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.

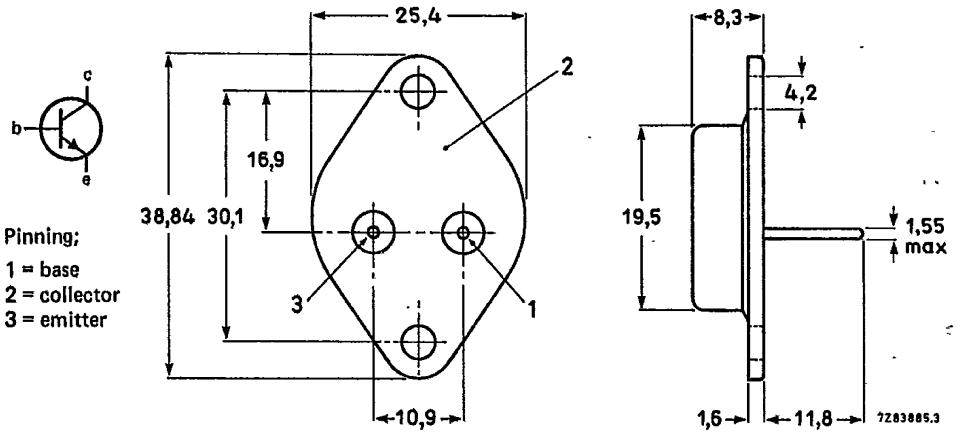
QUICK REFERENCE DATA

			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 °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.

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 ($R_{BE} \leqslant 10\ \Omega$)	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 °C	P_{tot}	max.	85		W
Storage temperature range	T_{stg}		−65 to +175		°C
Junction temperature	T_j	max.	175		°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	1,75	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current*					
$V_{CE} = V_{CESMmax}$; $R_{BE} \leqslant 10\ \Omega$	I_{CER}	max.	0,3		mA
$V_{CE} = V_{CESMmax}$; $R_{BE} \leqslant 10\ \Omega$; T_j = 125 °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	$V_{CEOsust}$	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 °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).

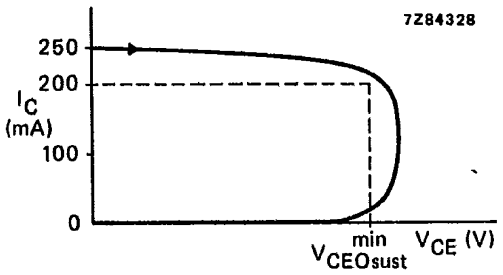


Fig. 2 Oscilloscope display for sustaining voltage.

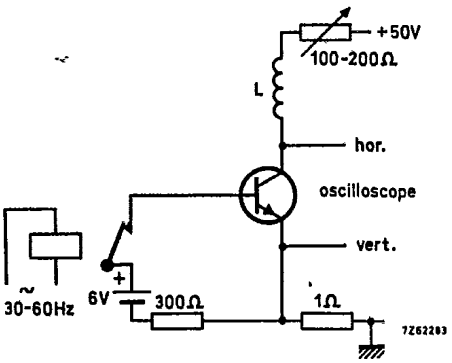


Fig. 3 Test circuit for $V_{CEOsust}$.

Switching times resistive load (Figs 4 and 5)

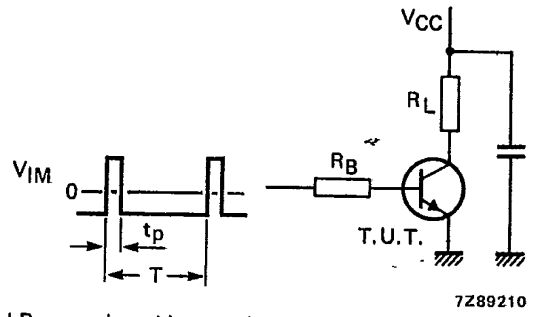
I_{Con} = 2,5 A; I_{Bon} = $-I_{Boff}$ = 0,5 A

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



V_{CC} = 250 V
V_{IM} = −6 to + 8 V
$\frac{t_p}{T}$ = 0,01
t_p = 20 μs

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

Fig. 4 Test circuit resistive load.

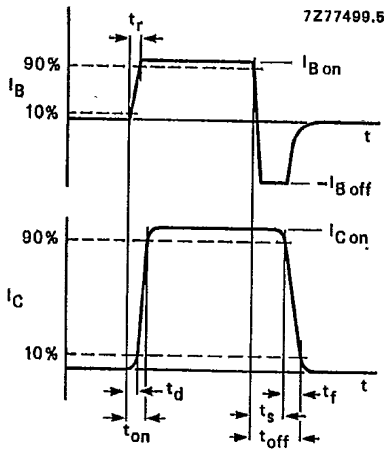


Fig. 5 Switching times waveforms with resistive load.

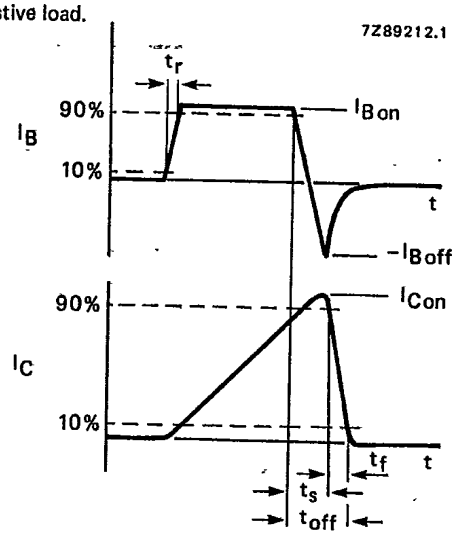
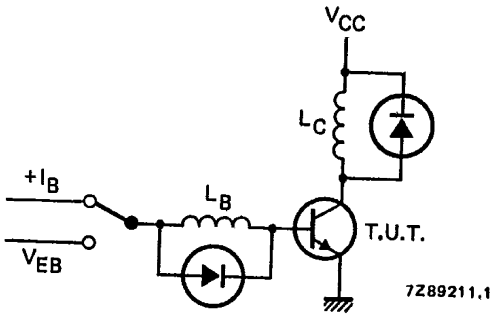
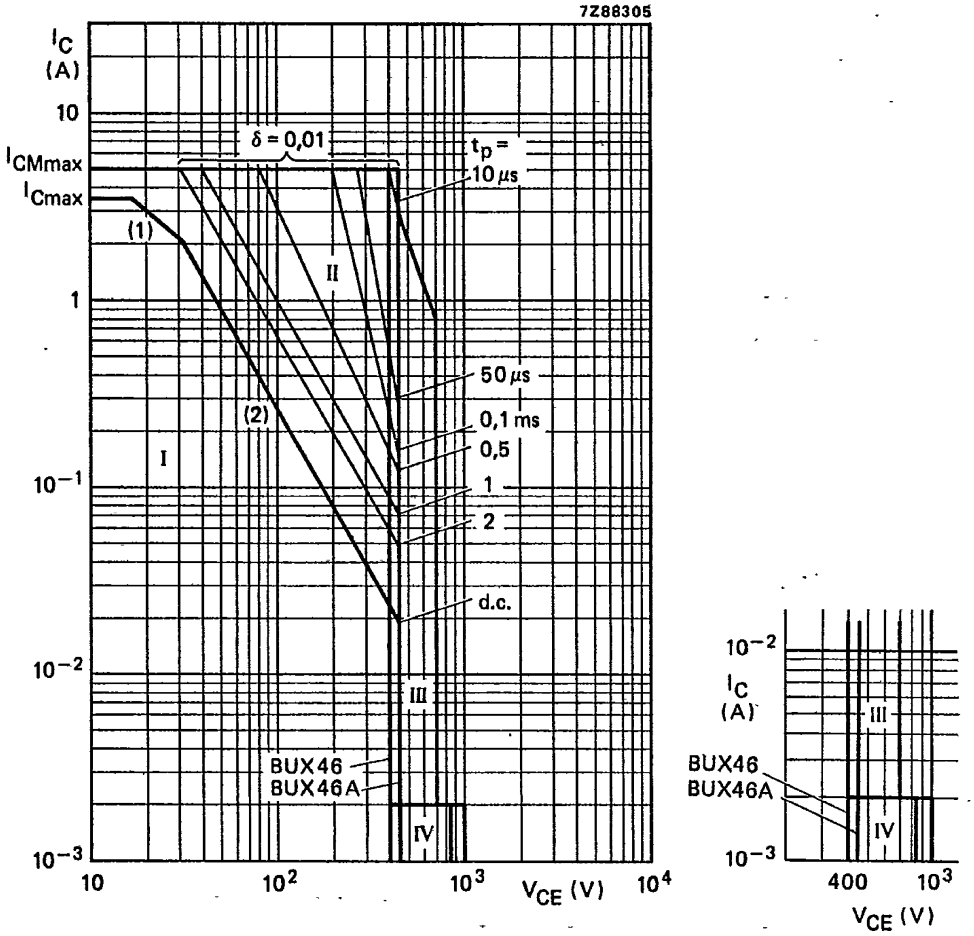


Fig. 6 Switching times waveforms with inductive load.



V_{CC} = 300 V
V_{EB} = −5 V
L_C = 1 mH
L_B = 3 μH

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 $R_{BE} \leqslant 100\ \Omega$ and $t_p \leqslant 0{,}6\ \mu s$.
IV Repetitive pulse operation in this region is permissible, provided $V_{BE} \leqslant 0$ and $t_p \leqslant 2$ ms.

Fig. 8 Safe operating area at $T_{mb} \leqslant 60\ ^oC$.

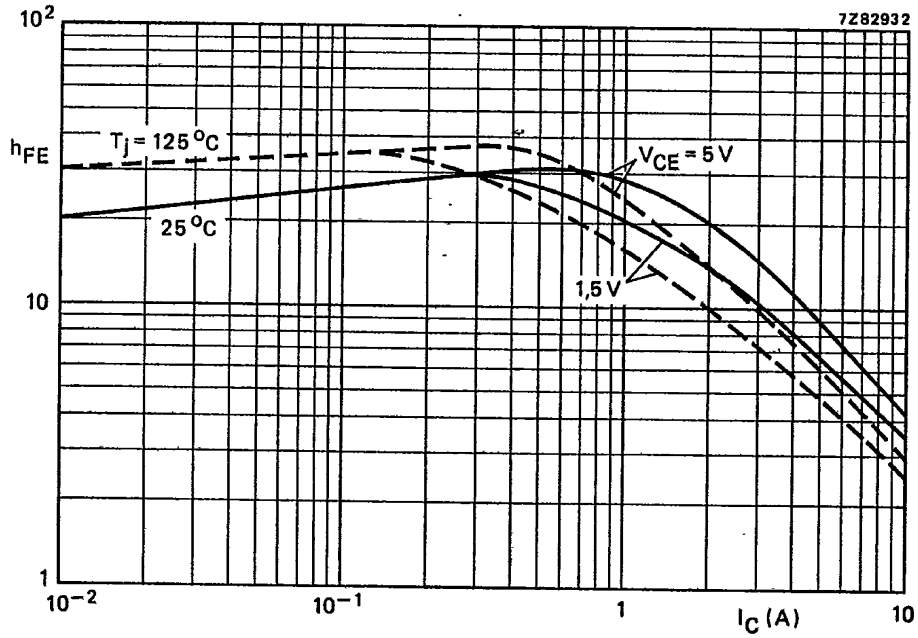


Fig. 9 DC current gain.

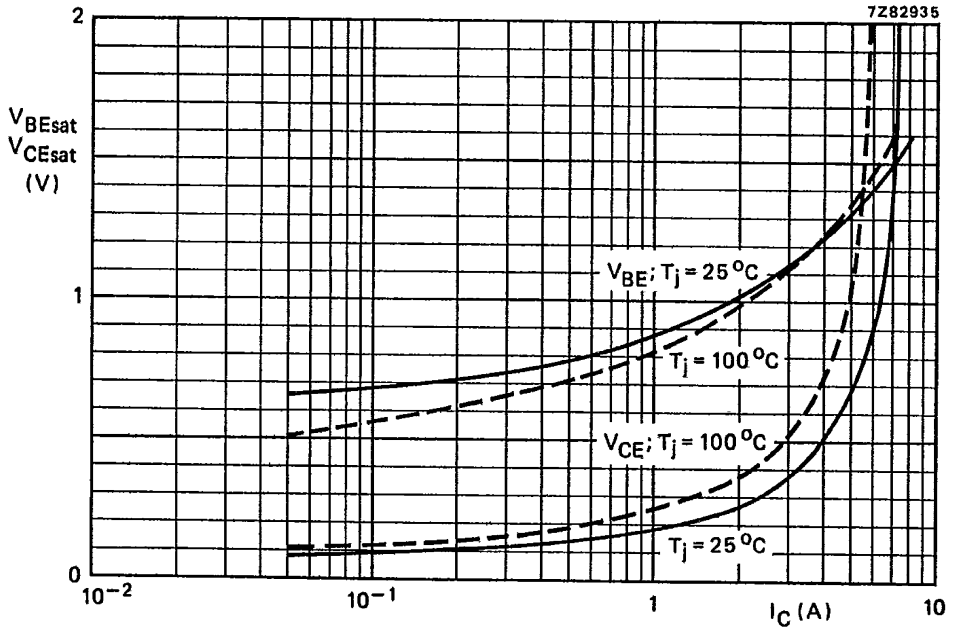


Fig. 10 Typical values base-emitter and collector-emitter voltage, $I_C/I_B = 5$.

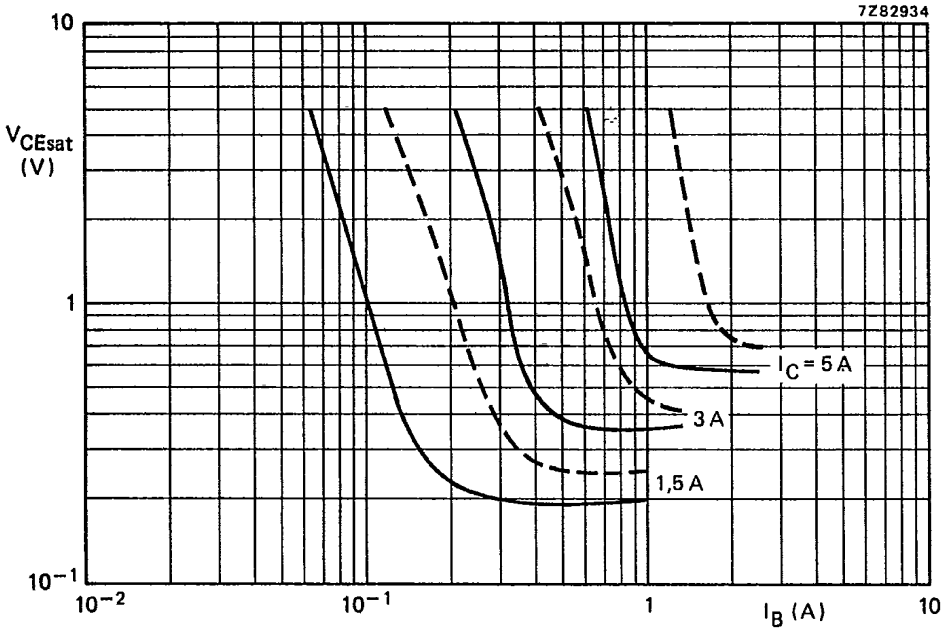


Fig. 11 Typ. (——) and max. (– – –) values collector-emitter saturation voltage at T_j = 25 °C.

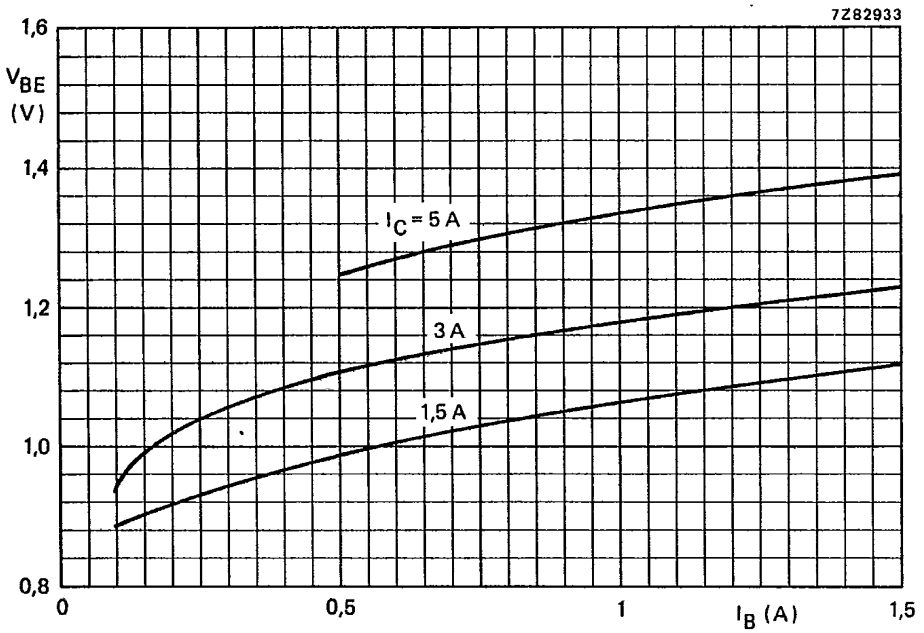


Fig. 12 Typical values at T_j = 25 °C.