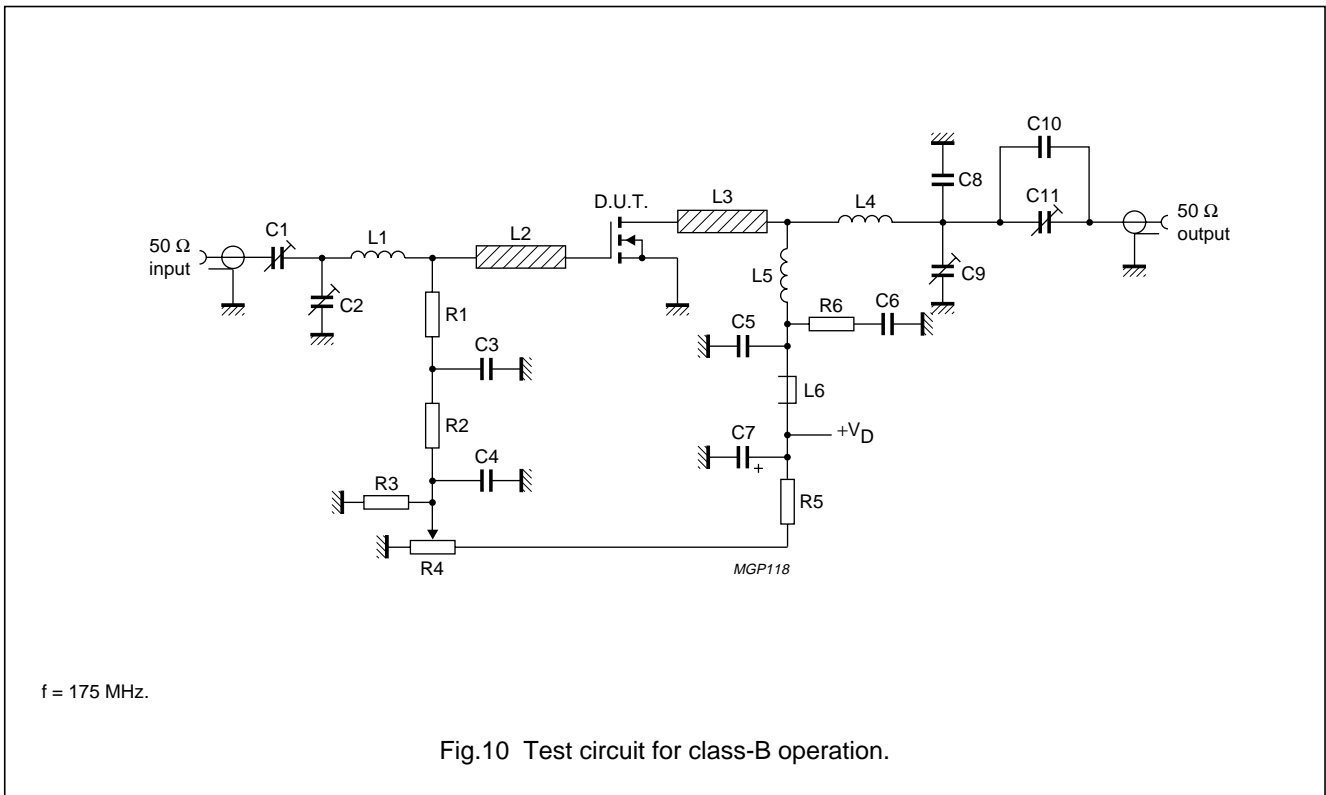
**Ruggedness in class-B operation**

The BLF202 is capable of withstanding a load mismatch corresponding to  $V_{SWR} = 50:1$  through all phases under the following conditions:  $V_{DS} = 15.5\text{ V}$ ;  $f = 175\text{ MHz}$  at rated load power.



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## List of components (class-B test circuit)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
C1, C11	film dielectric trimmer	2 to 9 pF		2222 809 09005
C2, C9	film dielectric trimmer	2 to 9 pF		2222 809 09002
C3, C5	multilayer ceramic chip capacitor; note 1	1 nF; 500 V		
C4, C6	multilayer ceramic chip capacitor	2 × 100 nF in parallel, 50 V		2222 852 47104
C7	Sprague electrolytic tantalum capacitor	2.2 μF; 35 V		
C8	multilayer ceramic chip capacitor; note 1	5.1 pF; 500 V		
C10	multilayer ceramic chip capacitor; note 1	9.1 pF; 500 V		
L1	8 turns enamelled 0.8 mm copper wire	137 nH	length 5.1 mm; int. dia. 4 mm; leads 2 × 5 mm	
L2, L3	stripline; note 2	81 Ω	8 mm × 2 mm	
L4	3 turns enamelled 1 mm copper wire	57 nH	length 5 mm; int. dia. 6 mm; leads 2 × 5 mm	
L5	9 turns enamelled 1 mm copper wire	355 nH	length 11 mm; int. dia. 7 mm; leads 2 × 5 mm	
L6	grade 3B Ferroxcube RF choke			4312 020 36642
R1	0.4 W metal film resistor	237 Ω		2322 151 72371
R2	0.4 W metal film resistor	1 kΩ		2322 151 71002
R3	0.4 W metal film resistor	1 MΩ		2322 151 71005
R4	10 turns cermet potentiometer	5 kΩ		
R5	0.4 W metal film resistor	7.5 kΩ		2322 151 77502
R6	1 W metal film resistor	10 Ω		2322 153 51009

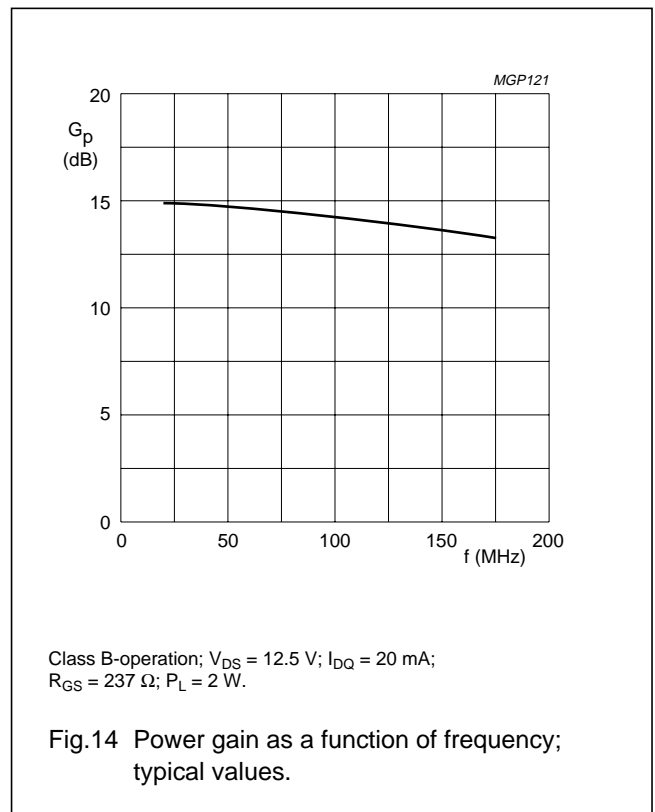
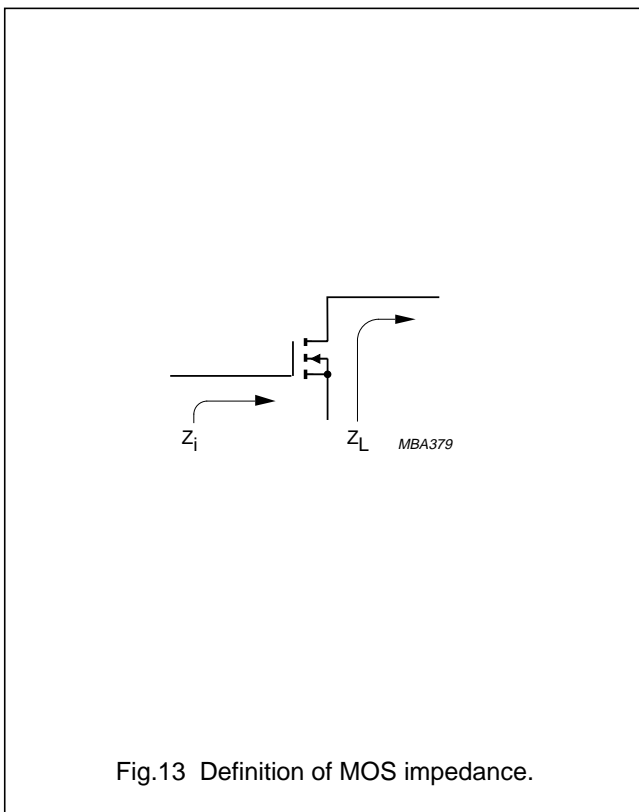
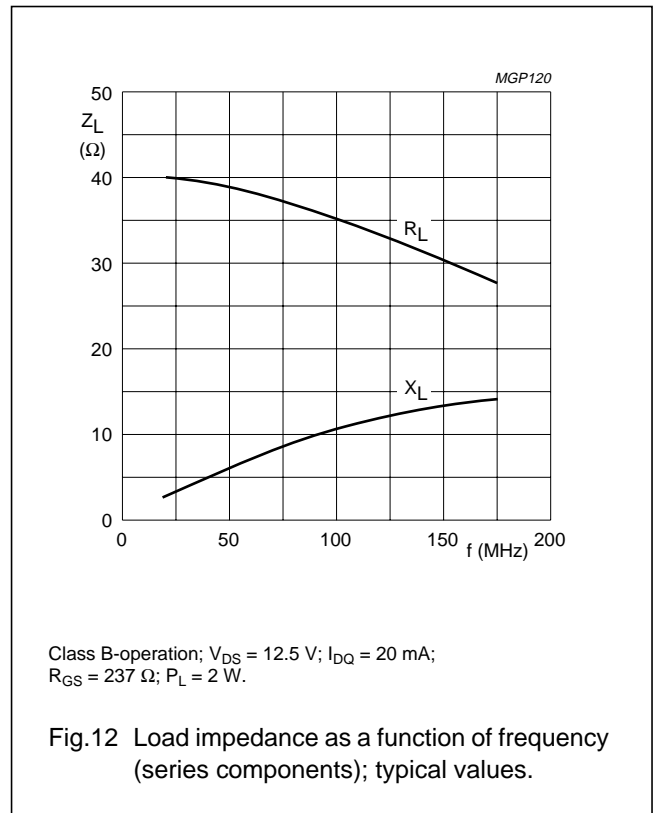
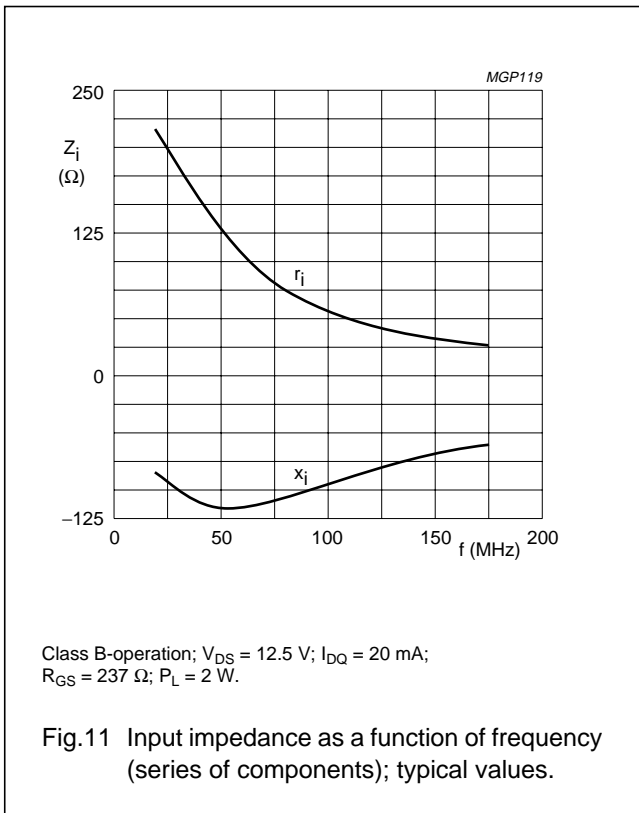
## Notes

- American Technical Ceramics (ATC) capacitor, type 100B or other capacitor of the same quality.
- The striplines are on a double copper-clad printed-circuit board, with PTFE fibre-glass dielectric ( $\epsilon_r = 2.2$ ), thickness 1.6 mm.



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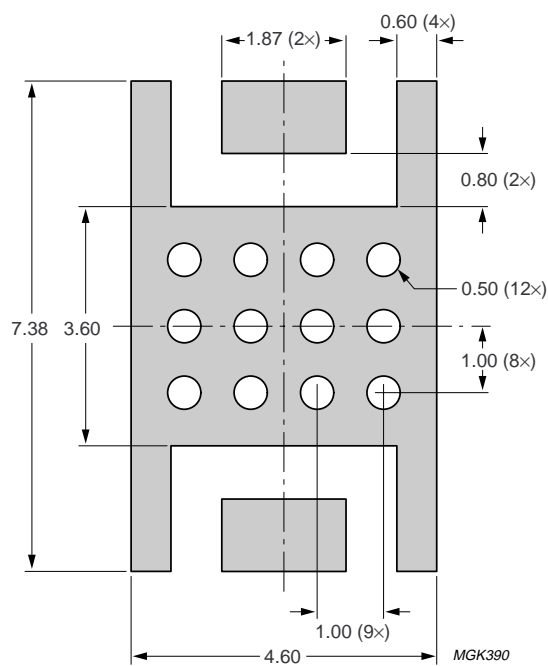
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**MOUNTING RECOMMENDATIONS**

Both the metallized groundplate and leads contribute to the heatflow. It is recommended that the transistor is mounted on a grounded metallized area of 0.8 mm maximum thickness on the printed-circuit board, equipped with at least 12 (0.5 mm diameter) through metallized holes filled with solder.

A thermal resistance  $R_{th(mb-h)}$  of 5 K/W can be achieved if heatsink compound is applied when the transistor is mounted on the printed-circuit board.



Dimensions in mm.

Fig.15 Footprint SOT409A.

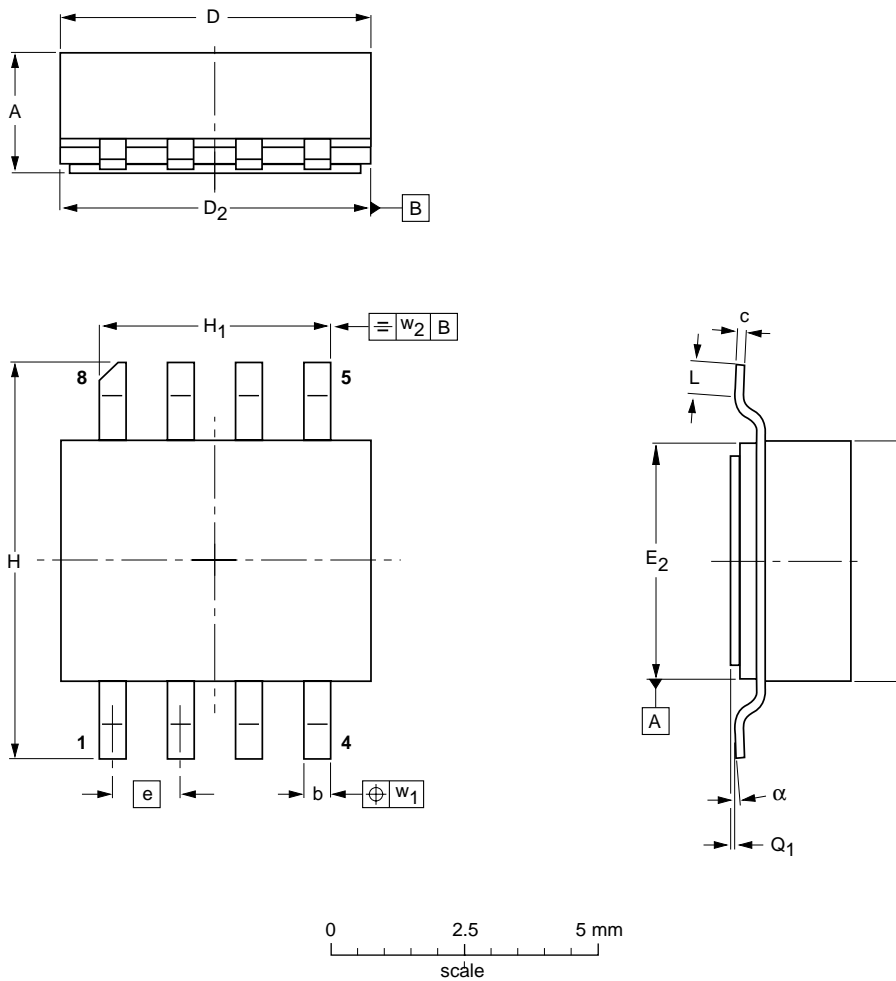
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PACKAGE OUTLINE

Ceramic surface mounted package; 8 leads

SOT409A



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

UNIT	A	b	c	D	D <sub>2</sub>	E	E <sub>2</sub>	e	H	H <sub>1</sub>	L	Q <sub>1</sub>	w <sub>1</sub>	w <sub>2</sub>	α
mm	2.36 2.06	0.58 0.43	0.23 0.18	5.94 5.03	5.16 5.00	4.93 4.01	4.14 3.99	1.27	7.47 7.26	4.39 4.24	1.02 0.51	0.10 0.00	0.25	0.25	7° 0°
inches	0.093 0.081	0.023 0.017	0.009 0.007	0.234 0.198	0.203 0.197	0.194 0.158	0.163 0.157	0.050	0.294 0.286	0.173 0.167	0.040 0.020	0.004 0.000	0.010	0.010	7° 0°

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT409A						98-01-27

## HF/VHF power MOS transistor

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**DEFINITIONS**

<b>Data sheet status</b>	
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.
Short-form specification	The data in this 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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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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.

HF/VHF power MOS transistor

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**NOTES**

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**NOTES**

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**NOTES**

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