

**DISCRETE SEMICONDUCTORS**

# DATA SHEET

## **BSP254; BSP254A**

P-channel enhancement mode  
vertical D-MOS transistor

Product specification

April 1995

File under Discrete Semiconductors, SC13b

# P-channel enhancement mode vertical D-MOS transistor

## BSP254; BSP254A

### FEATURES

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

### DESCRIPTION

P-channel vertical D-MOS transistor in a TO-92 variant envelope and intended for use as a line current interruptor in relay, high-speed and line transformer drivers.

### QUICK REFERENCE DATA

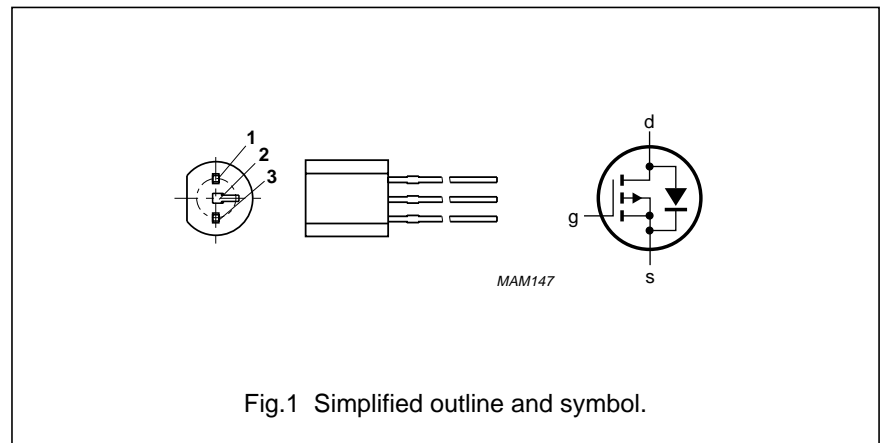
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	–	–250	V
$V_{GSO}$	gate-source voltage	open drain	–	–	±20	V
$ Y_{fs} $	forward transfer admittance	$I_D = -200 \text{ mA};$ $V_{DS} = -25 \text{ V}$	100	200	–	mS
$I_D$	drain current (DC)		–	–	–0.2	A
$R_{DS(on)}$	drain-source on-state resistance	$V_{GS} = -10 \text{ V};$ $I_D = -200 \text{ mA}$	–	10	15	$\Omega$
$P_{tot}$	total power dissipation	$T_{amb} = 25 \text{ }^\circ\text{C}$	–	–	1	W

### PINNING - TO-92 variant BSP254

PIN	DESCRIPTION
1	gate
2	drain
3	source

### PINNING - TO-92 variant BSP254A

PIN	DESCRIPTION
1	source
2	gate
3	drain



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### LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134)

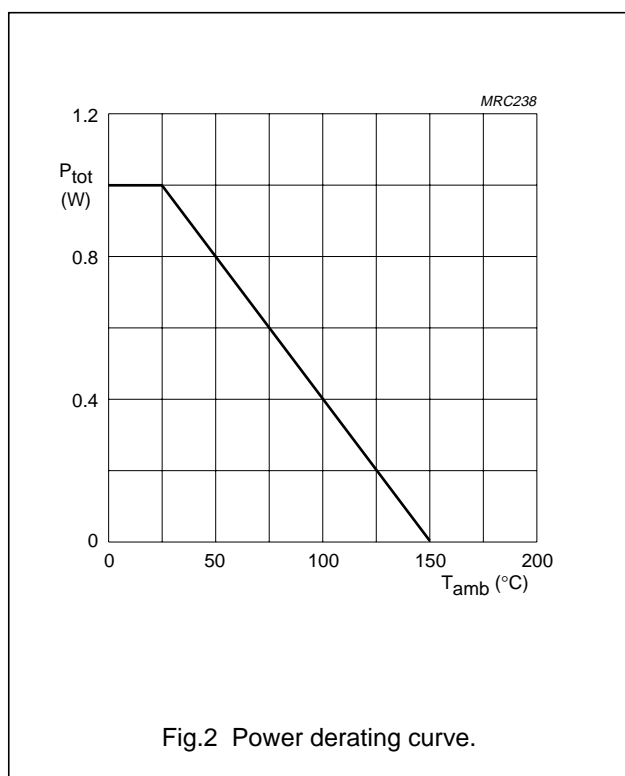
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$-V_{DS}$	drain-source voltage		–	250	V
$V_{GSO}$	gate-source voltage	open drain	–	20	V
$-I_D$	drain current	DC	–	0.2	A
$-I_{DM}$	drain current	peak value	–	0.6	A
$P_{tot}$	total power dissipation	$T_{amb} = 25\text{ °C}$ (note 1)	–	1	W
$T_{stg}$	storage temperature range		–65	+150	°C
$T_j$	junction temperature		–	150	°C

### THERMAL RESISTANCE

SYMBOL	PARAMETER	MAX.	UNIT
$R_{th\ j-a}$	from junction to ambient (note 1)	125	K/W

#### Note

1. Transistor mounted on printed circuit board, maximum lead length 4 mm, mounting pad for drain lead minimum 10 mm x 10 mm.



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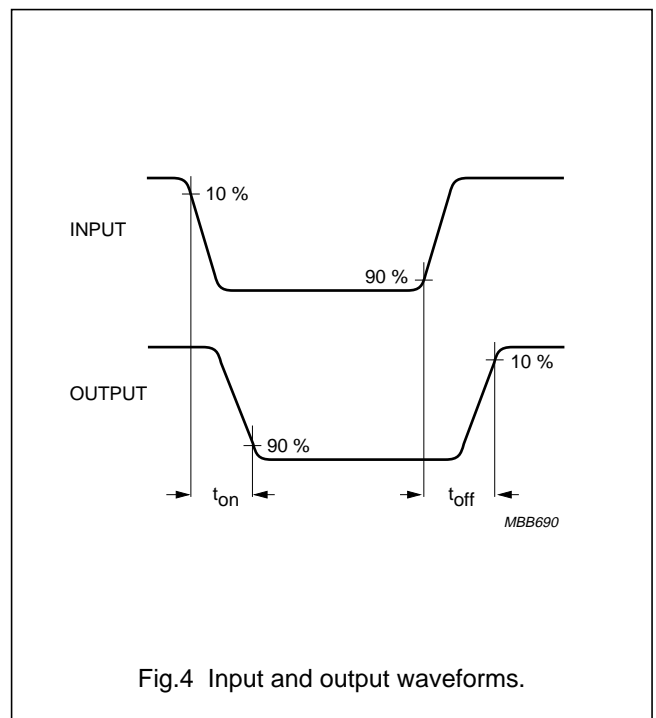
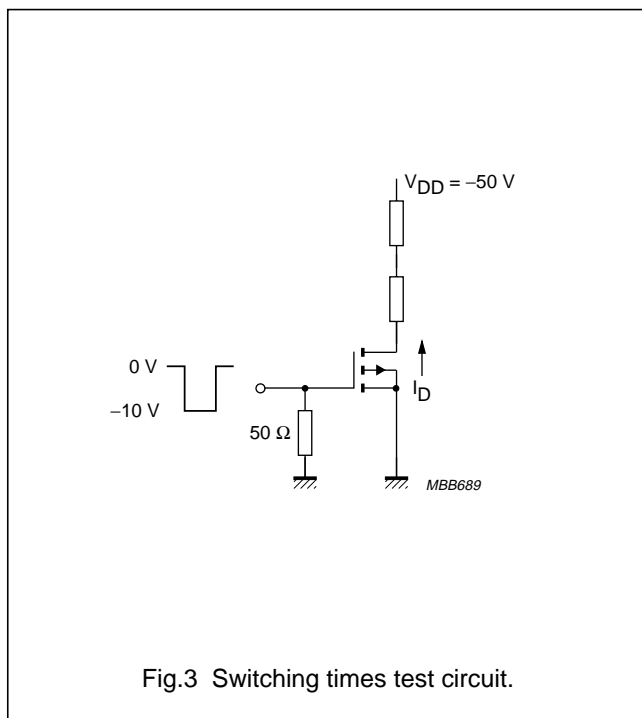
**CHARACTERISTICS**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$-V_{(BR)DSS}$	drain-source breakdown voltage	$-V_{GS} = 0$ $-I_D = 10\text{ }\mu\text{A}$	250	–	–	V
$-I_{DSS}$	drain-source leakage current	$-V_{DS} = 200\text{ V}$ $V_{GS} = 0$	–	–	1	$\mu\text{A}$
$\pm I_{GSS}$	gate-source leakage current	$\pm V_{GS} = 20\text{ V}$ $V_{DS} = 0$	–	–	100	nA
$-V_{GS(th)}$	gate-source threshold voltage	$V_{GS} = V_{DS}$ $-I_D = 1\text{ mA}$	0.8	–	2.8	V
$R_{DS(on)}$	drain-source on-resistance	$-V_{GS} = 10\text{ V}$ $-I_D = 200\text{ mA}$ ;	–	10	15	$\Omega$
$ Y_{fs} $	transfer admittance	$-V_{DS} = 25\text{ V}$ $-I_D = 200\text{ mA}$	100	200	–	mS
$C_{iss}$	input capacitance	note 1	–	65	90	pF
$C_{oss}$	output capacitance	note 1	–	20	30	pF
$C_{rss}$	feedback capacitance	note 1	–	6	15	pF
$t_{on}$	turn-on time	note 2	–	5	10	ns
$t_{off}$	turn-off time	note 2	–	20	30	ns

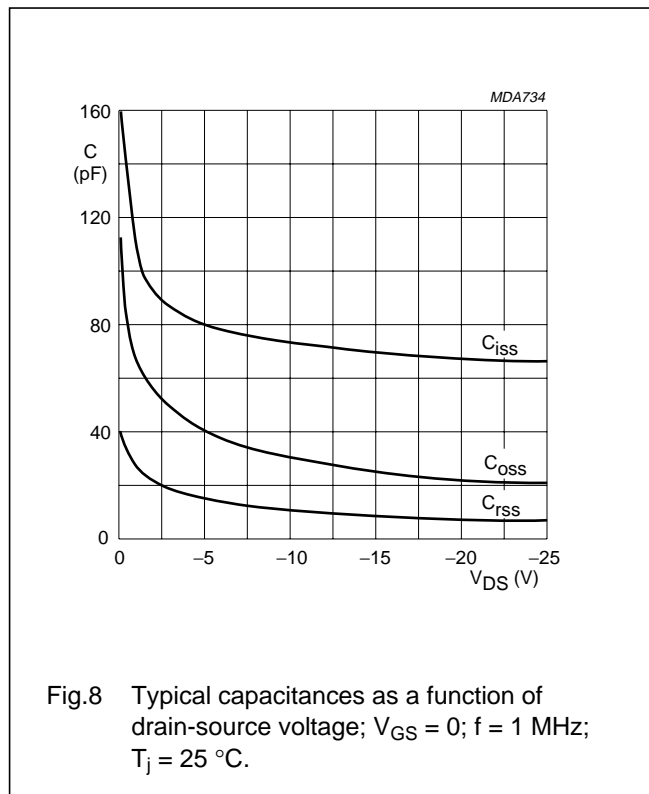
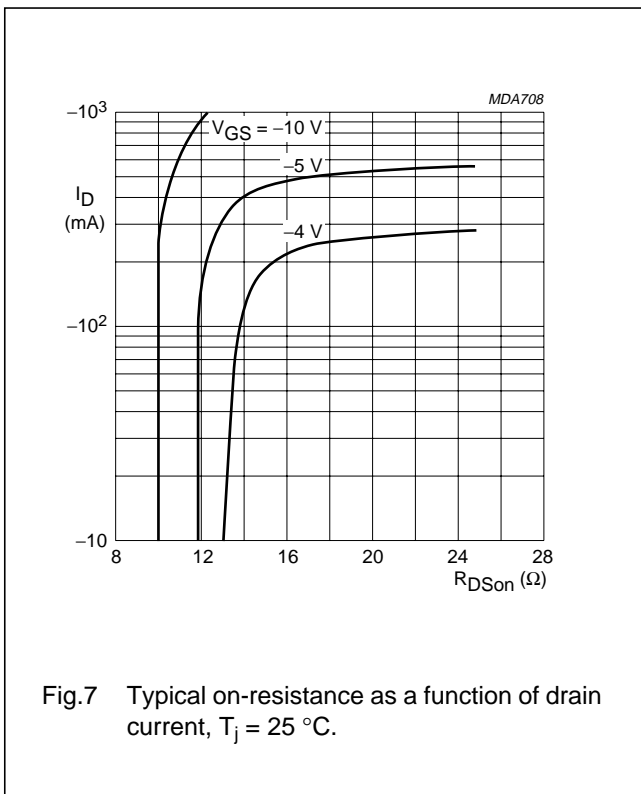
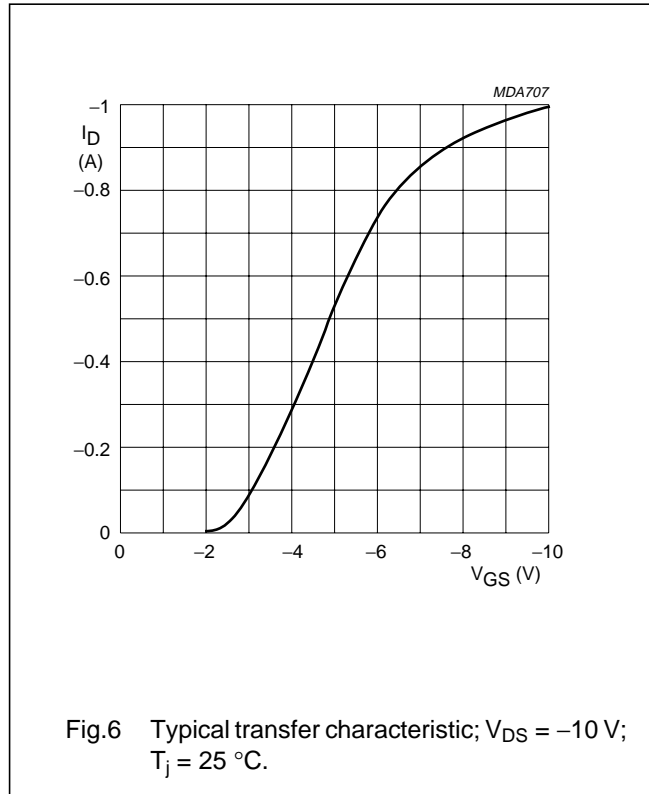
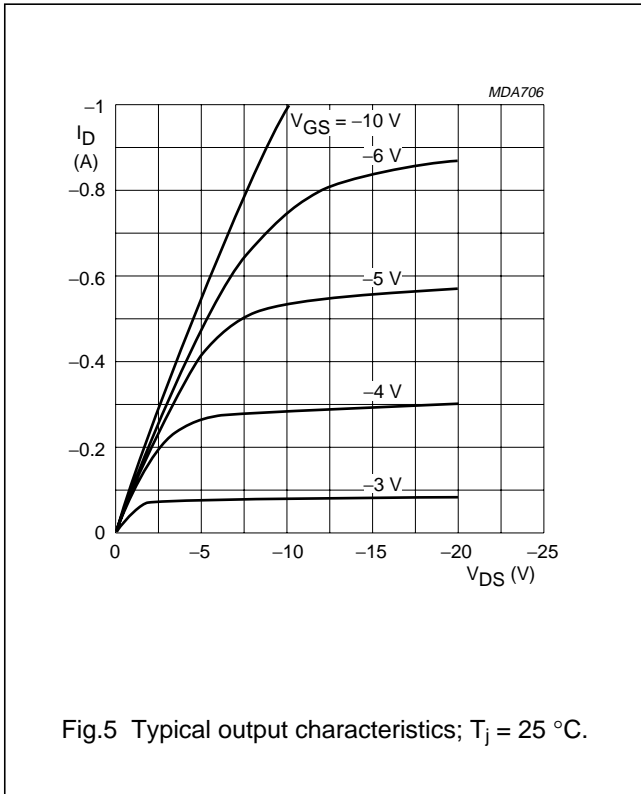
**Notes**

1. Measured at  $f = 1\text{ MHz}$ ;  $-V_{DS} = 25\text{ V}$ ;  $V_{GS} = 0$ .
2.  $-V_{GS} = 0$  to  $10\text{ V}$ ;  $-I_D = 250\text{ mA}$ ;  $-V_{DD} = 50\text{ V}$ .



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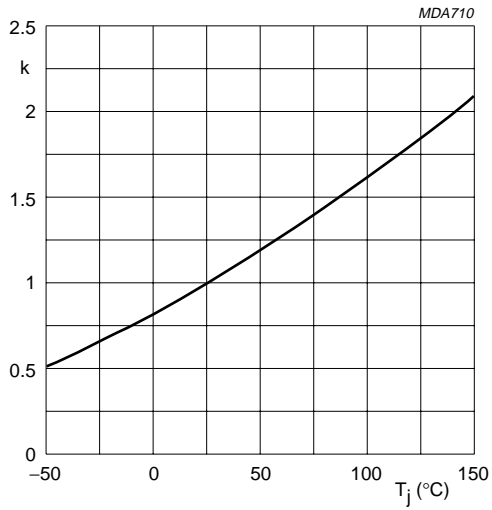


Fig.9

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

typical  $R_{DS(on)}$  at  $-200 \text{ mA}/-10 \text{ V}$ .

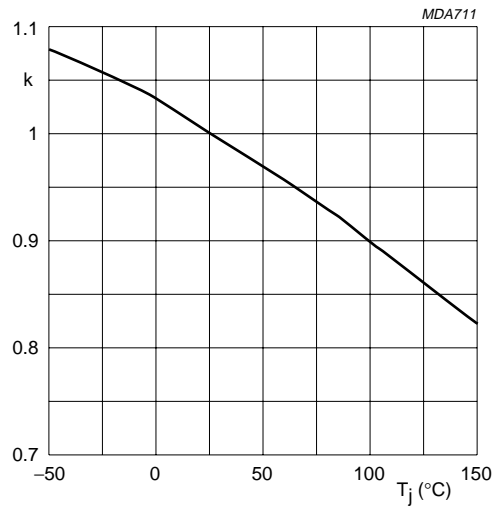


Fig.10

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

typical  $V_{GS(th)}$  at  $-1 \text{ mA}$ .

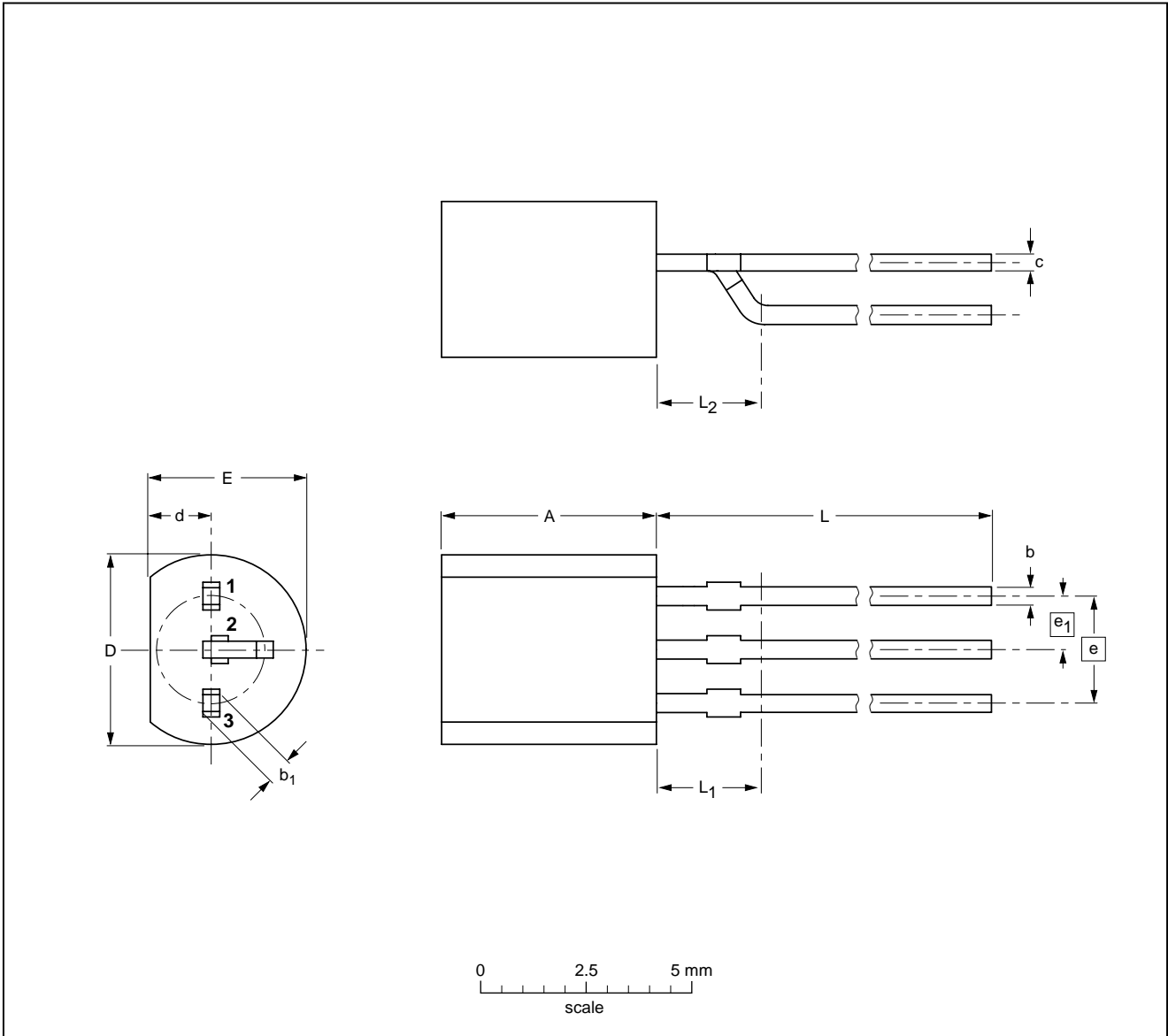
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PACKAGE OUTLINES

Plastic single-ended leaded (through hole) package; 3 leads (on-circle)

SOT54 variant



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max	L <sub>2</sub> max
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5	2.5

Notes

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT54 variant		TO-92	SC-43		97-04-14

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**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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**NOTES**

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