DATA SHEET

BUX84F; BUX85F
Silicon diffused power transistors

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

1997 Aug 14

Philips
Semiconductors

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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

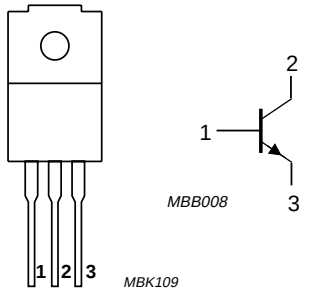


Fig.1 Simplified outline (SOT186) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	collector-emitter peak voltage	V_{BE} = 0			
	BUX84F		–	800	V
	BUX85F		–	1000	V
V_{CEO}	collector-emitter voltage	open base			
	BUX84F		–	400	V
	BUX85F		–	450	V
V_{CEsat}	collector-emitter saturation voltage	see Fig.4	–	1	V
I_{Csat}	collector saturation current		–	1	A
I_C	collector current (DC)		–	2	A
I_{CM}	collector current (peak value)		–	3	A
P_{tot}	total power dissipation	$T_h \leq 25$ °C	–	18	W
t_f	fall time		0.4	–	µs

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}h}$	thermal resistance from junction to external heatsink	note 1	7.2	K/W
		note 2	4.7	K/W
$R_{th\ j\text{-}a}$	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_{isolM}	isolation voltage from all terminals to external heatsink (peak value)	–	1500	V
C_{isol}	isolation capacitance from collector to external heatsink	12	–	pF

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			
	BUX84F		–	800	V
	BUX85F		–	1000	V
V_{CEO}	collector-emitter voltage	open base			
	BUX84F		–	400	V
	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	$T_h \leq 25$ °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 ±5 N force on centre of package.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

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

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

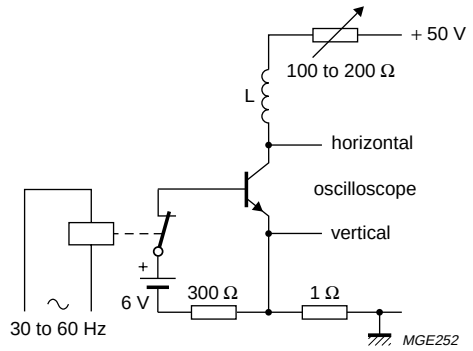


Fig.2 Test circuit for collector-emitter sustaining voltage.

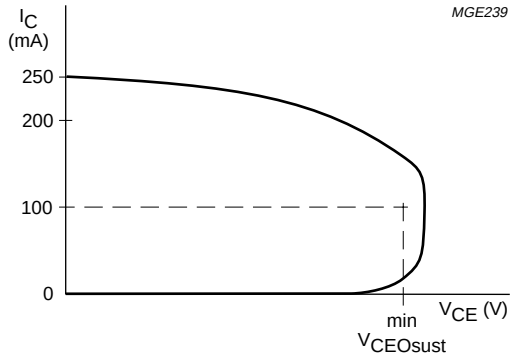
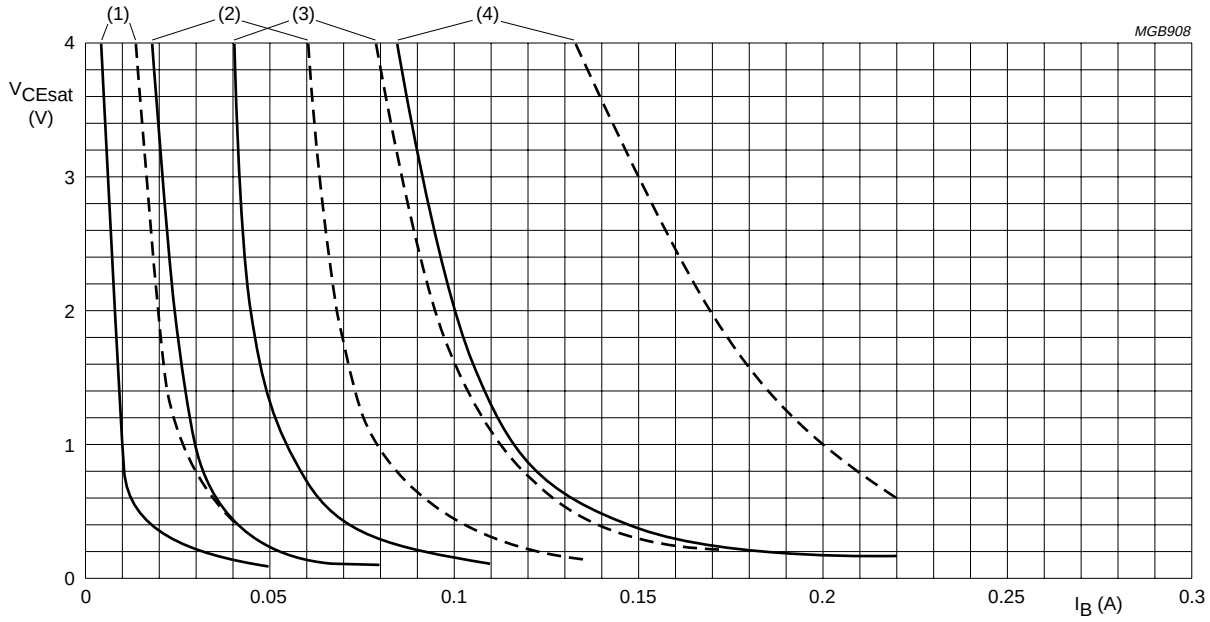
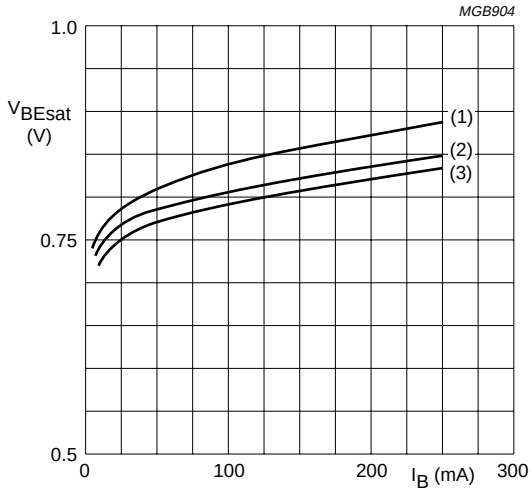


Fig.3 Oscilloscope display for collector-emitter sustaining voltage.



(1) I_C = 0.3 A. (2) I_C = 0.5 A. (3) I_C = 0.7 A. (4) I_C = 1 A. T_j = 25 °C; solid line: typical values; dotted line: maximum values.

Fig.4 Collector-emitter saturation voltage as a function of base current; typical values.



T_j = 25 °C.
(1) I_C = 1 A.
(2) I_C = 0.5 A.
(3) I_C = 0.3 A.

Fig.5 Base-emitter saturation voltage as a function of emitter current; typical values.

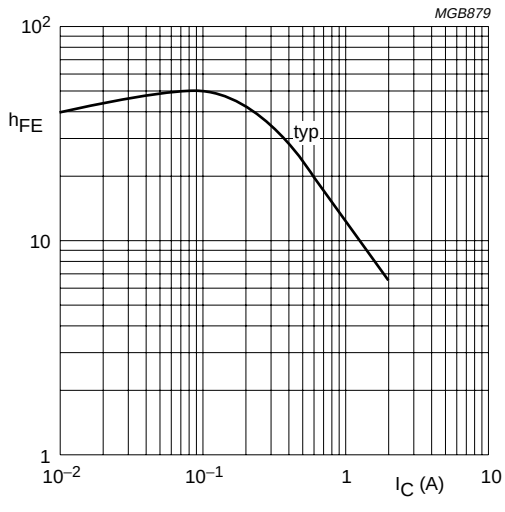


Fig.6 DC current gain; typical values.

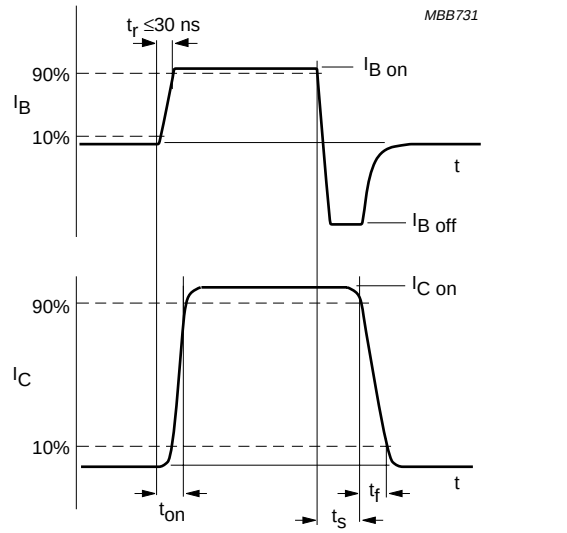
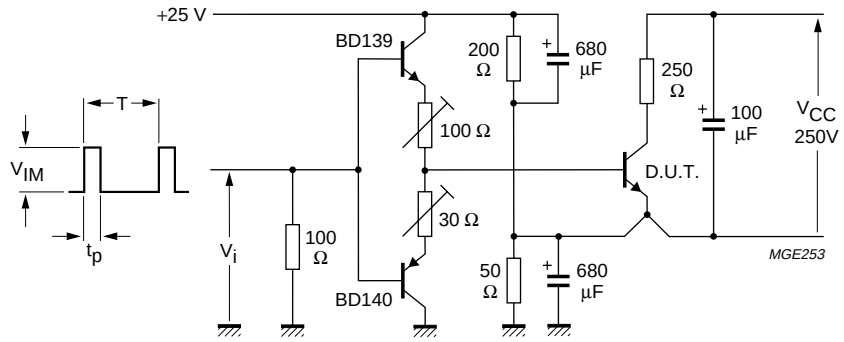


Fig.7 Switching time waveforms with resistive load.

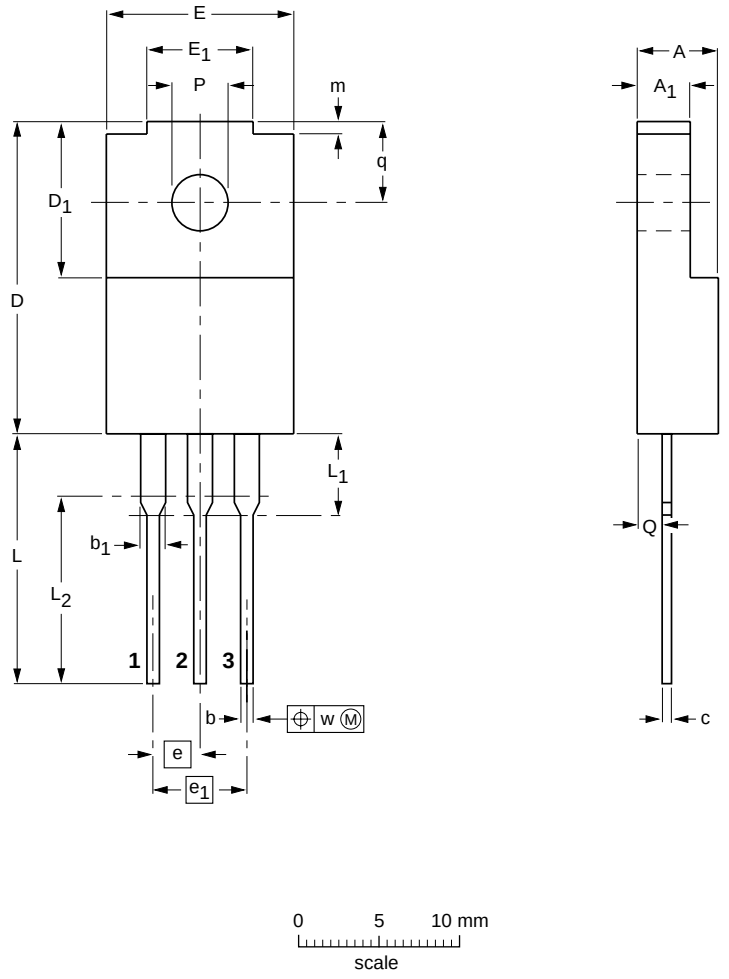


t_p = 20 µs; T = 2 ms; V_{IM} = 15 V.

Fig.8 Test circuit resistive load.

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_1	b	b_1	c	D	D_1	E	E_1	e	e_1	L	L_1(1)	L_2	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

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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