

SILICON DARLINGTON POWER TRANSISTORS

P-N-P epitaxial base transistors in monolithic Darlington circuit for audio output stages and general amplifier and switching applications. TO-220 plastic envelope. N-P-N complements are BDT63, BDT63A, BDT63B and BDT63C.

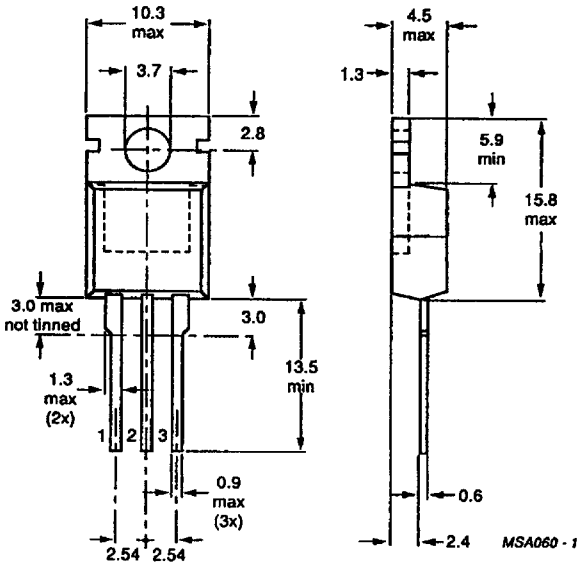
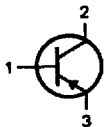
QUICK REFERENCE DATA

			BDT62	A	B	C
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	100	120 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	100	120 V
Collector current (d.c.)	$-I_C$	max.		10		A
Collector current (peak value) $t_p = 0,3 \text{ ms}; \delta = 10\%$	$-I_{CM}$	max.		15		A
Total power dissipation up to $T_{mb} = 25^\circ\text{C}$	P_{tot}	max.		90		W
Junction temperature	T_j	max.		150		$^\circ\text{C}$
D.C. current gain $-I_C = 3 \text{ A}; -V_{CE} = 3 \text{ V}$	h_{FE}	$>$		1000		

MECHANICAL DATA

Fig. 1 TO-220.

Collector connected to mounting base.



See also chapters
Mounting instructions
and Accessories.

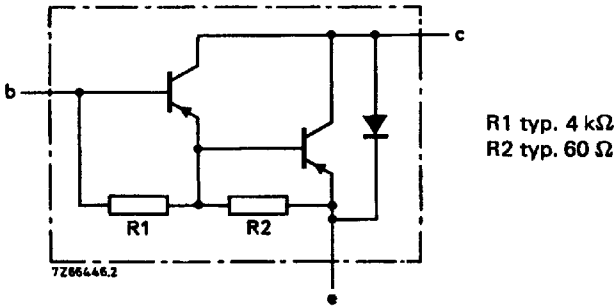


Fig. 2 Circuit diagram.

RATINGS

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

		BDT62	A	B	C
Collector-base voltage (open emitter)	$-V_{CBO}$ max.	60	80	100	120 V
Collector-emitter voltage (open base)	$-V_{CEO}$ max.	60	80	100	120 V
Emitter-base voltage (open collector)	$-V_{EBO}$ max.			5	V
Collector current (d.c.)	$-I_C$ max.		10		A
Collector current (peak value) $t_p = 0,3 \text{ ms}; \delta = 10\%$	$-I_{CM}$ max.		15		A
Base current (d.c.)	$-I_B$ max.		250		mA
Total power dissipation up to $T_{mb} = 25^\circ\text{C}$	P_{tot} max.		90		W
Storage temperature	T_{stg}		-65 to + 150		$^\circ\text{C}$
Junction temperature*	T_j max.		150		$^\circ\text{C}$

THERMAL RESISTANCE*

From junction to mounting base	$R_{th \text{ j-mb}}$ =	1,39	K/W
From junction to ambient (in free air)	$R_{th \text{ j-a}}$ =	70	K/W

* Base on maximum average junction temperature in line with common industrial practice. The resulting higher junction temperature of the output transistor part is taken into account.

CHARACTERISTICS $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.**Collector cut-off current** $I_E = 0; -V_{CB} = -V_{CB0max}$ $-I_{CBO} < 0,2\text{ mA}$ $I_E = 0; -V_{CB} = -\frac{1}{2}V_{CB0max}; T_j = 150\text{ }^{\circ}\text{C}$ $-I_{CBO} < 2\text{ mA}$ $I_B = 0; -V_{CE} = -\frac{1}{2}V_{CE0max}$ $-I_{CEO} < 0,2\text{ mA}$ **Emitter cut-off current** $I_C = 0; -V_{EB} = 5\text{ V}$ $-I_{EBO} < 5\text{ mA}$ **Forward bias second-breakdown collector current** $-V_{CE} = 40\text{ V}; t = 0,1\text{ s}; \text{non-repetitive}$

(without heatsink)

BDT62

 $I_{(SB)} > 0,45\text{ A}$

BDT62A, B and C

 $I_{(SB)} > 1,4\text{ A}$ **D.C. current gain*** $-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$ $h_{FE} > 1000$ $-I_C = 10\text{ A}; -V_{CE} = 3\text{ V}$ $h_{FE} \text{ typ. } 200$ **Base-emitter voltage*** $-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$ $-V_{BE} < 2,5\text{ V}$ **Collector-emitter saturation voltage*** $-I_C = 3\text{ A}; -I_B = 12\text{ mA}$ $-V_{CEsat} < 2\text{ V}$ $-I_C = 8\text{ A}; -I_B = 80\text{ mA}$ $-V_{CEsat} < 2,5\text{ V}$ **Cut-off frequency** $-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$ $f_{hfe} \text{ typ. } 100\text{ kHz}$ **Collector capacitance** $-V_{CB} = 10\text{ V}; f = 1\text{ MHz}$ $C_{ob} \text{ typ. } 100\text{ pF}$ **D.C. current gain ratio of matched**

complementary pairs

 $-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$ $h_{FE1}/h_{FE2} < 2,5$ **Small-signal current gain at $f = 1\text{ MHz}$** $-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$ $h_{fe} > 10$ * Measured under pulse conditions; $t_p < 300\text{ }\mu\text{s}$; $\delta < 2\%$.

CHARACTERISTICS (continued)

Diode, forward voltage

$$I_F = 3 \text{ A}$$

$$V_F < 2 \text{ V}$$

Switching times

(between 10% and 90% levels)

$$-I_{Con} = 3 \text{ A}; -I_{Bon} = I_{Boff} = 12 \text{ mA}$$

turn-on time

$$t_{on} \begin{matrix} \text{typ. } 0,5 \mu\text{s} \\ < 1,5 \mu\text{s} \end{matrix}$$

turn-off time

$$t_{off} \begin{matrix} \text{typ. } 2,5 \mu\text{s} \\ < 5 \mu\text{s} \end{matrix}$$

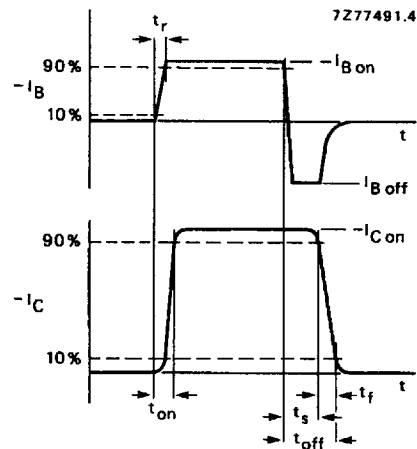


Fig. 3 Switching times waveforms.

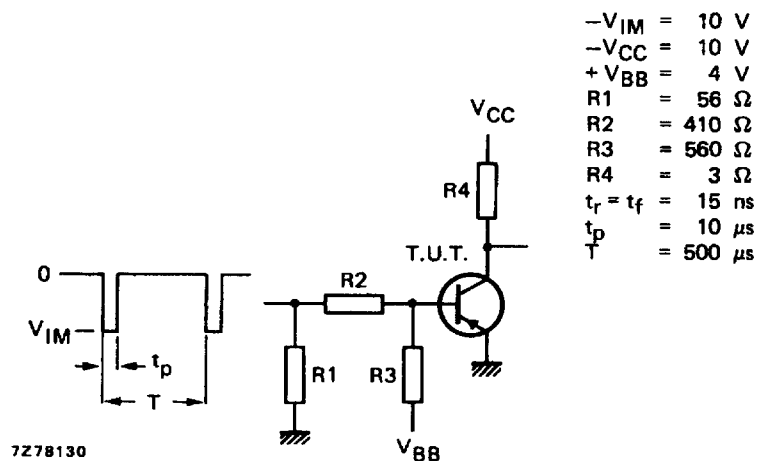


Fig. 4 Switching times test circuit.

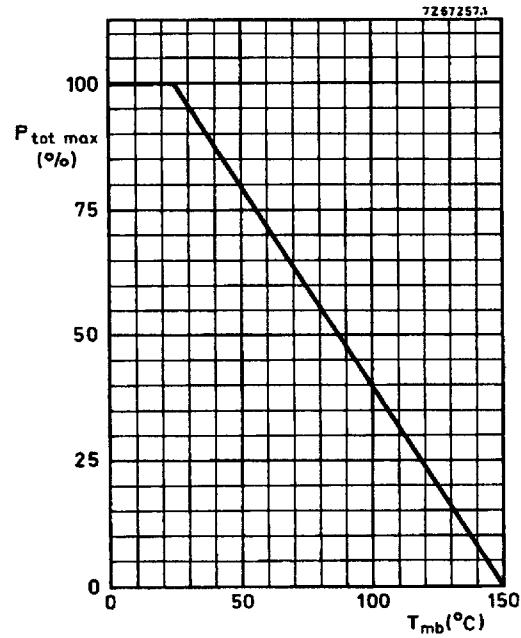


Fig. 5 Power derating curve.

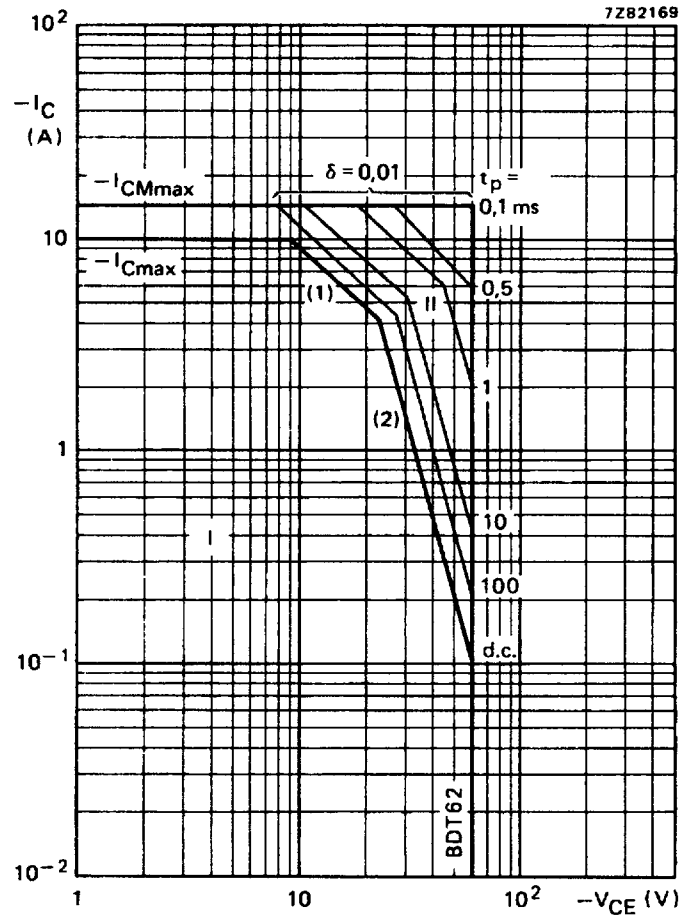


Fig. 6 Safe Operating Area BDT62; $T_{mb} = 25^\circ\text{C}$.

- I Region of permissible d.c. operation.
- II Permissible extension for repetitive pulse operation.
- (1) $P_{tot\ max}$ and $P_{peak\ max}$ lines.
- (2) Second-breakdown limits.

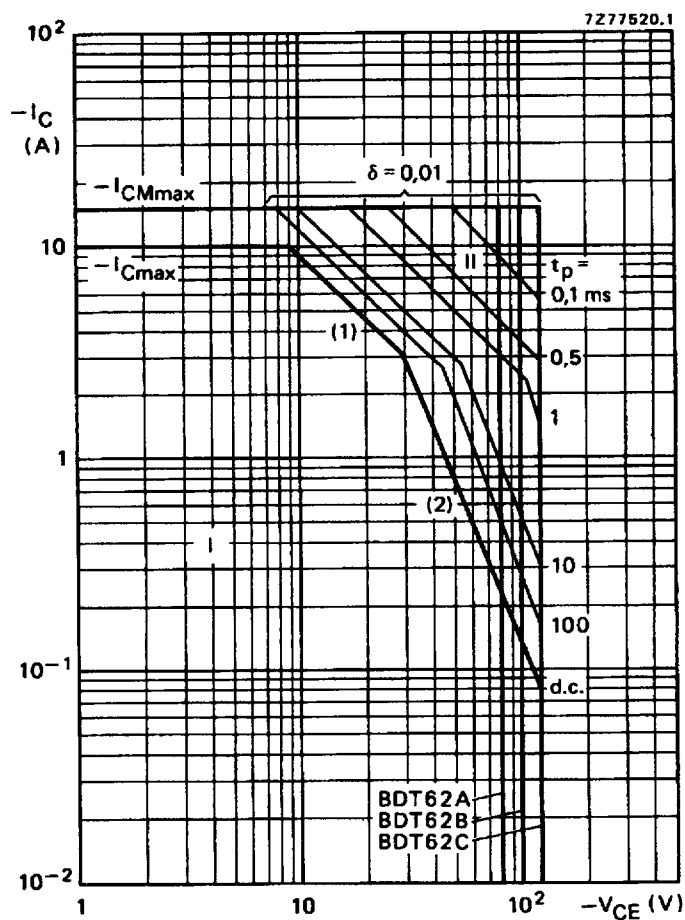


Fig. 7 Safe Operating Area BDT62A; 62B and 62C; $T_{mb} = 25^\circ\text{C}$.

- I Region of permissible d.c. operation.
- II Permissible extension for repetitive pulse operation.
- (1) $P_{tot \text{ max}}$ and $P_{peak \text{ max}}$ lines.
- (2) Second-breakdown limits.

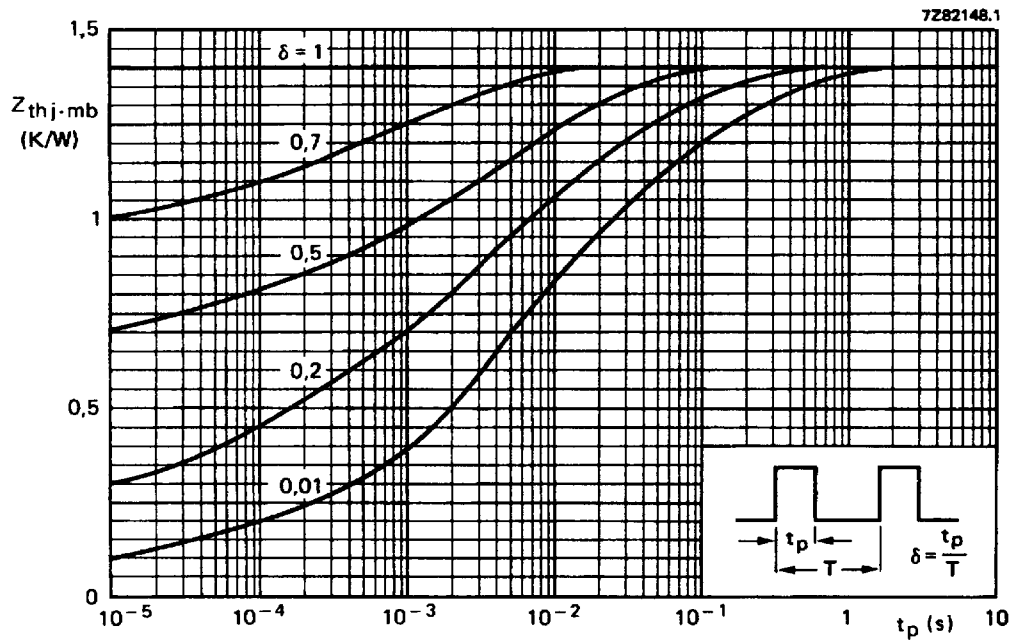


Fig. 8 Pulse power rating chart.

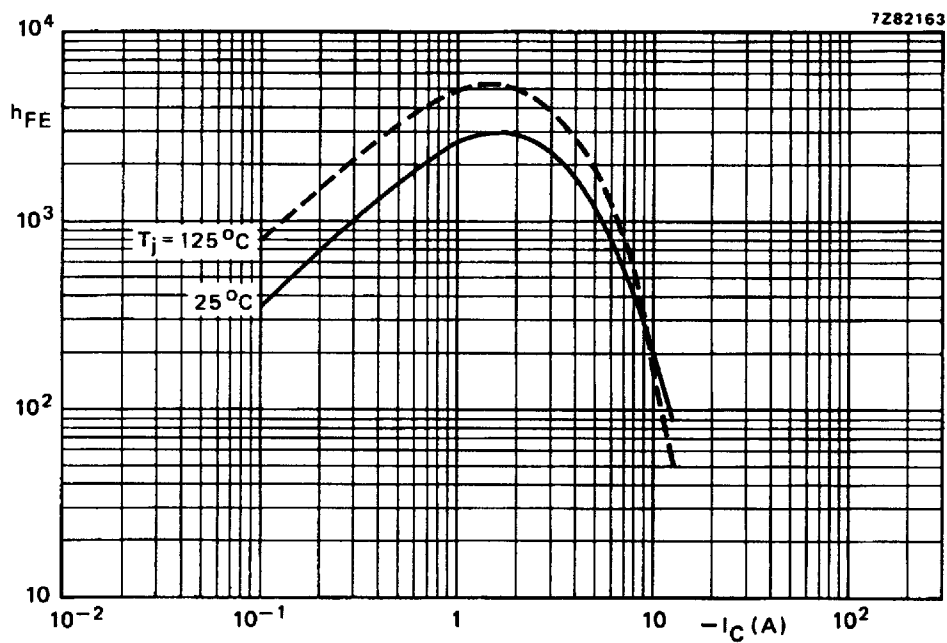


Fig. 9 Typical d.c. current gain at $-V_{CE} = 3$ V.

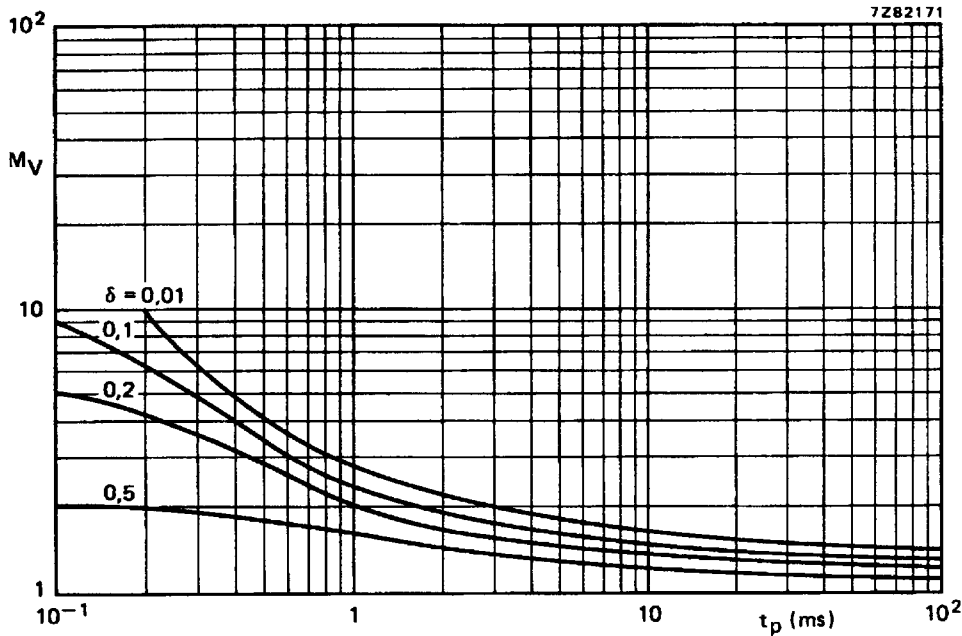


Fig. 10 S.B. voltage multiplying factor at the I_C max level.

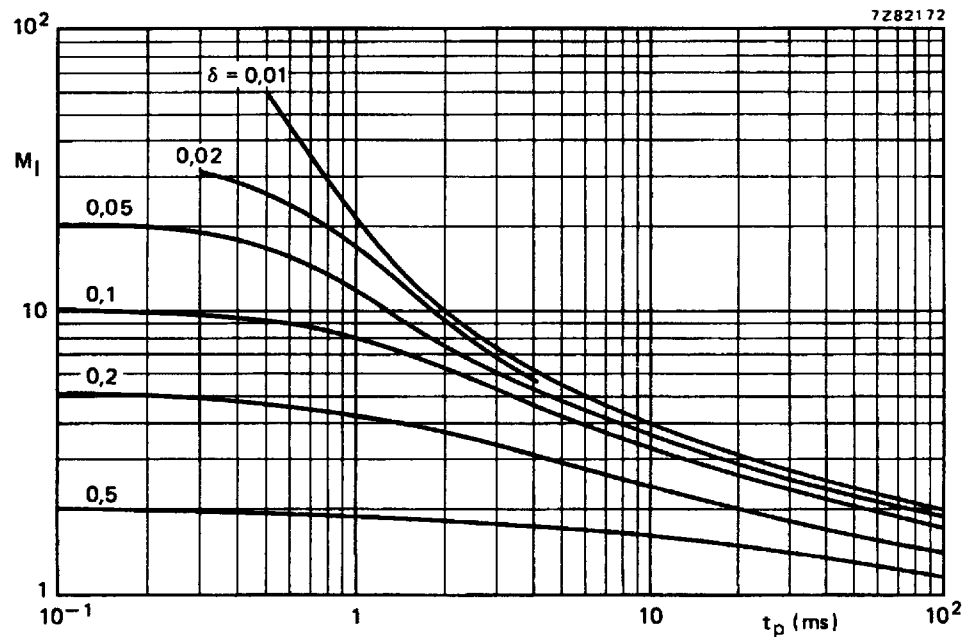


Fig. 11 S.B. current multiplying factor at the V_{CEO} max level.

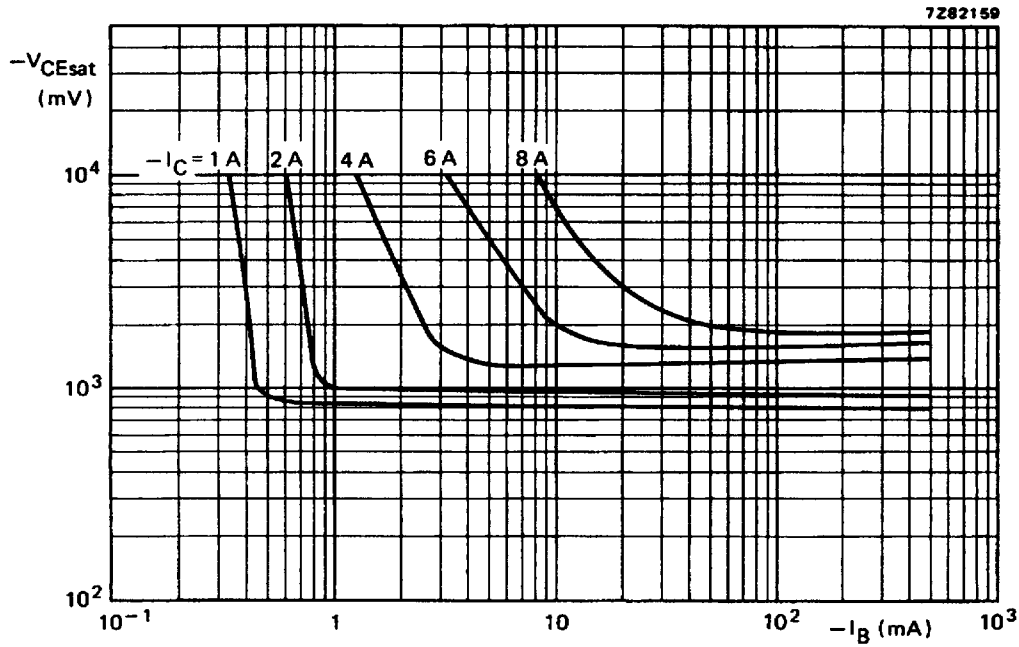


Fig. 12 Typical collector-emitter saturation voltage.

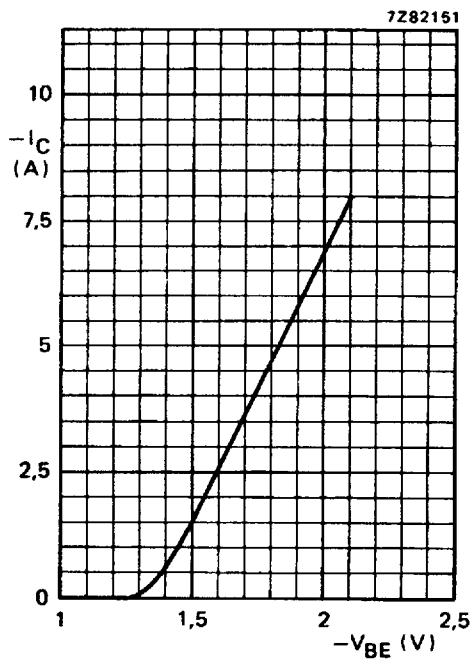


Fig. 13 Typical base emitter voltage as a function of the collector current.