

SILICON DIFFUSED POWER TRANSISTORS

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.

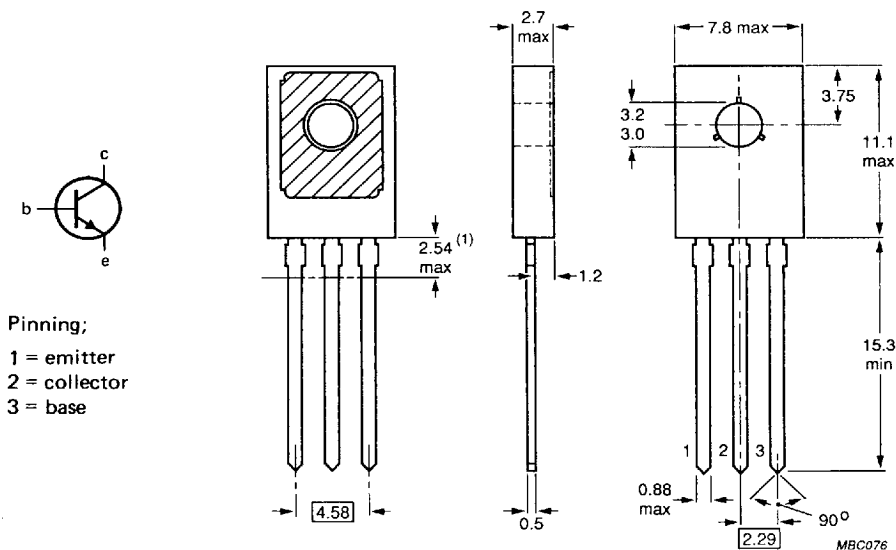
QUICK REFERENCE DATA

		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 $T_{mb} = 60\text{ }^{\circ}\text{C}$	P_{tot} max.	20	W
Fall time	t_f typ.	0,4	μs

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-126.



BUX86

BUX87

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	μA
$V_{CE} = V_{CESMmax}; V_{BE} = 0; T_j = 125$ °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).

Emitter cut-off current

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

I_{EBO} max. 1 mA

Saturation voltage

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

V_{CEsat} max. 0,8 V

$I_C = 0,2 \text{ A}; I_B = 20 \text{ mA}$

V_{CEsat} max. 1,0 V

$I_C = 0,2 \text{ A}; I_B = 20 \text{ mA}$

V_{BEsat} max. 1,0 V

Collector-emitter sustaining voltages

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

	BUX86	BUX87
$V_{CEOsust}$ min.	400	450

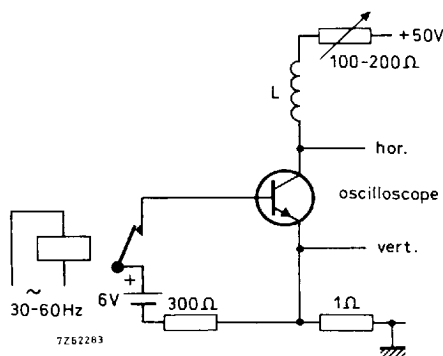


Fig. 2 Test circuit for $V_{CEOsust}$.

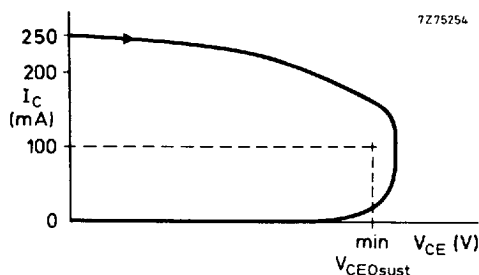


Fig. 3 Oscilloscope display for sustaining voltage.

CHARACTERISTICS (continued)

Transition frequency at $f = 1 \text{ MHz}$

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

f_T typ 20 MHz

Switching times

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

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

Turn-on time

t_{on} typ 0,25 μs
max. 0,5 μs

Turn-off: Storage time

t_s typ 2 μs
max. 3,5 μs

Fall time

t_f typ 0,4 μs

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

t_f max. 1,3 μs

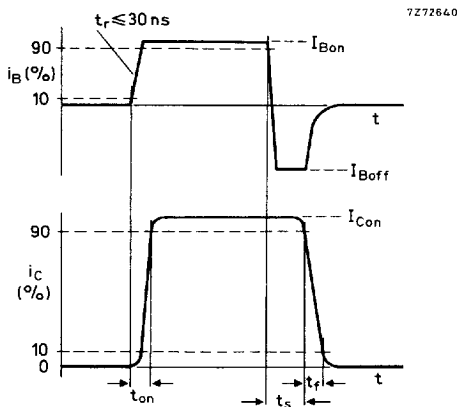


Fig. 4 Switching times waveforms with resistive load.

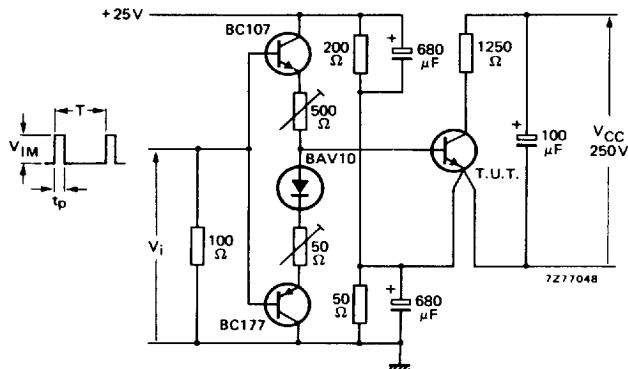
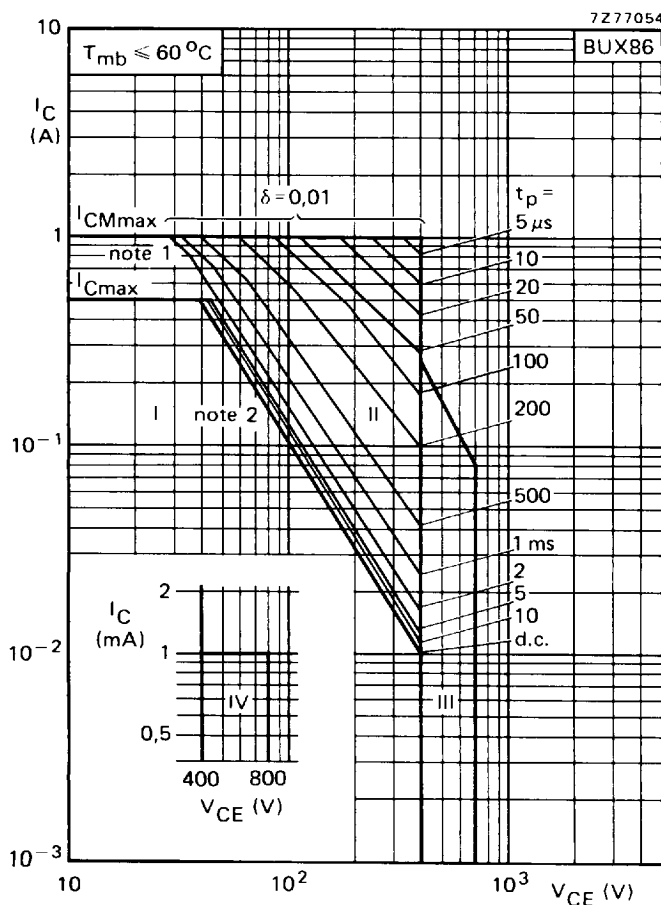


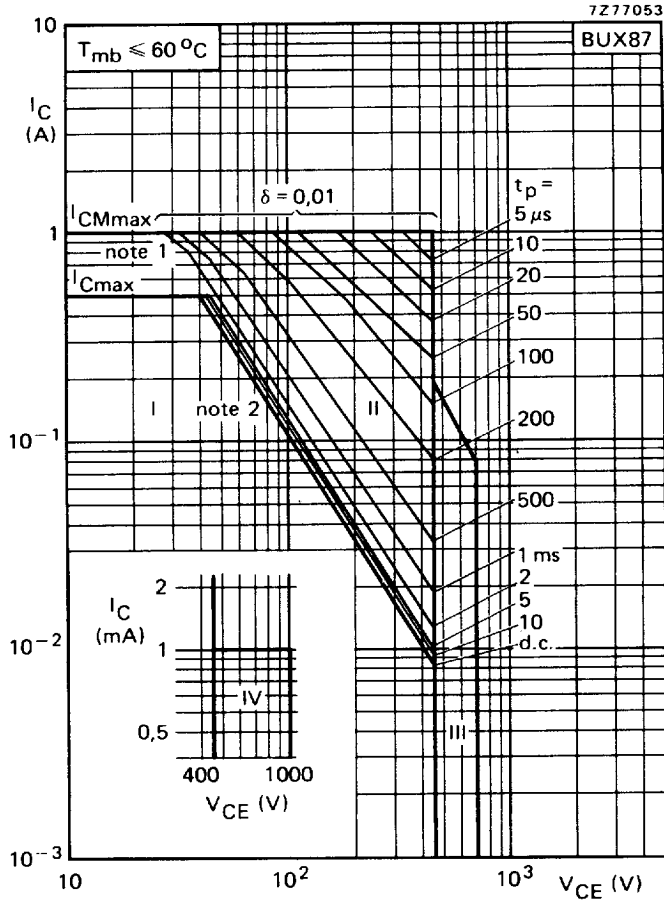
Fig. 5 Test circuit resistive load.

$t_p = 20 \mu\text{s}$
 $T = 2 \text{ ms}$
 $V_{IM} = 15 \text{ V}$



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 $t_p \leq 2 \text{ ms}$

Fig. 6 Safe operating area.



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 2. Second-breakdown limits.
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Fig. 7 Safe operating area.

Silicon diffused power transistors

BUX86

BUX87

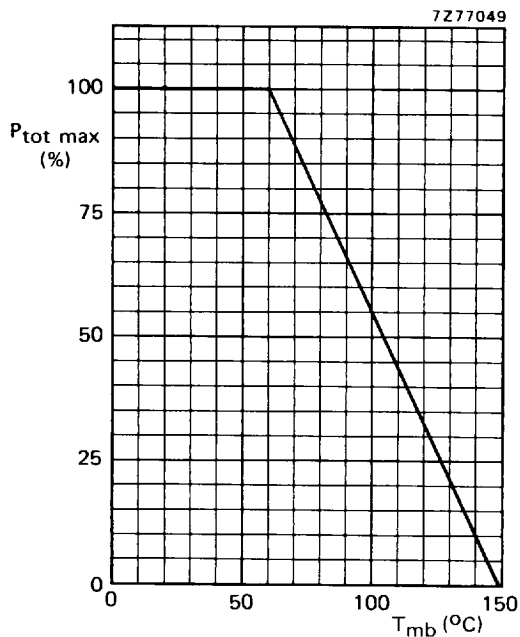


Fig. 8 Power derating curve.

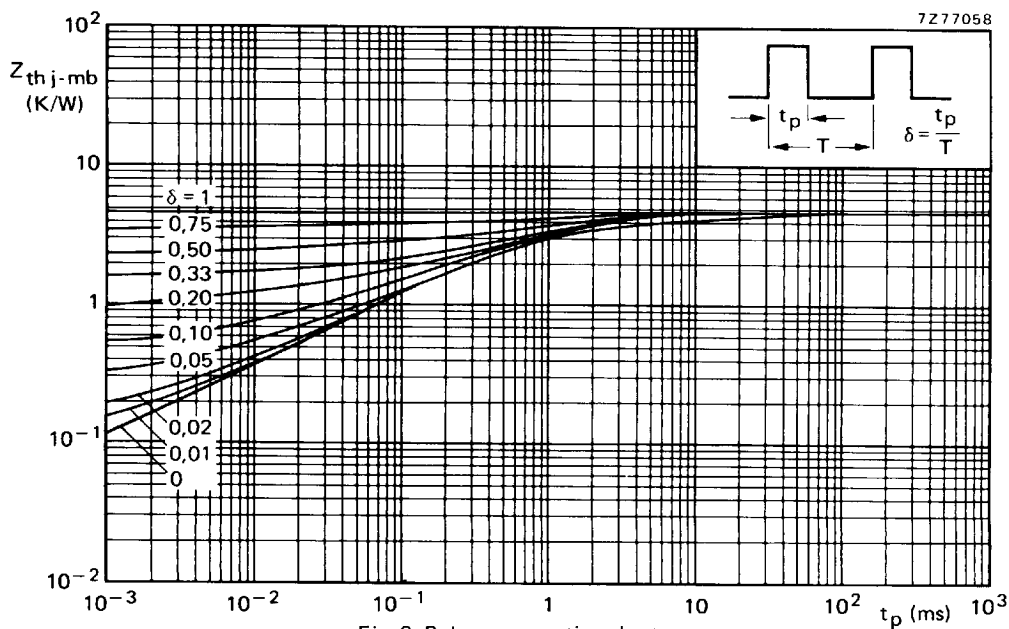


Fig. 9 Pulse power rating chart.

BUX86
BUX87

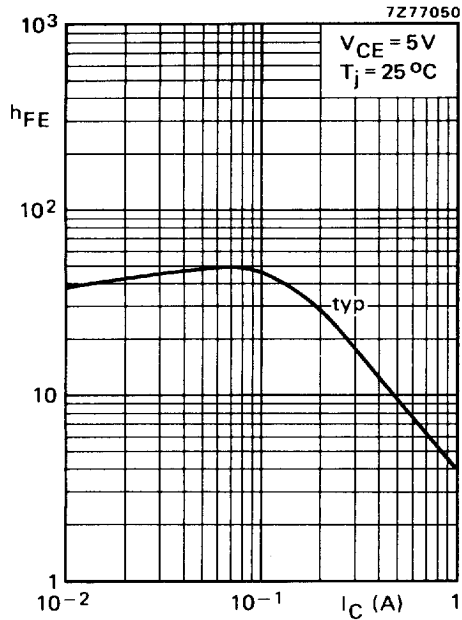


Fig. 10 Typical DC current gain.

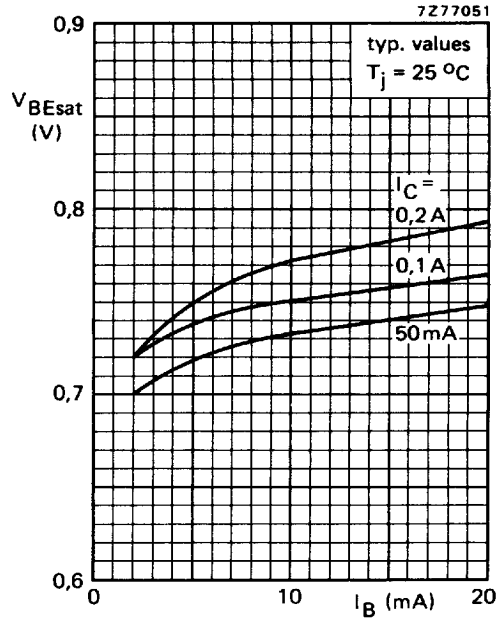


Fig. 11 Typical base-emitter voltage.

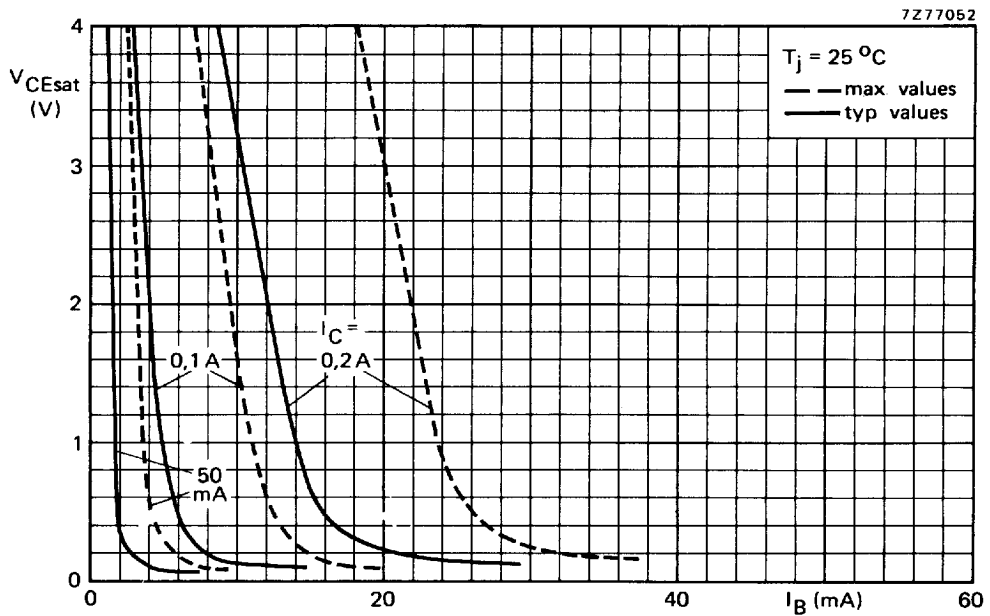


Fig. 12 Typical collector-emitter saturation voltage.