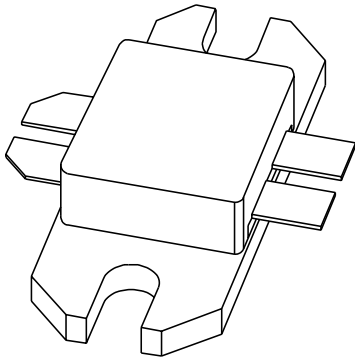


DATA SHEET



BLV861 UHF linear push-pull power transistor

Product specification
Supersedes data of 1998 Jan 14

1998 Jan 16

UHF linear push-pull power transistor

BLV861

FEATURES

- Double stage internal input and output matching networks for an optimum wideband capability and high gain
- Polysilicon emitter ballasting resistors for an optimum temperature profile
- Gold metallization ensures excellent reliability.

APPLICATIONS

- Common emitter class-AB output stages of television transmitter amplifiers (sound and vision) operating in bands 4 and 5 (470 to 860 MHz).

DESCRIPTION

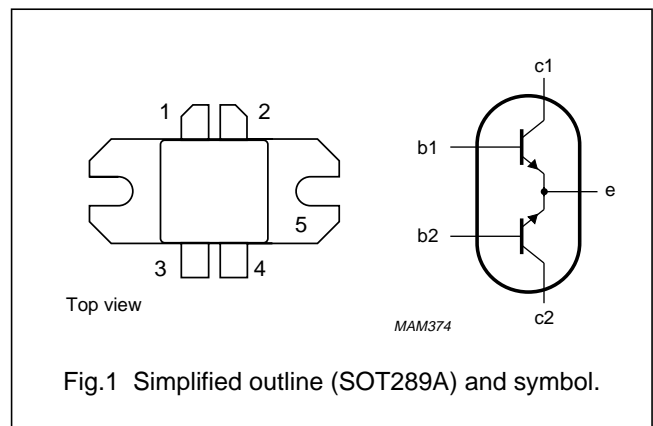
NPN silicon planar epitaxial transistor with two sections in push-pull configuration. The device is encapsulated in a SOT289A 4-lead rectangular flange package, with a ceramic cap.

PINNING

PIN	SYMBOL	DESCRIPTION
1	c1	collector 1; note 1
2	c2	collector 2; note 1
3	b1	base 1
4	b2	base 2
5	e	common emitters; note 2

Notes

1. Collectors c1 and c2 are internally connected.
2. Common emitters are connected to the flange.



QUICK REFERENCE DATA

RF performance at $T_h = 25\text{ °C}$ in a common emitter push-pull test circuit.

MODE OF OPERATION	f (MHz)	V_{CE} (V)	P_L (W)	G_p (dB)	η_c (%)	ΔG_p (dB)
CW class-AB	860	28	100	≥ 8.5	≥ 55	≤ 1

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.

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LIMITING VALUES

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

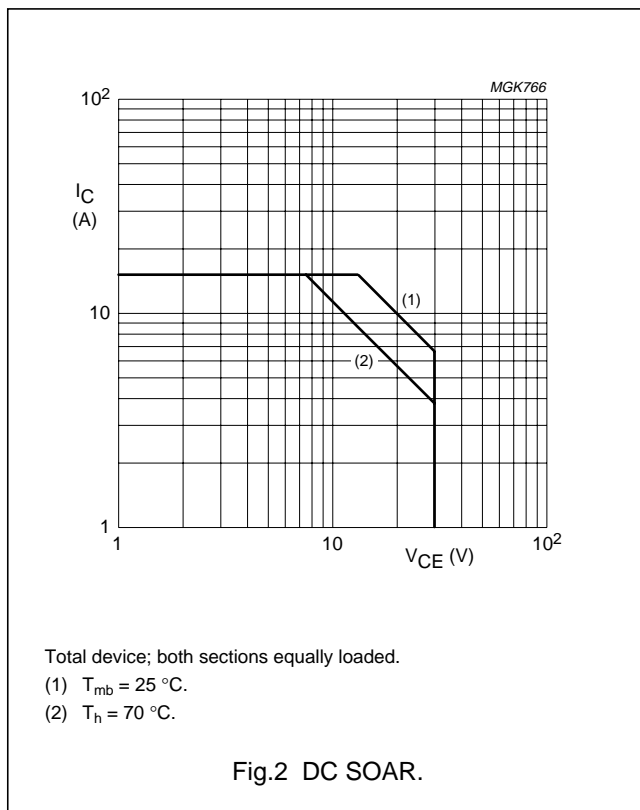
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	65	V
V_{CEO}	collector-emitter voltage	open base	–	30	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	15	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ °C}$	–	220	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	200	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting base	$P_{tot} = 220\text{ W}$; note 1	0.8	K/W
$R_{th\ mb-h}$	thermal resistance from mounting base to heatsink		0.2	K/W

Note

1. Thermal resistance is determined under specified RF operating conditions.



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CHARACTERISTICSValues apply to either transistor section; $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_E = 0; I_C = 35\text{ mA}$	65	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_B = 0; I_C = 90\text{ mA}$	30	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = 2\text{ mA}; I_C = 0$	3	–	–	V
I_{CBO}	collector-base leakage current	$V_{CB} = 28\text{ V}$	–	–	3	mA
h_{FE}	DC current gain	$I_C = 2.8\text{ A}; V_{CE} = 10\text{ V}$	30	–	120	–
Δh_{FE}	DC current gain ratio of both sections	$I_C = 4.5\text{ A}; V_{CE} = 10\text{ V}$	0.67	–	1.5	–
C_c	collector capacitance	$I_E = i_e = 0; V_{CE} = 28\text{ V};$ $f = 1\text{ MHz}; \text{note } 1$	–	47	–	pF

Note

1. The value of C_c is that of the die only; it is not measurable because of the internal matching network.

APPLICATION INFORMATIONRF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common emitter push-pull class-AB test circuit.

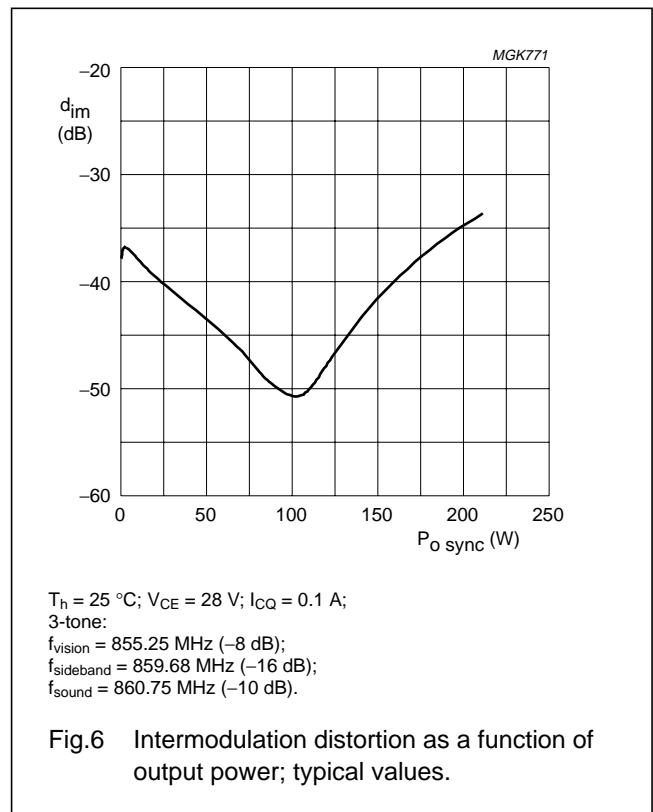
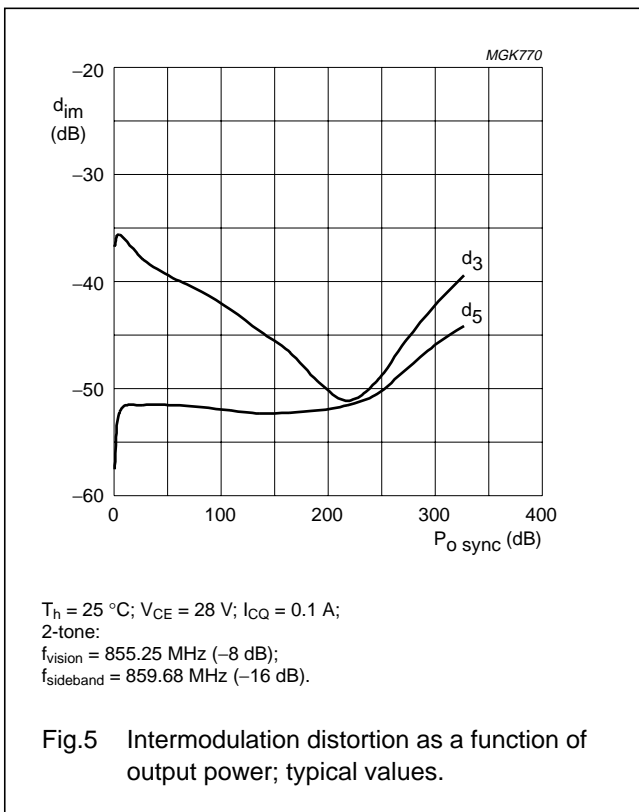
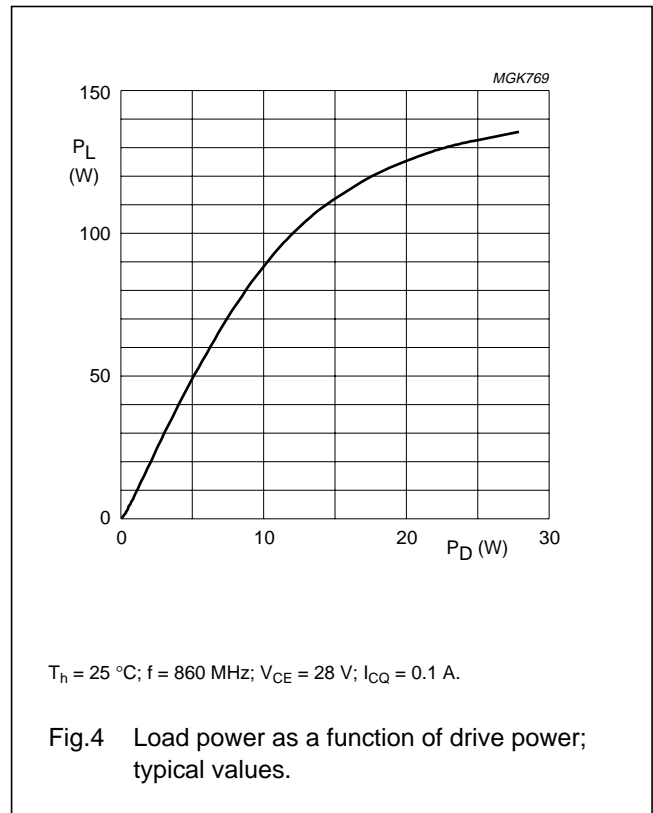
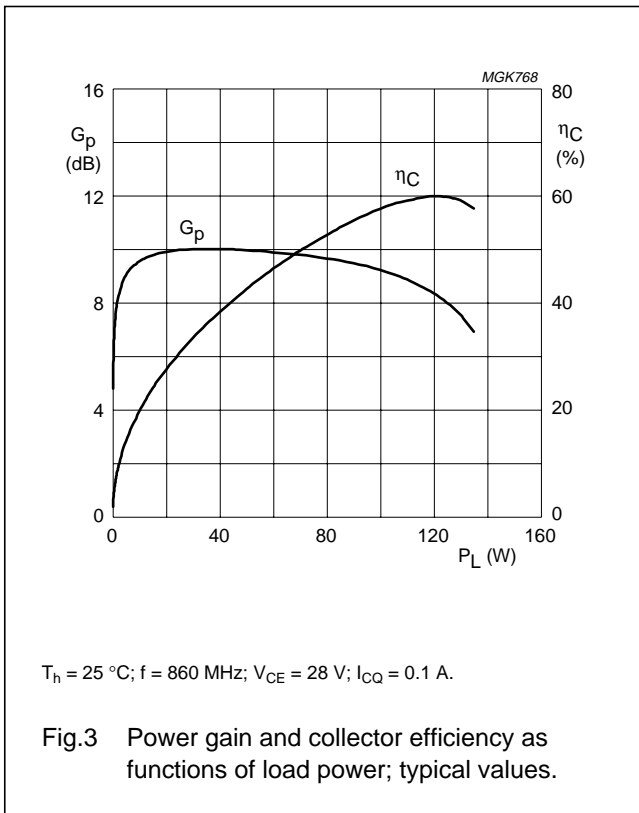
MODE OF OPERATION	f (MHz)	V_{CE} (V)	I_{CQ} (A)	P_L (W)	G_p (dB)	η_c (%)	ΔG_p (dB)
CW class-AB	860	28	0.1	100	≥ 8.5	≥ 55	≤ 1

Ruggedness in class-AB operation

The BLV861 is capable of withstanding a load mismatch corresponding to $V_{SWR} = 3 : 1$ through all phases under the conditions: $T_h = 25\text{ }^\circ\text{C}$; $f = 860\text{ MHz}$; $V_{CE} = 28\text{ V}$; $I_{CQ} = 0.1\text{ A}$; $P_L = 100\text{ W}$; $R_{th\text{ mb-h}} = 0.2\text{ K/W}$.

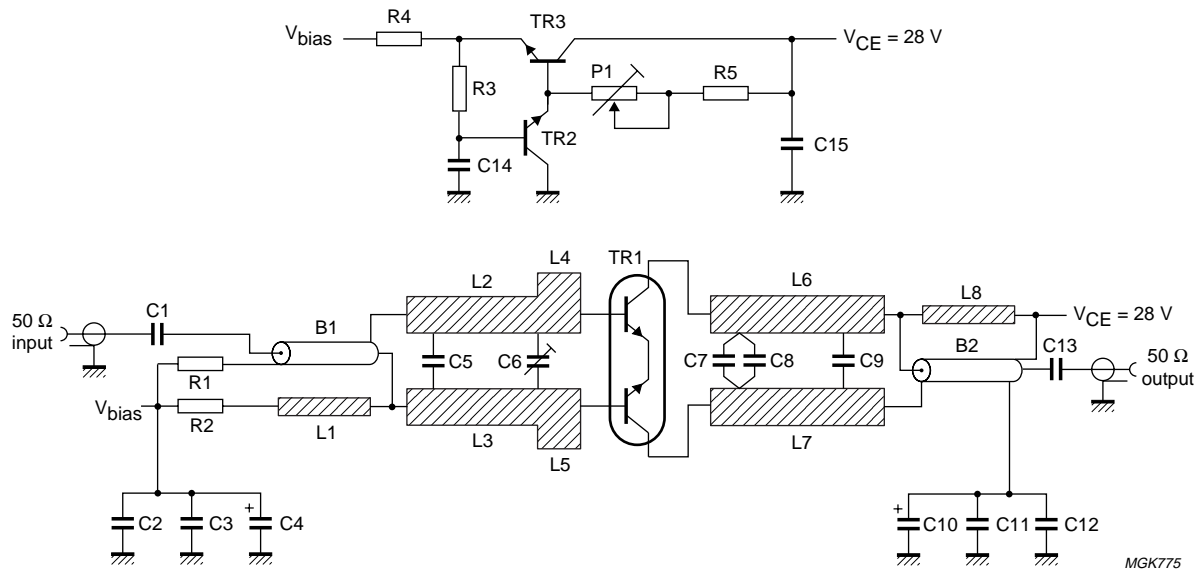
UHF linear push-pull power transistor

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UHF linear push-pull power transistor

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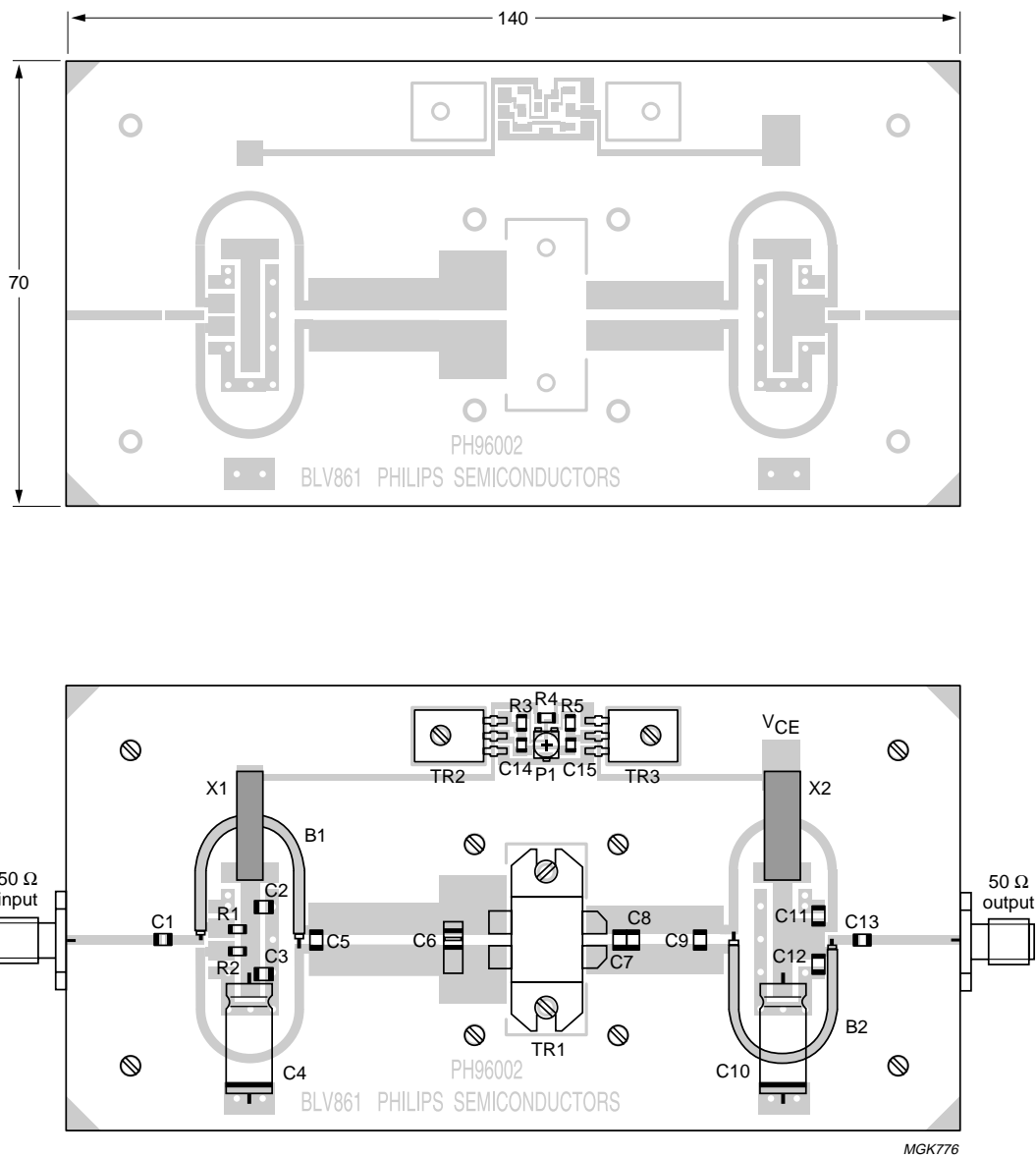


MGK775

Fig.7 Class-AB test circuit at 860 MHz.

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Dimensions in mm.

The components are situated on one side of the copper-clad PTFE-glass board (TLX8) from Taconic, the other side is unetched and serves as a ground plane. Earth connections from the component side to the ground plane are made by through metallization.

Fig.8 Printed-circuit board and component layout for the 860 MHz class-AB test circuit.

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List of components

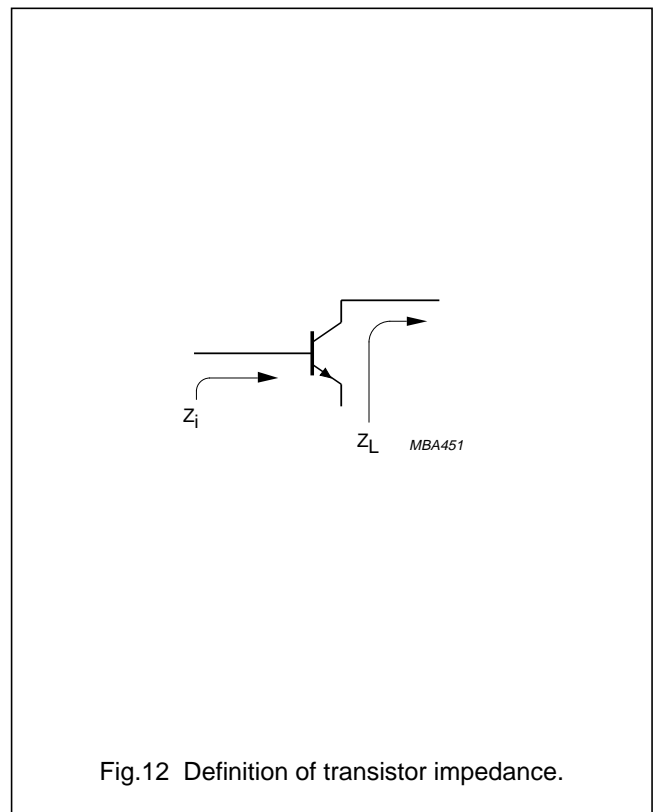
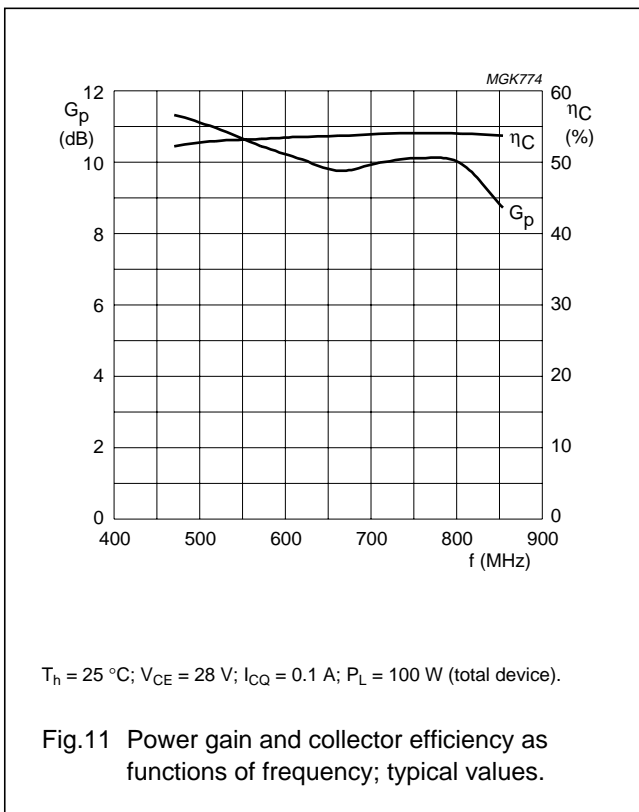
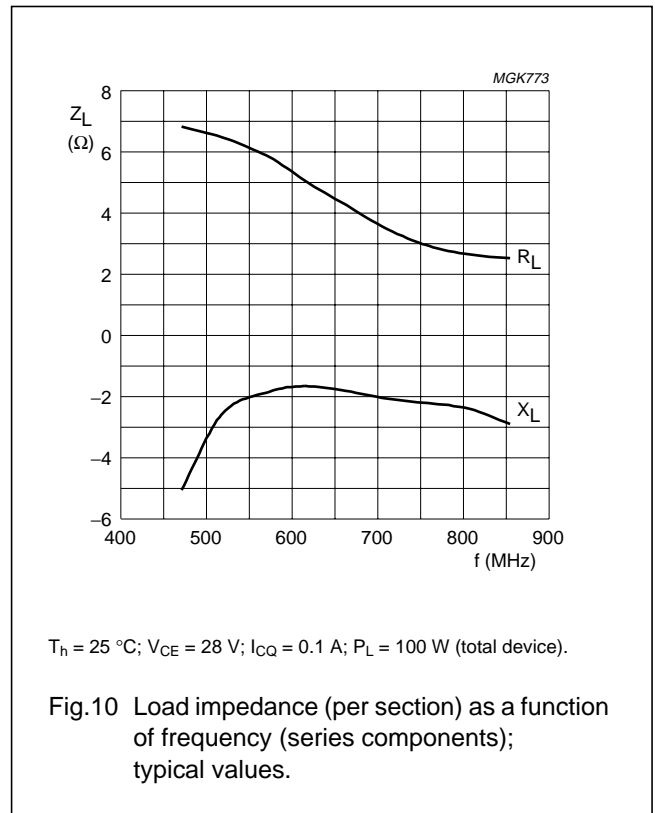
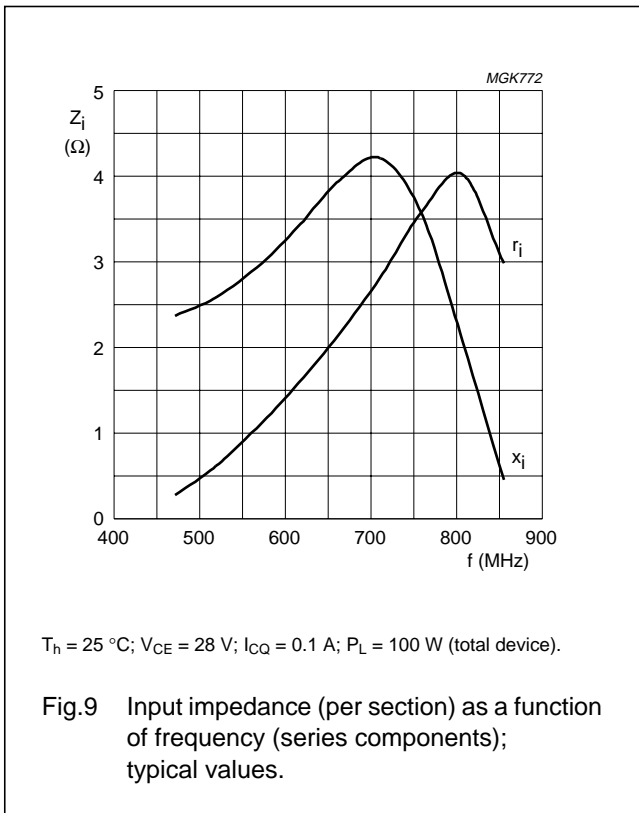
COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE No.
C1, C13	multilayer ceramic chip capacitor; note 1	15 pF		
C2, C11, C15	multilayer ceramic chip capacitor	15 nF	0805	2222 590 16629
C3, C12	multilayer ceramic chip capacitor	100 nF	1206	2222 581 16641
C4, C10	solid aluminium capacitor	100 μ F; 40 V		2222 031 37101
C5	multilayer ceramic chip capacitor; note 2	8.2 pF		
C6	multilayer ceramic chip capacitor + Tekelek trimmer; note 2	10 pF; 0.6 to 4.5 pF		
C7	multilayer ceramic chip capacitor; note 3	10 pF		
C8	multilayer ceramic chip capacitor; note 3	2.7 pF		
C9	multilayer ceramic chip capacitor; note 2	3 pF		
C14	multilayer ceramic chip capacitor; note 1	100 nF		
L1, L8	stripline; note 4		46 \times 1.8 mm	
L2, L3	stripline; note 4		20 \times 5 mm	
L4, L5	stripline; note 4		10 \times 10 mm	
L6, L7	stripline; note 4		21 \times 5 mm	
B1	semi rigid coax balun UT70-25	$Z = 25 \Omega \pm 1.5 \Omega$	46 mm	
B2	semi rigid coax balun UT70-25	$Z = 25 \Omega \pm 1.5 \Omega$	46 mm	
R1, R2, R4	SMD resistor	1 Ω	0805	2122 118 04562
R3	SMD resistor	47 Ω	0805	2122 118 04598
R5	SMD resistor	1.2 k Ω	0805	2122 118 04579
P1	potentiometer	4.7 k Ω		
X1, X2	copper ribbon hairpin			
TR1	NPN push-pull RF transistor BLV861			9340 542 40112
TR2, TR3	NPN transistor BD139			9330 912 20112

Notes

- American Technical Ceramics type 100A or capacitor of same quality.
- American Technical Ceramics type 100B or capacitor of same quality.
- American Technical Ceramics type 180R or capacitor of same quality.
- The striplines are on a double copper-clad printed-circuit board: PTFE-glass material (TLX8) from Taconic ($\epsilon_r = 2.55$); thickness 0.5 mm.

UHF linear push-pull power transistor

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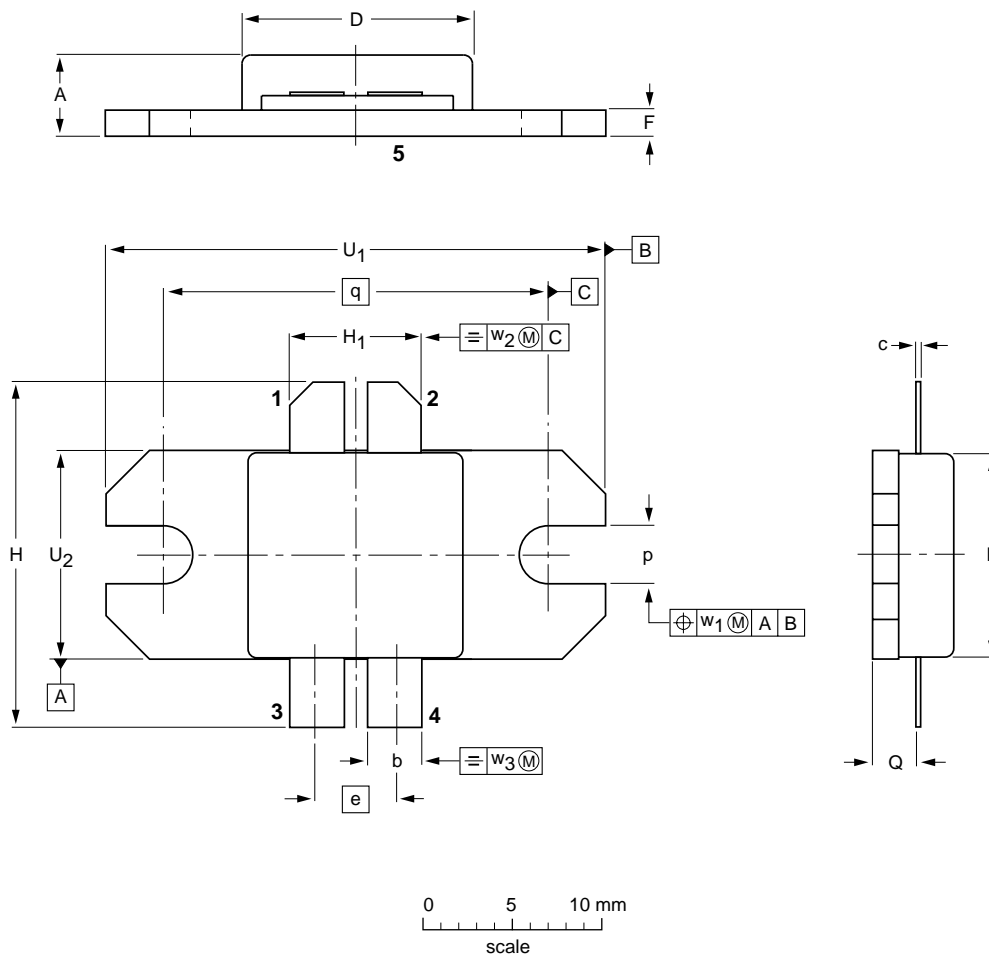
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PACKAGE OUTLINE

Flanged ceramic package; 2 mounting holes; 4 leads

SOT289A



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

UNIT	A	b	c	D	E	e	F	H	H ₁	p	Q	q	U ₁	U ₂	w ₁	w ₂	w ₃
mm	4.65 3.92	3.33 3.07	0.10 0.05	13.10 12.90	11.53 11.33	4.60	1.65 1.40	19.81 19.05	4.85 4.34	3.43 3.17	2.31 2.06	21.44	28.07 27.81	11.81 11.56	0.51	1.02	0.25
inches	0.183 0.154	0.131 0.121	0.004 0.002	0.516 0.508	0.454 0.446	0.181	0.065 0.055	0.780 0.750	0.191 0.171	0.135 0.125	0.091 0.081	0.844	1.105 1.095	0.465 0.455	0.02	0.04	0.01

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT289A						97-06-28

UHF linear push-pull power transistor

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DEFINITIONS

Data Sheet Status	
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.
Limiting values	
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.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213, Tel. +43 160 1010,
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Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 200 733, Fax. +375 172 200 773

Belgium: see The Netherlands

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Bulgaria: Philips Bulgaria Ltd., Energoproject, 15th floor,
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Tel. +359 2 689 211, Fax. +359 2 689 102

Canada: PHILIPS SEMICONDUCTORS/COMPONENTS,
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China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
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Colombia: see South America

Czech Republic: see Austria

Denmark: Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,
Tel. +45 32 88 2636, Fax. +45 31 57 0044

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615800, Fax. +358 9 61580920

France: 51 Rue Carnot, BP317, 92156 SURESNES Cedex,
Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427

Germany: Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 23 53 60, Fax. +49 40 23 536 300

Greece: No. 15, 25th March Street, GR 17778 TAVROS/ATHENS,
Tel. +30 1 4894 339/239, Fax. +30 1 4814 240

Hungary: see Austria

India: Philips INDIA Ltd, Band Box Building, 2nd floor,
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Tel. +91 22 493 8541, Fax. +91 22 493 0966

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Tel. +353 1 7640 000, Fax. +353 1 7640 200

Israel: RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

Italy: PHILIPS SEMICONDUCTORS, Piazza IV Novembre 3,
20124 MILANO, Tel. +39 2 6752 2531, Fax. +39 2 6752 2557

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku, TOKYO 108,
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Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
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Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
Tel. +60 3 750 5214, Fax. +60 3 757 4880

Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
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Middle East: see Italy

Netherlands: Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,
Tel. +31 40 27 82785, Fax. +31 40 27 88399

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

Norway: Box 1, Manglerud 0612, OSLO,
Tel. +47 22 74 8000, Fax. +47 22 74 8341

Philippines: Philips Semiconductors Philippines Inc.,
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

Poland: Ul. Lukiska 10, PL 04-123 WARSZAWA,
Tel. +48 22 612 2831, Fax. +48 22 612 2327

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South America: Al. Vicente Pinzon, 173, 6th floor,
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Spain: Balmes 22, 08007 BARCELONA,
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Ukraine: PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
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United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
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