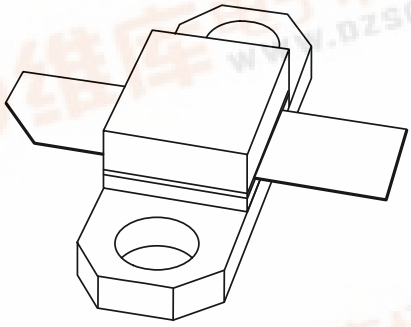
DATA SHEET



BLA1011-10
Avionics LDMOS transistor

Product specification
Supersedes data of 2002 Oct 02

2003 Nov 19

Philips Semiconductors

PHILIPS

Avionics LDMOS transistor BLA1011-10

FEATURES

- High power gain
- Easy power control
- Excellent ruggedness
- Source on mounting base eliminates DC isolators, reducing common mode inductance.

APPLICATIONS

- Avionics transmitter applications in the 1030 to 1090 MHz frequency range.

DESCRIPTION

Silicon N-channel enhancement mode lateral D-MOS transistor encapsulated in a 2-lead flange package (SOT467C) with a ceramic cap. The common source is connected to the flange.

PINNING - SOT467C

PIN	DESCRIPTION
1	drain
2	gate
3	source, connected to flange

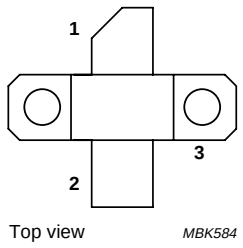


Fig.1 Simplified outline (SOT467C).

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 (%)
Pulsed class-AB; t_p = 50 µs; δ = 2 %	1030 to 1090	36	10	>15	>40

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BLA1011-10	–	flanged LDMOST ceramic package; 2 mounting holes; 2 leads	SOT467C

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	75	V
V_{GS}	gate-source voltage		–	±15	V
I_D	drain current (DC)		–	2.2	A
P_{tot}	total power dissipation	$T_h \leq 25$ °C	–	25	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	200	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$Z_{th(j\text{-}mb)}$	thermal impedance from junction to mounting base	T_{mb} = 25 °C; note 1	1.2	K/W
$R_{th(mb\text{-}h)}$	thermal resistance from mounting base to heatsink	note 2	0.55	K/W

Notes

1. Thermal impedance is determined under RF operating conditions with pulsed bias.
2. Typical value for SOT467C mounted with thermal compound and 0.6 Nm fastening torque.

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 = 0.7 mA	75	–	–	V
V_{GSth}	gate-source threshold voltage	V_{DS} = 10 V; I_D = 20 mA	4	–	5	V
I_{DSS}	drain-source leakage current	V_{GS} = 0; V_{DS} = 28 V	–	–	0.1	mA
I_{DSX}	on-state drain current	V_{GS} = V_{GSth} + 9 V; V_{DS} = 10 V	2.8	–	–	A
I_{GSS}	gate leakage current	V_{GS} = ±15 V; V_{DS} = 0	–	–	40	nA
g_{fs}	forward transconductance	V_{DS} = 10 V; I_D = 0.75 A	–	0.5	–	S
R_{DSon}	drain-source on-state resistance	V_{GS} = 10 V; I_D = 0.75 A	–	1.2	–	Ω

APPLICATION INFORMATION

RF performance in a common source class-AB circuit. T_h = 25 °C; $R_{th\ mb\text{-}h}$ = 0.55 K/W unless otherwise specified.

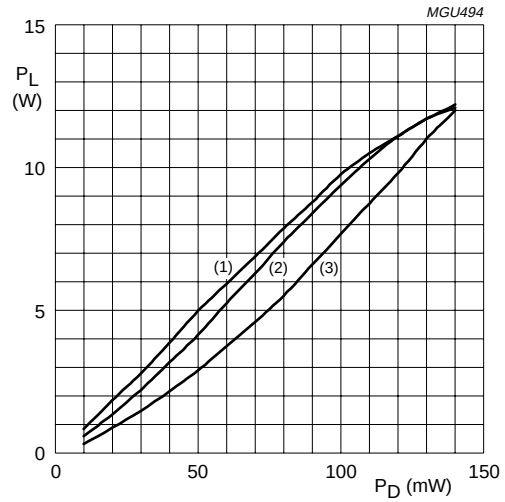
MODE OF OPERATION	f (MHz)	V_{DS} (V)	I_{DQ} (mA)	P_L (W)	G_p (dB)	η_D (%)	t_r (ns)	t_f (ns)	PULSE DROOP (dB)
Pulsed class-AB; t_p = 50 µs; δ = 2%	1030 to 1090	36	50	10	>15	>40	<20	<20	<0.5

Ruggedness in class-AB operation

The BLA1011-10 is capable of withstanding a load mismatch corresponding to VSWR = 5 : 1 through all phases under the operating conditions.

Typical impedance values

FREQUENCY (MHz)	Z_S (Ω)	Z_L (Ω)
1030	1 + j 10.6	4.3 + j 7
1060	1.3 + j 6.99	5.99 + j 13.98
1090	1.42 + j 7	7 + j 11.58



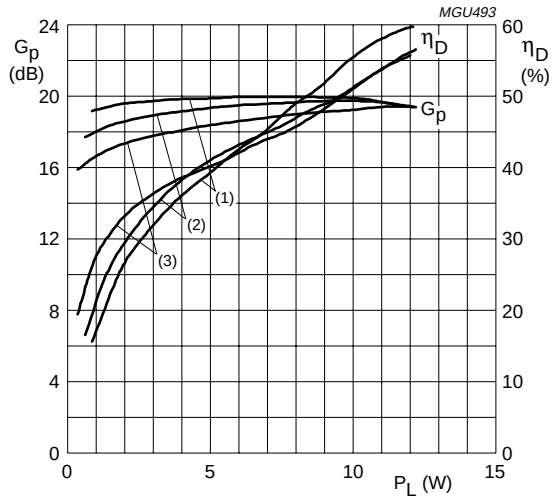
T_h = 25 °C; V_{DS} = 36 V; I_{DQ} = 50 mA; class-AB;
t_p = 50 µs; δ = 2%.

(1) f = 1090 MHz.

(2) f = 1060 MHz.

(3) f = 1030 MHz.

Fig.2 Load power as a function of drive power; typical values.



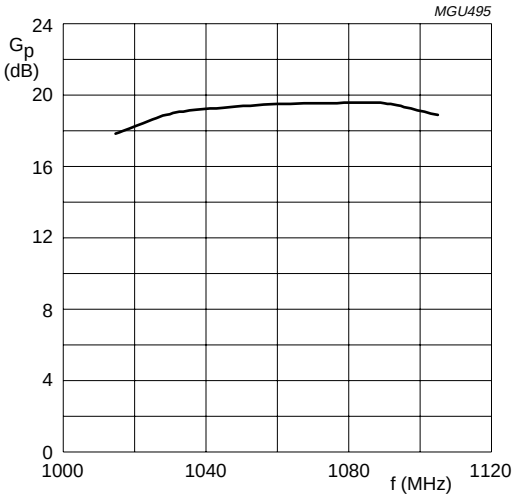
T_h = 25 °C; V_{DS} = 36 V; I_{DQ} = 50 mA; class-AB;
t_p = 50 µs; δ = 2%.

(1) f = 1090 MHz.

(2) f = 1060 MHz.

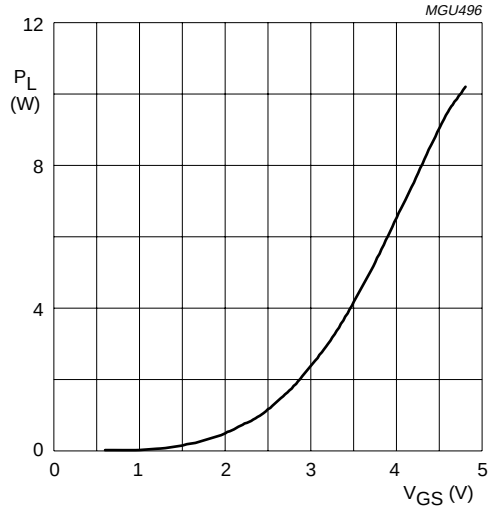
(3) f = 1030 MHz.

Fig.3 Power gain and efficiency as functions of load power; typical values.



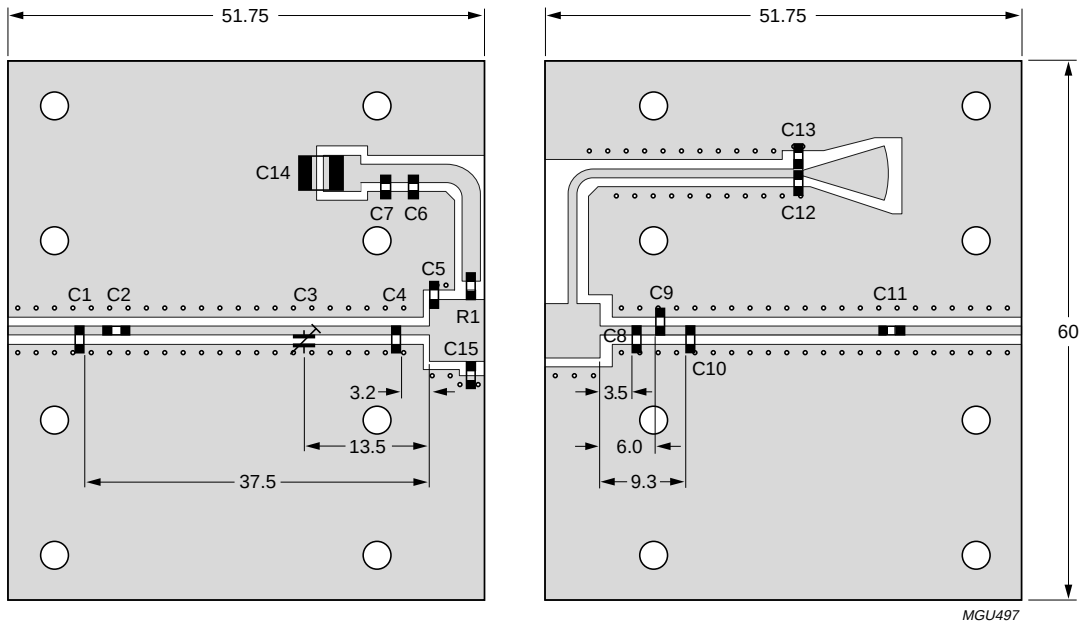
T_h = 25 °C; V_{DS} = 36 V; I_{DQ} = 50 mA; class-AB;
P_L = 10 W; t_p = 50 µs; δ = 2%.

Fig.4 Power gain as a function of frequency; typical values.



T_h = 25 °C; V_{DS} = 36 V; I_{DQ} = 50 mA; class-AB;
f = 1090 MHz; t_p = 50 µs; δ = 2%.

Fig.5 Load power as a function of gate-source voltage; typical values.



Dimensions in mm.

The components are situated on one side of the Rogers 6006 printed-circuit board (thickness = 0.64 mm; ε_r = 6.2), 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.6 Printed-circuit board for class-AB test circuit.

List of components for class-AB test circuit (see Fig.6)

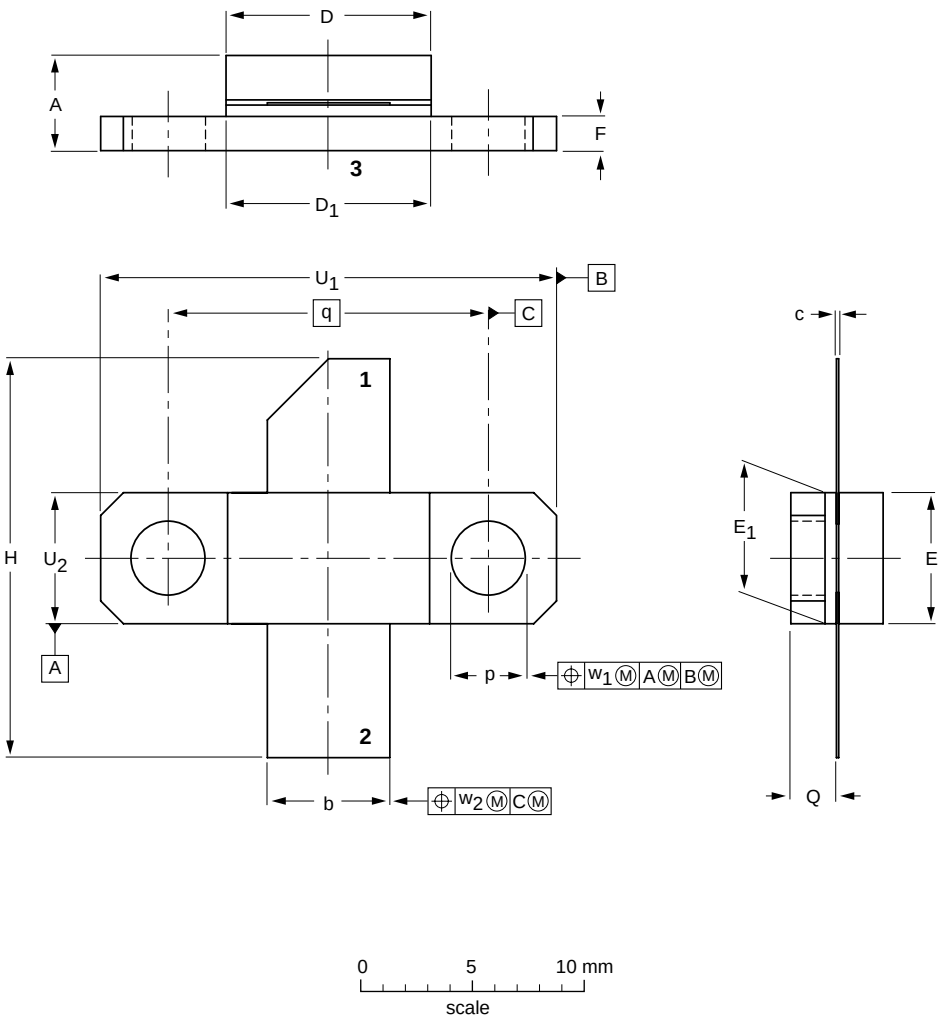
COMPONENT	DESCRIPTION	VALUE
C1	multilayer ceramic chip capacitor; note 1	2.7 pF
C2, C11	multilayer ceramic chip capacitor; note 1	56 pF
C3	tekelec trimmer; type 37293	0.8 to 8 pF
C4	multilayer ceramic chip capacitor; note 1	3.6 pF
C5	multilayer ceramic chip capacitor; note 1	6.2 pF
C6	multilayer ceramic chip capacitor; note 1	2 pF
C7, C13	multilayer ceramic chip capacitor; note 1	62 pF
C8	multilayer ceramic chip capacitor; note 1	11 pF
C9	multilayer ceramic chip capacitor; note 1	1.5 pF
C10	multilayer ceramic chip capacitor; note 1	6.2 pF
C12	multilayer ceramic chip capacitor; note 2	20 nF
C14	electrolytic capacitor	4.7 μF; 50 V
C15	multilayer ceramic chip capacitor; note 1	36 pF
R1	SMD resistor (0805)	22 Ω

Notes

1. American Technical Ceramics type 100A or capacitor of same quality.
2. American Technical Ceramics type 200B or capacitor of same quality.

PACKAGE OUTLINE

Flanged LDMOST ceramic package; 2 mounting holes; 2 leads **SOT467C**



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

UNIT	A	b	c	D	D_1	E	E_1	F	H	p	Q	q	U_1	U_2	w_1	w_2
mm	4.67 3.94	5.59 5.33	0.15 0.10	9.25 9.04	9.27 9.02	5.92 5.77	5.97 5.72	1.65 1.40	18.54 17.02	3.43 3.18	2.21 1.96	14.27	20.45 20.19	5.97 5.72	0.25	0.51
inch	0.184 0.155	0.220 0.210	0.006 0.004	0.364 0.356	0.365 0.355	0.233 0.227	0.235 0.225	0.065 0.055	0.73 0.67	0.135 0.125	0.087 0.077	0.562	0.805 0.795	0.235 0.225	0.010	0.020

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT467C						~~99-12-06~~ 99-12-28

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.
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