

SILICON DIFFUSED POWER TRANSISTORS

High-voltage, high-speed, glass-passivated npn power transistors in a TO-3 envelope, intended for use in converters, inverters, switching regulators, motor control systems etc.

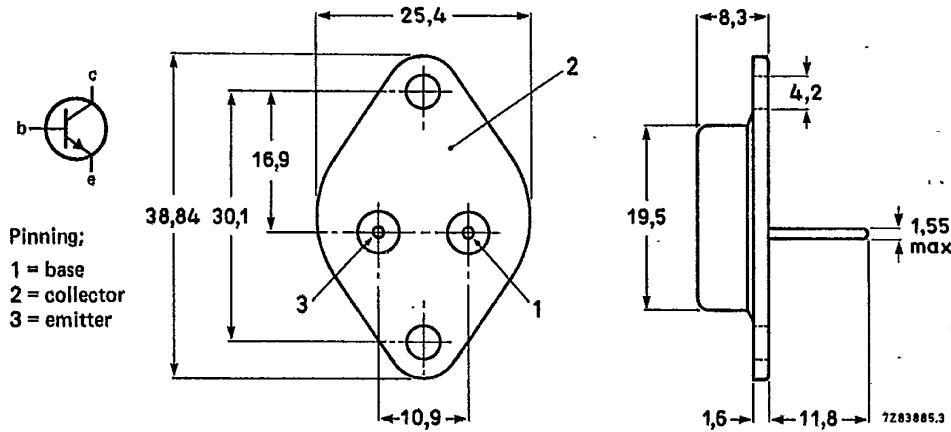
QUICK REFERENCE DATA

		BUX46	BUX46A
Collector-emitter voltage (peak value; $V_{BE} = 0$ )	$V_{CESM}$ max.	850	1000 V
Collector-emitter voltage (open base)	$V_{CEO}$ max.	400	450 V
Collector-emitter saturation voltage	$V_{CEsat}$ max.	1,5	V
Collector current (DC)	$I_C$ max.	3,5	A
Collector current (peak value)	$I_{CM}$ max.	5	A
Total power dissipation up to $T_{mb} = 25^\circ C$	$P_{tot}$ max.	85	W
Fall time (resistive load)	$t_f$ max.	0,8	$\mu s$

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-3.



Collector connected to case.

**BUX46**  
**BUX46A**

T-33-13

**RATINGS**

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

		BUX46	BUX46A	
Collector-emitter voltage (peak value; $V_{BE} = 0$ )	$V_{CESM}$	max. 850	1000	V
Collector-emitter voltage ( $R_{BE} \leq 10 \Omega$ )	$V_{CER}$	max. 850	1000	V
Collector-emitter voltage (open base)	$V_{CEO}$	max. 400	450	V
Collector current (DC)	$I_C$	max. 3,5		A
Collector current (peak value) $t_p < 2$ ms	$I_{CM}$	max. 5		A
Base current (DC)	$I_B$	max. 1,5		A
Base current (peak value); $t_p < 2$ ms	$I_{BM}$	max. 3		A
Total power dissipation up to $T_{mb} = 25^\circ\text{C}$	$P_{tot}$	max. 85		W
Storage temperature range	$T_{stg}$	-65 to +175		$^\circ\text{C}$
Junction temperature	$T_j$	max. 175		$^\circ\text{C}$

**THERMAL RESISTANCE**

From junction to mounting base	$R_{th\ j-mb}$	=	1,75	K/W
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**CHARACTERISTICS** $T_j = 25^\circ\text{C}$  unless otherwise specified

Collector cut-off current\*

 $V_{CE} = V_{CESMmax}; R_{BE} \leq 10 \Omega$  $V_{CE} = V_{CESMmax}; R_{BE} \leq 10 \Omega; T_j = 125^\circ\text{C}$ 

$I_{CER}$	max.	0,3	mA
$I_{CER}$	max.	2	mA

Emitter cut-off current

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

$I_{EBO}$	max.	1	mA
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Saturation voltages

 $I_C = 3,5\text{ A}; I_B = 0,7\text{ A}$  $I_C = 2,5\text{ A}; I_B = 0,5\text{ A}$ 

$V_{CEsat}$	max.	5	V
$V_{CEsat}$	max.	1,5	V
$V_{BEsat}$	max.	1,3	V

Collector-emitter sustaining voltage

 $I_C = 200\text{ mA}; I_B = 0; L = 25\text{ mH}$ 

$V_{CEO\text{sust}}$	min.	400	450	V
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Collector-emitter cut-off current

 $V_{CE} = V_{CESMmax}; V_{BE} = -2,5\text{ V}$  $V_{CE} = V_{CESMmax}; V_{BE} = -2,5\text{ V}; T_j = 124^\circ\text{C}$ 

$I_{CEX}$	max.	0,1	mA
$I_{CEX}$	max.	1	mA

Emitter-base breakdown voltage

 $I_C = 0; I_E = 0,5\text{ A}$ 

$V_{(BR)EBO}$	max.	30	V
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Second breakdown collector current

 $V_{CE} = 70\text{ V}; t = 1\text{ sec.}$ 

$I_{(SB)C}$	min.	0,5	A
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\* Measured with a half-sinewave voltage (curve tracer).

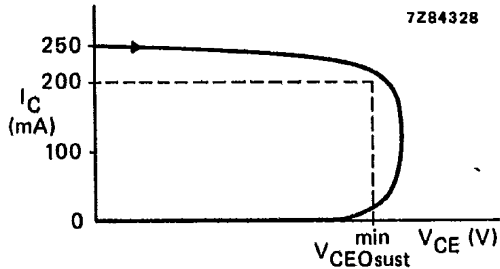


Fig. 2 Oscilloscope display for sustaining voltage.

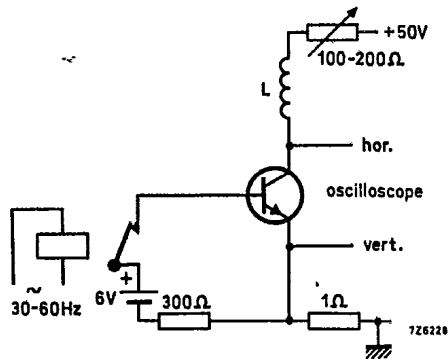


Fig. 3 Test circuit for  $V_{CE0sust}$ .

Switching times resistive load (Figs 4 and 5)

$I_{Con} = 2,5 \text{ A}; I_{Bon} = -I_{Boff} = 0,5 \text{ A}$

Turn-on time

Turn-off: Storage time

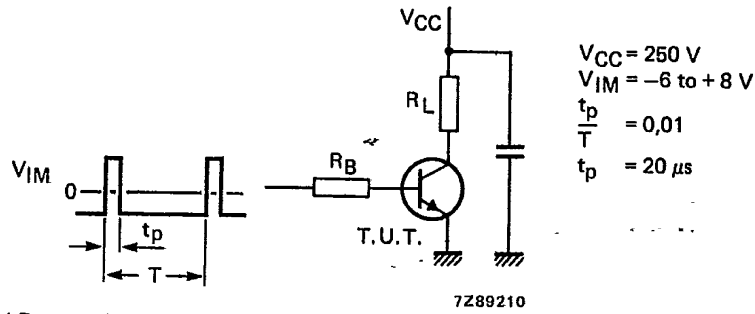
Fall time

Switching times inductive load (Figs 6 and 7)

$I_{Con} = 2,5 \text{ A}; I_B = 0,5 \text{ A}$

Fall time

$t_{on}$	typ.	0,5 $\mu\text{s}$
	max.	1 $\mu\text{s}$
$t_s$	typ.	1,5 $\mu\text{s}$
	max.	3 $\mu\text{s}$
$t_f$	typ.	0,5 $\mu\text{s}$
	max.	0,8 $\mu\text{s}$
$t_f$	max.	0,2 $\mu\text{s}$



The values of  $R_B$  and  $R_L$  are selected in accordance with  $I_{C \text{ on}}$  and  $I_B$  requirements.

Fig. 4 Test circuit resistive load.

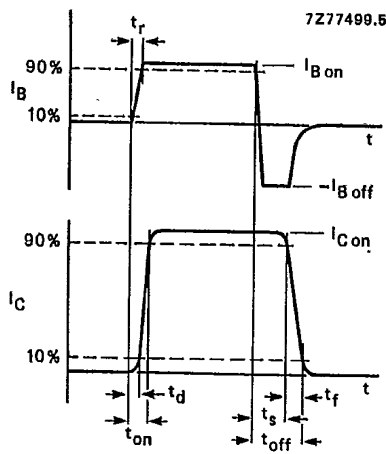


Fig. 5 Switching times waveforms with resistive load.

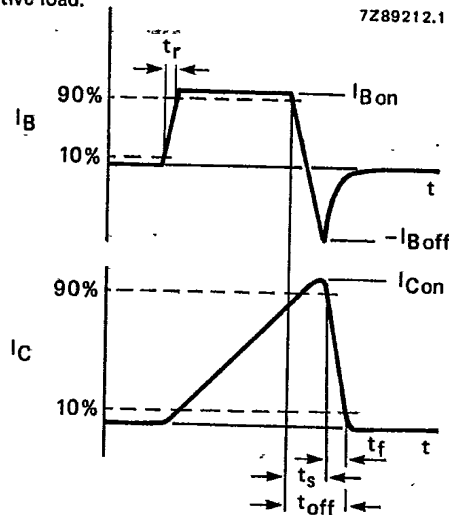


Fig. 6 Switching times waveforms with inductive load.

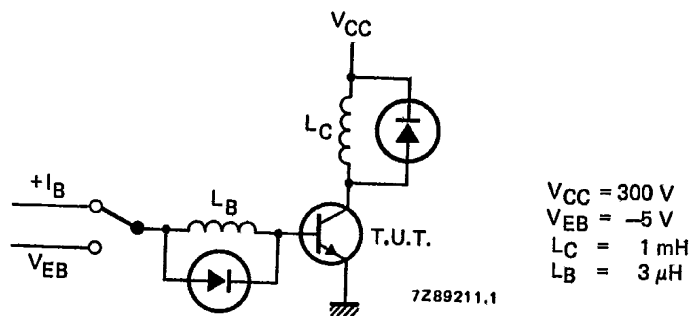
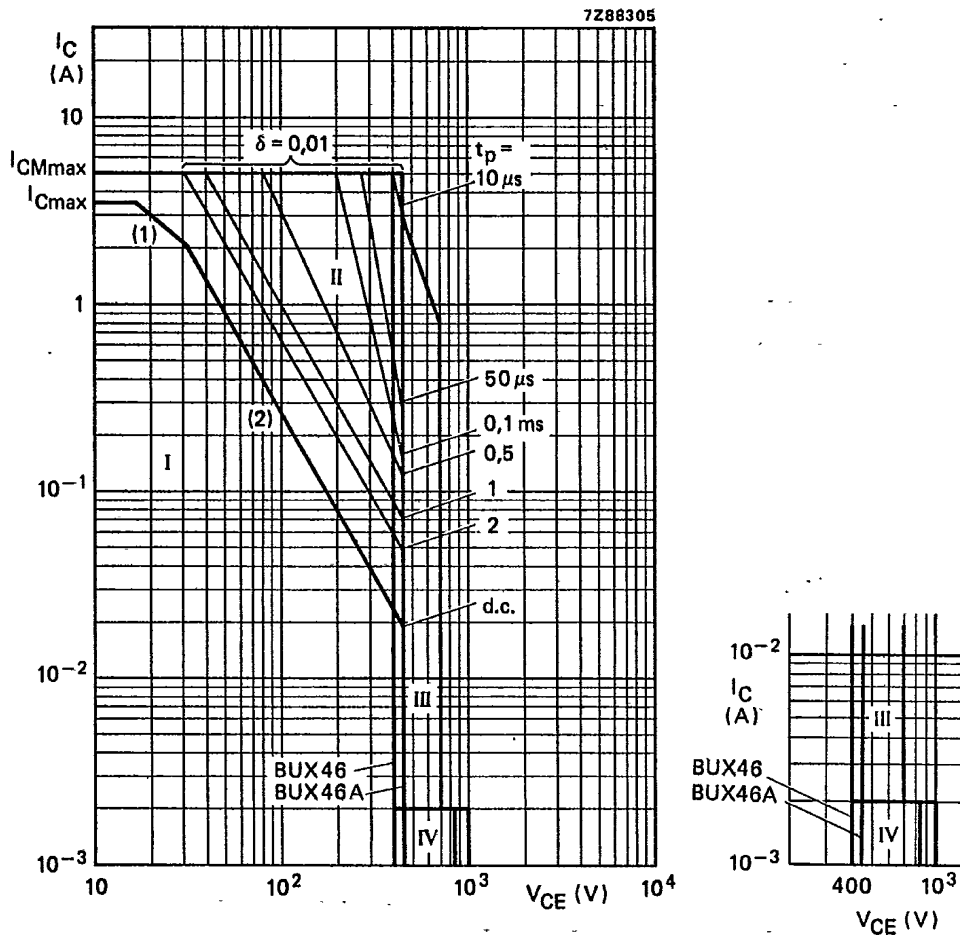


Fig. 7 Test circuit inductive load.



- (1)  $P_{tot \max}$  and  $P_{tot \text{ peak } \max}$  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. 8 Safe operating area at  $T_{mb} \leq 60 \text{ }^\circ\text{C}$ .

BUX46  
BUX46A

T-33-13

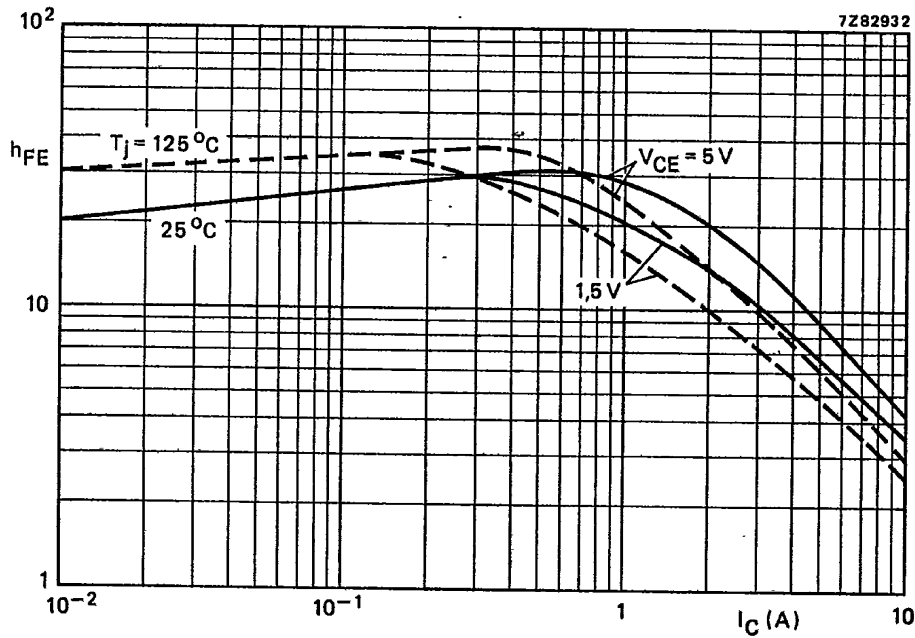


Fig. 9 DC current gain.

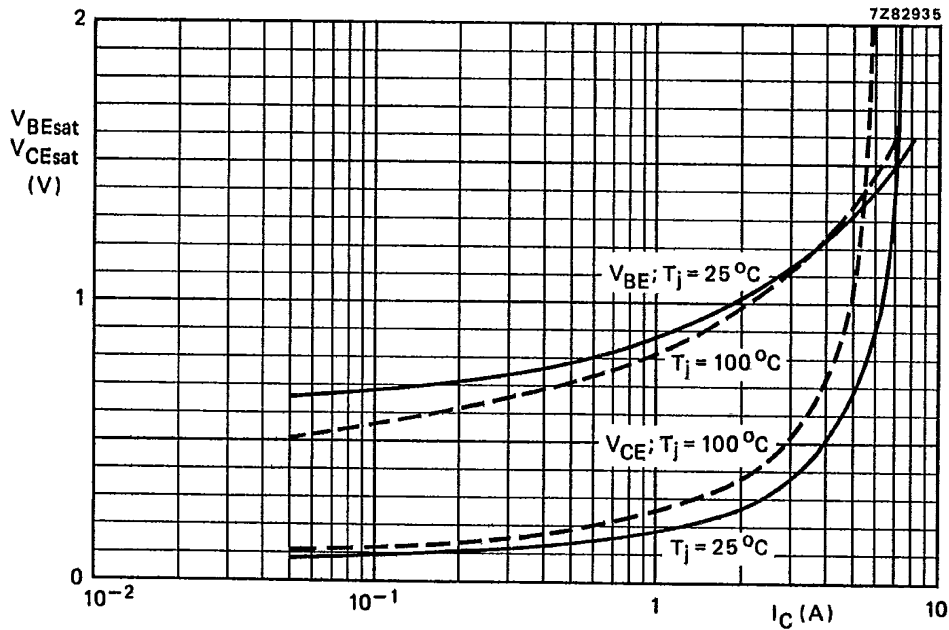


Fig. 10 Typical values base-emitter and collector-emitter voltage, I<sub>C</sub>/I<sub>B</sub> = 5.

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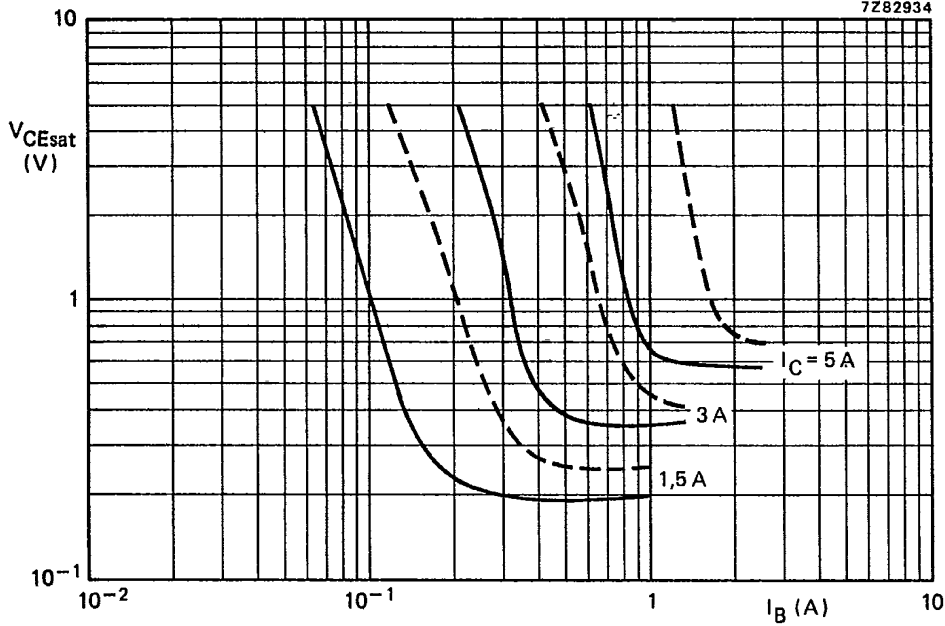


Fig. 11 Typ. (—) and max. (---) values collector-emitter saturation voltage at  $T_j = 25^\circ C$ .

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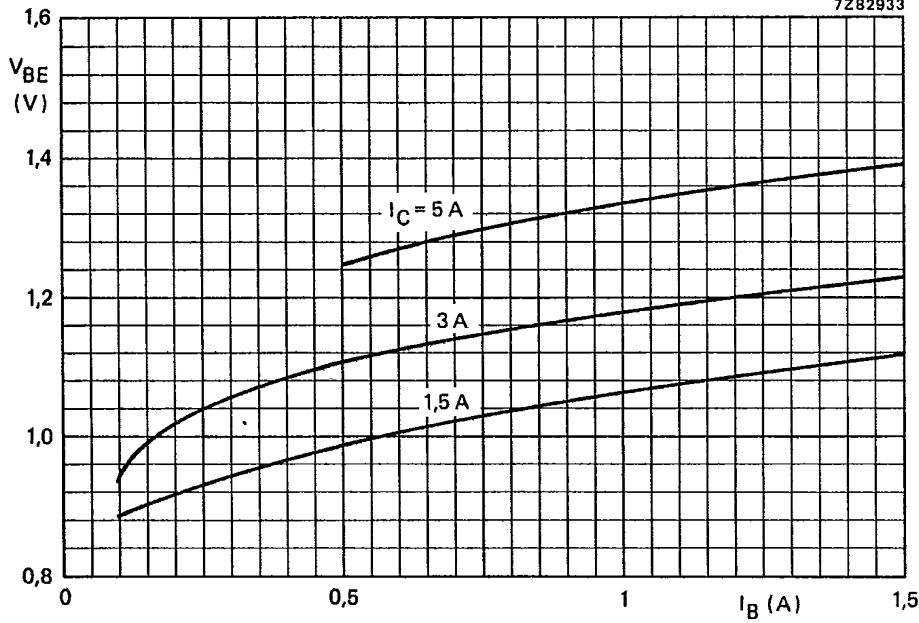


Fig. 12 Typical values at  $T_j = 25^\circ C$ .