290-531 to 555

MAGNA TEC

BDT62; 62A
BDT62B; 62C

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.

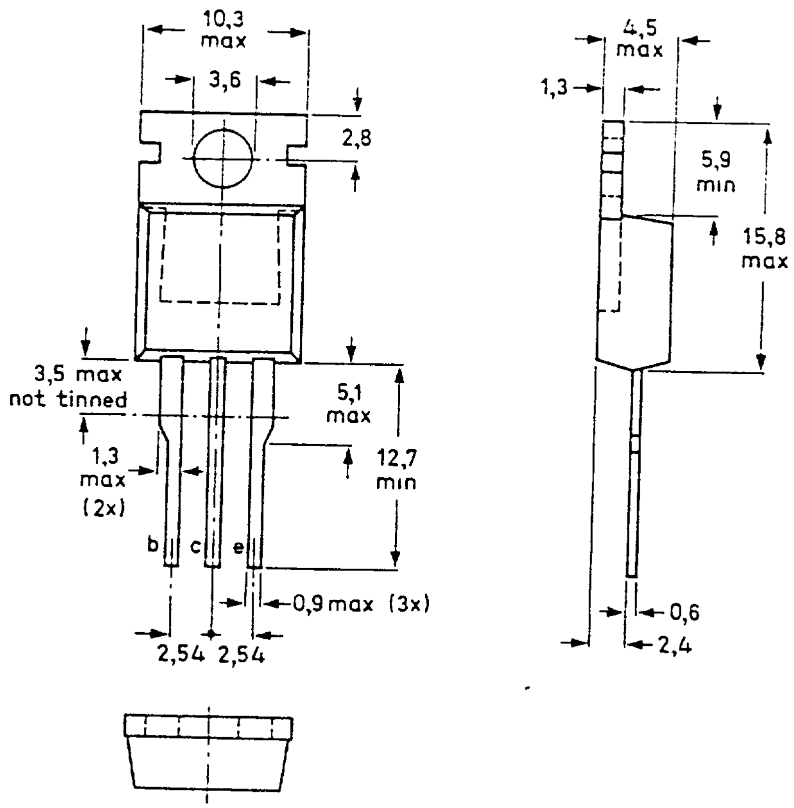
QUICK REFERENCE DATA

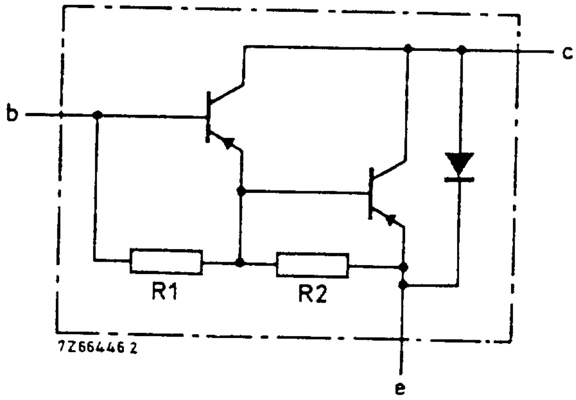
			BDT62	A	B	C	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	100	120	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	100	120	V
Collector current (d.c.)	$-I_C$	max.	10				A
Collector current (peak value) t_p = 0,3 ms; δ = 10%	$-I_{CM}$	max.	15				A
Total power dissipation up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

MECHANICAL DATA

Fig. 1 TO-220AB.

Collector connected to mounting base.





R1 typ. 4 kΩ
R2 typ. 60 Ω

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 ms, δ = 10%	$-I_{CM}$	max		15			A
Base current (d.c.)	$-I_B$	max.		250			mA
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		90			W
Storage temperature	T_{stg}			−65 to + 150			°C
Junction temperature*	T_j	max.		150			°C

THERMAL RESISTANCE*

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

Collector cut-off current				
$I_E = 0$; $-V_{CB} = -V_{CBOmax}$	$-I_{CBO}$	<	0,2	mA
$I_E = 0$; $-V_{CB} = -½V_{CBOmax}$; T_j = 150 °C	$-I_{CBO}$	<	2	mA
$I_B = 0$; $-V_{CE} = -½V_{CEOmax}$	$-I_{CEO}$	<	0,5	mA
Emitter cut-off current				
$I_C = 0$; $-V_{EB}$ = 5 V	$-I_{EBO}$	<	5	mA
Forward bias second-breakdown collector current				
$-V_{CE}$ = 40 V; t = 0,1 s; non-repetitive (without heatsink)				
BDT62	$I_{(SB)}$	>	0,45	A
BDT62A, B and C	$I_{(SB)}$	>	1,4	A
D.C. current gain*				
$-I_C$ = 3 A; $-V_{CE}$ = 3 V	h_{FE}	>	1000	
$-I_C$ = 10 A; $-V_{CE}$ = 3 V	h_{FE}	typ.	200	
Base-emitter voltage*				
$-I_C$ = 3 A; $-V_{CE}$ = 3 V	$-V_{BE}$	<	2,5	V
Collector-emitter saturation voltage*				
$-I_C$ = 3 A; $-I_B$ = 12 mA	$-V_{CEsat}$	<	2	V
$-I_C$ = 8 A; $-I_B$ = 80 mA	$-V_{CEsat}$	<	2,5	V
Cut-off frequency				
$-I_C$ = 3 A; $-V_{CE}$ = 3 V	f_{hfe}	typ.	100	kHz
Collector capacitance				
$-V_{CB}$ = 10 V; f = 1 MHz	C_{ob}	typ.	100	pF
D.C. current gain ratio of matched complementary pairs				
$-I_C$ = 3 A; $-V_{CE}$ = 3 V	h_{FE1}/h_{FE2}	<	2,5	
Small-signal current gain at f = 1 MHz				
$-I_C$ = 3 A; $-V_{CE}$ = 3 V	h_{fe}	>	25	

* Measured under pulse conditions; $t_p < 300\ \mu s$; $\delta < 2\%$

CHARACTERISTICS (continued)

Diode, forward voltage			
I_F = 3 A	V_F	<	2 V
Switching times			
(between 10% and 90% levels)			
$-I_{Con}$ = 3 A; $-I_{Bon}$ = I_{Boff} = 12 mA			
turn-on time	t_{on}	typ.	0,5 μs
turn-off time	t_{off}	typ.	2,5 μs

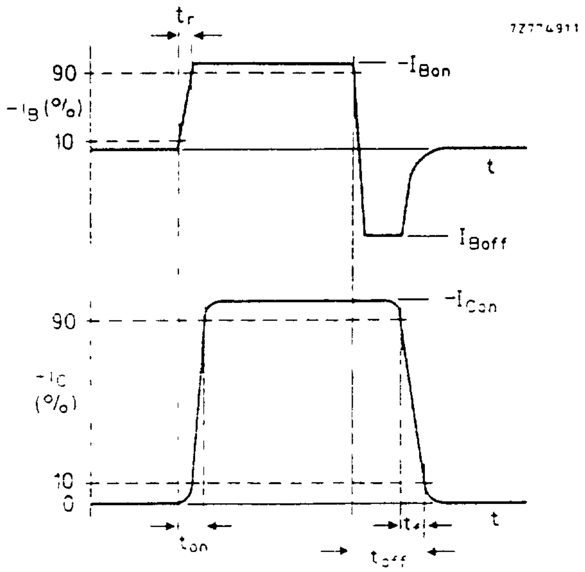


Fig. 3 Switching times waveforms.

$-V_{IM}$	=	10 V
$-V_{CC}$	=	10 V
$+V_{BB}$	=	4 V
R1	=	56 Ω
R2	=	410 Ω
R3	=	560 Ω
R4	=	3 Ω
$t_r = t_f$	=	15 ns
t_p	=	10 μs
T	=	500 μs

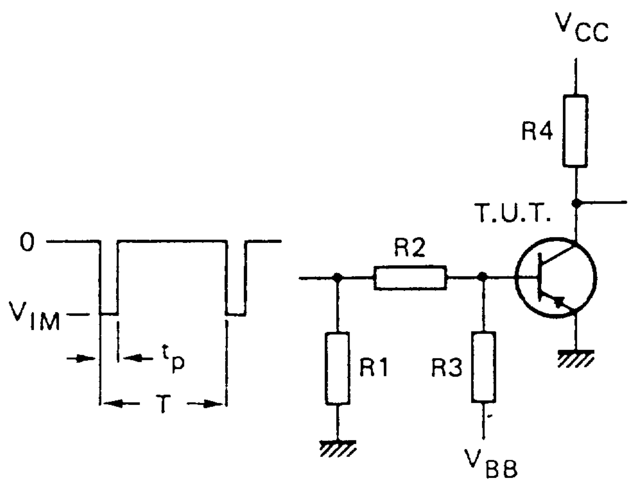


Fig. 4 Switching times test circuit.

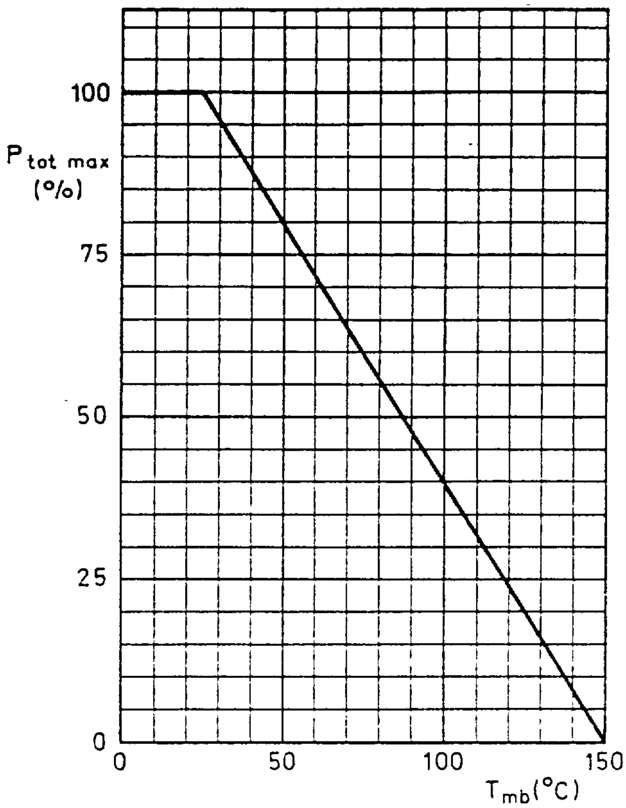


Fig. 5 Power derating curve.

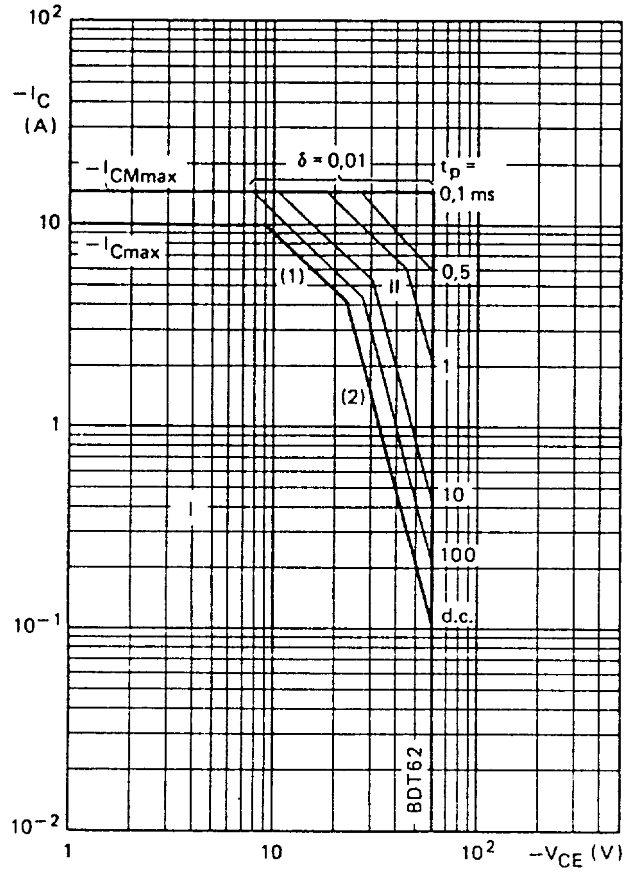


Fig 6 Safe Operating ARea BDT62; T_{mb} = 25 °C.

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 (independent of temperature)

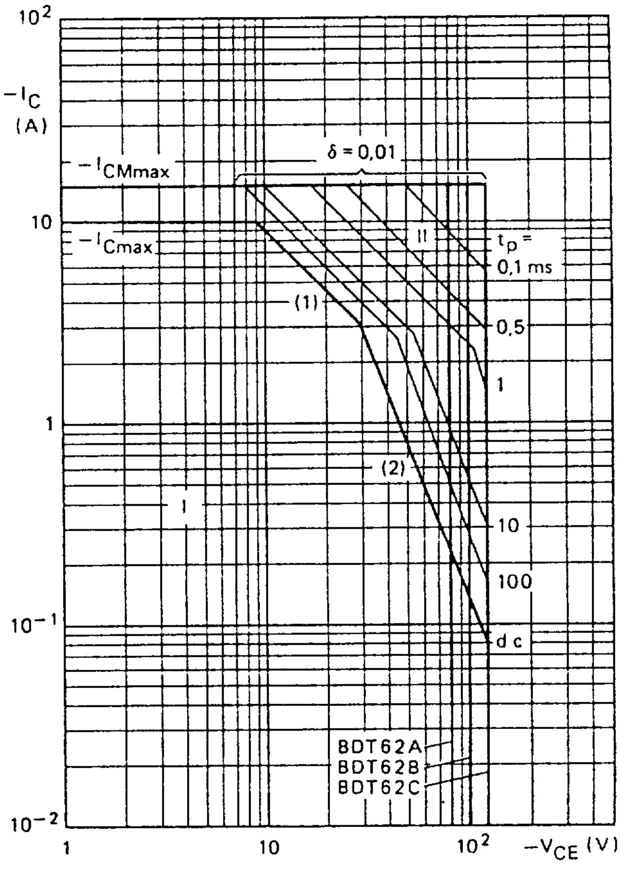


Fig. 7 Safe Operating ARea BDT62A, 62B and 62C, T_{mb} = 25 °C.

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 (independent of temperature).

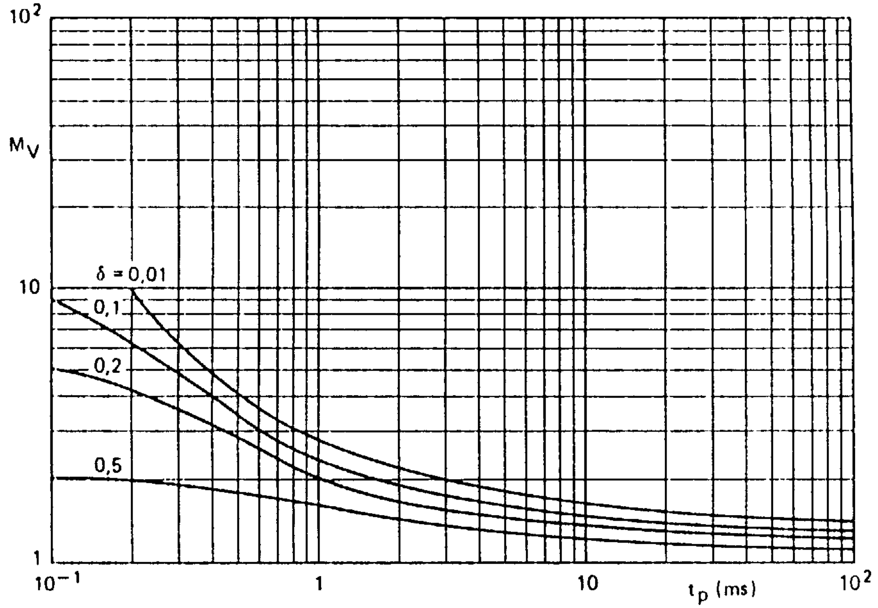


Fig. 10 S.B. voltage multiplying factor at the $I_{C\,max}$ level

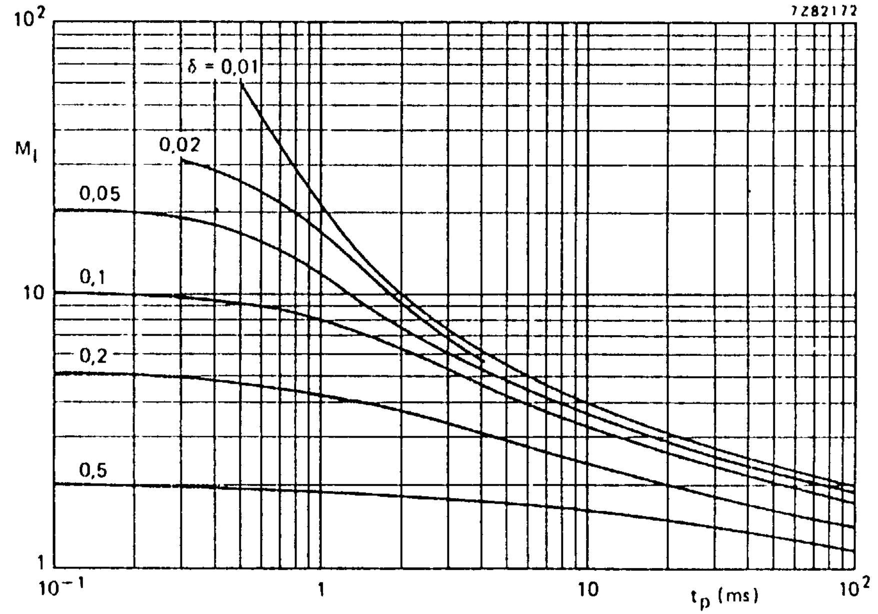


Fig. 11 S.B. current multiplying factor at the $V_{CEO\,max}$ level.

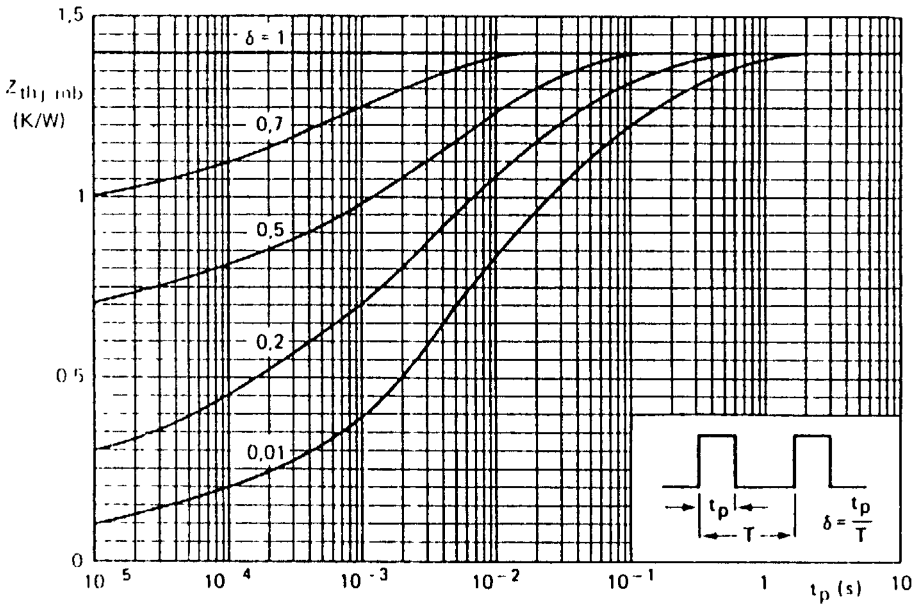


Fig. 8 Pulse power rating chart.

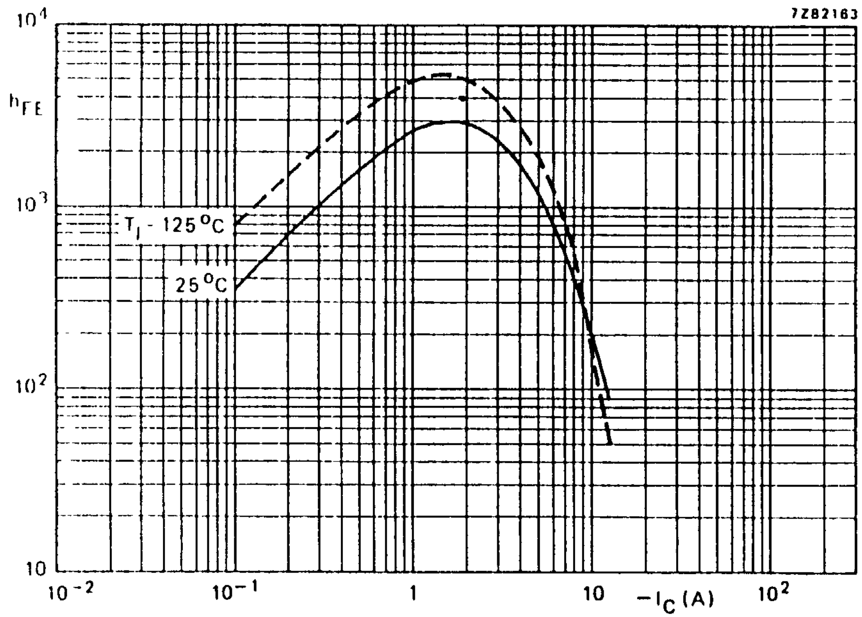


Fig 9 Typical d.c. current gain at $-V_{CE}$ = 3 V.

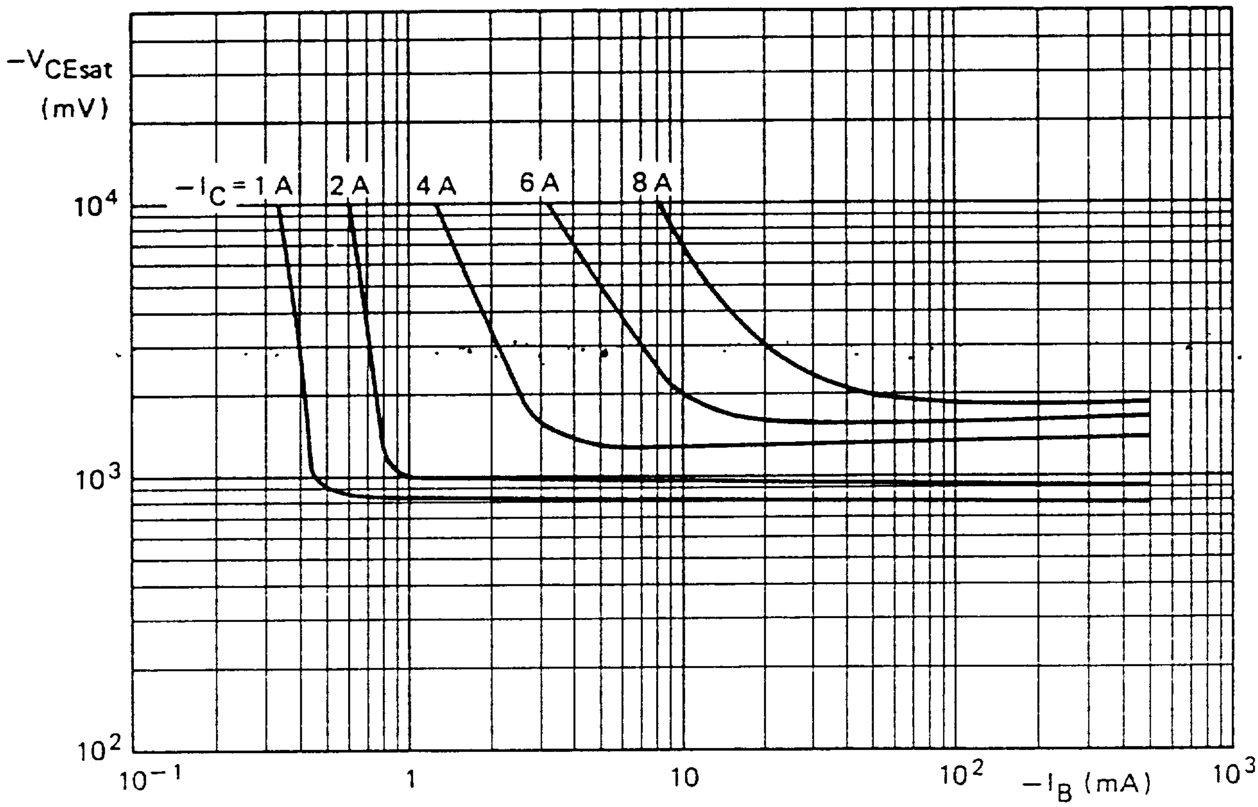


Fig. 12 Typical collector-emitter saturation voltage.

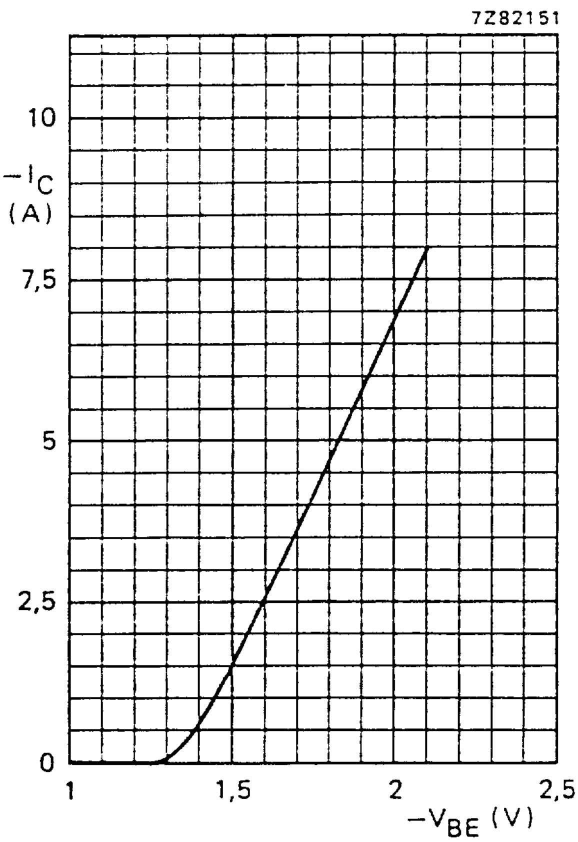


Fig. 13 Typical base emitter voltage as a function of the collector current.