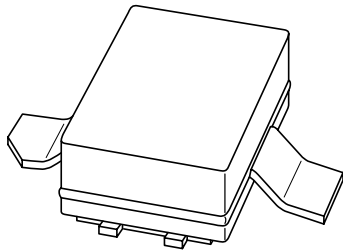


DATA SHEET



BLA1011-2 Avionics LDMOS transistor

Product specification
Supersedes data of 2002 Oct 02

2003 Nov 19

Avionics LDMOS transistor

BLA1011-2

FEATURES

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

APPLICATIONS

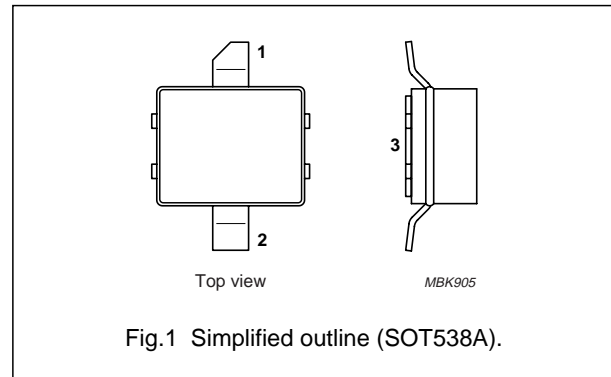
- Avionics applications in the 1030 to 1090 MHz frequency range.

DESCRIPTION

Silicon N-channel enhancement mode lateral D-MOS transistor encapsulated in a 2-lead flangeless package (SOT538A) with a ceramic cap. The common source is connected to the mounting base.

PINNING - SOT538A

PIN	DESCRIPTION
1	drain
2	gate
3	source, connected to mounting base



QUICK REFERENCE DATA

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

MODE OF OPERATION	f (MHz)	V_{DS} (V)	P_L (W)	G_p (dB)
Pulsed class-AB; $t_p = 50\text{ }\mu\text{s}$; $\delta = 2\%$	1030 to 1090	36	2	>16

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BLA1011-2	–	ceramic surface mounted package; 2 leads	SOT538A

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	$T_h \leq 25\text{ }^\circ\text{C}$	–	10	W
T_{stg}	storage temperature		–65	+150	$^\circ\text{C}$
T_j	junction temperature		–	200	$^\circ\text{C}$

Avionics LDMOS transistor

BLA1011-2

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$Z_{th(j-mb)}$	thermal impedance from junction to mounting base	note 1	1	K/W
$R_{th(mb-h)}$	thermal resistance from mounting base to heatsink	note 2	6.5	K/W

Notes

1. Thermal impedance is determined under RF operating conditions with pulsed bias and $T_h = 25\text{ }^\circ\text{C}$.
2. Typical value for mounting on PCB with 32 0.4 mm thermal vias with 20 μm tin plating and thermal compound between PCB and heatsink.

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	$V_{GS} = 0$; $I_D = 0.2\text{ mA}$	75	–	–	V
V_{GSth}	gate-source threshold voltage	$V_{DS} = 10\text{ V}$; $I_D = 20\text{ mA}$	2	–	5	V
I_{DSS}	drain-source leakage current	$V_{GS} = 0$; $V_{DS} = 26\text{ V}$	–	–	0.1	mA
I_{DSX}	on-state drain current	$V_{GS} = V_{GSth} + 9\text{ V}$; $V_{DS} = 10\text{ V}$	2.8	–	–	A
I_{GSS}	gate leakage current	$V_{GS} = \pm 15\text{ V}$; $V_{DS} = 0$	–	–	40	nA
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}$; $I_D = 0.75\text{ A}$	–	0.5	–	S
R_{DSon}	drain-source on-state resistance	$V_{GS} = 10\text{ V}$; $I_D = 0.75\text{ A}$	–	1.2	–	Ω
C_{is}	input capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 26\text{ V}$; $f = 1\text{ MHz}$	–	11	–	pF
C_{os}	output capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 26\text{ V}$; $f = 1\text{ MHz}$	–	9	–	pF
C_{rs}	feedback capacitance	$V_{GS} = 0\text{ V}$; $V_{DS} = 26\text{ V}$; $f = 1\text{ MHz}$	–	0.5	–	pF

APPLICATION INFORMATION

RF performance in a common source class-AB circuit. $T_h = 25\text{ }^\circ\text{C}$; $R_{th\text{ mb-h}} = 6.5\text{ K/W}$ unless otherwise specified.

MODE OF OPERATION	f (MHz)	V_{DS} (V)	I_{DQ} (mA)	P_L (W)	G_p (dB)	t_r (ns)	t_f (ns)	PULSE DROOP (dB)
Pulsed class-AB; $t_p = 50\text{ }\mu\text{s}$; $\delta = 2\%$	1030 to 1090	36	50	2	>16	<15	<15	<0.5

Ruggedness in class-AB operation

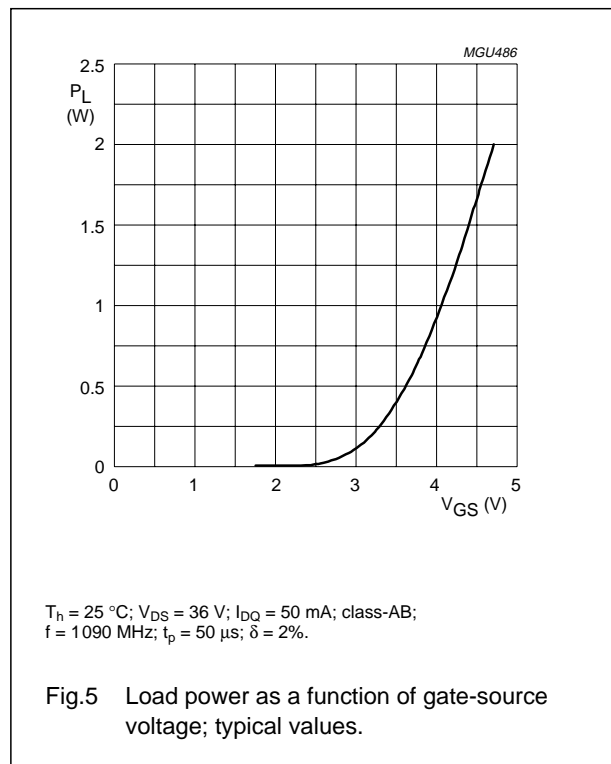
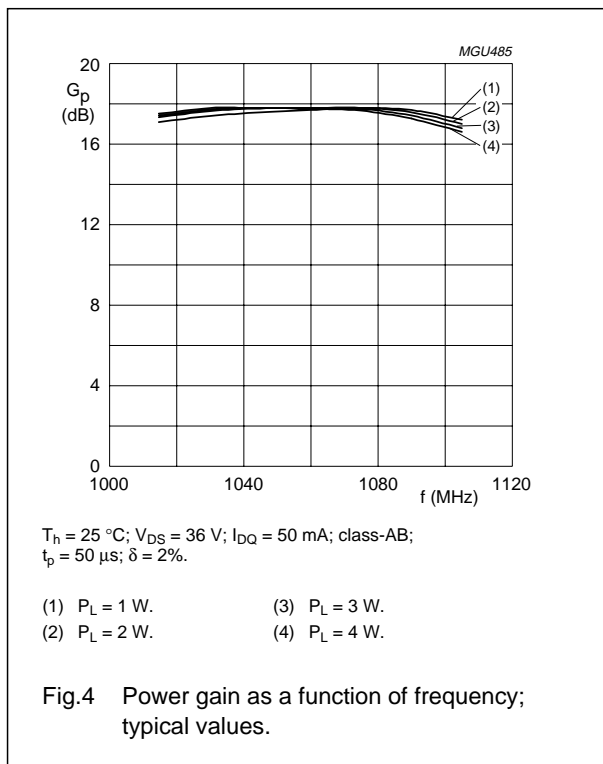
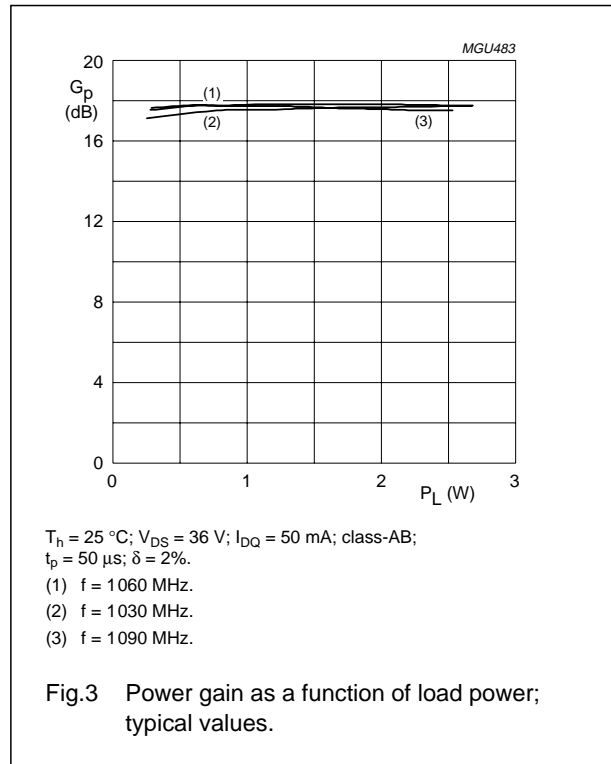
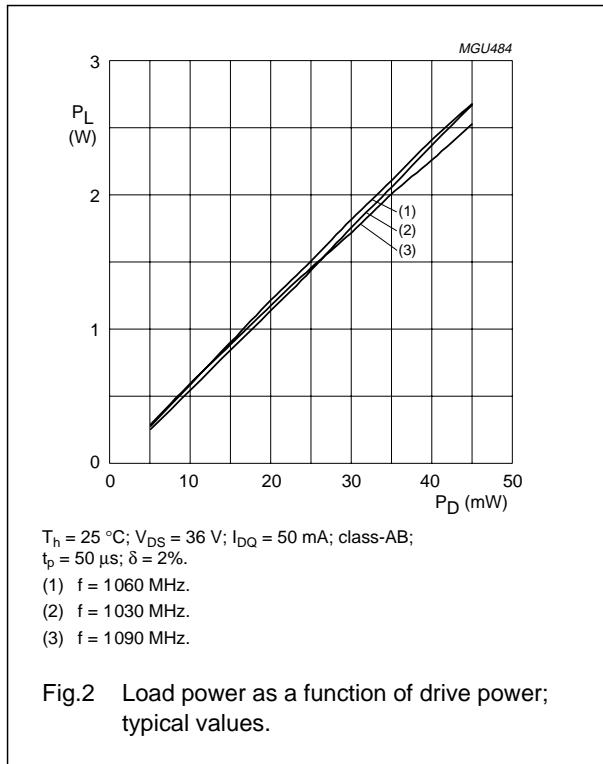
The BLA1011-2 is capable of withstanding a load mismatch corresponding to $V_{SWR} = 5 : 1$ through all phases under the operating conditions.

Typical impedance values

FREQUENCY (MHz)	Z_S (Ω)	Z_L (Ω)
1030	$1.51 + j 11.76$	$6.9 + j 5$
1060	$1.51 + j 11.26$	$6.7 + j 5.9$
1090	$1.52 + j 10.77$	$5.1 + j 6.6$

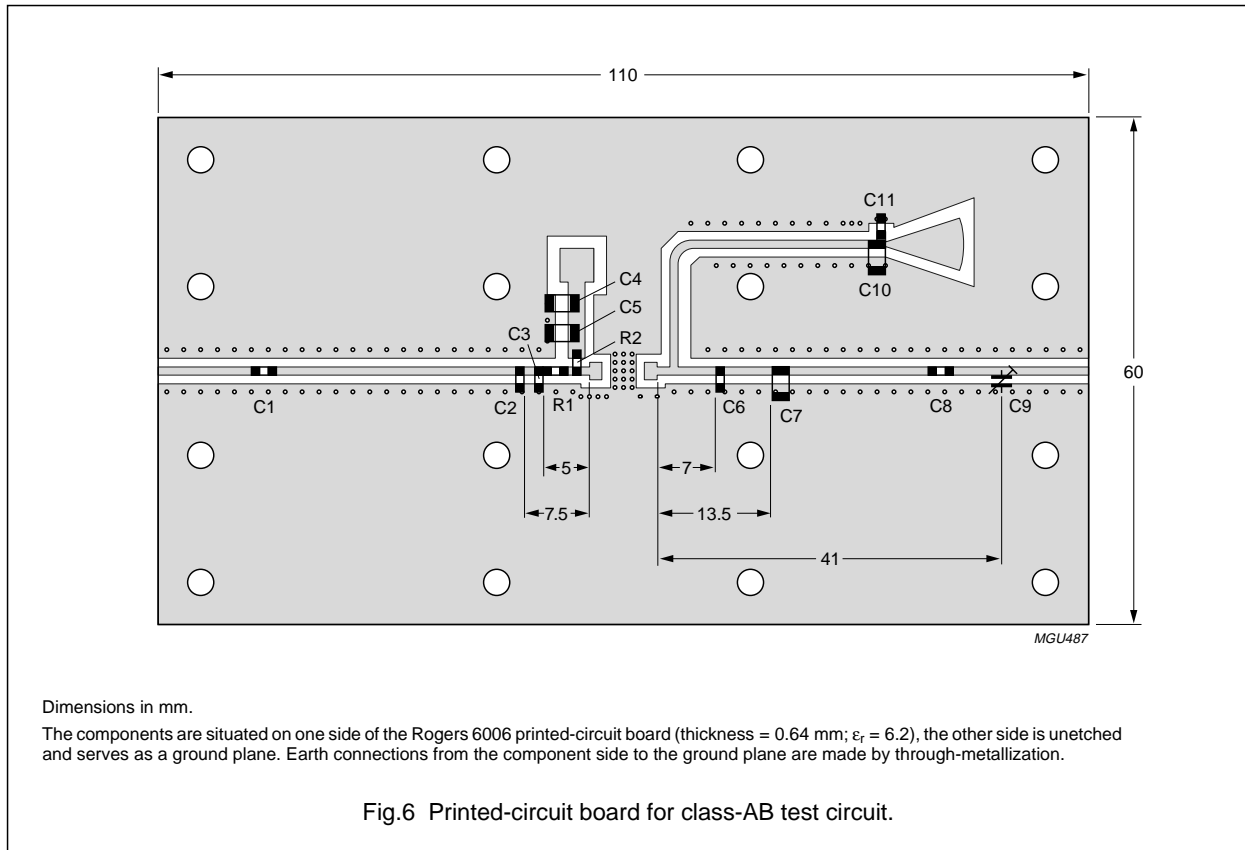
Avionics LDMOS transistor

BLA1011-2



Avionics LDMOS transistor

BLA1011-2



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

COMPONENT	DESCRIPTION	VALUE
C1, C8	multilayer ceramic chip capacitor; note 1	56 pF
C2	multilayer ceramic chip capacitor; note 1	7.5 pF
C3	multilayer ceramic chip capacitor; note 1	1.8 pF
C4, C10	multilayer ceramic chip capacitor; note 2	20 nF
C5	multilayer ceramic chip capacitor; note 3	33 pF
C6	multilayer ceramic chip capacitor; note 1	5.6 pF
C7	multilayer ceramic chip capacitor; note 3	6.2 pF
C9	tekelec trimmer; type 37283	0.4 to 2.5 pF
C11	multilayer ceramic chip capacitor; note 1	33 pF
R1	SMD resistor	2.2 Ω (2 in parallel)
R2	SMD resistor	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.
3. American Technical Ceramics type 100B or capacitor of same quality.

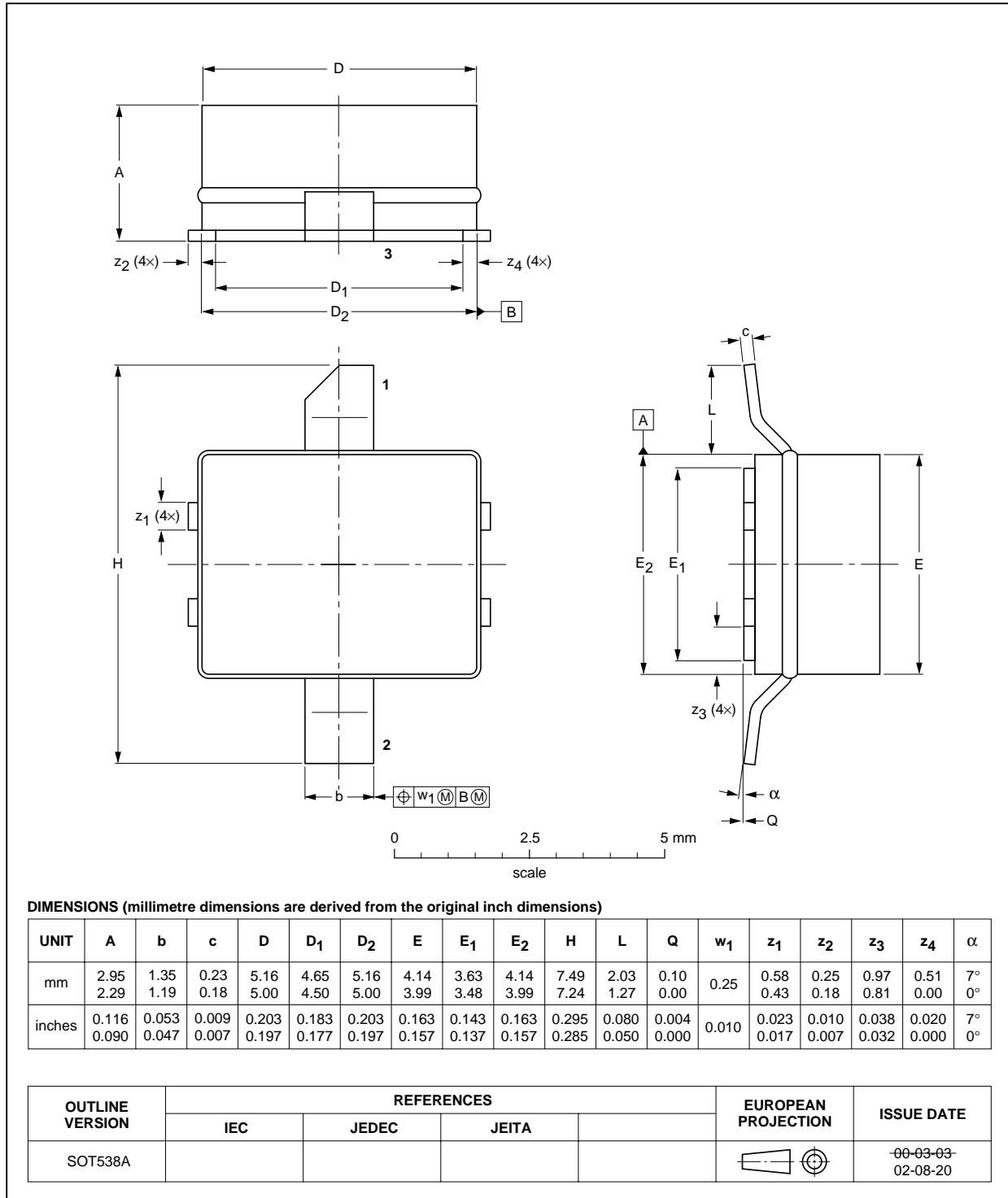
Avionics LDMOS transistor

BLA1011-2

PACKAGE OUTLINE

Ceramic surface mounted package; 2 leads

SOT538A



Avionics LDMOS transistor

BLA1011-2

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.

Avionics LDMOS transistor

BLA1011-2

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.

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

R77/05/pp9

Date of release: 2003 Nov 19

Document order number: 9397 750 12245

Let's make things better.

**Philips
Semiconductors**



PHILIPS