BLF202

HF/VHF power MOS transistor

Rev. 3 — 1 September 2015

AMPLEON

Product data sheet

IMPORTANT NOTICE

Dear customer,

As of December 7th, 2015 BL RF Power of NXP Semiconductors will operate as an independent company under the new trade name Ampleon, which will be used in future data sheets together with new contact details.

In data sheets, where the previous Philips references is mentioned, please use the new links as shown below.

http://www.philips.semiconductors.com use http://www.ampleon.com

http://www.semiconductors.philips.com use http://www.ampleon.com (Internet)

sales.addresses@www.semiconductors.philips.com use http://www.ampleon.com/sales

The copyright notice at the bottom of each page (or elsewhere in the document, depending on the version)
- © Koninklijke Philips Electronics N.V. (year). All rights reserved -
is replaced with:
- © Ampleon B.V. (year). All rights reserved. -

If you have any questions related to the data sheet, please contact our nearest sales office (details via http://www.ampleon.com/sales).

Thank you for your cooperation and understanding,

Ampleon

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

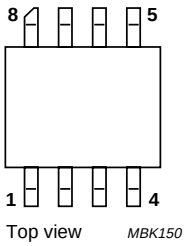


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C in a common source test circuit.

MODE OF OPERATION	f (MHz)	V_{DS} (V)	P_L (W)	G_p (dB)	η_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.

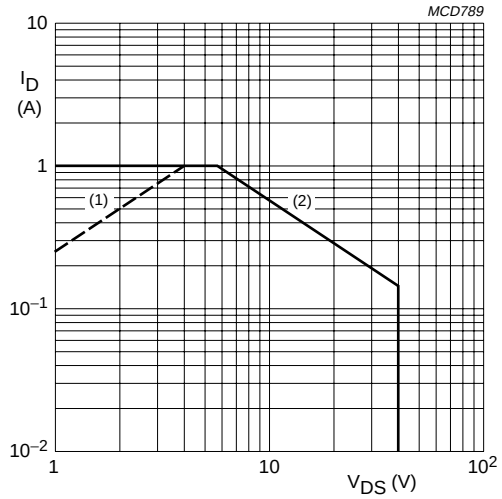
LIMITING VALUES

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

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

THERMAL CHARACTERISTICS

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



(1) Current is this area may be limited by R_{DSon}.
(2) T_{mb} = 85 °C.

Fig.2 DC SOAR.

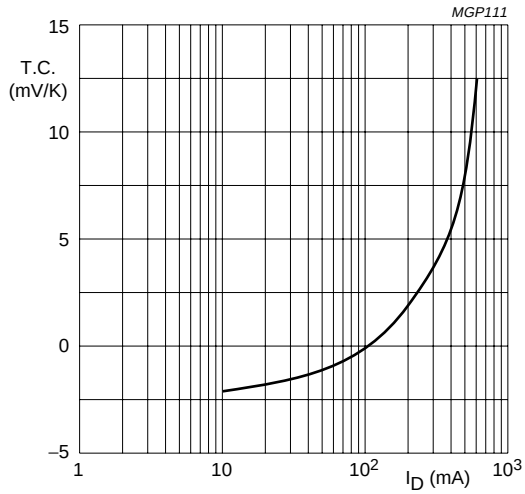
CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

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

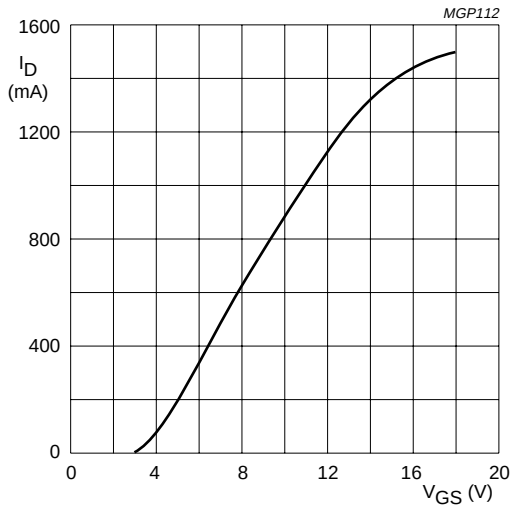
V_{GS} group indicator

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			



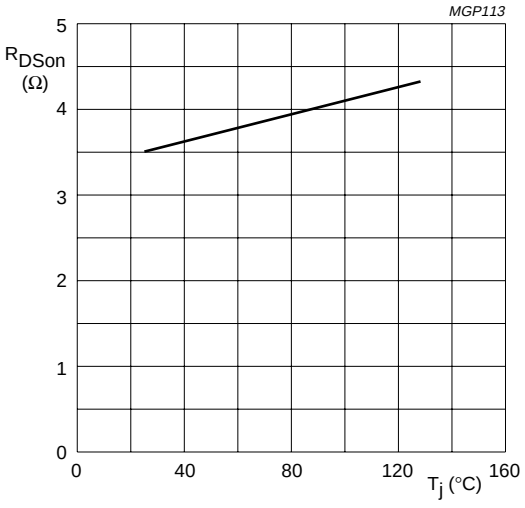
V_{DS} = 10 V.

Fig.3 Temperature coefficient of gate-source voltage as a function of drain current; typical values.



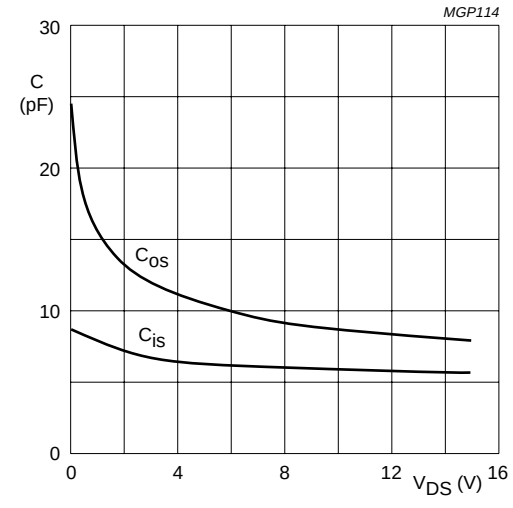
V_{DS} = 10 V; T_j = 25 °C.

Fig.4 Drain current as a function of gate-source voltage; typical values.



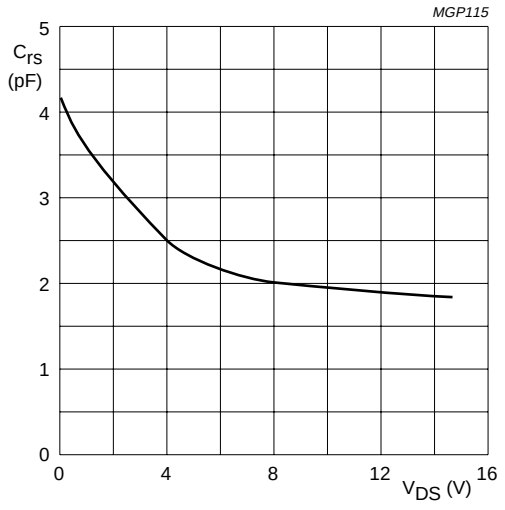
V_{GS} = 15 V; I_D = 0.3 A.

Fig.5 Drain-source on-state resistance as a function of junction temperature; typical values.



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

Fig.6 Input and output capacitance as functions of drain-source voltage; typical values.



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

Fig.7 Feedback capacitance as a function of drain-source voltage; typical values.

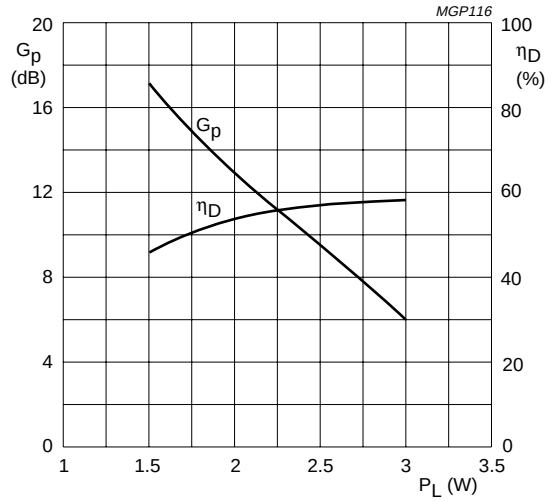
APPLICATION INFORMATION FOR CLASS-B OPERATION

T_{mb} = 25 °C; R_{GS} = 237 Ω; 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)	η_D (%)
CW, class-B	175	12.5	20	2	>10 typ. 13	>50 typ. 55

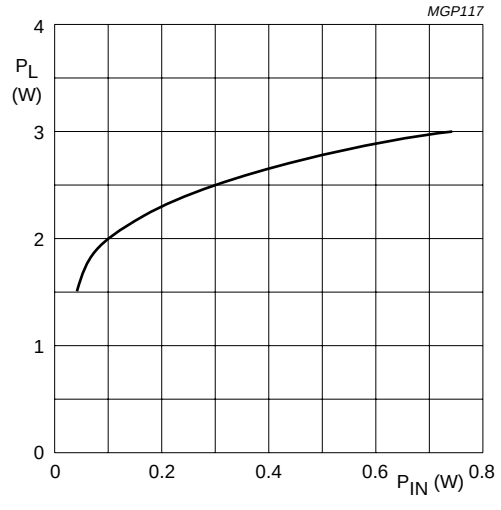
Ruggedness in class-B operation

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



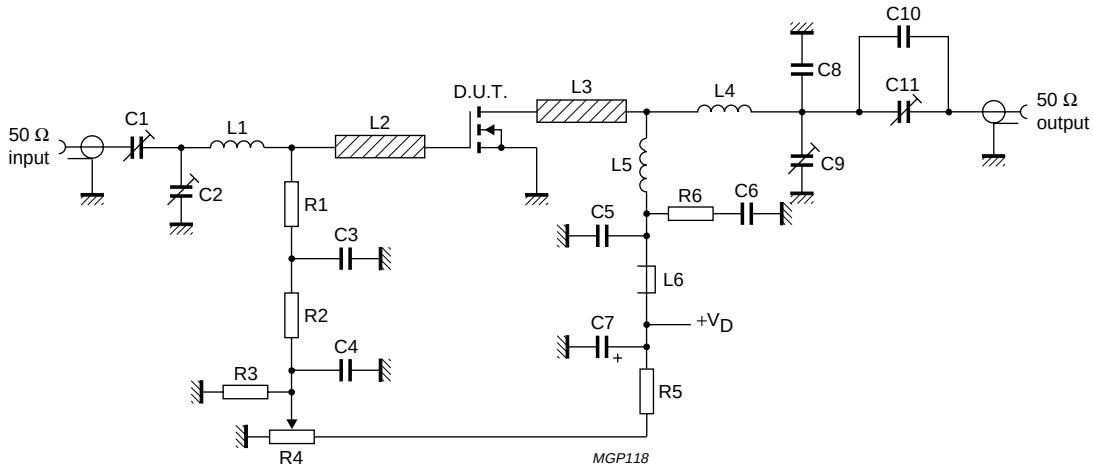
Class-B operation; V_{DS} = 12.5 V; I_{DQ} = 20mA; f = 175 MHz.

Fig.8 Power gain and efficiency as a functions of load power; typical values.



Class-B operation; V_{DS} = 12.5 V; I_{DQ} = 20 mA; f = 175 MHz.

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



f = 175 MHz.

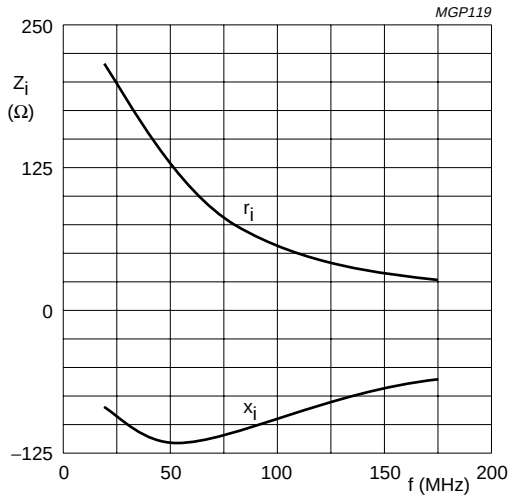
Fig.10 Test circuit for class-B operation.

List of components (see Fig.10)

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

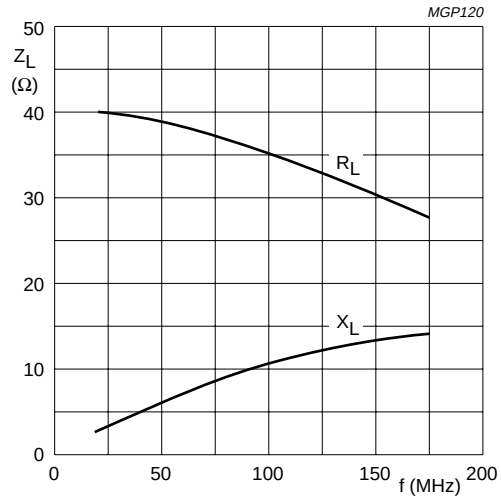
Notes

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 PTFE fibre-glass dielectric (ε_r = 2.2), thickness 1.6 mm.



Class B-operation; V_{DS} = 12.5 V; I_{DQ} = 20 mA;
R_{GS} = 237 Ω; P_L = 2 W.

Fig.11 Input impedance as a function of frequency (series of components); typical values.



Class B-operation; V_{DS} = 12.5 V; I_{DQ} = 20 mA;
R_{GS} = 237 Ω; P_L = 2 W.

Fig.12 Load impedance as a function of frequency (series components); typical values.

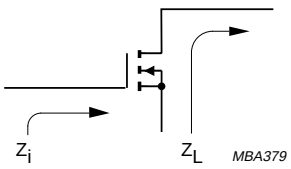
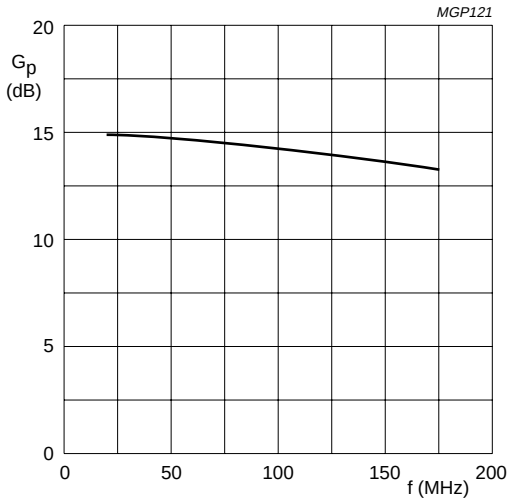


Fig.13 Definition of MOS impedance.



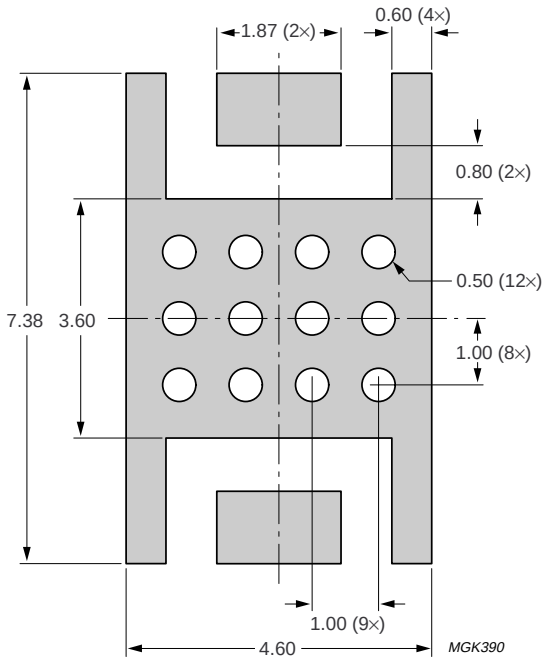
Class B-operation; V_{DS} = 12.5 V; I_{DQ} = 20 mA;
R_{GS} = 237 Ω; P_L = 2 W.

Fig.14 Power gain as a function of frequency; typical values.

MOUNTING RECOMMENDATIONS

Both the metallized ground plate and the device leads contribute to the heat flow. It is recommended that the transistor be mounted on a grounded metallized area of the printed-circuit board. This area should be of maximum 0.8 mm thickness and include at least 12 x 0.5 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.

BLF202 scattering parameters

V_{DS} = 12.5 V; I_D = 20 mA; note 1

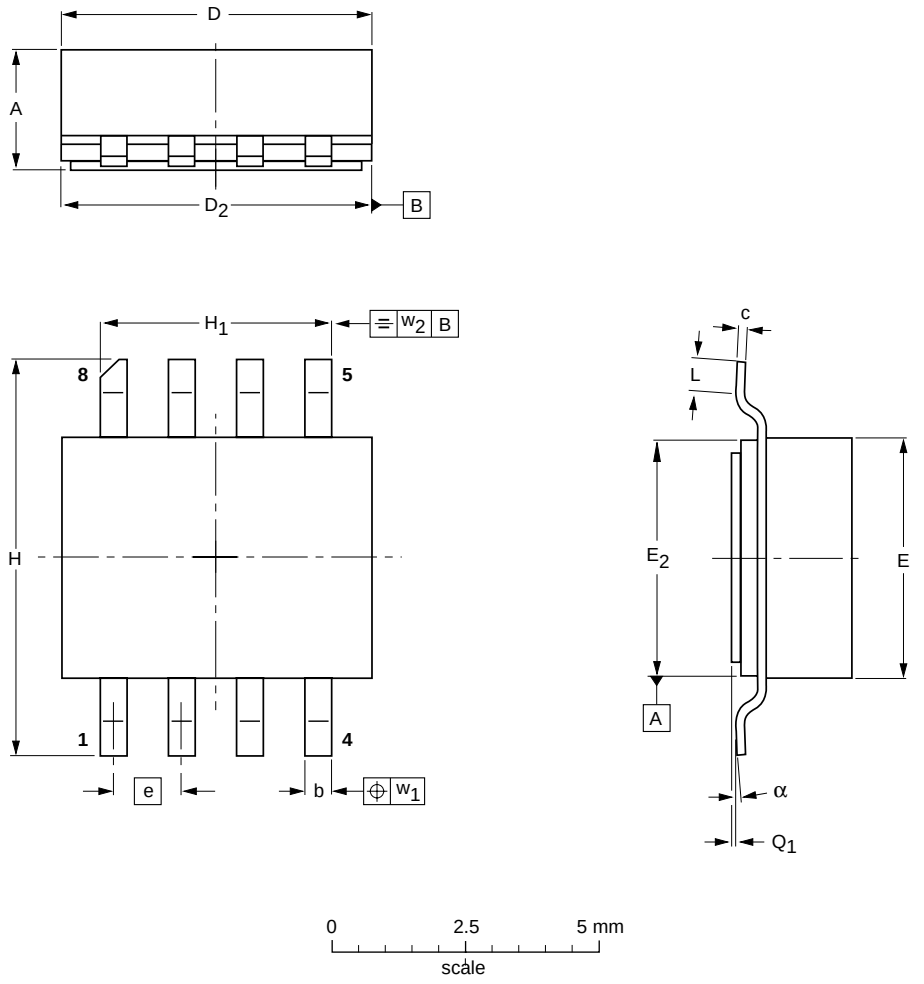
f (MHz)	s_{11}		s_{21}		s_{12}		s_{22}	
	$\|s_{11}\|$	$\angle\Phi$	$\|s_{21}\|$	$\angle\Phi$	$\|s_{12}\|$	$\angle\Phi$	$\|s_{22}\|$	$\angle\Phi$
5	1.00	–2.00	5.76	178.30	0.01	88.30	0.97	–2.40
10	1.00	–4.00	5.75	176.50	0.01	86.70	0.97	–4.90
20	1.00	–7.90	5.72	172.90	0.02	83.40	0.97	–9.70
30	0.99	–11.90	5.69	169.40	0.03	80.20	0.97	–14.50
40	0.99	–15.80	5.65	165.90	0.04	77.00	0.96	–19.30
50	0.98	–19.60	5.58	162.40	0.05	73.80	0.96	–23.90
60	0.97	–23.40	5.51	159.00	0.06	70.70	0.95	–28.50
70	0.96	–27.00	5.42	–155.70	0.07	67.70	0.94	–33.00
80	0.94	–30.70	5.33	152.40	0.08	64.80	0.93	–37.40
90	0.93	–34.10	5.23	149.30	0.09	62.00	0.92	–41.60
100	0.92	–37.50	5.12	146.40	0.10	59.40	0.92	–45.60
125	0.89	–45.60	4.86	139.30	0.12	53.10	0.89	–55.30
150	0.85	–53.00	4.58	132.60	0.13	47.20	0.87	–64.10
175	0.82	–59.80	4.29	126.60	0.14	42.00	0.85	–72.00
200	0.79	–66.00	4.03	121.20	0.15	37.70	0.83	–79.20
250	0.74	–77.00	3.55	111.30	0.17	29.30	0.79	–91.70
300	0.70	–86.30	3.15	103.30	0.17	23.10	0.77	–101.90
350	0.68	–94.30	2.80	96.00	0.18	17.30	0.76	–110.30
400	0.66	–101.40	2.52	89.80	0.18	12.90	0.75	–117.20
450	0.64	–107.80	2.27	83.80	0.18	8.60	0.74	–123.20
500	0.64	–113.50	2.07	78.80	0.18	5.20	0.74	–128.30
600	0.63	–123.80	1.75	69.60	0.17	–0.70	0.74	–136.60
700	0.64	–132.60	1.51	61.40	0.15	–5.30	0.75	–143.20
800	0.65	–140.60	1.32	54.40	0.14	–8.20	0.76	–148.60
900	0.67	–148.10	1.16	48.20	0.12	–9.70	0.77	–153.30
1000	0.68	–155.00	1.04	42.90	0.11	–9.20	0.78	–157.40

Note

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

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_2	E	E_2	e	H	H_1	L	Q_1	w_1	w_2	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

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.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

DISCLAIMERS

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 Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status ‘Production’), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

Philips Semiconductors – a worldwide company

Contact information

For additional information please visit **http://www.semiconductors.philips.com**. Fax: **+31 40 27 24825**
For sales offices addresses send e-mail to: **sales.addresses@www.semiconductors.philips.com**.

© Koninklijke Philips Electronics N.V. 2003 SCA75

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands 613524/02/pp14 Date of release: 2003 Sep 19 Document order number: 9397 750 11595

Let's make things better.

Philips
Semiconductors

PHILIPS

ENTEGRECİ

Bu belge www.entegreci.com üzerinden sunulmaktadır.

Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.