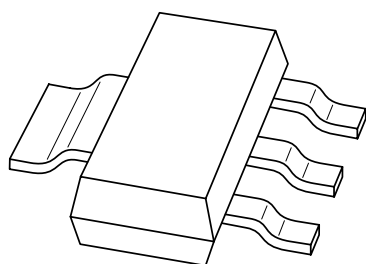


DATA SHEET



BSP130

N-channel enhancement mode
vertical D-MOS transistor

Product specification
Supersedes data of 1997 Jun 23

2001 Dec 11

N-channel enhancement mode vertical D-MOS transistor

BSP130

FEATURES

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

APPLICATIONS

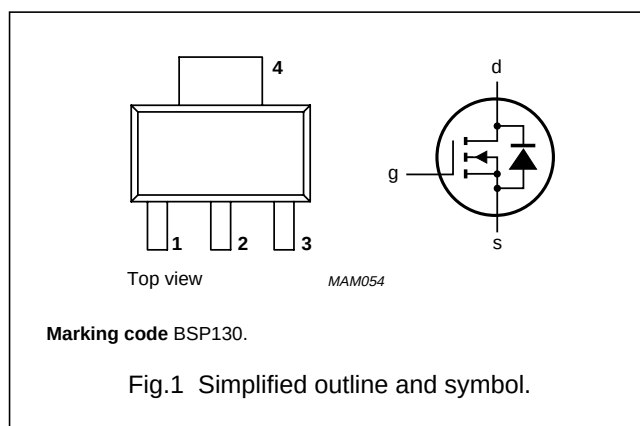
- Line current interruptor in telephone sets
- Relay, high-speed and line transformer drivers.

DESCRIPTION

N-channel enhancement mode vertical D-MOS transistor in a SOT223 package.

PINNING - SOT223

PIN	DESCRIPTION
1	gate
2	drain
3	source
4	drain



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage (DC)		–	300	V
I_D	drain current (DC)		–	350	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	1.5	W
V_{GSO}	gate-source voltage	open drain	–	± 20	V
$R_{DS(on)}$	drain-source on-state resistance	$I_D = 250\text{ mA}; V_{GS} = 10\text{ V}$	–	6	Ω
$V_{GS(off)}$	gate-source cut-off voltage	$I_D = 1\text{ mA}; V_{DS} = V_{GS}$	0.8	2	V

LIMITING VALUES

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

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)		–	350	mA
I_{DM}	peak drain current		–	1.4	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}; \text{note 1}$	–	1.5	W
T_{stg}	storage temperature		–55	+150	°C
T_j	junction temperature		–	150	°C

Note

1. Device mounted on an epoxy printed-circuit board, 40 x 40 x 1.5 mm, mounting pad for the drain tab minimum 6 cm².

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THERMAL CHARACTERISTICS

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

Note

1. Device mounted on an epoxy printed-circuit board, 40 x 40 x 1.5 mm, mounting pad for the drain tab minimum 6 cm².

STATIC 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	$I_D = 10\text{ }\mu\text{A}$; $V_{GS} = 0$	300	–	–	V
I_{GSS}	gate-source leakage current	$V_{GS} = \pm 20\text{ V}$; $V_{DS} = 0$	–	–	± 100	nA
V_{GSth}	gate-source threshold voltage	$I_D = 1\text{ mA}$; $V_{DS} = V_{GS}$	0.8	–	2	V
R_{DSon}	drain-source on-state resistance	$I_D = 20\text{ mA}$; $V_{GS} = 2.4\text{ V}$	–	4.8	10	Ω
		$I_D = 250\text{ mA}$; $V_{GS} = 10\text{ V}$	–	3.7	6	Ω
I_{DSS}	drain-source leakage current	$V_{DS} = 240\text{ V}$; $V_{GS} = 0$	–	–	100	nA
$ Y_{fs} $	transfer admittance	$I_D = 250\text{ mA}$; $V_{DS} = 25\text{ V}$	200	690	–	mS
C_{iss}	input capacitance	$V_{DS} = 25\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	–	100	120	pF
C_{oss}	output capacitance	$V_{DS} = 25\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	–	21	30	pF
C_{rss}	feedback capacitance	$V_{DS} = 25\text{ V}$; $V_{GS} = 0$; $f = 1\text{ MHz}$	–	10	15	pF
Switching times (see Figs 2 and 3)						
t_{on}	turn-on time	$I_D = 250\text{ mA}$; $V_{DD} = 50\text{ V}$; $V_{GS} = 0\text{ to }10\text{ V}$	–	6	10	ns
t_{off}	turn-off time	$I_D = 250\text{ mA}$; $V_{DD} = 50\text{ V}$; $V_{GS} = 10\text{ to }0\text{ V}$	–	46	60	ns

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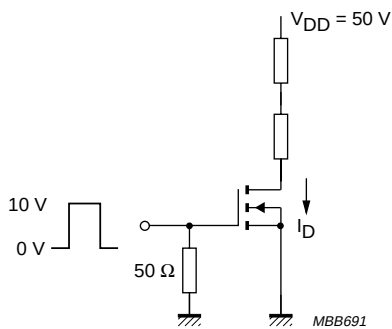


Fig.2 Switching times test circuit.

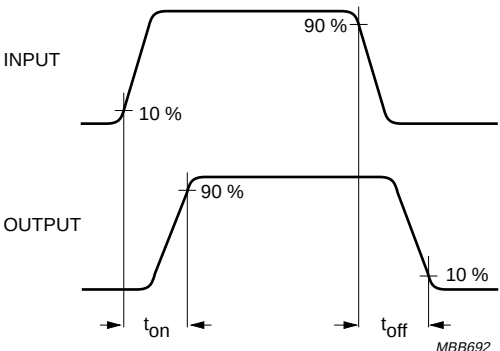


Fig.3 Input and output waveforms.

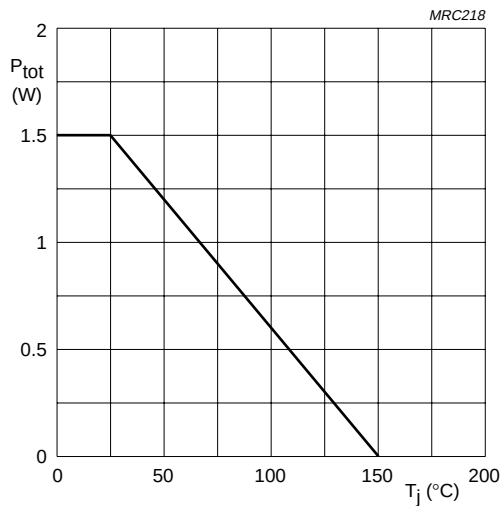
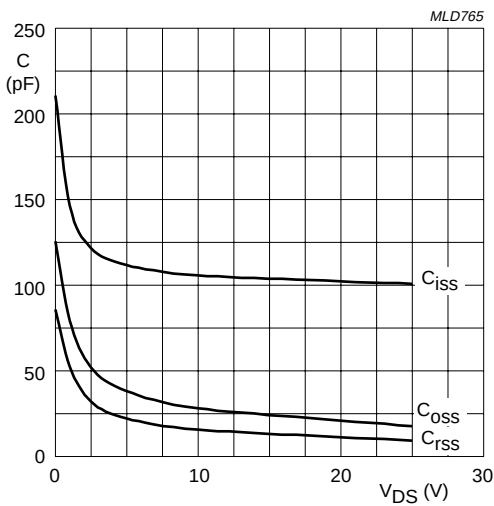


Fig.4 Power derating curve.

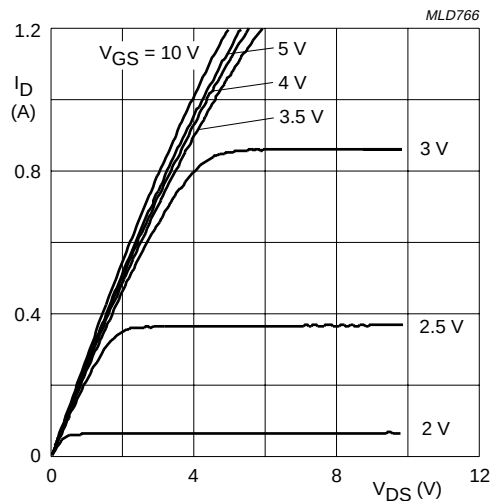


$V_{GS} = 0$; $f = 1$ MHz; $T_j = 25$ °C.

Fig.5 Capacitance as a function of drain-source voltage; typical values.

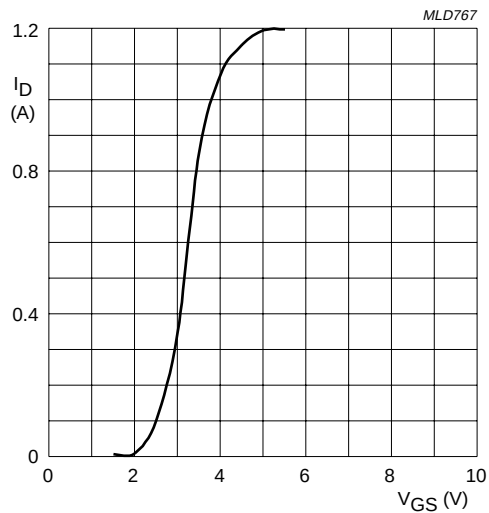
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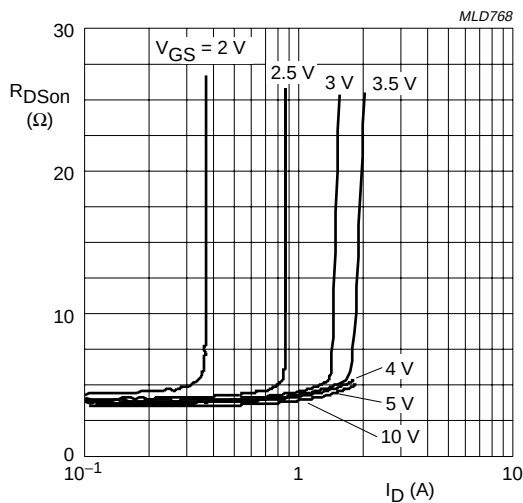
$T_j = 25\text{ }^{\circ}\text{C}.$

Fig.6 Typical output characteristics.



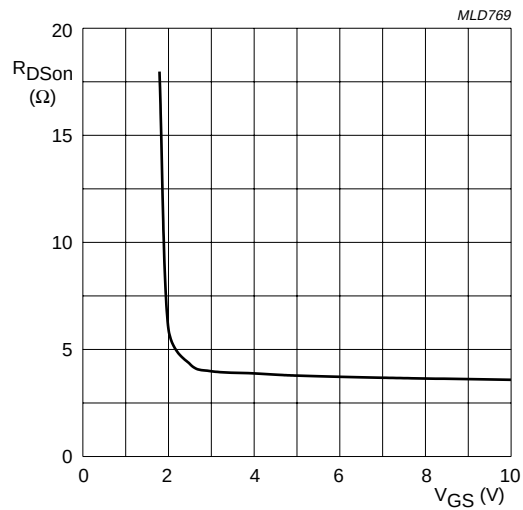
$V_{DS} = 10\text{ V}; T_j = 25\text{ }^{\circ}\text{C}.$

Fig.7 Typical transfer characteristics.



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

Fig.8 Drain-source on-state resistance as a function of drain current; typical values.

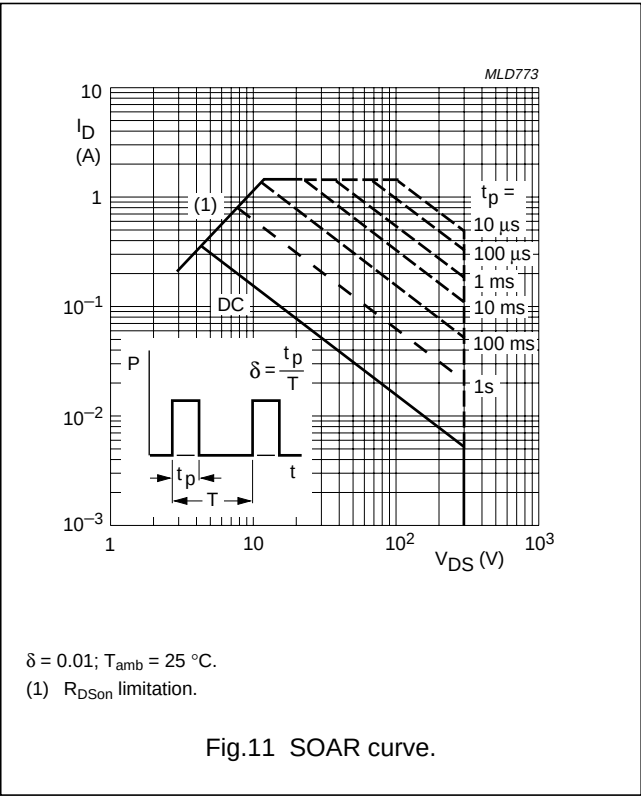
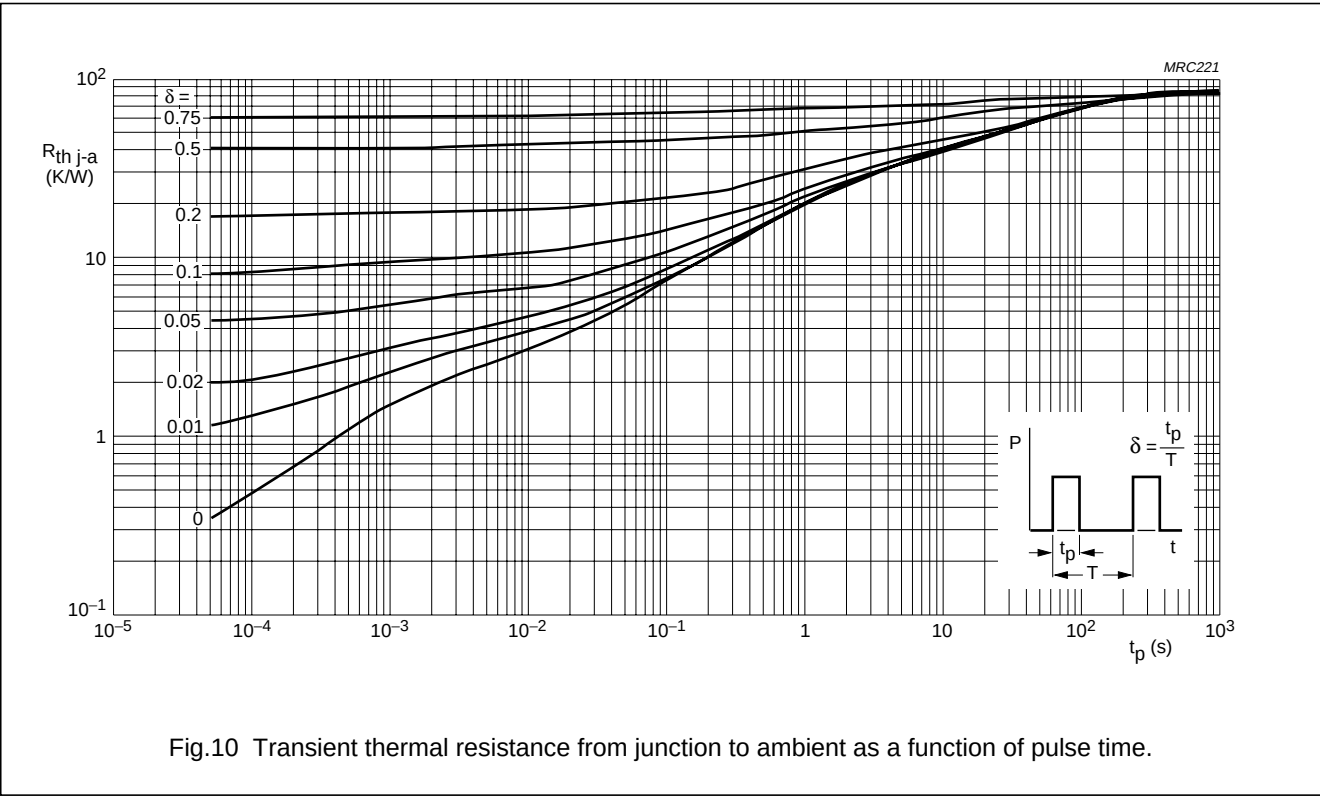


$V_{DS} = 100\text{ mV}; T_j = 25\text{ }^{\circ}\text{C}.$

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

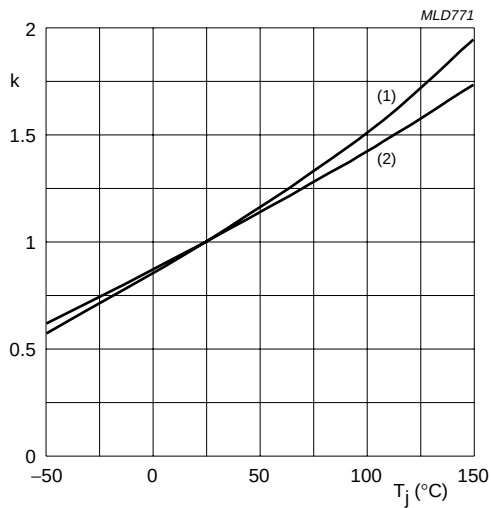
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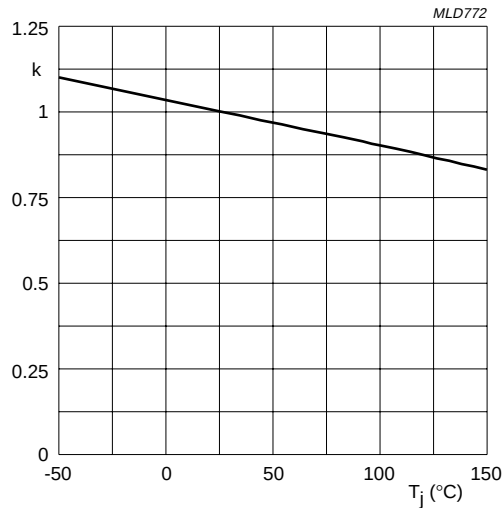
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$$k = \frac{R_{DS(on)} \text{ at } T_j}{R_{DS(on)} \text{ at } 25^\circ\text{C}}$$

Typical $R_{DS(on)}$:
(1) $I_D = 250$ mA; $V_{GS} = 10$ V.
(2) $I_D = 20$ mA; $V_{GS} = 2.4$ V.

Fig.12 Temperature coefficient of drain-source on-state resistance; typical values.



$$k = \frac{V_{GS(th)} \text{ at } T_j}{V_{GS(th)} \text{ at } 25^\circ\text{C}}$$

Typical V_{GSth} at 1 mA.

Fig.13 Temperature coefficient of gate-source threshold voltage; typical values.

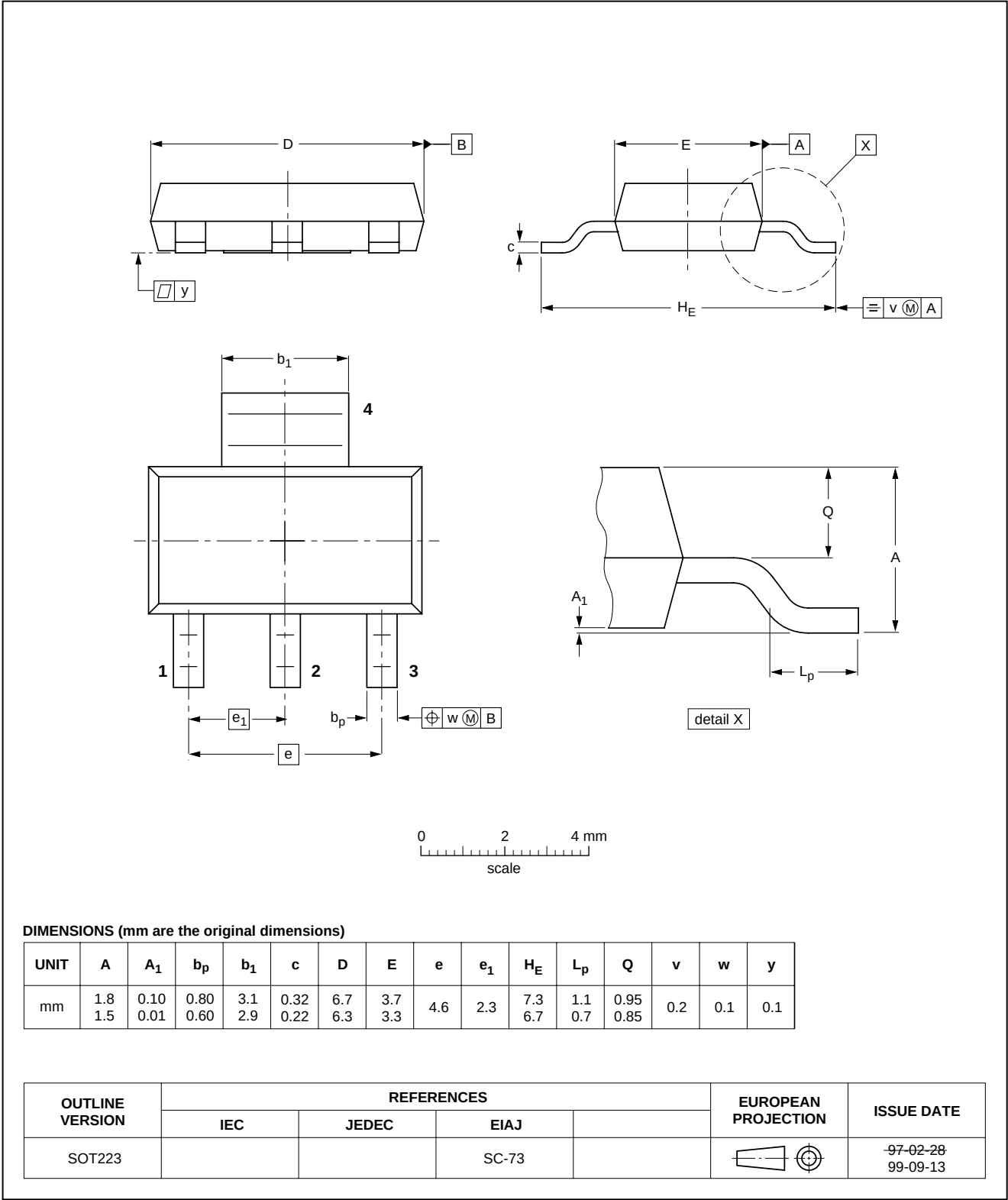
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PACKAGE OUTLINE

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

SOT223



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DATA SHEET STATUS

DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITIONS
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NOTES

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NOTES

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Contact information

For additional information please visit <http://www.semiconductors.philips.com>. Fax: **+31 40 27 24825**

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