

# DATA SHEET

## **BUX84F; BUX85F** Silicon diffused power transistors

Product specification  
Supersedes data of February 1996  
File under Discrete Semiconductors, SC06

1997 Aug 14

# Silicon diffused power transistors

# BUX84F; BUX85F

## DESCRIPTION

High-voltage, high-speed, glass-passivated NPN power transistor in a SOT186 package with electrically isolated mounting base.

## APPLICATIONS

- Converters
- Inverters
- Switching regulators
- Motor control systems.

## PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter
mb	mounting base; electrically isolated from all pins

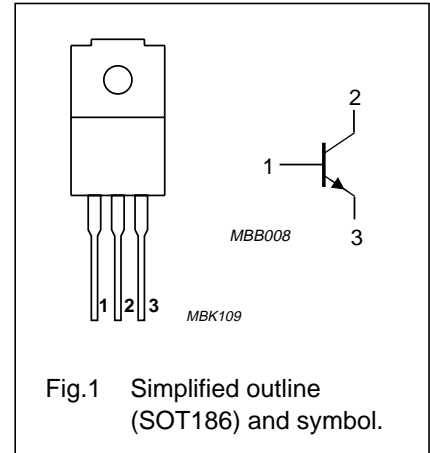


Fig.1 Simplified outline (SOT186) and symbol.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V <sub>CESM</sub>	collector-emitter peak voltage	V <sub>BE</sub> = 0			
	BUX84F		–	800	V
	BUX85F		–	1000	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BUX84F		–	400	V
	BUX85F		–	450	V
V <sub>CEsat</sub>	collector-emitter saturation voltage	see Fig.4	–	1	V
I <sub>Csat</sub>	collector saturation current		–	1	A
I <sub>C</sub>	collector current (DC)		–	2	A
I <sub>CM</sub>	collector current (peak value)		–	3	A
P <sub>tot</sub>	total power dissipation	T <sub>h</sub> ≤ 25 °C	–	18	W
t <sub>f</sub>	fall time		0.4	–	µs

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th j-h</sub>	thermal resistance from junction to external heatsink	note 1	7.2	K/W
		note 2	4.7	K/W
R <sub>th j-a</sub>	thermal resistance from junction to ambient		55	K/W

### Notes

1. Mounted **without** heatsink compound and 30 ±5 N force on centre of package.
2. Mounted **with** heatsink compound and 30 ±5 N force on centre of package.

## ISOLATION CHARACTERISTICS

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
V <sub>isolM</sub>	isolation voltage from all terminals to external heatsink (peak value)	–	1500	V
C <sub>isol</sub>	isolation capacitance from collector to external heatsink	12	–	pF

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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CESM}$	collector-emitter peak voltage	$V_{BE} = 0$	–	800	V
	BUX84F BUX85F			1000	V
$V_{CEO}$	collector-emitter voltage	open base	–	400	V
	BUX84F BUX85F			450	V
$I_C$	collector current (DC)		–	2	A
$I_{CM}$	collector current (peak value)		–	3	A
$I_B$	base current (DC)		–	0.75	A
$I_{BM}$	base current (peak value)		–	1	A
$P_{tot}$	total power dissipation	$T_h \leq 25\text{ °C}$ ; note 1	–	18	W
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C

**Note**

1. Mounted **without** heatsink compound and  $30 \pm 5$  N force on centre of package.

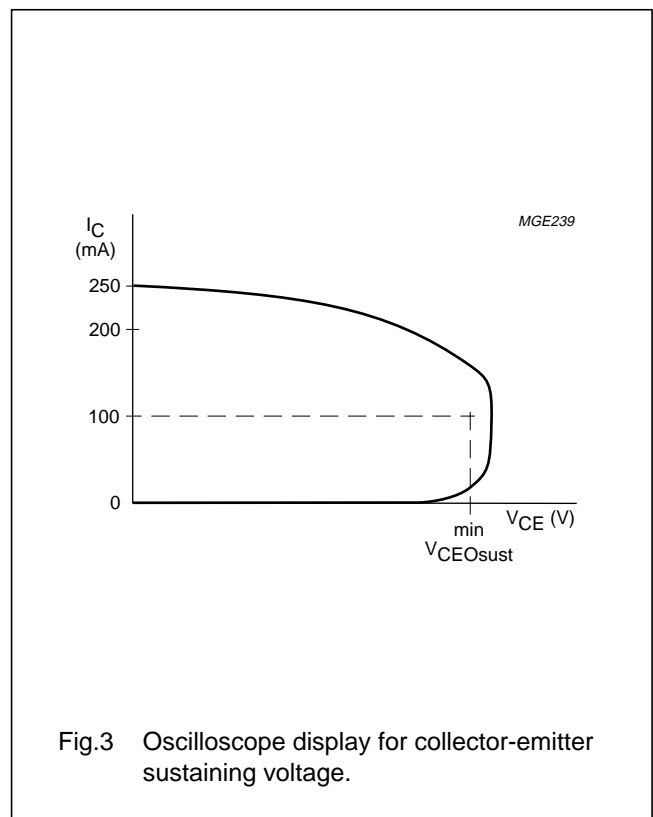
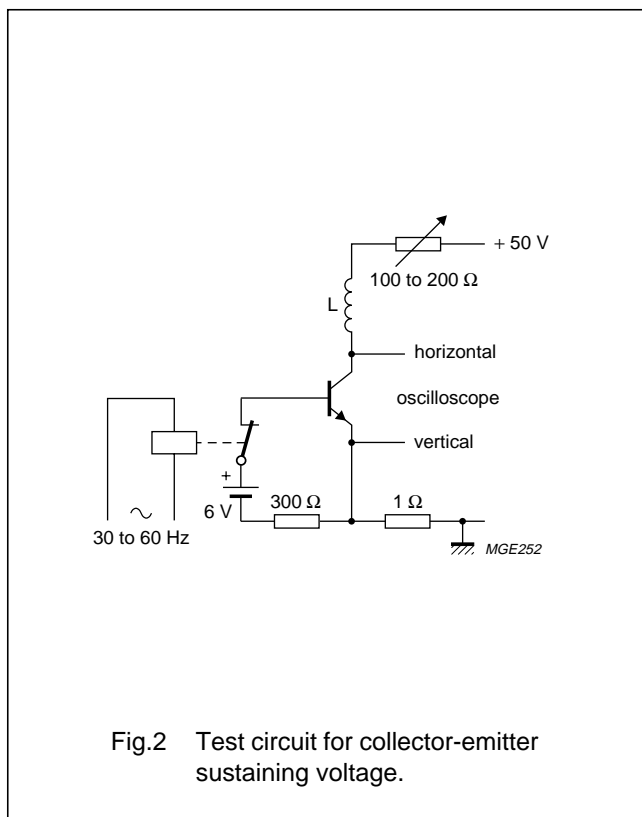
**CHARACTERISTICS** $T_j = 25\text{ °C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CEO_{sust}}$	collector-emitter sustaining voltage	$I_C = 100\text{ mA}$ ; $I_{B_{off}} = 0$ ; $L = 25\text{ mH}$ ; see Figs 2 and 3	400 450	–	–	V
	BUX84 BUX85				–	V
$V_{CE_{sat}}$	collector-emitter saturation voltage	$I_C = 0.3\text{ A}$ ; $I_B = 30\text{ mA}$ ; see Fig.4	–	–	0.8	V
		$I_C = 1\text{ A}$ ; $I_B = 200\text{ mA}$ ; see Fig.4	–	–	1	V
$V_{BE_{sat}}$	base-emitter saturation voltage	$I_C = 1\text{ A}$ ; $I_B = 200\text{ mA}$ ; see Fig.5	–	–	1.1	V
$I_{CES}$	collector-emitter cut-off current	$V_{CE} = V_{CES_{max}}$ ; $V_{BE} = 0$	–	–	0.2	mA
		$V_{CE} = V_{CES_{max}}$ ; $V_{BE} = 0$ ; $T_j = 125\text{ °C}$	–	–	1.5	mA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}$ ; $I_C = 0$	–	–	1	mA
$h_{FE}$	DC current gain	$V_{CE} = 5\text{ V}$ ; $I_C = 5\text{ A}$ ; see Fig.6	15	–	–	
		$V_{CE} = 5\text{ V}$ ; $I_C = 100\text{ mA}$ ; see Fig.6	20	50	100	
$f_T$	transition frequency	$V_{CE} = 10\text{ V}$ ; $I_C = 200\text{ mA}$ ; $f = 1\text{ MHz}$	–	20	–	MHz

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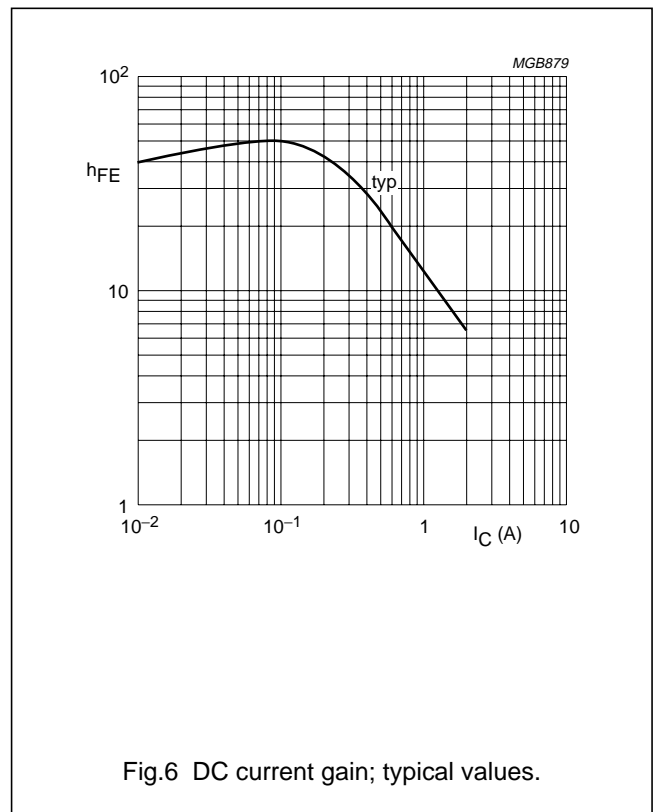
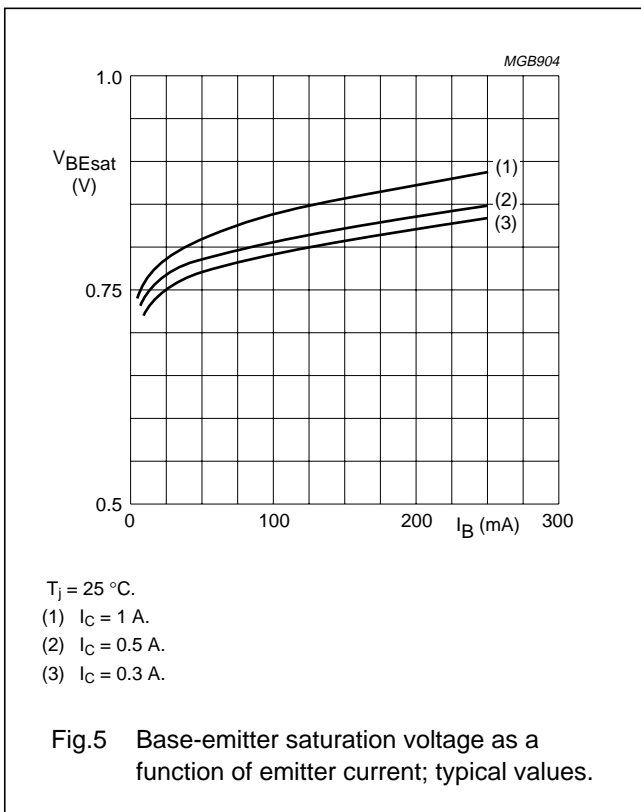
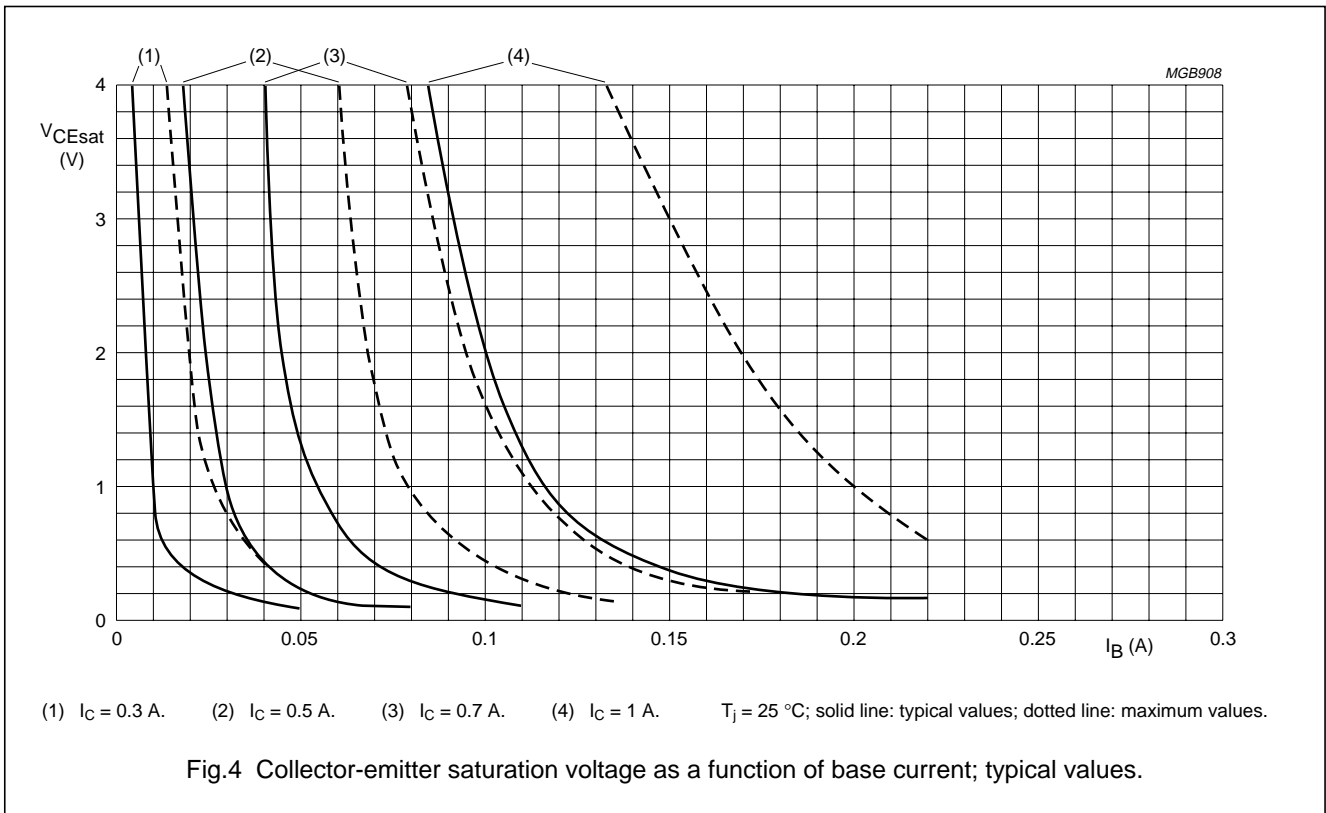
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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Switching times resistive load (see Fig.7)</b>						
$t_{on}$	turn-on time	$I_{Con} = 1\text{ A}; I_{Bon} = 200\text{ mA}; I_{Boff} = -400\text{ mA}; V_{CC} = 250\text{ V}$	–	0.2	0.5	$\mu\text{s}$
$t_s$	storage time	$I_{Con} = 1\text{ A}; I_{Bon} = 200\text{ mA}; I_{Boff} = -400\text{ mA}; V_{CC} = 250\text{ V}$	–	2	3.5	$\mu\text{s}$
$t_f$	fall time	$I_{Con} = 1\text{ A}; I_{Bon} = 200\text{ mA}; I_{Boff} = -400\text{ mA}; V_{CC} = 250\text{ V}$	–	0.4	–	$\mu\text{s}$
		$I_{Con} = 1\text{ A}; I_{Bon} = 200\text{ mA}; I_{Boff} = -400\text{ mA}; V_{CC} = 250\text{ V}; T_{mb} = 95\text{ }^\circ\text{C}$	–	–	1.4	$\mu\text{s}$



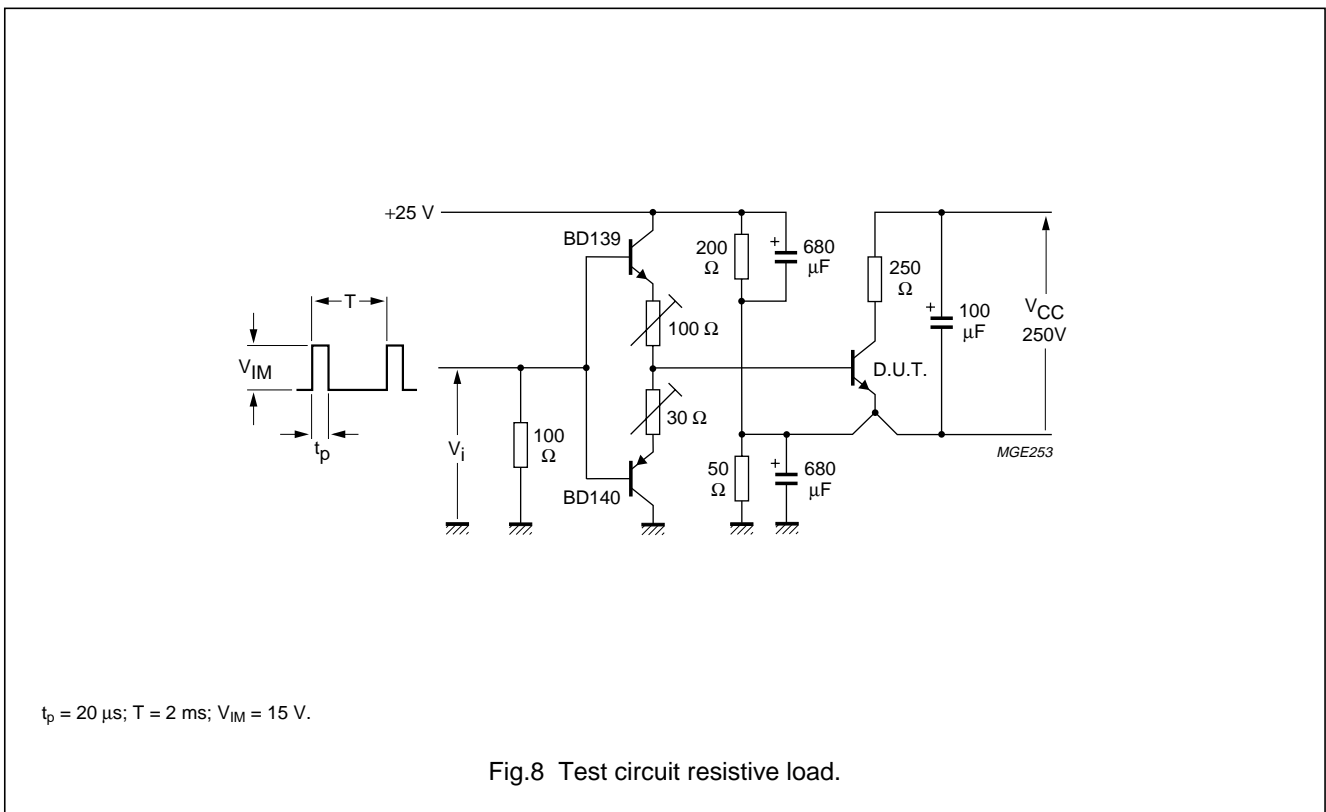
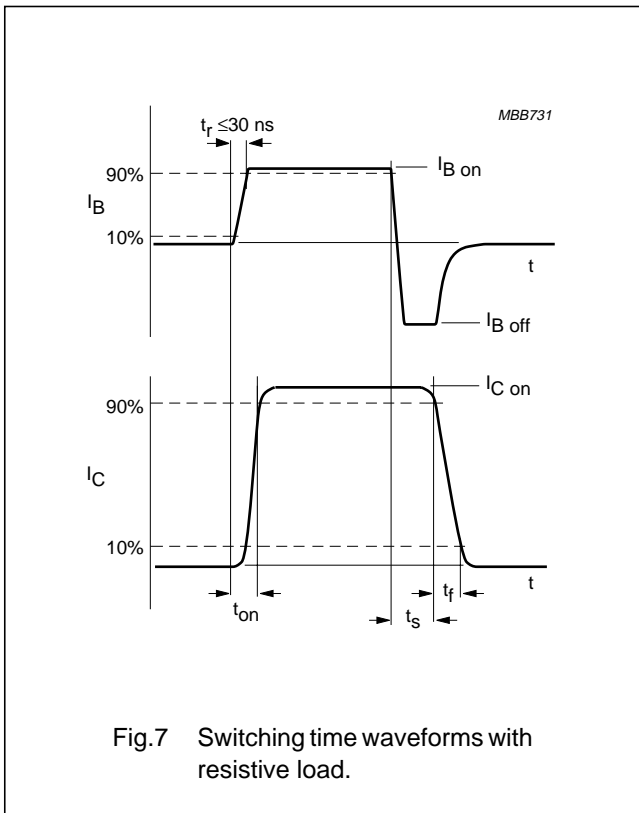
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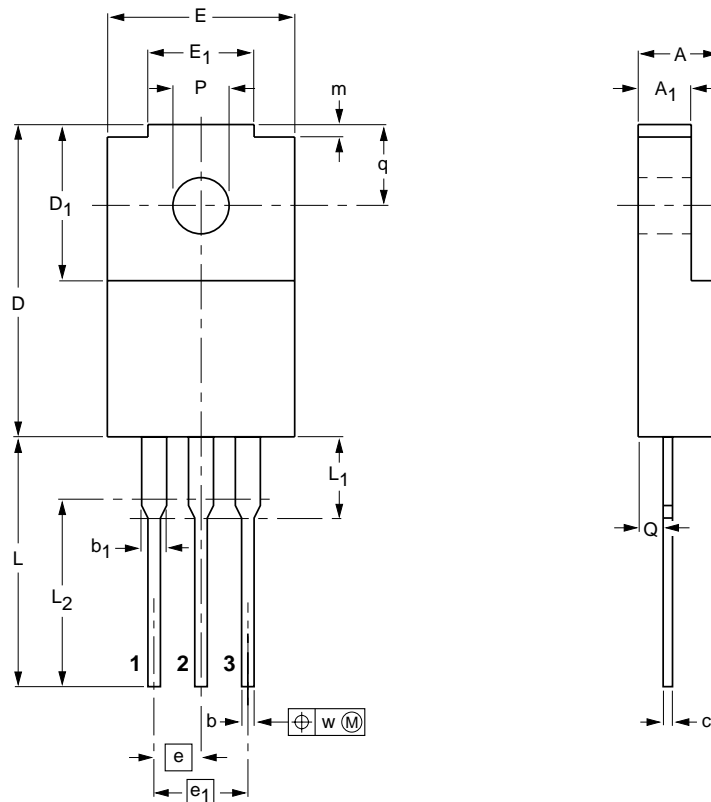
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PACKAGE OUTLINE

Plastic single-ended package; isolated heatsink mounted;  
1 mounting hole; 3 lead TO-220 exposed tabs

SOT186



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	b <sub>1</sub>	c	D	D <sub>1</sub>	E	E <sub>1</sub>	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup>	L <sub>2</sub>	m	P	Q	q	w
mm	4.4 4.0	2.9 2.5	0.9 0.7	1.5 1.3	0.55 0.38	17.0 16.4	7.9 7.5	10.2 9.6	5.7 5.3	2.54	5.08	14.3 13.5	4.8 4.0	10	0.9 0.5	3.2 3.0	1.4 1.2	4.4 4.0	0.4

Note

1. Terminal dimensions within this zone are uncontrolled. Terminals in this zone are not tinned.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT186		TO-220				97-06-11

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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>Limiting values</b>	
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.	
<b>Application information</b>	
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**NOTES**

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