

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.

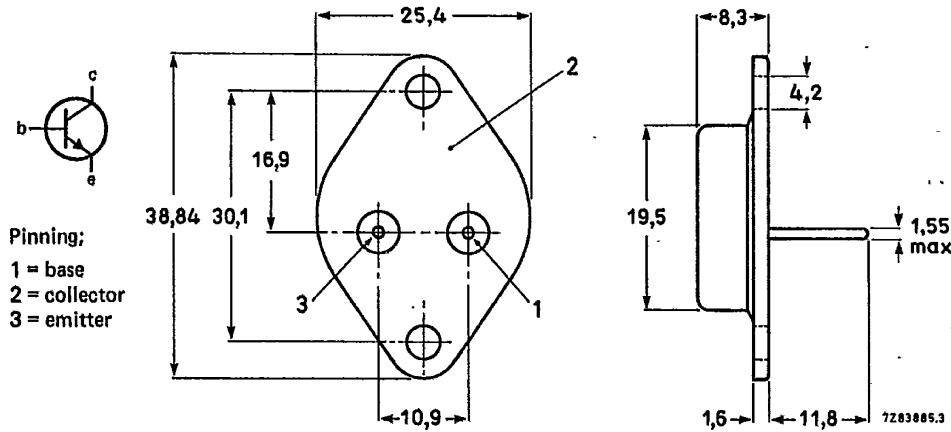
QUICK REFERENCE DATA

		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	μs

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-3.



Collector connected to case.

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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*				
$V_{CE} = V_{CESMmax}; R_{BE} \leq 10 \Omega$	I_{CER}	max. 0,3		mA
$V_{CE} = V_{CESMmax}; R_{BE} \leq 10 \Omega; T_j = 125^\circ\text{C}$	I_{CER}	max. 2		mA
Emitter cut-off current				
$I_C = 0; V_{EB} = 5$ V	I_{EBO}	max. 1		mA
Saturation voltages				
$I_C = 3,5$ A; $I_B = 0,7$ A	V_{CEsat}	max. 5		V
$I_C = 2,5$ A; $I_B = 0,5$ A	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	$V_{CEO\text{sust}}$	min. 400	450	V
Collector-emitter cut-off current				
$V_{CE} = V_{CESMmax}; V_{BE} = -2,5$ V	I_{CEX}	max. 0,1		mA
$V_{CE} = V_{CESMmax}; V_{BE} = -2,5$ V; $T_j = 124^\circ\text{C}$	I_{CEX}	max. 1		mA
Emitter-base breakdown voltage				
$I_C = 0; I_E = 0,5$ A	$V_{(BR)EBO}$	max. 30		V
Second breakdown collector current				
$V_{CE} = 70$ V; $t = 1$ sec.	$I_{(SB)C}$	min. 0,5		A

* Measured with a half-sinewave voltage (curve tracer).

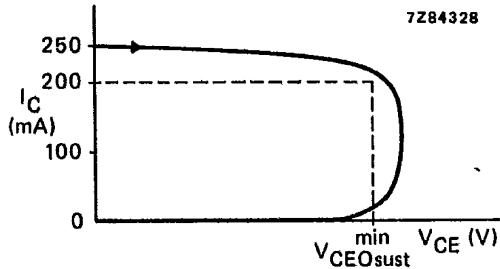


Fig. 2 Oscilloscope display for sustaining voltage.

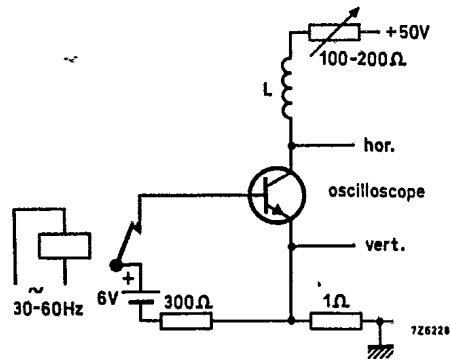


Fig. 3 Test circuit for $V_{CE0sust}$.

Switching times resistive load (Figs 4 and 5)

$I_{Con} = 2,5 \text{ A}; I_{B0n} = -I_{B0f} = 0,5 \text{ A}$

Turn-on time

Turn-off: Storage time

Fall time

Switching times inductive load (Figs 6 and 7)

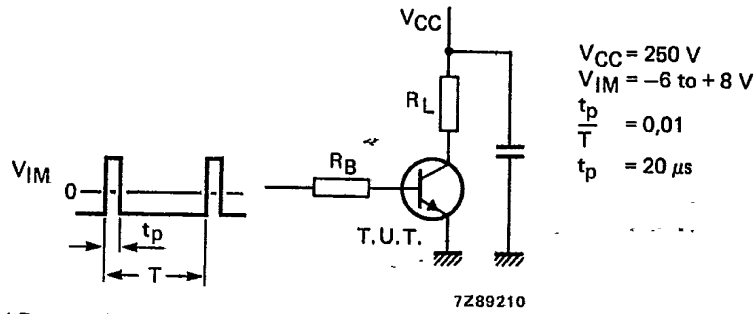
$I_{Con} = 2,5 \text{ A}; I_B = 0,5 \text{ A}$

Fall time

t_{on}	typ.	0,5 μs
	max.	1 μs
t_s	typ.	1,5 μs
	max.	3 μs
t_f	typ.	0,5 μs
	max.	0,8 μs
t_f	max.	0,2 μs

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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.

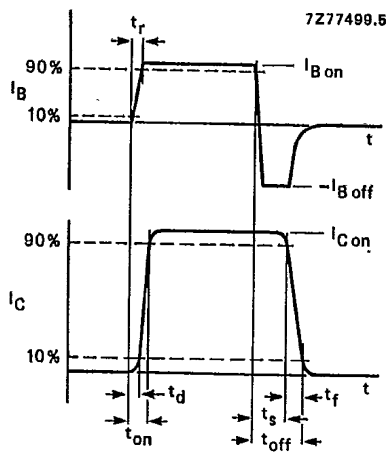


Fig. 5 Switching times waveforms with resistive load.

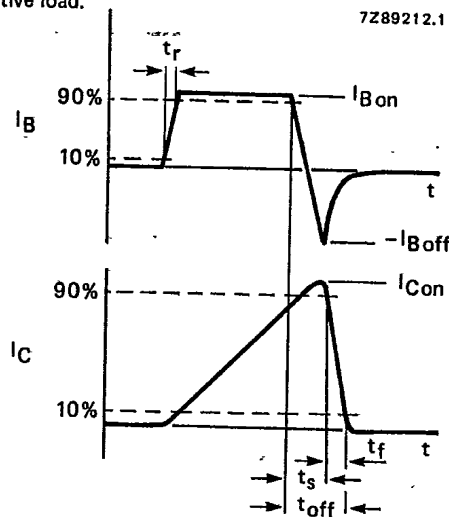


Fig. 6 Switching times waveforms with inductive load.

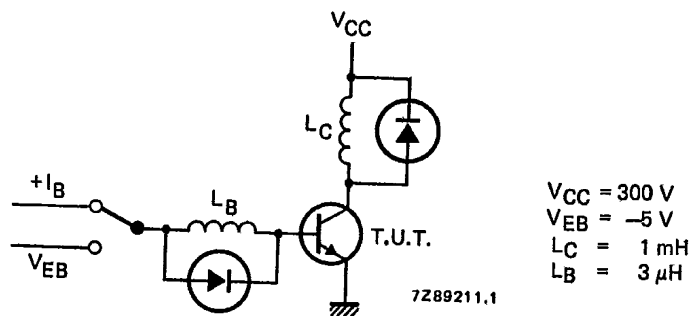
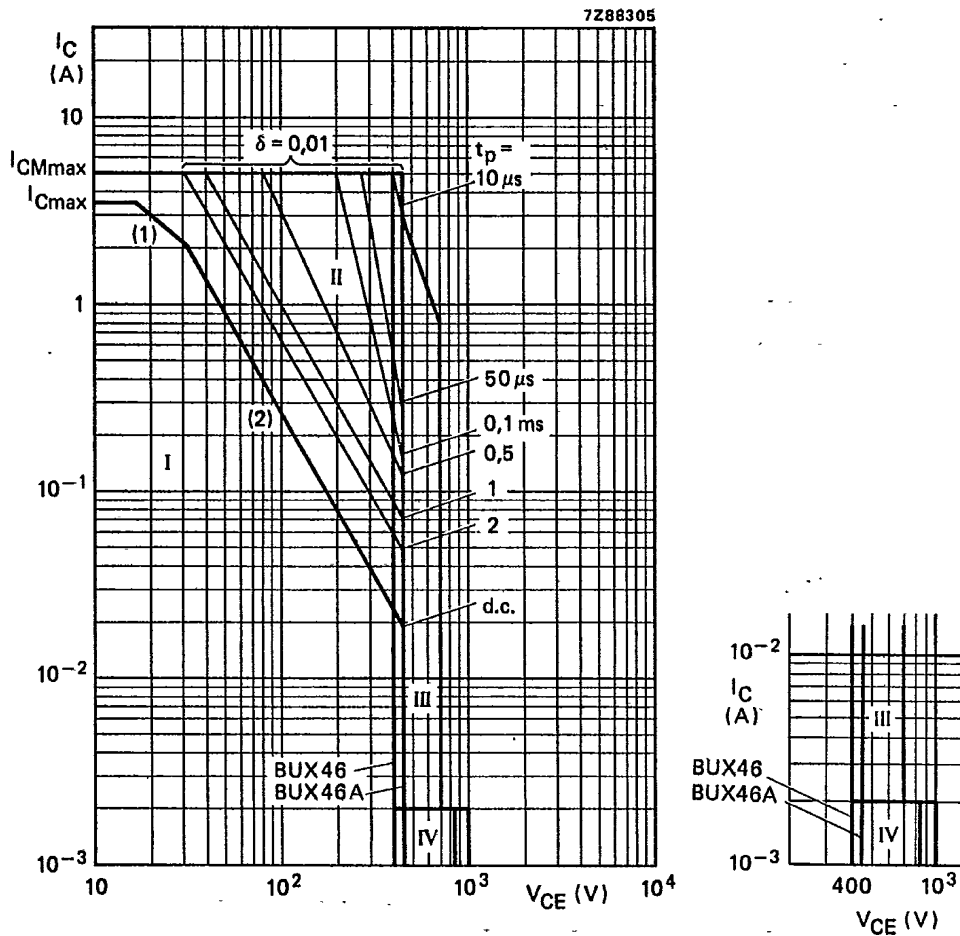


Fig. 7 Test circuit inductive load.



- (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 $T_{mb} \leq 60 \text{ }^\circ\text{C}$.

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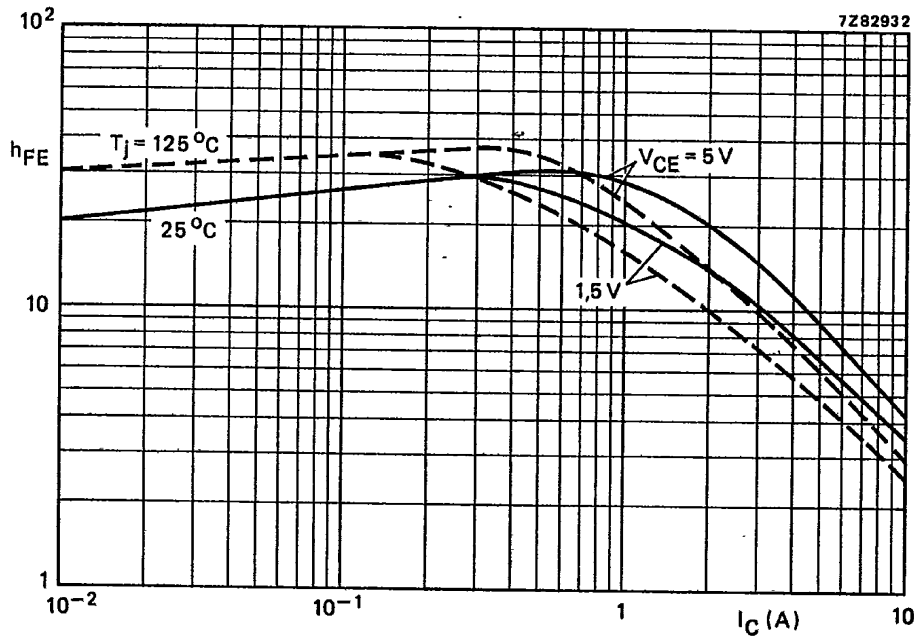


Fig. 9 DC current gain.

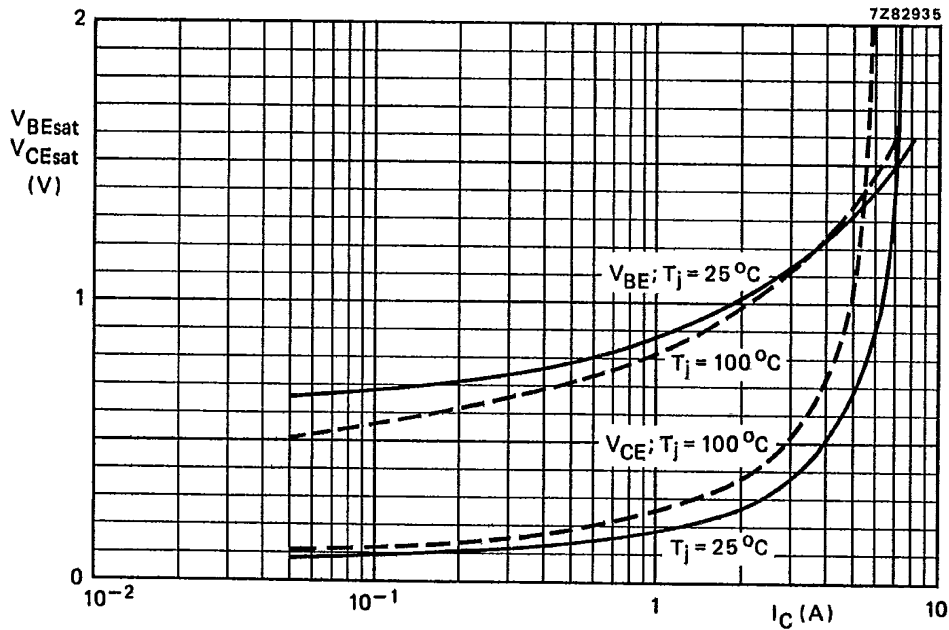


Fig. 10 Typical values base-emitter and collector-emitter voltage, $I_C/I_B = 5$.

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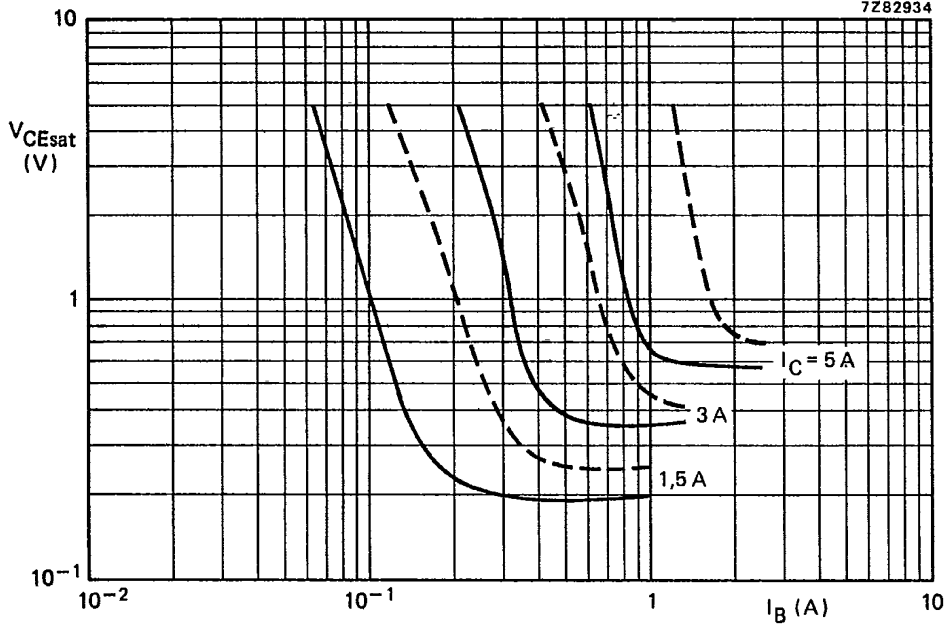


Fig. 11 Typ. (—) and max. (---) values collector-emitter saturation voltage at $T_j = 25^\circ C$.

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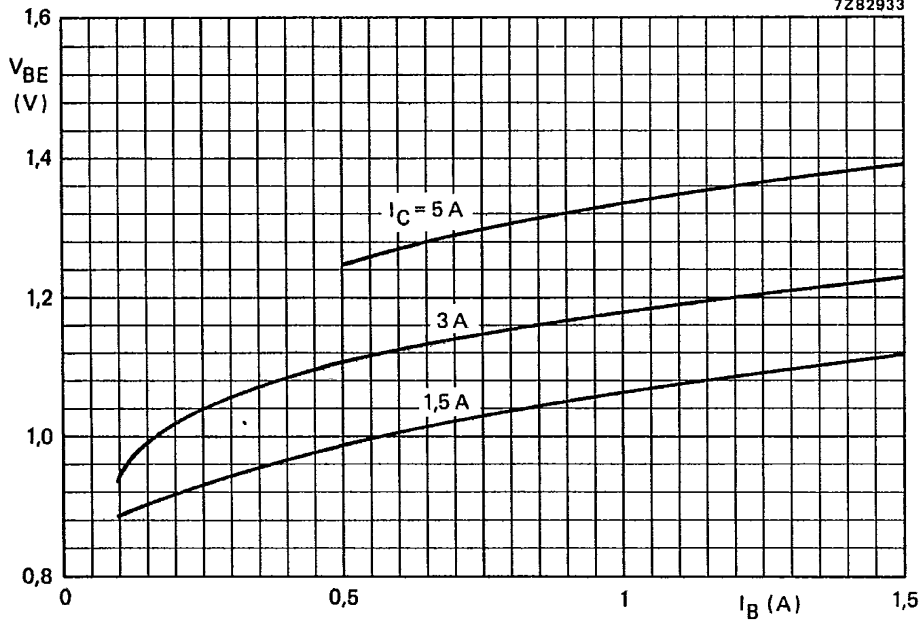


Fig. 12 Typical values at $T_j = 25^\circ C$.



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