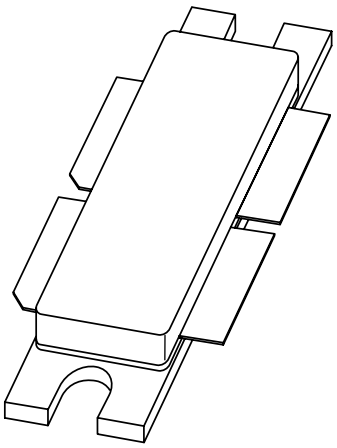
DATA SHEET



BLF2022-120
UHF push-pull power LDMOS transistor

Preliminary specification

2000 Dec 12

Philips Semiconductors

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UHF push-pull power LDMOS transistor BLF2022-120

FEATURES

- High power gain
- Easy power control
- Excellent ruggedness
- Source on underside eliminates DC isolators, reducing common mode inductance
- Designed for broadband operation (HF to 2.2 GHz).

APPLICATIONS

- Common source class-AB operation for PCN and PCS applications in the 2000 to 2200 MHz frequency range.

DESCRIPTION

Push-pull silicon N-channel enhancement mode lateral D-MOS transistor encapsulated in a 4-lead flange package (SOT539A) with a ceramic cap. The common source is connected to the mounting flange.

PINNING - SOT539A

PIN	DESCRIPTION
1	drain 1
2	drain 2
3	gate 1
4	gate 2
5	source connected to flange

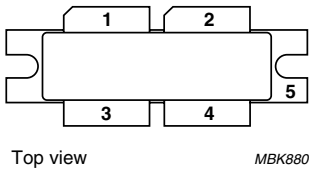


Fig.1 Simplified outline.

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)	η_D (%)	d_{im} (dBc)
2-tone, class-AB	f_1 = 2170; f_2 = 2170.1	28	120 (PEP)	>11	>30	≤–25

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage	–	65	V
V_{GS}	gate-source voltage	–	±15	V
I_D	drain current (DC)	–	18	A
T_{stg}	storage temperature	–65	+150	°C
T_j	junction temperature	–	200	°C

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.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}mb}$	thermal resistance from junction to mounting-base	P_L = 120 W; T_{mb} = 50 °C, note 1	0.35	K/W
$R_{th\ mb\text{-}h}$	thermal resistance from mounting-base to heatsink		0.15	K/W

Note

1. Thermal resistance is determined under nominal 2-tone RF operating conditions.

CHARACTERISTICS

T_j = 25 °C; per section unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	V_{GS} = 0; I_D = 1.4 mA	65	–	–	V
V_{GSth}	gate-source threshold voltage	V_{DS} = 10 V; I_D = 140 mA	4.4	–	5.5	V
I_{DSS}	drain-source leakage current	V_{GS} = 0; V_{DS} = 26 V	–	–	10	μA
I_{DSX}	drain cut-off current	V_{GS} = V_{GSth} + 9 V; V_{DS} = 10 V	18	–	–	A
I_{GSS}	gate leakage current	V_{GS} = ±15 V; V_{DS} = 0	–	–	25	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 5 A	–	4.2	–	S
R_{DSon}	drain-source on-state resistance	V_{GS} = V_{GSth} + 9 V; I_D = 5 A	–	0.15	–	Ω
C_{rs}	feedback capacitance	V_{GS} = 0; V_{DS} = 26 V; f = 1 MHz; note 1	–	3.4	–	pF

Note

1. Capacitance of die only.

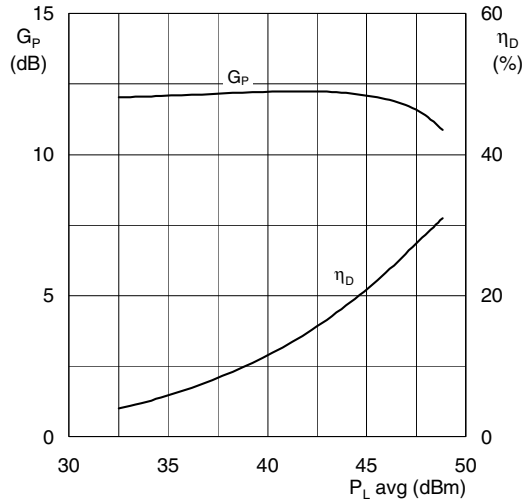
APPLICATION INFORMATION

RF performance in a common source class-AB circuit. T_h = 25 °C; $R_{th\ j\text{-}h}$ = 0.5 K/W; unless otherwise specified.

MODE OF OPERATION	f (MHz)	V_{DS} (V)	I_{DQ} (mA)	P_L (W)	G_p (dB)	η_D (%)	d_{im} (dBc)
2-tone, class-AB	f_1 = 2170; f_2 = 2170.1	28	2 x 500	120 (PEP)	>11	>30	≤–25

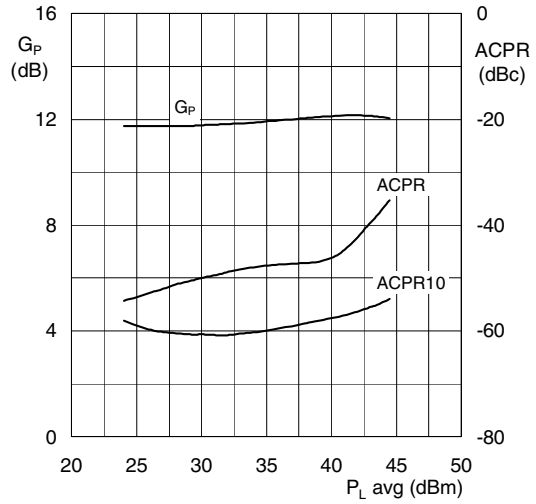
Ruggedness in class-AB operation

The BLF2022-120 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: V_{DS} = 28 V; f = 2170 MHz, P_L = 120 W (CW).



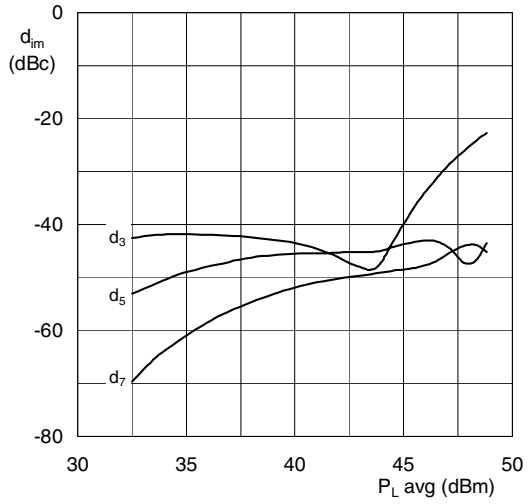
V_{DS} = 28 V; I_{DQ} = 2 x 500 mA;
f_1 = 2170 MHz; f_2 = 2170.1 MHz;$T_h \leq 25$ °C.

Fig.2 Power gain and drain efficiency as functions of average load power; typical values.



V_{DS} = 28 V; I_{DQ} = 2 x 500 mA;
f_1 = 2140 MHz; f_2 = 2140.1 MHz;$T_h \leq 25$ °C.
Input signal: 3GPP W-CDMA 15DPCH
Peak to average ratio: 10.27 dB (0.0001 %)

Fig.3 Power gain and adjacent channel power ratio as functions of average load power; typical values.

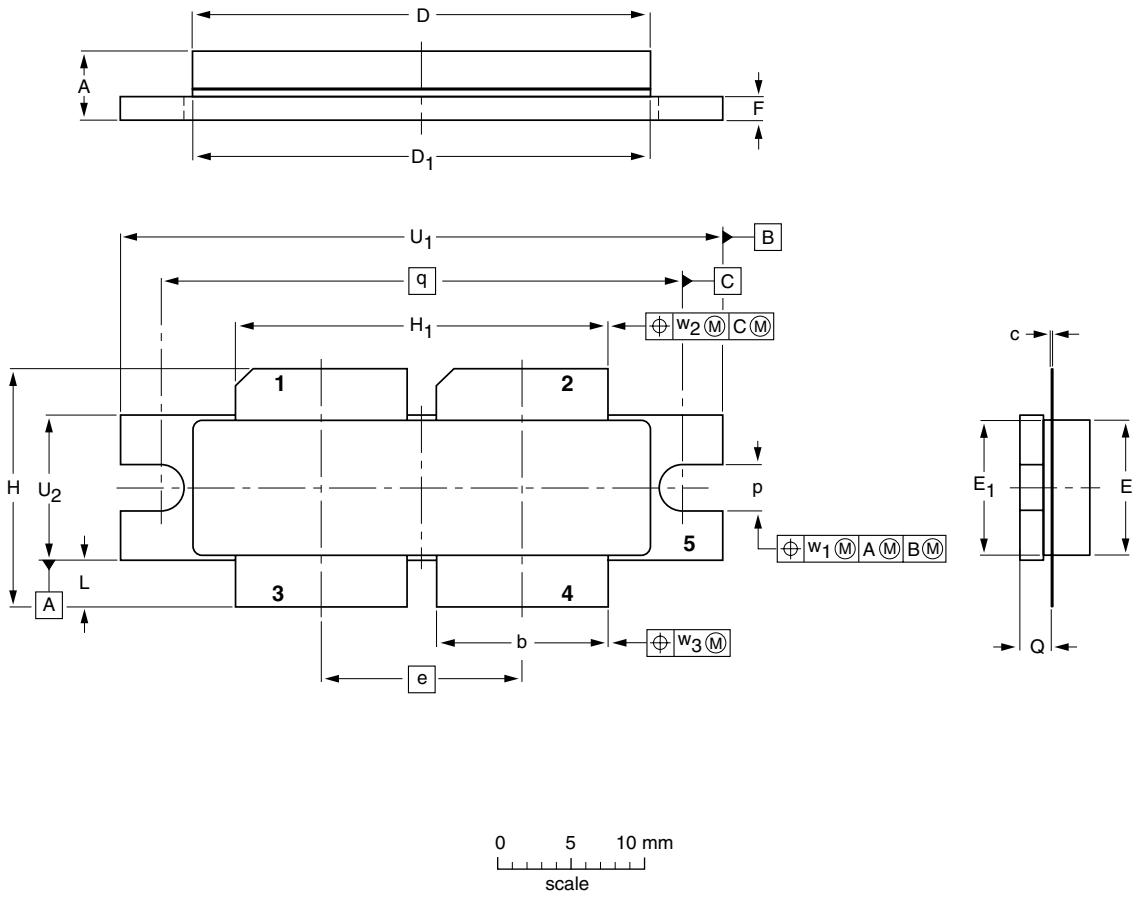


V_{DS} = 28 V; I_{DQ} = 2 x 500 mA;
f_1 = 2170 MHz; f_2 = 2170.1 MHz;$T_h \leq 25$ °C.

Fig.4 Intermodulation distortion as a function of average load power; typical values.

PACKAGE OUTLINE

Flanged balanced LDMOST ceramic package; 2 mounting holes; 4 leads **SOT539A**



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

UNIT	A	b	c	D	D_1	e	E	E_1	F	H	H_1	L	p	Q	q	U_1	U_2	w_1	w_2	w_3
mm	5.33 3.96	11.81 11.56	0.15 0.08	31.55 30.94	31.52 30.96	13.72	9.50 9.30	9.53 9.27	1.75 1.50	17.12 16.10	25.53 25.27	3.73 2.72	3.30 3.05	2.31 2.01	35.56	41.28 41.02	10.29 10.03	0.25	0.51	0.25
inches	0.210 0.156	0.465 0.455	0.006 0.003	1.242 1.218	1.241 1.219	0.540	0.374 0.366	0.375 0.365	0.069 0.059	0.674 0.634	1.005 0.995	0.147 0.107	0.130 0.120	0.091 0.079	1.400	1.625 1.615	0.405 0.395	0.010	0.020	0.010

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT539A						~~99-12-28~~ 00-03-03

DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS [1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

Note

1. Please consult the most recently issued data sheet before initiating or completing a design.

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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