

Silicon diffused power transistors

BUX86; BUX87

High-voltage, high-speed, glass-passivated npn power transistors in TO-126 envelopes, for use in converters, inverters, switching regulators, motor control systems and switching applications.

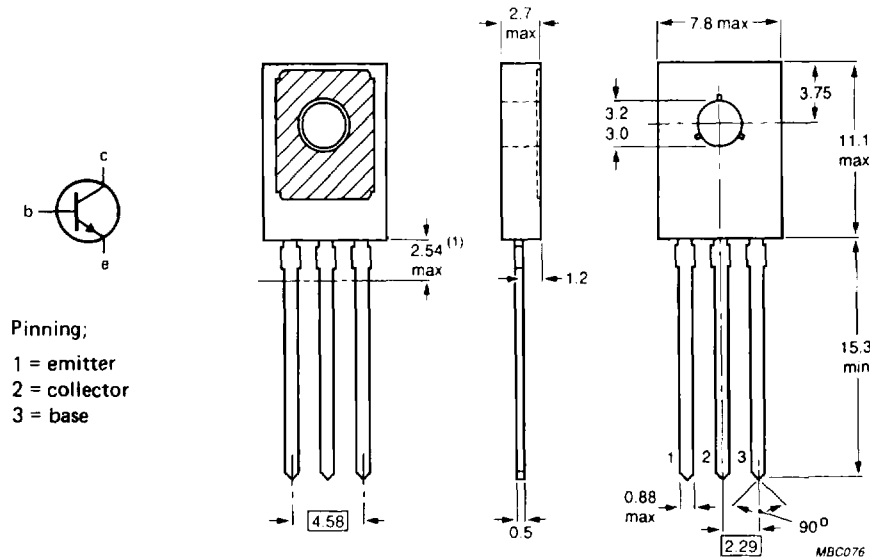
QUICK REFERENCE DATA

	BUX86 BUX87	
Collector-emitter voltage (peak value; $V_B = 0$)	V_{CESM} max.	800 1000 V
Collector-emitter voltage (open base)	V_{CEO} max.	400 450 V
Collector-emitter saturation voltage	V_{CEsat} max.	1 V
Collector current (DC)	I_C max.	0,5 A
Collector current (peak value)	I_{CM} max.	1 A
Total power dissipation up to $T_{mb} = 60$ °C	P_{tot} max.	20 W
Fall time	t_f typ.	0,4 μs

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-126.



Collector connected to metal part of mounting surface.

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RATINGS Limiting values in accordance with the Absolute Maximum System (IEC 134)

		BUX86	BUX87	
Collector-emitter voltage (peak value; $V_{BE} = 0$)	V_{CESM}	max. 800	1000	V
Collector-emitter voltage (open base)	V_{CEO}	max. 400	450	V
Emitter-base voltage (open collector)	V_{EBO}	max. 5	5	V
Collector current (DC)	I_C	max. 0,5		A
Collector current (peak value) $t_p = 2$ ms	I_{CM}	max. 1		A
Base current (DC)	I_B	max. 0,2		A
Base current (peak value)	I_{BM}	max. 0,3		A
Reverse base current (peak value) (note 1)	$-I_{BM}$	max. 0,3		A
Total power dissipation up to $T_{mb} = 60$ °C	P_{tot}	max. 20		W
Storage temperature range	T_{stg}	-65 to + 150		°C
Junction temperature	T_j	max. 150		°C
THERMAL RESISTANCE				
From junction to mounting base	$R_{th\ j-mb}$	= 4,5		K/W
From junction to ambient in free air	$R_{th\ j-a}$	= 100		K/W
CHARACTERISTICS				
$T_j = 25$ °C unless otherwise specified				
Collector-cut-off current (note 2)				
$V_{CE} = V_{CESMmax}; V_{BE} = 0$	I_{CES}	max. 100		μ A
$V_{CE} = V_{CESMmax}; V_{BE} = 0; T_j = 125$ °C	I_{CES}	max. 1		mA
DC current gain				
$I_C = 50$ mA; $V_{CE} = 5$ V	h_{FE}	min. 26		
	h_{FE}	typ. 50		
	h_{FE}	max. 125		

Notes

1. Turn-off current.
2. Measured with a half-sinewave voltage (curve tracer).

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Emitter cut-off current

$I_C = 0; V_{EB} = 5\text{ V}$

I_{EBO}	max.	1	mA
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Saturation voltage

$I_C = 0,1\text{ A}; I_B = 10\text{ mA}$

V_{CEsat}	max.	0,8	V
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$I_C = 0,2\text{ A}; I_B = 20\text{ mA}$

V_{CEsat}	max.	1,0	V
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$I_C = 0,2\text{ A}; I_B = 20\text{ mA}$

V_{BEsat}	max.	1,0	V
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Collector-emitter sustaining voltages

$I_C = 100\text{ mA}; I_{Boff} = 0; L = 25\text{ mH}$

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$V_{CEOsust}$	min. 400	450	V

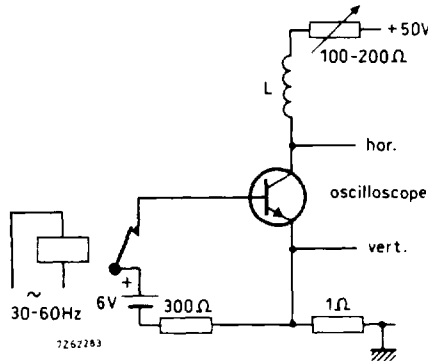


Fig. 2 Test circuit for $V_{CEOsust}$

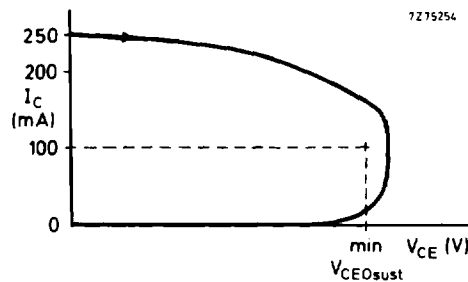


Fig. 3 Oscilloscope display for sustaining voltage.

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CHARACTERISTICS (continued)

Transition frequency at $f = 1$ MHz

$I_C = 50$ mA; $V_{CE} = 10$ V

f_T typ 20 MHz

Switching times

$I_{Con} = 0,2$ A; $V_{CC} = 250$ V

$I_{Bon} = 20$ mA; $-I_{Boff} = 40$ mA

Turn-on time

t_{on} typ 0,25 μ s
max. 0,5 μ s

Turn-off: Storage time

t_s typ 2 μ s
max. 3,5 μ s

Fall time

t_f typ 0,4 μ s

Fall time, $T_{mb} = 95$ $^{\circ}$ C

t_f max. 1,3 μ s

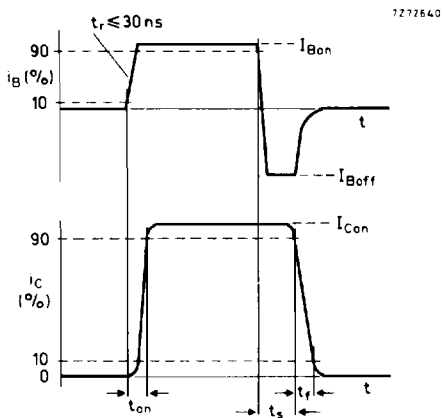
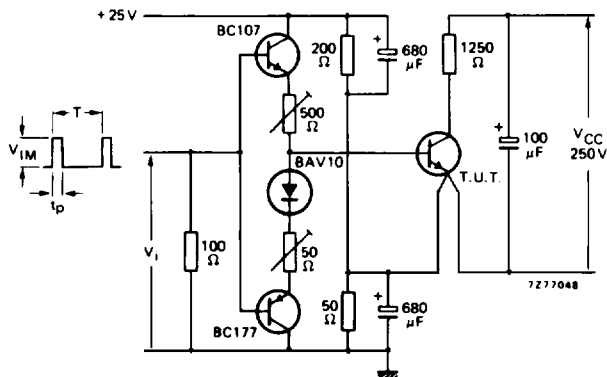


Fig. 4 Switching times waveforms with resistive load.

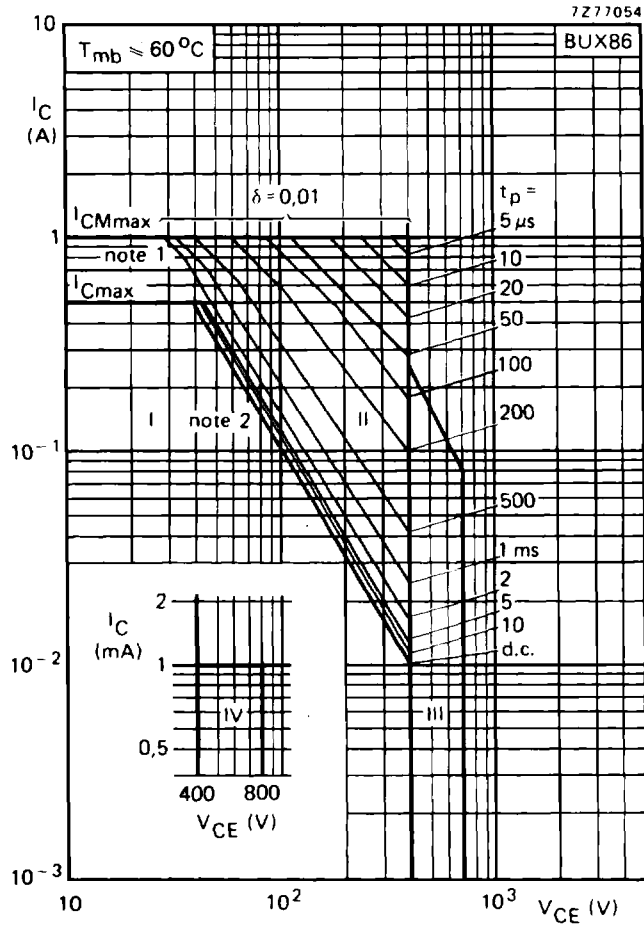


$t_p = 20$ μ s
 $T = 2$ ms
 $V_{IM} = 15$ V

Fig. 5 Test circuit resistive load.

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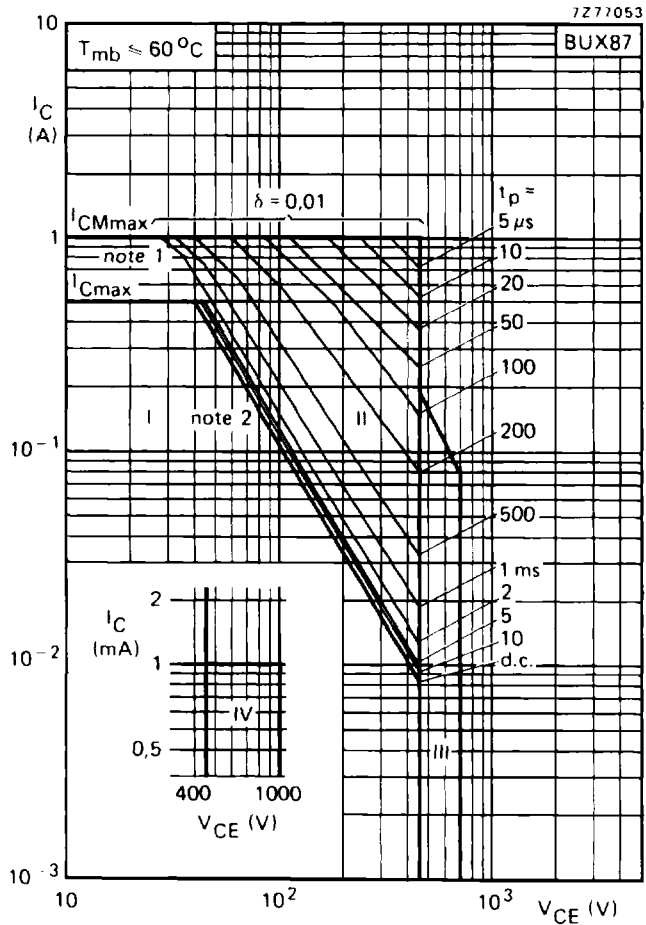


- 1. P_{peak} max lines.
 - 2. Second-breakdown limits.
- I Region of permissible DC operation
 - II Permissible extension for repetitive pulse operation
 - III Area of permissible operation during turn-on in single-transistor converters, provided $R_{BE} \leq 100 \Omega$ and $t_p \leq 0,6 \mu s$
 - IV Repetitive pulse operation in this region is permissible, provided $V_{BE} \leq 0$ and $t_p \leq 2 ms$

Fig. 6 Safe operating area.

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Fig. 7 Safe operating area.

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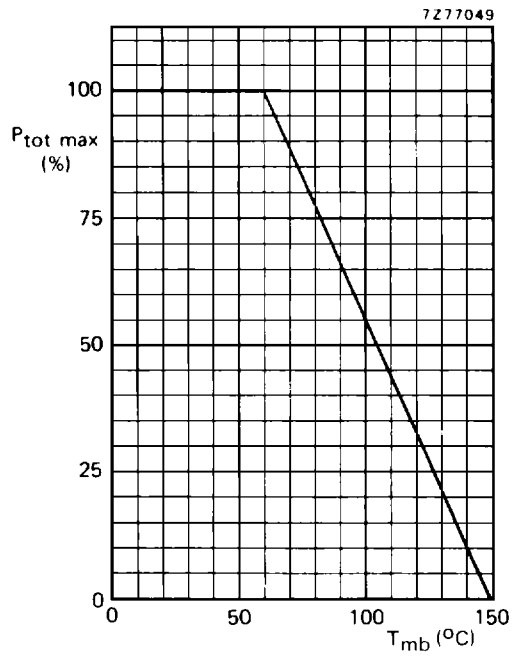


Fig. 8 Power derating curve.

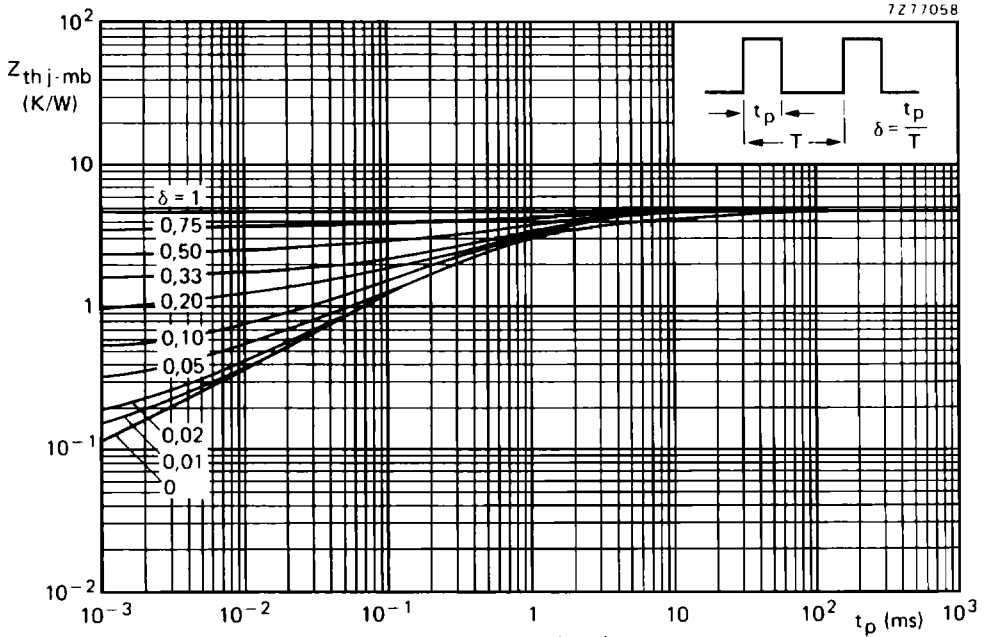


Fig. 9 Pulse power rating chart.

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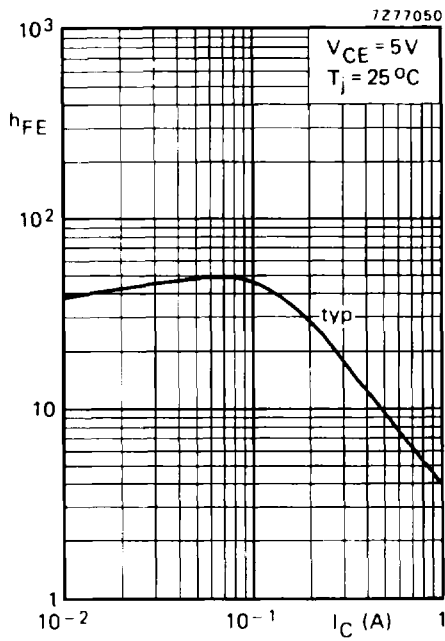


Fig. 10 Typical DC current gain.

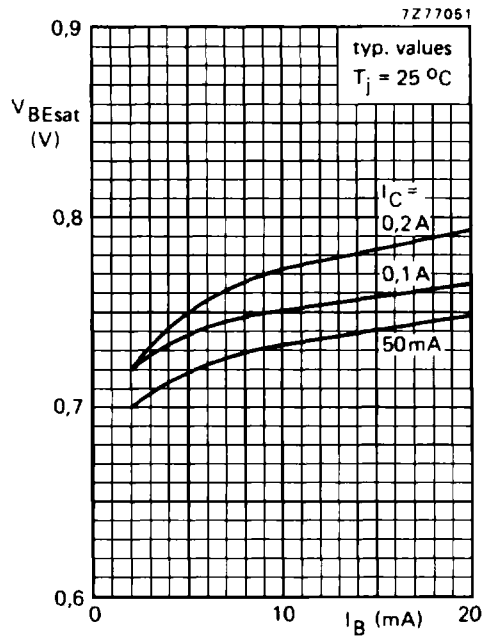


Fig. 11 Typical base-emitter voltage.

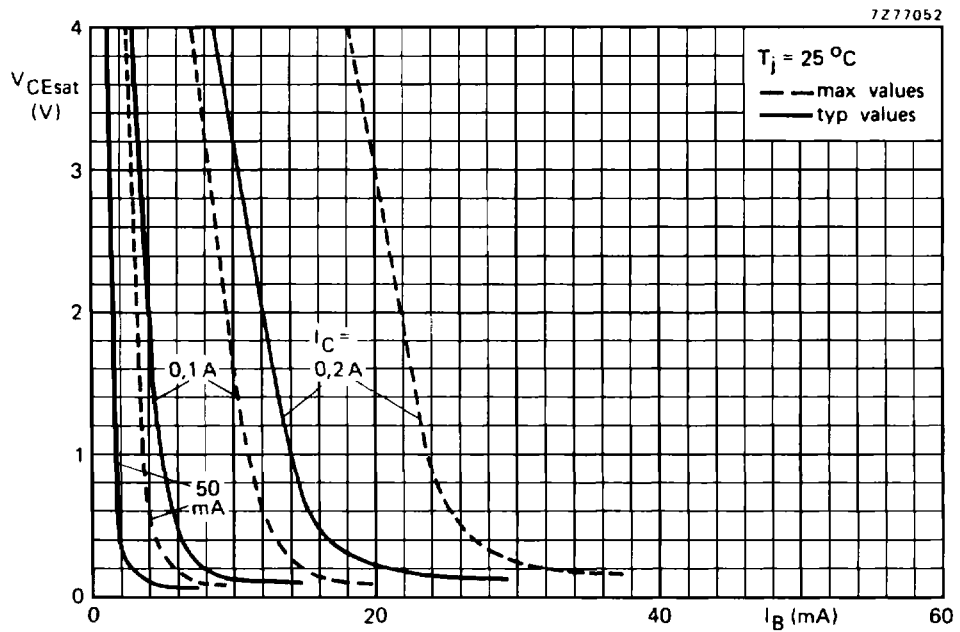


Fig. 12 Typical collector-emitter saturation voltage.