

# DATA SHEET

## **BSP106**

N-channel enhancement mode  
vertical D-MOS transistor

Product specification  
File under Discrete Semiconductors, SC13b

April 1995

# N-channel enhancement mode vertical D-MOS transistor

**BSP106**

**FEATURES**

- Very low  $R_{DS(on)}$
- Direct interface to C-MOS, TTL, etc.
- High-speed switching
- No secondary breakdown.

**DESCRIPTION**

N-channel enhancement mode vertical D-MOS transistor in a miniature SOT223 envelope and intended for use in relay, high-speed and line transformer drivers.

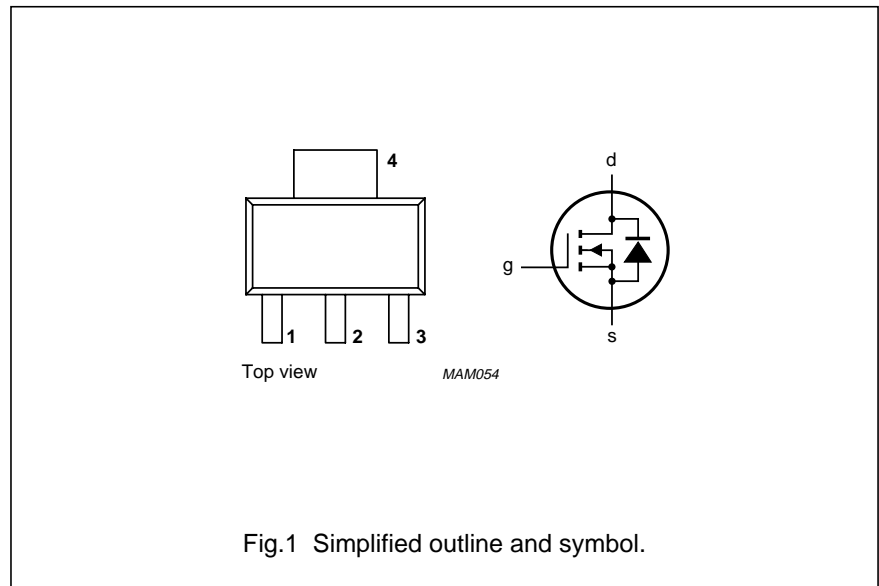
**PINNING - SOT223**

PIN	DESCRIPTION
1	gate
2	drain
3	source
4	drain

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$V_{DS}$	drain-source voltage	–	60	V
$I_D$	drain current	DC value	425	mA
$R_{DS(on)}$	drain-source on-resistance	$I_D = 200\text{ mA}$ $V_{GS} = 10\text{ V}$	4	$\Omega$
$V_{GS(th)}$	gate-source threshold voltage	$I_D = 1\text{ mA}$ $V_{GS} = V_{DS}$	3	V

**PIN CONFIGURATION**



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## LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	60	V
$V_{DG}$	drain-gate voltage		–	60	V
$\pm V_{GSO}$	gate-source voltage		–	20	V
$I_D$	drain current	DC value	–	425	mA
$I_{DM}$	drain current	peak value	–	850	mA
$P_{tot}$	total power dissipation	up to $T_{amb} = 25\text{ °C}$ (note 1)	–	1.5	W
$T_{stg}$	storage temperature range		–55	150	°C
$T_j$	junction temperature		–	150	°C

## THERMAL RESISTANCE

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-a}$	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 lead minimum 6 cm<sup>2</sup>.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	drain-source breakdown voltage	$I_D = 10\ \mu\text{A}$ $V_{GS} = 0$	60	90	–	V
$I_{DSS}$	drain-source leakage current	$V_{DS} = 48\ \text{V}$ $V_{GS} = 0$	–	–	1	$\mu\text{A}$
		$V_{DS} = 25\ \text{V}$ $V_{GS} = 0$	–	–	0.5	$\mu\text{A}$
$\pm I_{GSS}$	gate-source leakage current	$V_{DS} = 0$ $\pm V_{GS} = 15\ \text{V}$	–	–	10	nA
$V_{GS(th)}$	gate-source threshold voltage	$I_D = 1\ \text{mA}$ $V_{GS} = V_{DS}$	0.8	–	3	V
$R_{DS(on)}$	drain-source on-resistance	$I_D = 200\ \text{mA}$ $V_{GS} = 10\ \text{V}$	–	2.5	4	$\Omega$
$ Y_{fs} $	transfer admittance	$I_D = 200\ \text{mA}$ $V_{DS} = 10\ \text{V}$	100	200	–	mS
$C_{iss}$	input capacitance	$V_{DS} = 10\ \text{V}$ $V_{GS} = 0$ $f = 1\ \text{MHz}$	–	25	40	pF
$C_{oss}$	output capacitance	$V_{DS} = 10\ \text{V}$ $V_{GS} = 0$ $f = 1\ \text{MHz}$	–	22	30	pF
$C_{rss}$	feedback capacitance	$V_{DS} = 10\ \text{V}$ $V_{GS} = 0$ $f = 1\ \text{MHz}$	–	6	10	pF
<b>Switching times (see Figs 2 and 3)</b>						
$t_{on}$	turn-on time	$I_D = 200\ \text{mA}$ $V_{DD} = 50\ \text{V}$ $V_{GS} = 0\ \text{to}\ 10\ \text{V}$	–	2	5	ns
$t_{off}$	turn-off time	$I_D = 200\ \text{mA}$ $V_{DD} = 50\ \text{V}$ $V_{GS} = 0\ \text{to}\ 10$	–	10	15	ns

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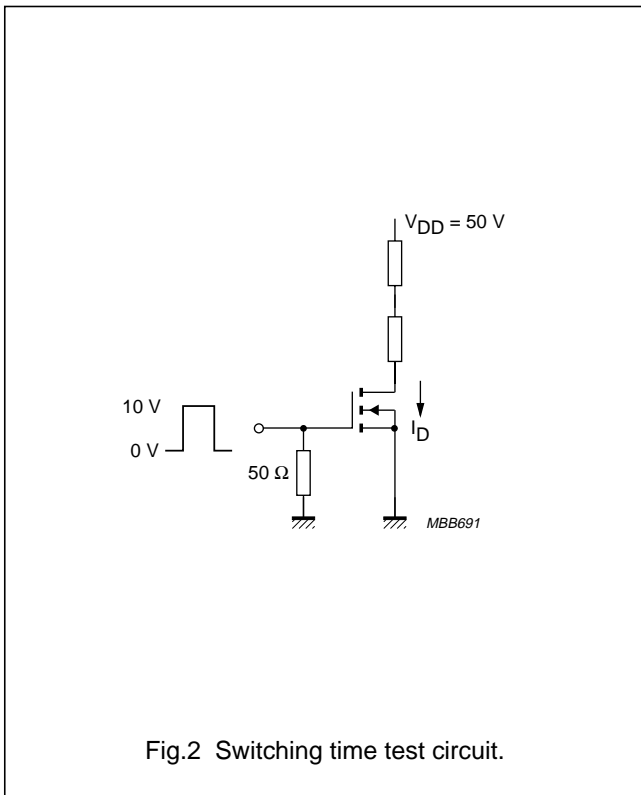


Fig.2 Switching time test circuit.

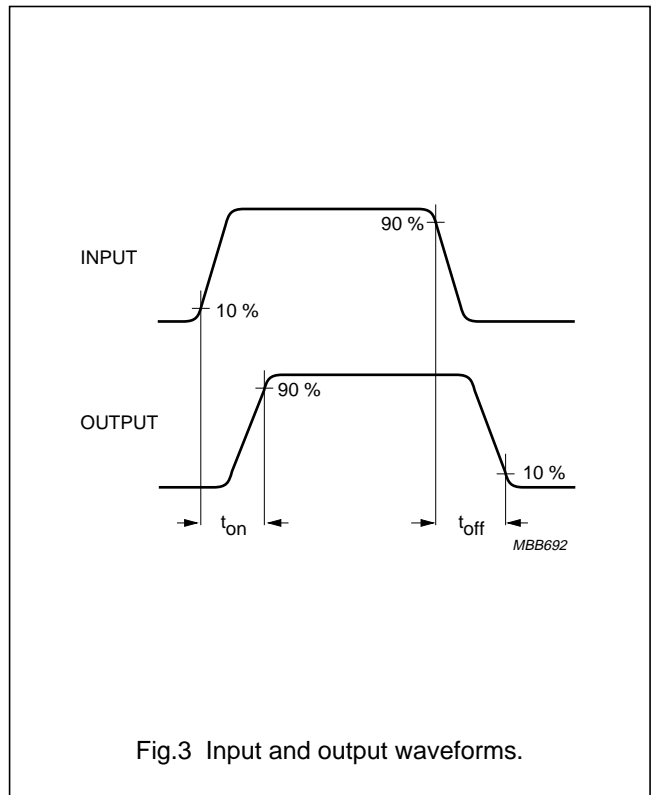


Fig.3 Input and output waveforms.

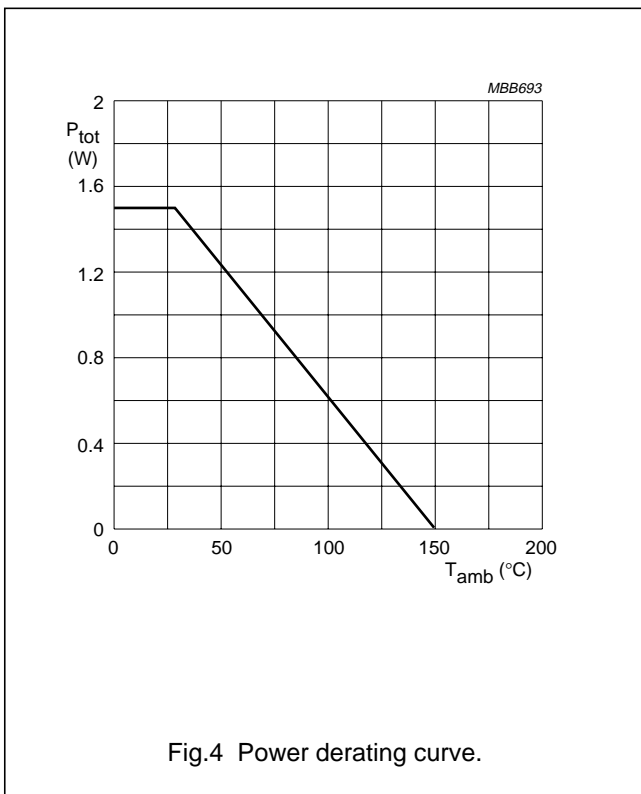


Fig.4 Power derating curve.

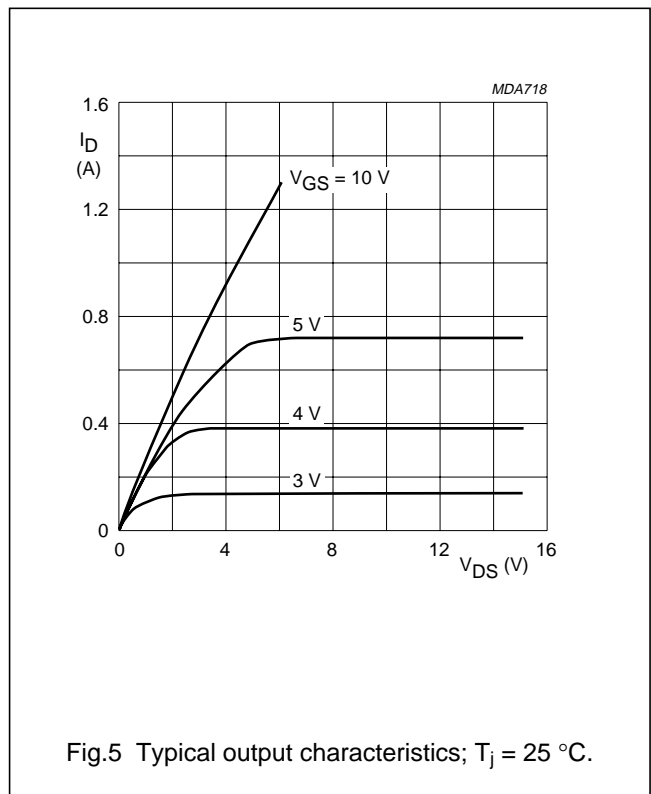
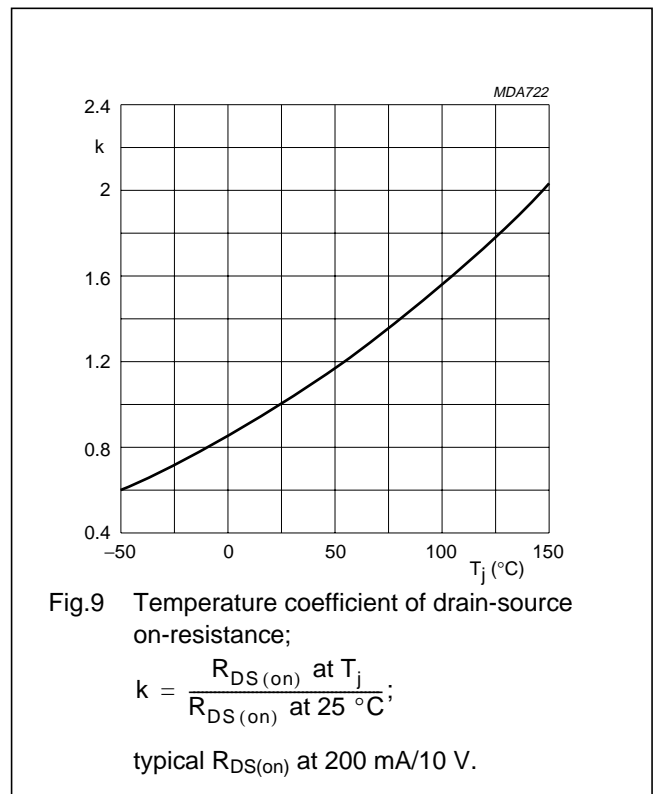
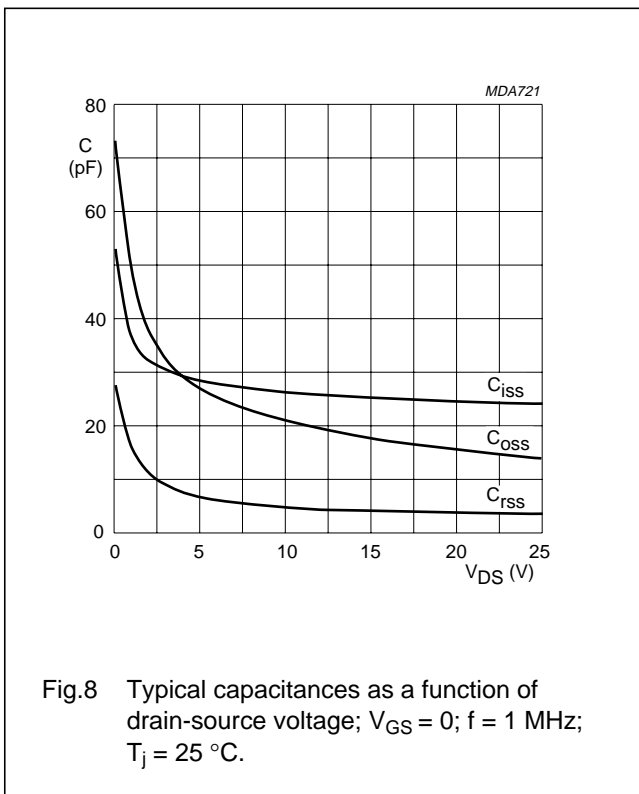
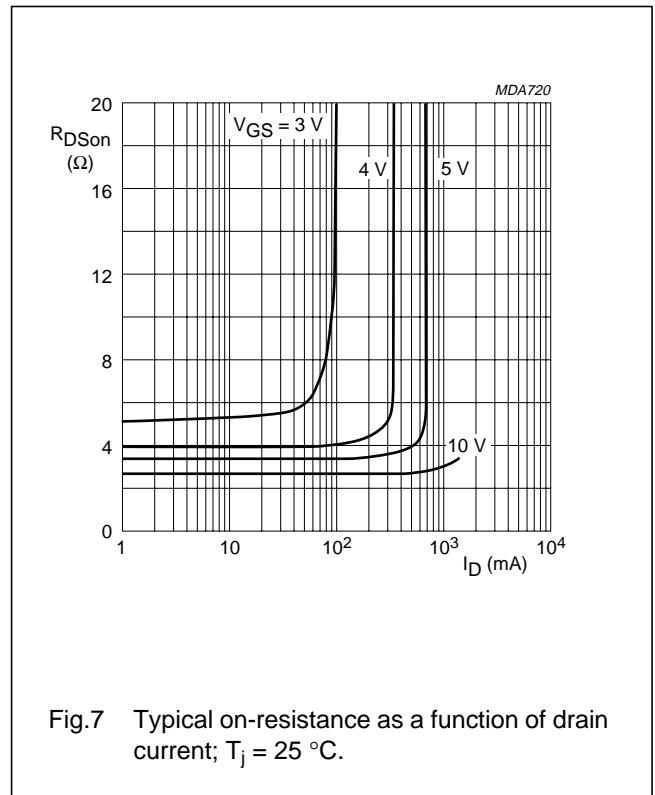
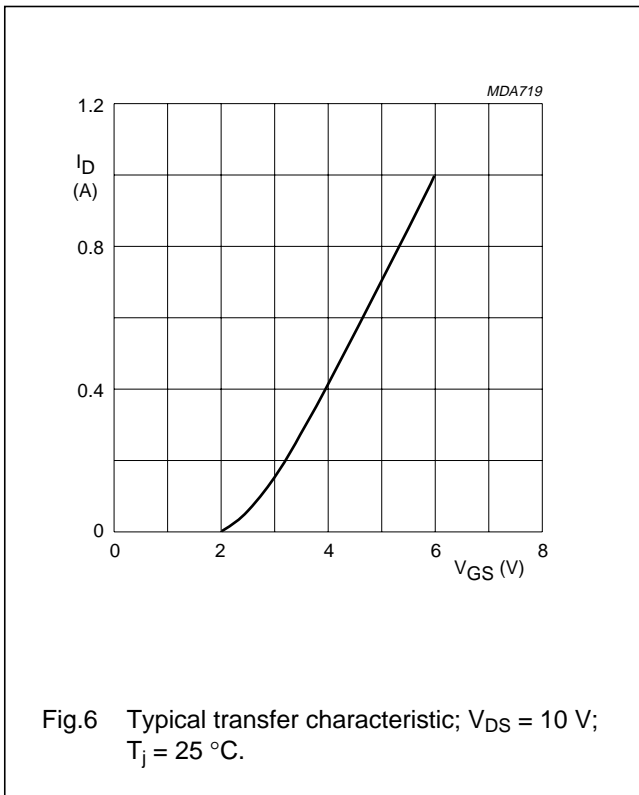


Fig.5 Typical output characteristics;  $T_j = 25^\circ C$ .

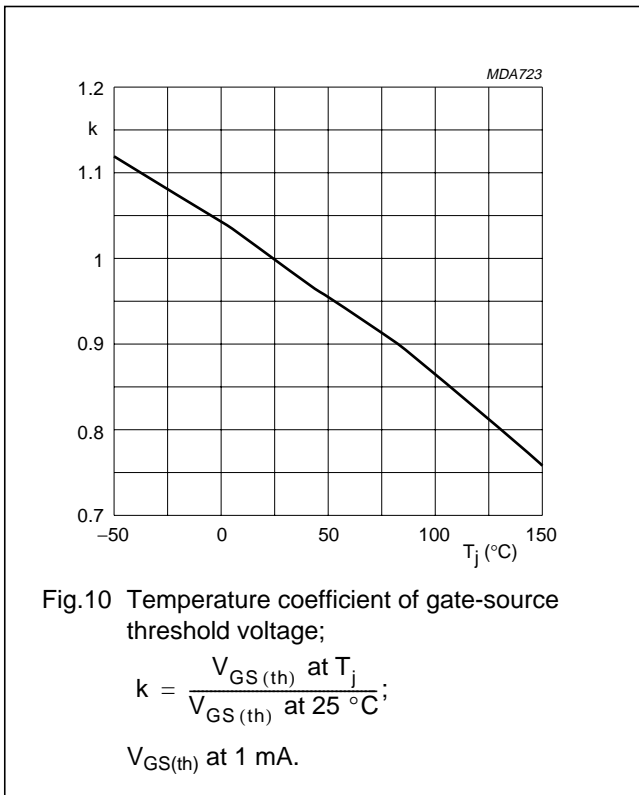
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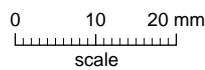
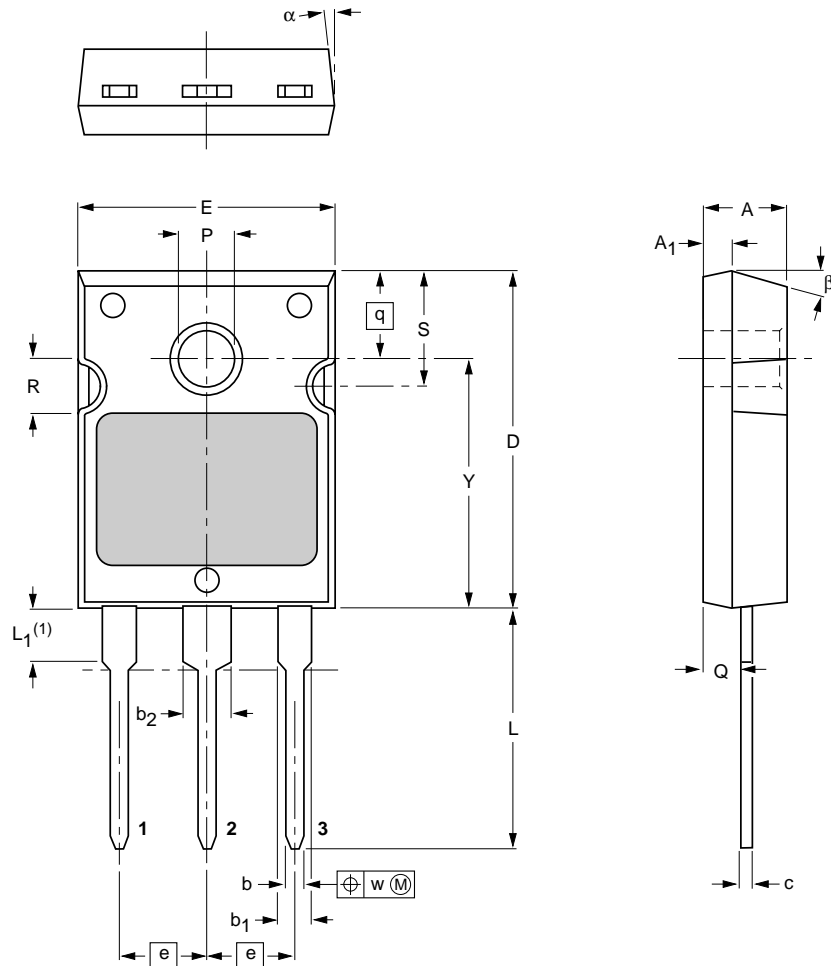
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## PACKAGE OUTLINES

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-247

SOT429



**DIMENSIONS (mm are the original dimensions)**

UNIT	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	D	E	e	L	L <sub>1</sub> <sup>(1)</sup>	P	Q	q	R	S	w	Y	α	β
mm	5.3 4.7	1.9 1.7	1.2 0.9	2.2 1.8	3.2 2.8	0.9 0.6	21 20	16 15	5.45	16 15	4.0 3.6	3.7 3.3	2.6 2.4	5.3	3.5 3.3	7.5 7.1	0.4	15.7 15.3	6° 4°	17° 13°

**Note**

1. Tinning of terminals are uncontrolled within zone L<sub>1</sub>.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT429		TO-247				98-03-24



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**BSP106****DEFINITIONS**

<b>Data sheet status</b>	
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.
<b>Application information</b>	
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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