

BUX46
BUX46A

T-33-13

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.

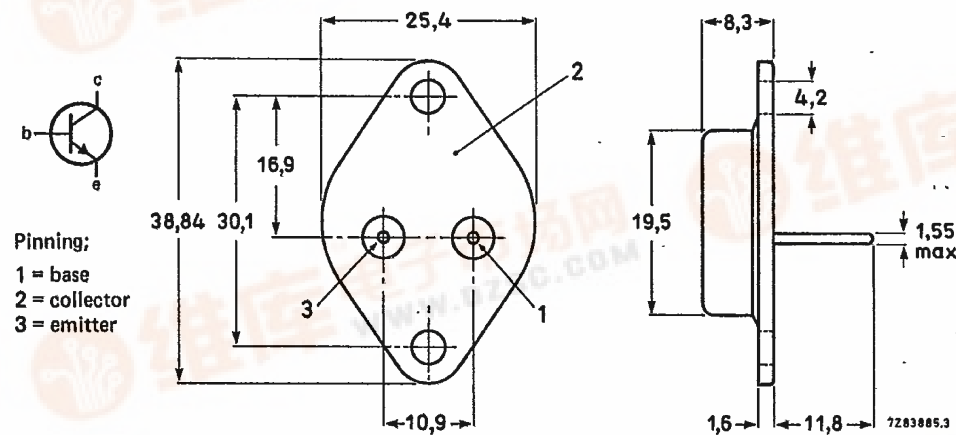
QUICK REFERENCE DATA

		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 $T_{mb} = 25^\circ\text{C}$	P_{tot} max.	85	W
Fall time (resistive load)	t_f max.	0,8	μs

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-3.



Collector connected to case.

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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 $T_{mb} = 25^\circ C$	P_{tot}	max.	85		W
Storage temperature range	T_{stg}		-65 to +175		$^\circ C$
Junction temperature	T_j	max.	175		$^\circ C$

THERMAL RESISTANCE

From junction to mounting base	R_{thj-mb}	=	1,75		K/W
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CHARACTERISTICS

$T_j = 25^\circ C$ unless otherwise specified

Collector cut-off current*

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

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

Emitter cut-off current

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

I_{EBO}	max.	1		mA
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Saturation voltages

$I_C = 3,5$ A; $I_B = 0,7$ A
 $I_C = 2,5$ A; $I_B = 0,5$ A

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

Collector-emitter sustaining voltage

$I_C = 200$ mA; $I_B = 0$; $L = 25$ mH

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

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

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

Emitter-base breakdown voltage

$I_C = 0; I_E = 0,5$ A

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

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

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

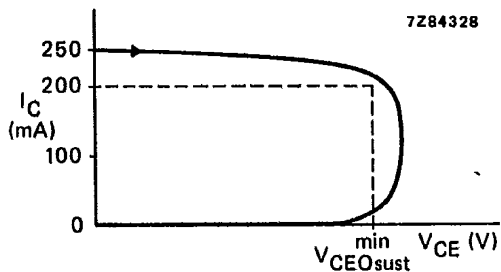


Fig. 2 Oscilloscope display for sustaining voltage.

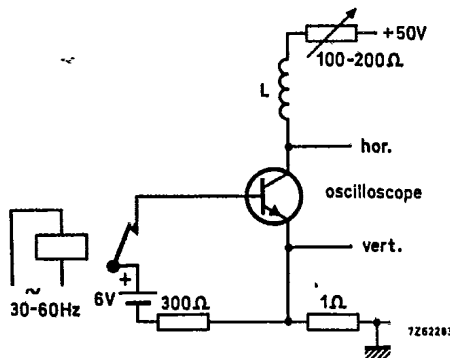


Fig. 3 Test circuit for $V_{CEO(sust)}$.

Switching times resistive load (Figs 4 and 5)

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

Turn-on time

t_{on}	typ.	0,5 μs
	max.	1 μs

Turn-off: Storage time

t_s	typ.	1,5 μs
	max.	3 μs

Fall time

t_f	typ.	0,5 μs
	max.	0,8 μs

Switching times inductive load (Figs 6 and 7)

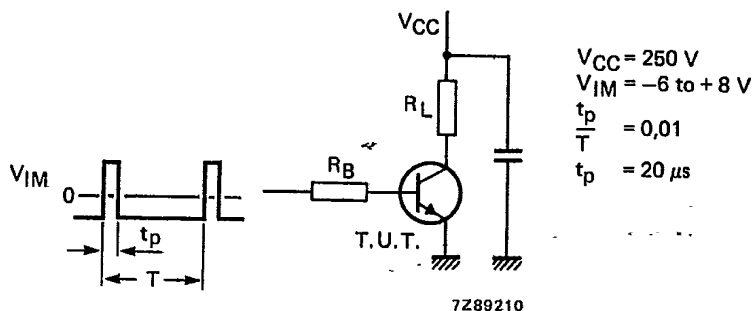
$I_{Con} = 2,5 A; I_B = 0,5 A$

Fall time

t_f	max.	0,2 μs
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BUX46A

T-33-13



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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.

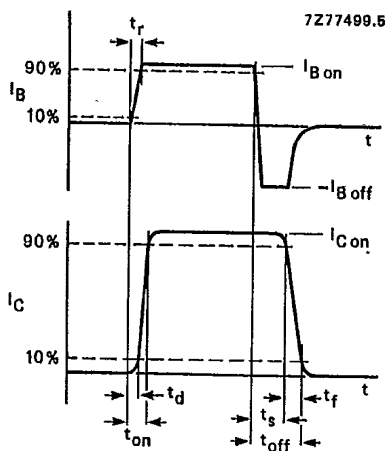


Fig. 5 Switching times waveforms with resistive load.

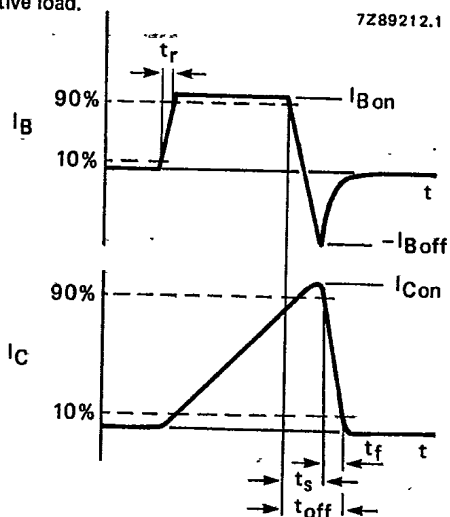
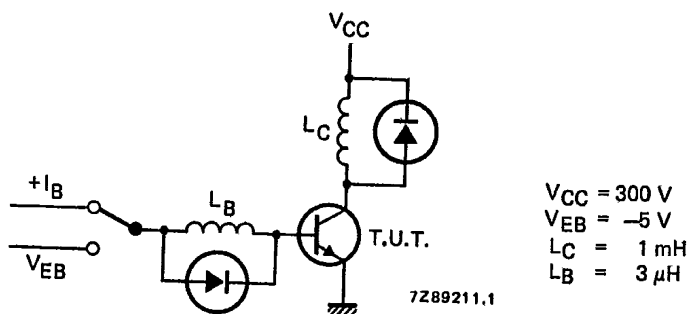
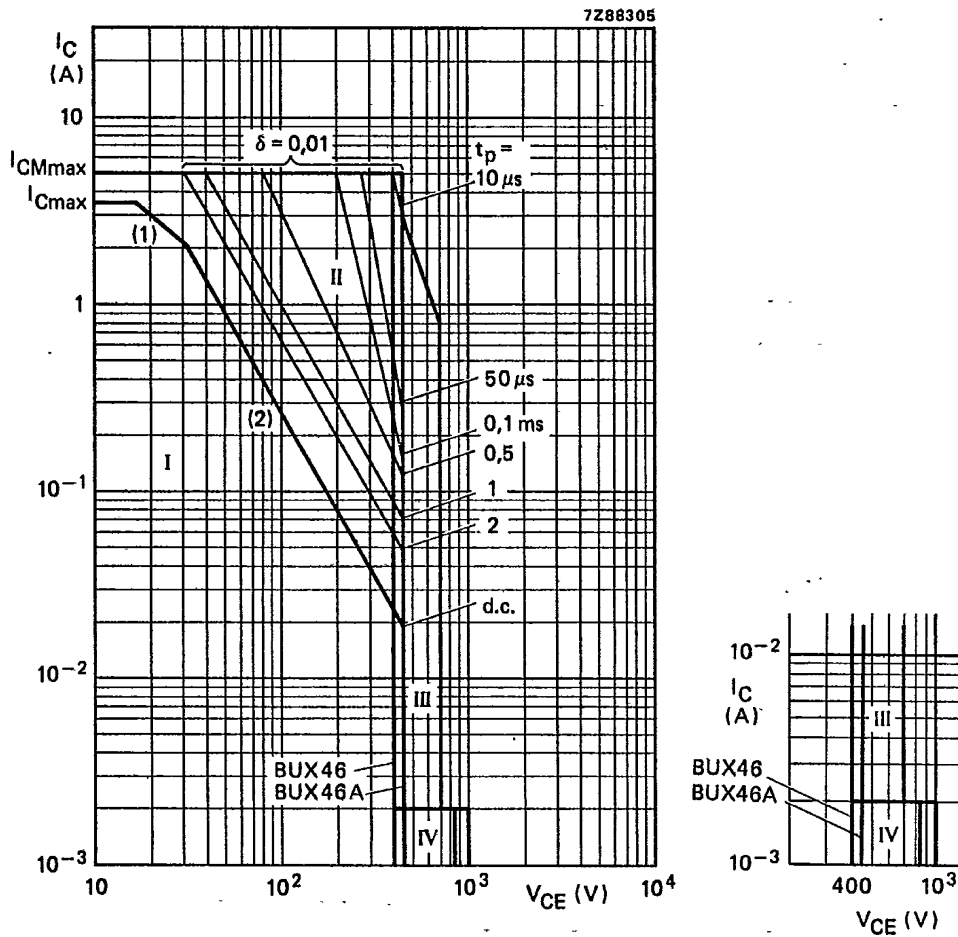


Fig. 6 Switching times waveforms with inductive load.



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Fig. 7 Test circuit inductive load.



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

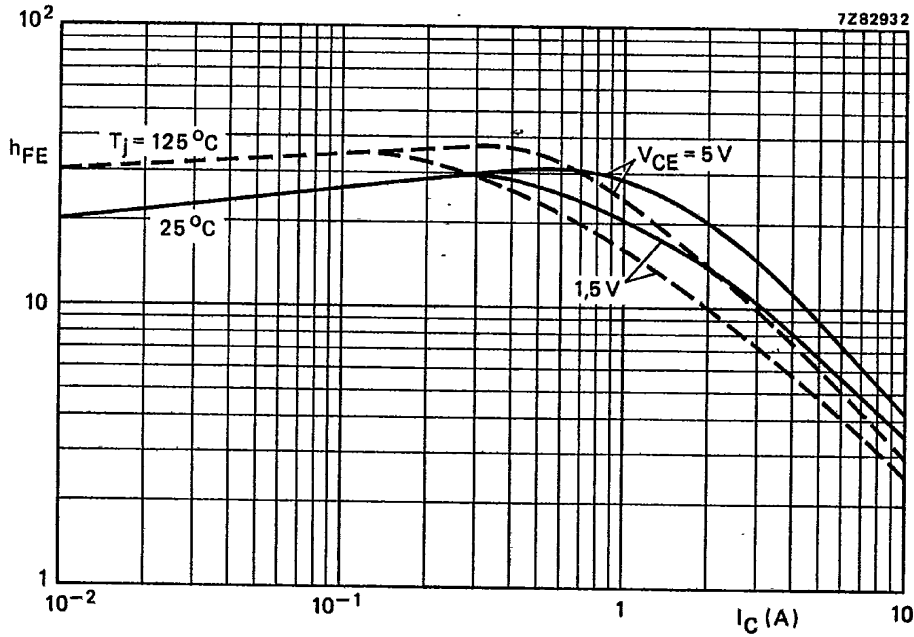


Fig. 9 DC current gain.

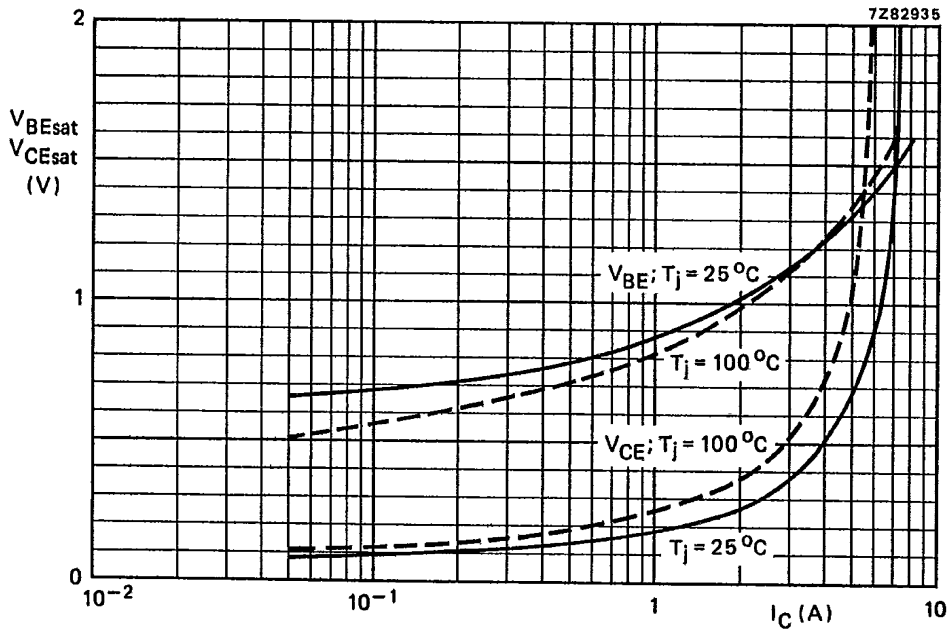


Fig. 10 Typical values base-emitter and collector-emitter voltage, $I_C/I_B = 5$.

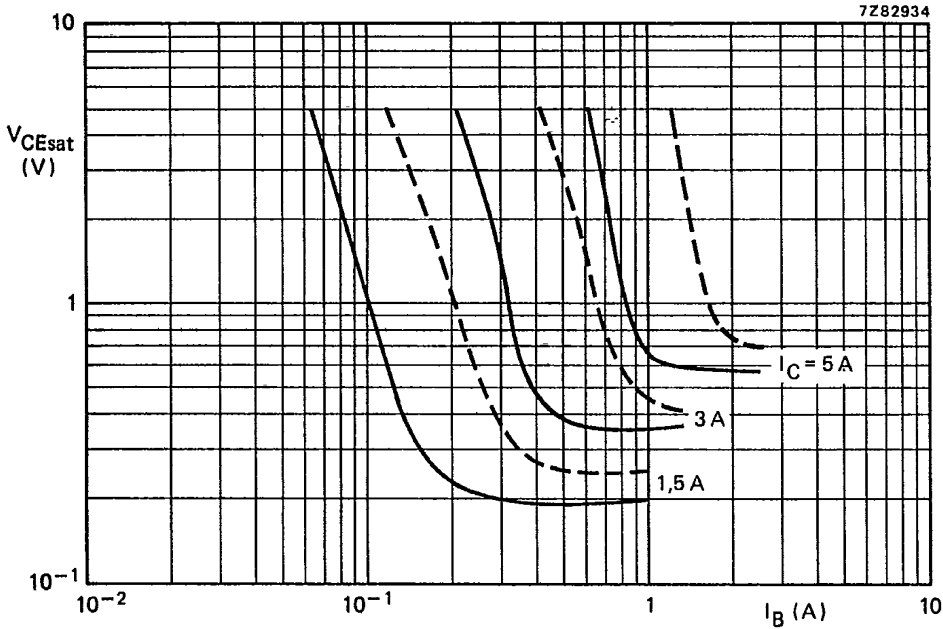


Fig. 11 Typ. (—) and max. (---) values collector-emitter saturation voltage at $T_j = 25^\circ C$.

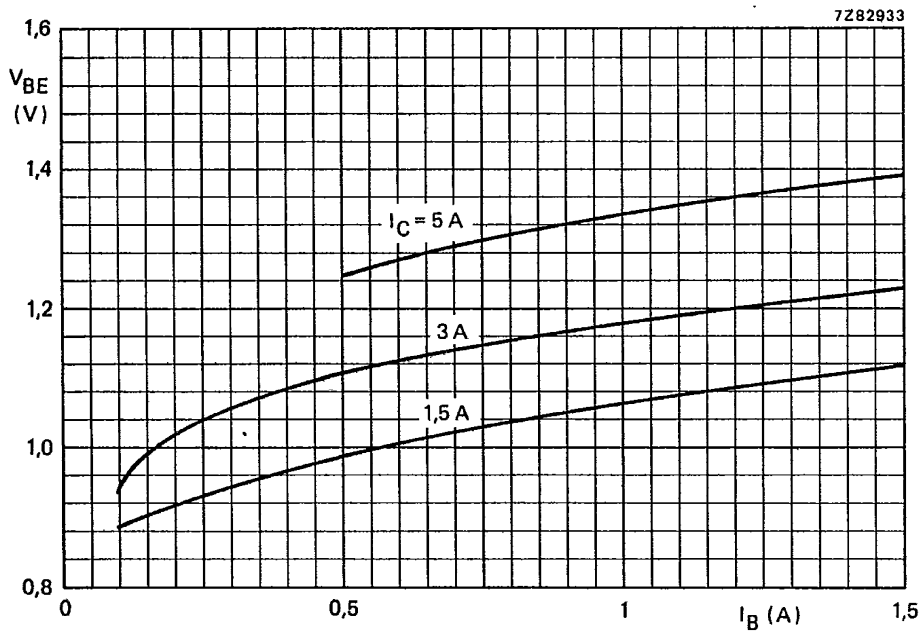


Fig. 12 Typical values at $T_j = 25^\circ C$.