

DATA SHEET

BSP230

P-channel enhancement mode
vertical D-MOS transistor

Product specification
Supersedes data of 1997 Jun 17
File under Discrete Semiconductors, SC13b

1997 Oct 21

P-channel enhancement mode
vertical D-MOS transistor

BSP230

FEATURES

- Direct interface to C-MOS, TTL, etc.
- High-speed switching
- No secondary breakdown.

APPLICATIONS

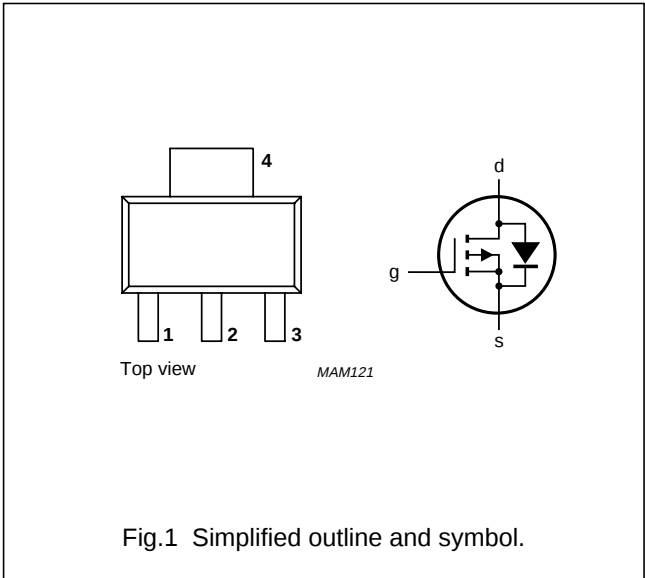
- Line current interruptor in telephone sets
- Relay, high speed and line transformer drivers.

DESCRIPTION

P-channel enhancement mode vertical D-MOS transistor in a SOT223 plastic SMD package.

PINNING - SOT223

PIN	SYMBOL	DESCRIPTION
1	g	gate
2	d	drain
3	s	source
4	d	drain



CAUTION

The device is supplied in an antistatic package.
The gate-source input must be protected against static discharge during transport or handling.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	–300	V
V_{GSO}	gate-source voltage (DC)	open drain	–	± 20	V
V_{GSth}	gate-source threshold voltage	$I_D = -1\text{ mA}$; $V_{DS} = V_{GS}$	–1.95	–2.8	V
I_D	drain current (DC)		–	–210	mA
R_{DSon}	drain-source on-state resistance	$I_D = -170\text{ mA}$; $V_{GS} = -10\text{ V}$	–	17	Ω
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$	–	1.5	W

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	–300	V
V_{GSO}	gate-source voltage (DC)	open drain	–	±20	V
I_D	drain current (DC)		–	–210	mA
I_{DM}	peak drain current		–	–0.75	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$; note 1	–	1.5	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	83.3	K/W

Note to the Limiting values and Thermal characteristics

1. Device mounted on an epoxy printed-circuit board, $40 \times 40 \times 1.5\text{ mm}$; mounting pad for drain lead minimum 6 cm^2 .

CHARACTERISTICS

$T_j = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	$V_{GS} = 0$; $I_D = -10\text{ }\mu\text{A}$	–300	–	–	V
V_{GSth}	gate-source threshold voltage	$V_{DS} = V_{GS}$; $I_D = -1\text{ mA}$	–1.95	–	–2.8	V
I_{DSS}	drain-source leakage current	$V_{GS} = 0$; $V_{DS} = -240\text{ V}$	–	–	–100	nA
I_{GSS}	gate leakage current	$V_{GS} = \pm 20\text{ V}$; $V_{DS} = 0$	–	–	±100	nA
R_{DSon}	drain-source on-state resistance	$V_{GS} = -10\text{ V}$; $I_D = -170\text{ mA}$	–	–	17	Ω
$ y_{fs} $	forward transfer admittance	$V_{DS} = -25\text{ V}$; $I_D = -170\text{ mA}$	100	–	–	mS
C_{iss}	input capacitance	$V_{GS} = 0$; $V_{DS} = -25\text{ V}$; $f = 1\text{ MHz}$	–	60	90	pF
C_{oss}	output capacitance	$V_{GS} = 0$; $V_{DS} = -25\text{ V}$; $f = 1\text{ MHz}$	–	15	30	pF
C_{rss}	reverse transfer capacitance	$V_{GS} = 0$; $V_{DS} = -25\text{ V}$; $f = 1\text{ MHz}$	–	5	15	pF
Switching times (see Figs 2 and 3)						
t_{on}	turn-on time	$V_{GS} = 0\text{ to }-10\text{ V}$; $V_{DD} = -50\text{ V}$; $I_D = -250\text{ mA}$	–	5	10	ns
t_{off}	turn-off time	$V_{GS} = -10\text{ to }0\text{ V}$; $V_{DD} = -50\text{ V}$; $I_D = -250\text{ mA}$	–	15	30	ns

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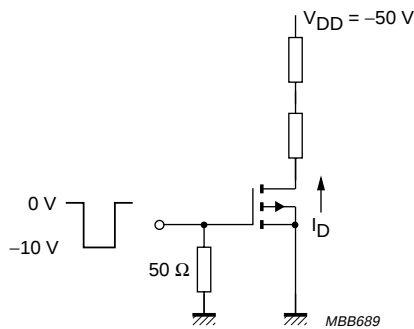


Fig.2 Switching time test circuit.

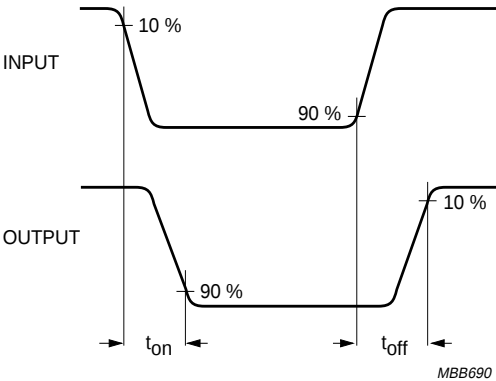


Fig.3 Input and output waveforms.

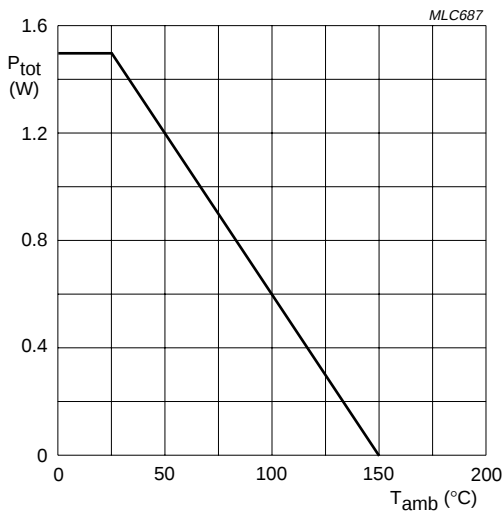
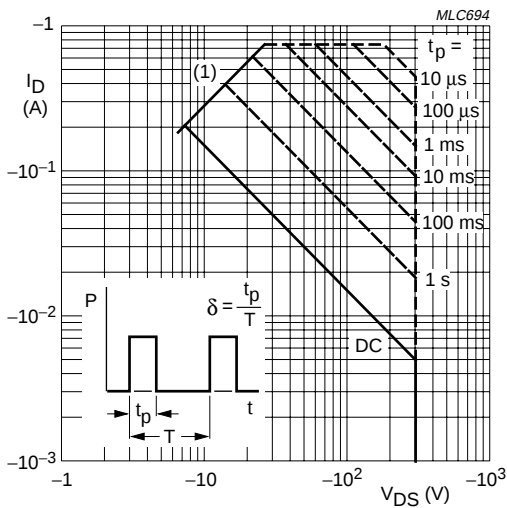


Fig.4 Power derating curve.

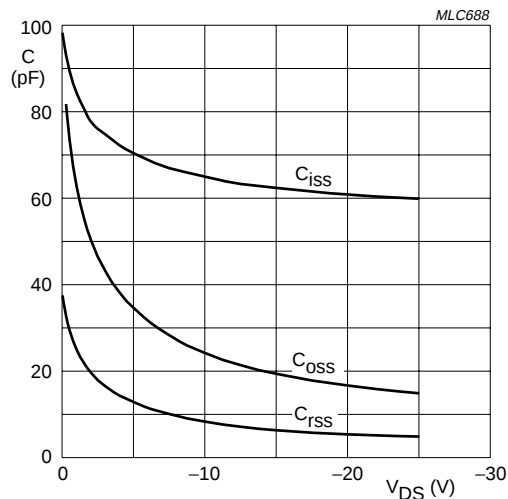


$\delta = 0.01$.
 $T_{amb} = 25\text{ }^{\circ}\text{C}$.
(1) R_{DSon} limitation.

Fig.5 DC SOAR.

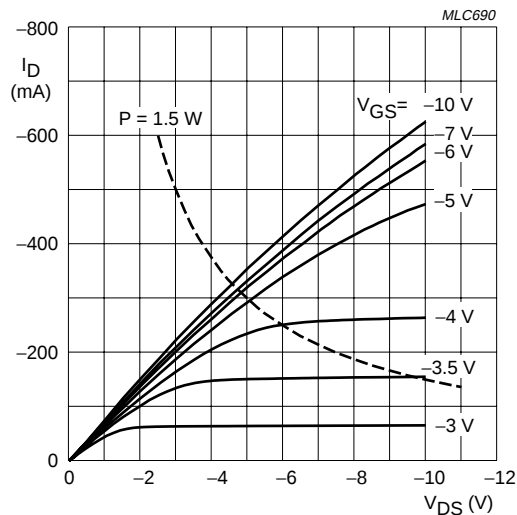
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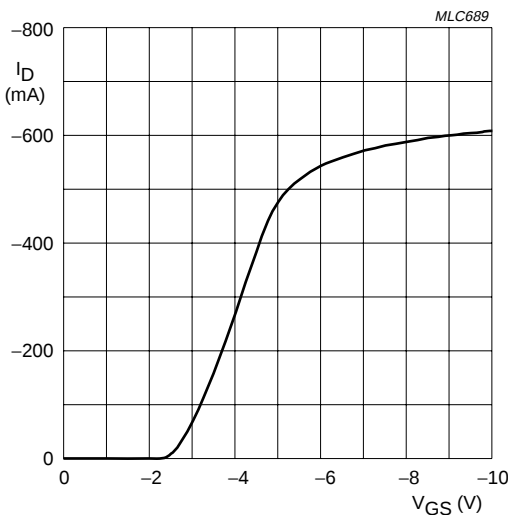
$V_{GS} = 0$.
 $T_j = 25^\circ\text{C}$.
 $f = 1\text{ MHz}$.

Fig.6 Capacitance as a function of drain source voltage; typical values.



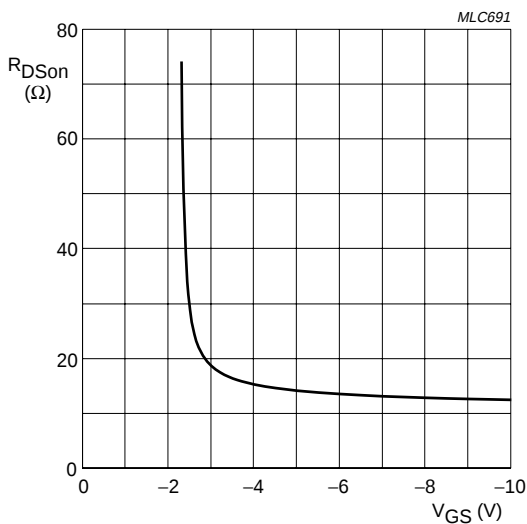
$T_j = 25^\circ\text{C}$.

Fig.7 Typical output characteristics.



$V_{DS} = -25\text{ V}$.
 $T_j = 25^\circ\text{C}$.

Fig.8 Typical transfer characteristics.

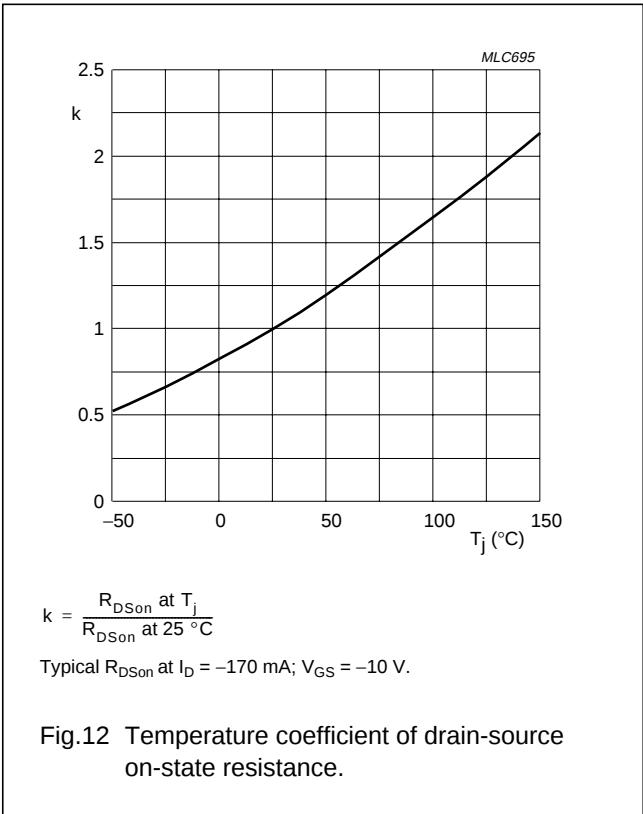
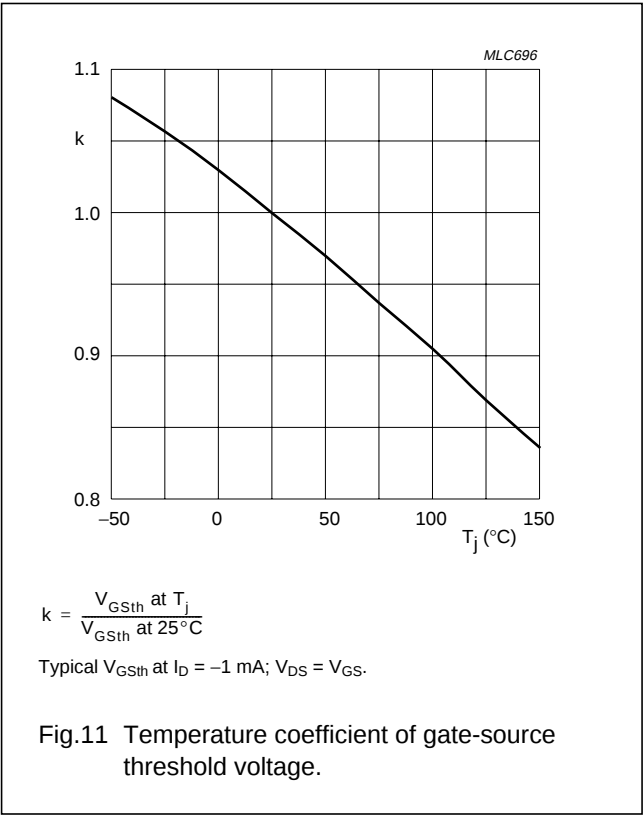
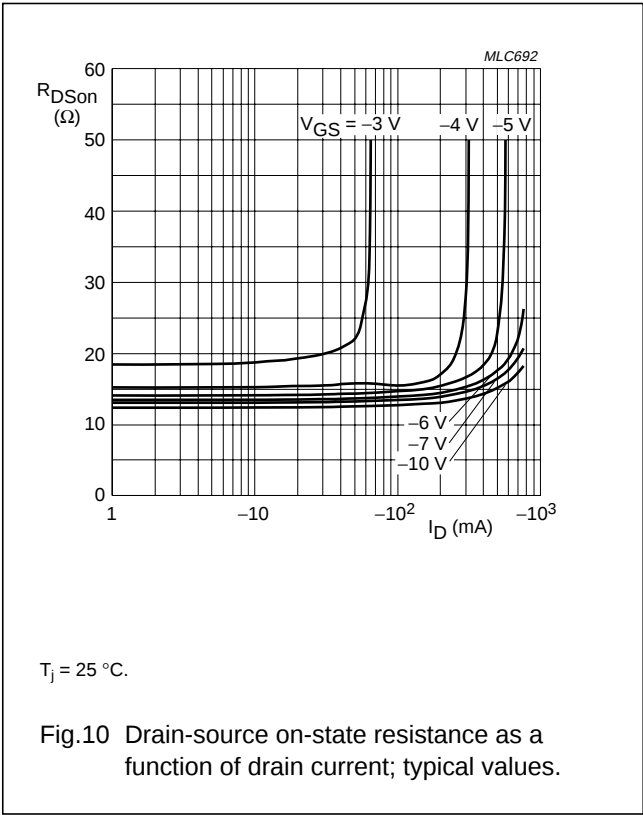


$I_D = -170\text{ mA}$.
 $T_j = 25^\circ\text{C}$.

Fig.9 Drain-source on-state resistance as a function of gate-source voltage; typical values.

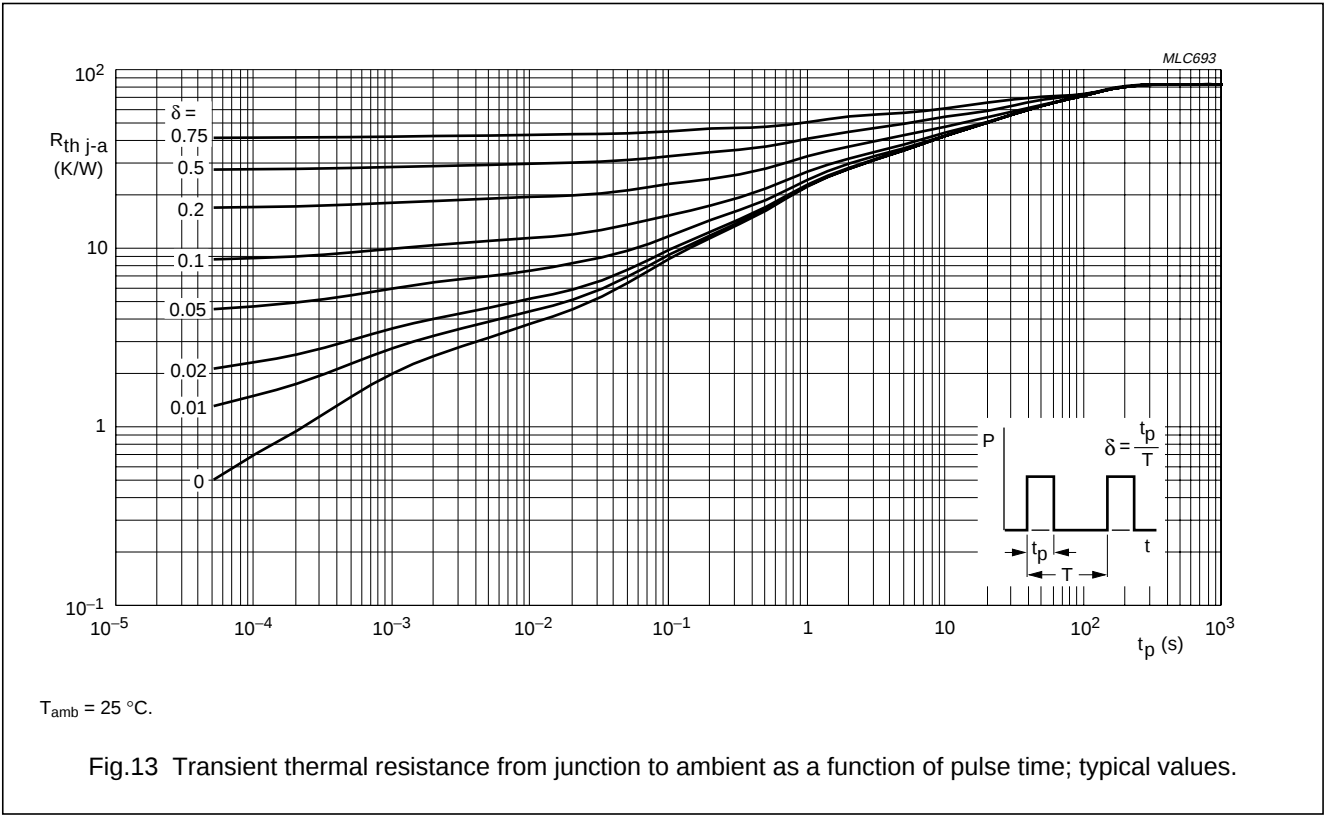
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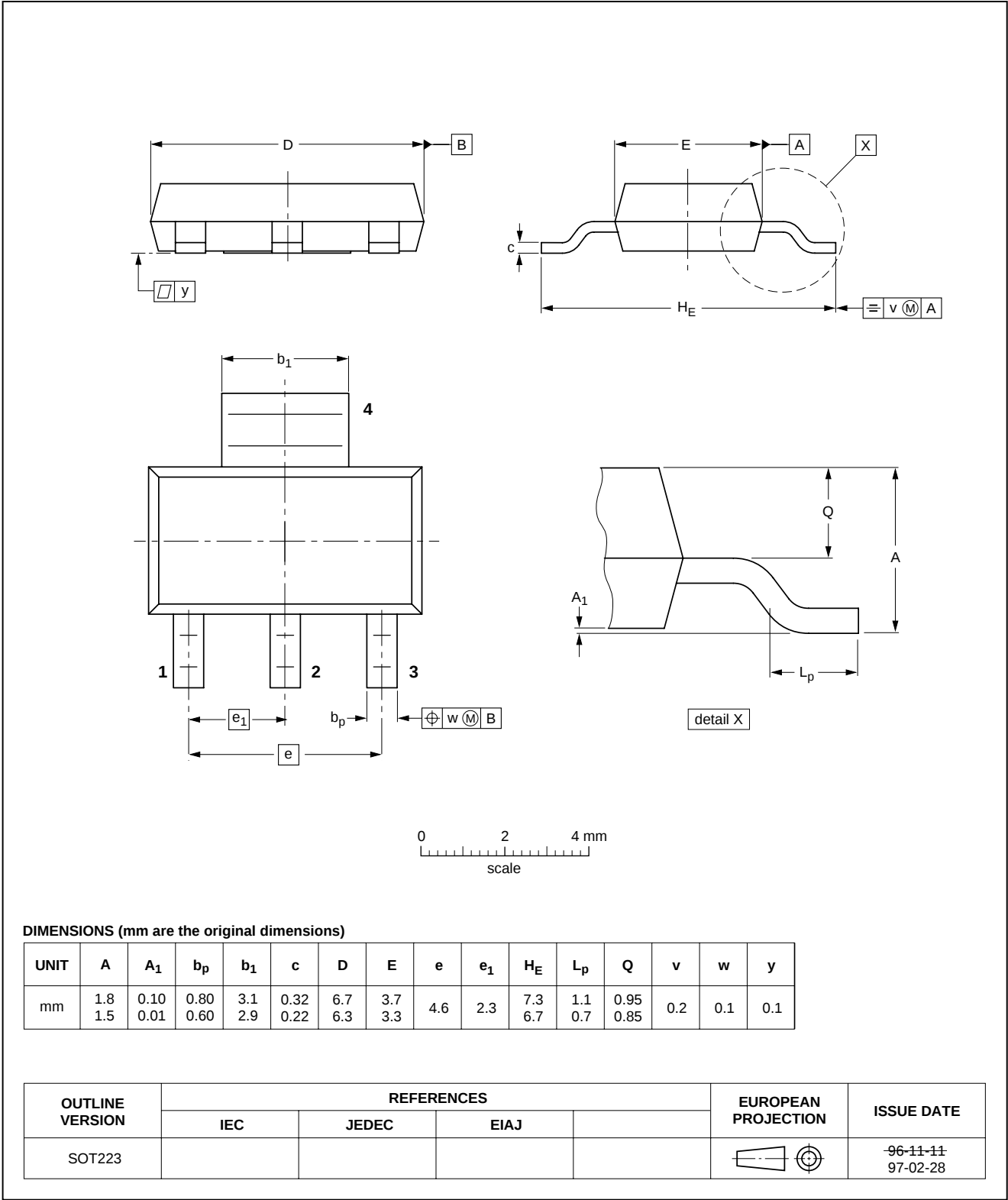
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PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 4 leads

SOT223



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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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NOTES

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Philips Semiconductors – a worldwide company

Argentina: see South America

Australia: 34 Waterloo Road, NORTH RYDE, NSW 2113,
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213, Tel. +43 160 1010,
Fax. +43 160 101 1210

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., Energoprojekt, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 689 211, Fax. +359 2 689 102

Canada: PHILIPS SEMICONDUCTORS/COMPONENTS,
Tel. +1 800 234 7381

China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,
Tel. +852 2319 7888, Fax. +852 2319 7700

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: 4 Rue du Port-aux-Vins, 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,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

Indonesia: see Singapore

Ireland: Newstead, Clonskeagh, DUBLIN 14,
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,
Tel. +81 3 3740 5130, Fax. +81 3 3740 5077

Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
Tel. +82 2 709 1412, Fax. +82 2 709 1415

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
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Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
Tel. +9-5 800 234 7381

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

Portugal: see Spain

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Russia: Philips Russia, Ul. Usatcheva 35A, 119048 MOSCOW,
Tel. +7 095 755 6918, Fax. +7 095 755 6919

Singapore: Lorong 1, Toa Payoh, SINGAPORE 1231,
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South Africa: S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale,
2092 JOHANNESBURG, P.O. Box 7430 Johannesburg 2000,
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South America: Rua do Rocio 220, 5th floor, Suite 51,
04552-903 São Paulo, SÃO PAULO - SP, Brazil,
Tel. +55 11 821 2333, Fax. +55 11 829 1849

Spain: Balmes 22, 08007 BARCELONA,
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Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,
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Turkey: Talatpasa Cad. No. 5, 80640 GÜLTEPE/ISTANBUL,
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Ukraine: PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,
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United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
MIDDLESEX UB3 5BX, Tel. +44 181 730 5000, Fax. +44 181 754 8421

United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
Tel. +1 800 234 7381

Uruguay: see South America

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