TR BD650;CDIL;TO220;tranzystor; PNP;Darlington;8A;100V;62,5W;Pbf

Dane techniczne:
Nazwa: BD650
Układ Darlingtona
Typ tranzystora: bipolarny
Kierunek przewodnictwa: PNP
Prąd kolektora: 8A
Napięcie kolektor-emiter: 100V
Moc: 62.5W
Montaż: przewlekany(THT)
Obudowa: TO220
Producent: CDIL

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MAGNA TEC

BD646; 648
BD650; 652

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 BD645, BD647, BD649 and BD651.

QUICK REFERENCE DATA

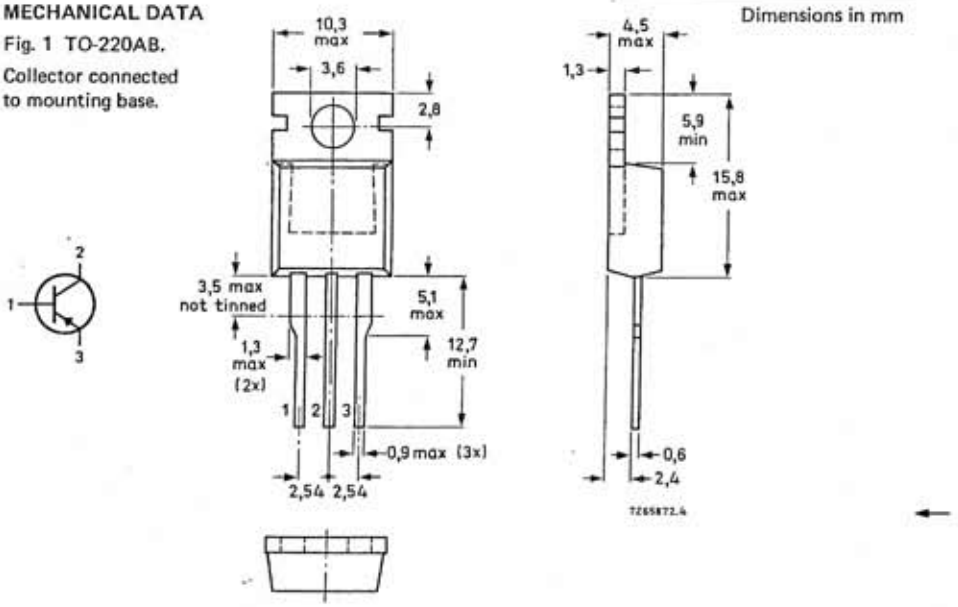
			BD646	648	650	652	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	100	120	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	100	120	V
Collector current (peak value)	$-I_{CM}$	max.		12			A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		62,5			W
Junction temperature	T_j	max.		150			°C
D.C. current gain:							
$-I_C$ = 0,5 A; $-V_{CE}$ = 3 V	h_{FE}	typ.		2700			
$-I_C$ = 3,0 A; $-V_{CE}$ = 3 V	h_{FE}	>		750			
Cut-off frequency:							
$-I_C$ = 3 A; $-V_{CE}$ = 3 V	f_{hfe}	typ.		100			kHz

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-220AB.

Collector connected to mounting base.



See also chapters Mounting Instructions and Accessories.

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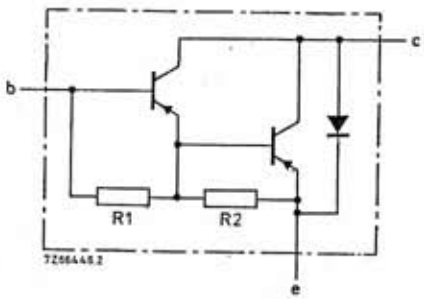
BD646; 648
BD650; 652



R_1 typ. 4 kΩ
R_2 typ. 80 Ω

Fig. 2 Darlington circuit diagram.

RATINGS

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

			BD646	648	650	652	
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	5	5	5	V
Collector current (d.c.)	$-I_C$	max.		8			A
Collector current (peak value)	$-I_{CM}$	max.		12			A
Base current (d.c.)	$-I_B$	max.		150			mA
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		62,5			W
Storage temperature	T_{stg}			−65 to + 150			°C
Junction temperature *	T_j			150			°C

THERMAL RESISTANCE *

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	2	K/W
From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	70	K/W

* Based 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.

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MAGNA TEC

Silicon Darlington power transistors

BD646;648
BD650; 652

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current				
$I_E = 0$; $-V_{CB} = -V_{CBOmax}$	$-I_{CBO}$	<	0,2	mA
$I_E = 0$; BD646: $-V_{CB} = 40$ V; BD648: $-V_{CB} = 50$ V; BD650: $-V_{CB} = 60$ V; BD652: $-V_{CB} = 70$ V; T_j = 150 °C	$-I_{CBO}$	<	2	mA
$I_B = 0$; $-V_{CE} = ½ V_{CEOmax}$	$-I_{CEO}$	<	0,5	mA
Emitter cut-off current				
$I_C = 0$; $-V_{EB} = 5$ V	$-I_{EBO}$	<	5	mA
D.C. current gain (note 1)				
$-I_C = 0,5$ A; $-V_{CE} = 3$ V	h_{FE}	typ.	2700	
$-I_C = 3$ A; $-V_{CE} = 3$ V	h_{FE}	>	750	
$-I_C = 8$ A; $-V_{CE} = 3$ V	h_{FE}	typ.	200	
Base-emitter voltage (notes 1 and 2)				
$-I_C = 3$ A; $-V_{CE} = 3$ V	$-V_{BE}$	<	2,5	V
Saturation voltages (note 1)				
$-I_C = 3$ A; $-I_B = 12$ mA	$-V_{CEsat}$	<	2	V
$-I_C = 5$ A; $-I_B = 50$ mA	$-V_{CEsat}$	<	2,5	V
	$-V_{BEsat}$	<	3	V
Collector capacitance at f = 1 MHz				
$I_E = I_e = 0$; $-V_{CB} = 10$ V	C_c	typ.	75	pF
Cut-off frequency				
$-I_C = 3$ A; $-V_{CE} = 3$ V	f_{hfe}	typ.	100	kHz
Small-signal current gain				
$-I_C = 3$ A; $-V_{CE} = 3$ V; f = 1 MHz	h_{fe}	>	10	←
Diode, forward voltage				
$I_F = 3$ A	V_F	typ.	1,8	V
Second-breakdown collector current				
$-V_{CE} = 50$ V; $t_p = 0,1$ s	$-I_{(SB)}$	>	1,25	A
Switching times (between 10% and 90% levels) (Fig. 3)				
$-I_{Con} = 3$ A; $-I_{Bon} = I_{Boff} = 12$ mA; $V_{CC} = -10$ V				
Turn-on time	t_{on}	typ.	1	μs
		<	2	μs
Turn-off time	t_{off}	typ.	5	μs
		<	10	μs

Notes
1. Measured under pulse conditions: $t_p < 300$ μs, $\delta < 2\%$.
2. $-V_{BE}$ decreases by about 3,8 mV/K with increasing temperature.

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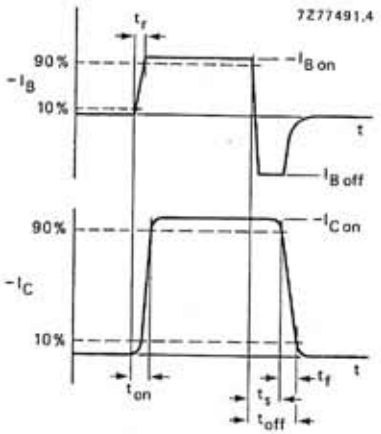
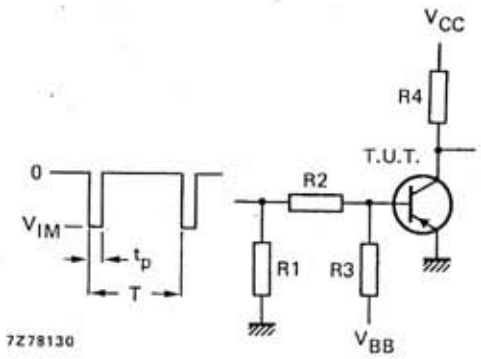


Fig. 3 Switching times waveforms.



$-V_{IM}$ = 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.

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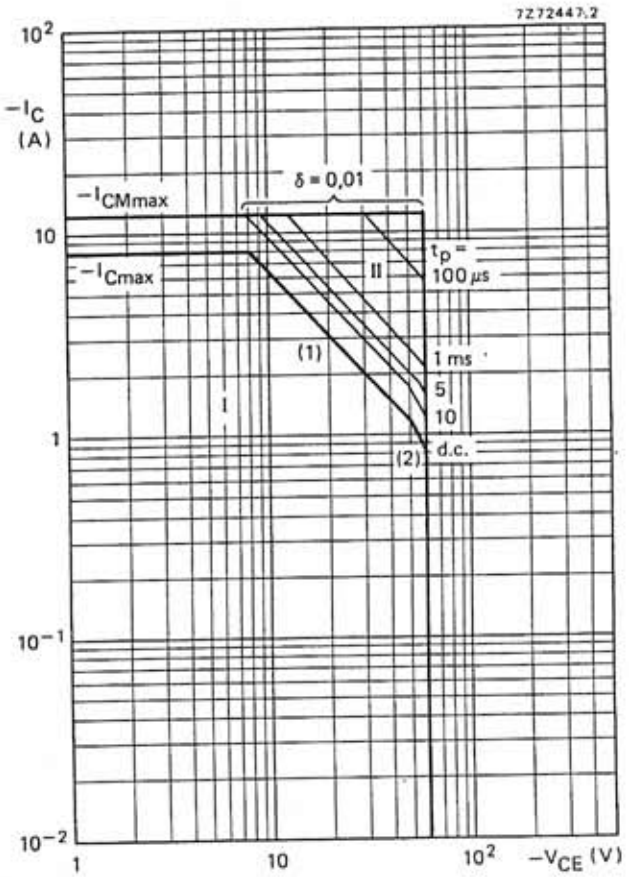

Fig. 5 Safe Operating ARea transistor BD646 at T_{mb} = 25 °C.

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).

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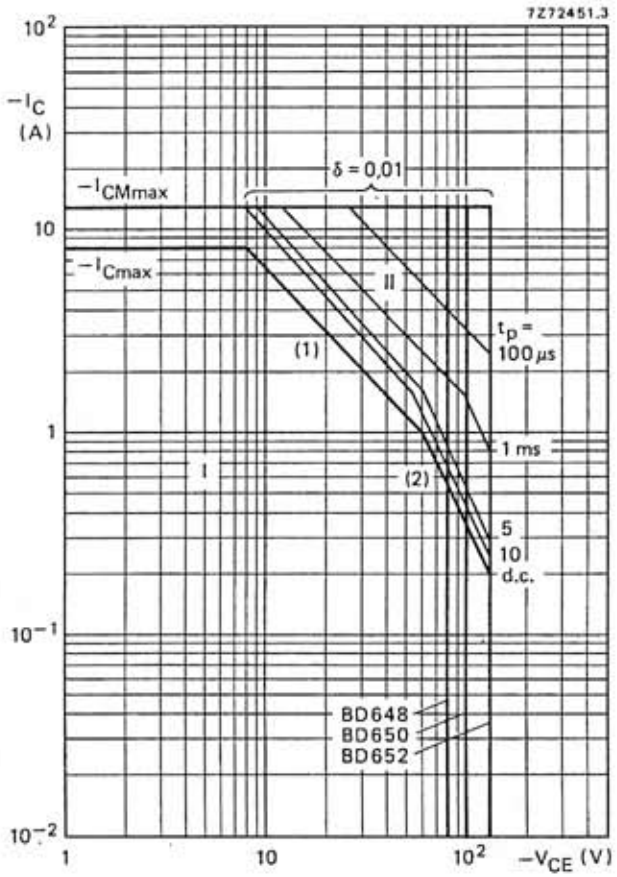

Fig. 6 Safe Operating ARea. T_{mb} = 25 °C

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).

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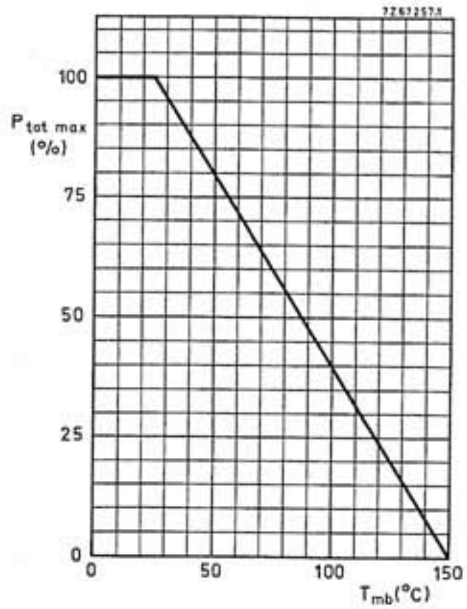

Fig. 7 Power derating curve.

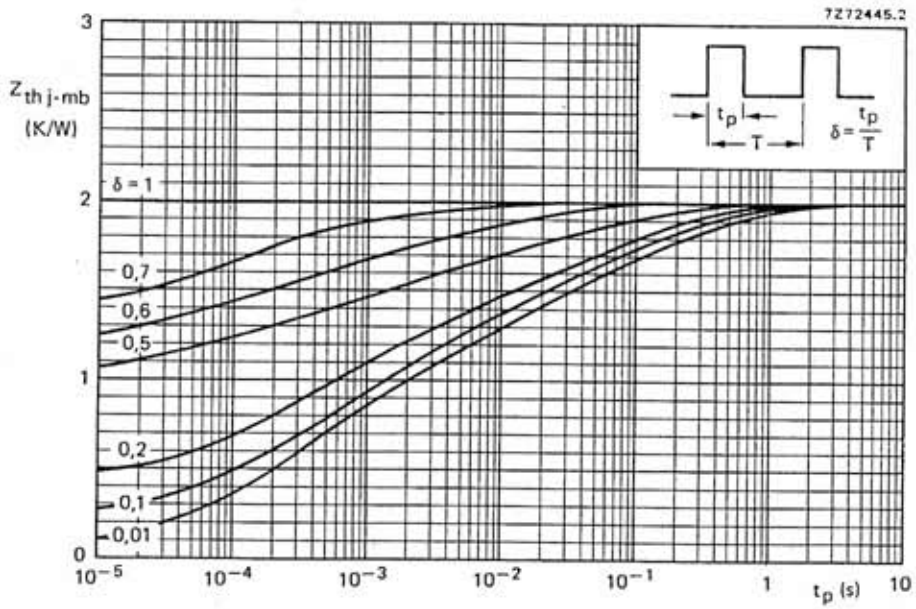

Fig. 8 Pulse power rating chart.

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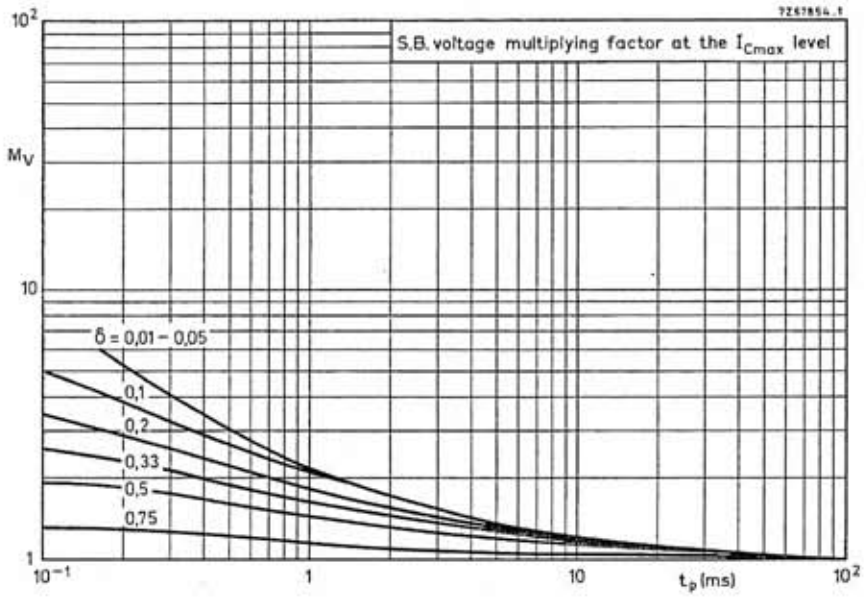

Fig. 9 S.B. voltage multiplying factor at the I_{Cmax} level.

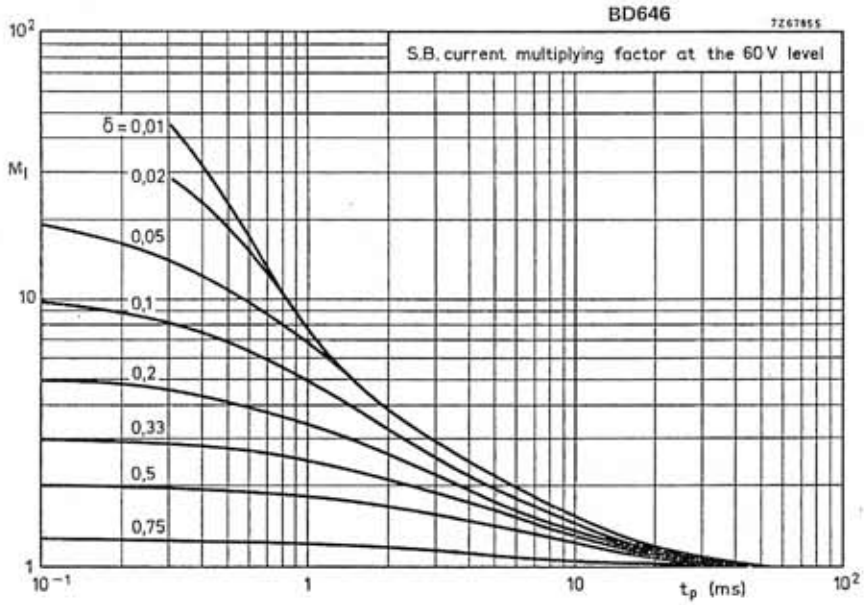

Fig. 10 S.B. current multiplying factor at 60 V level.

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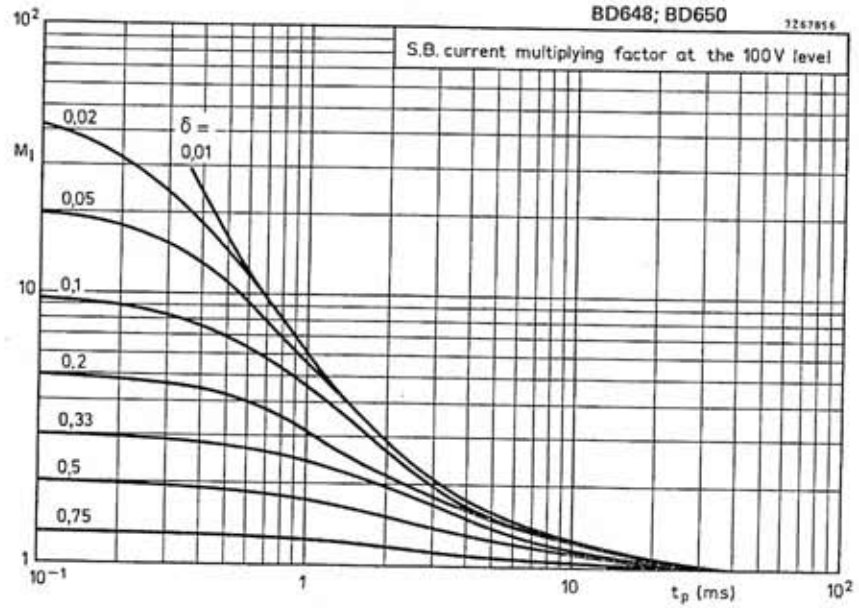

Fig. 11.

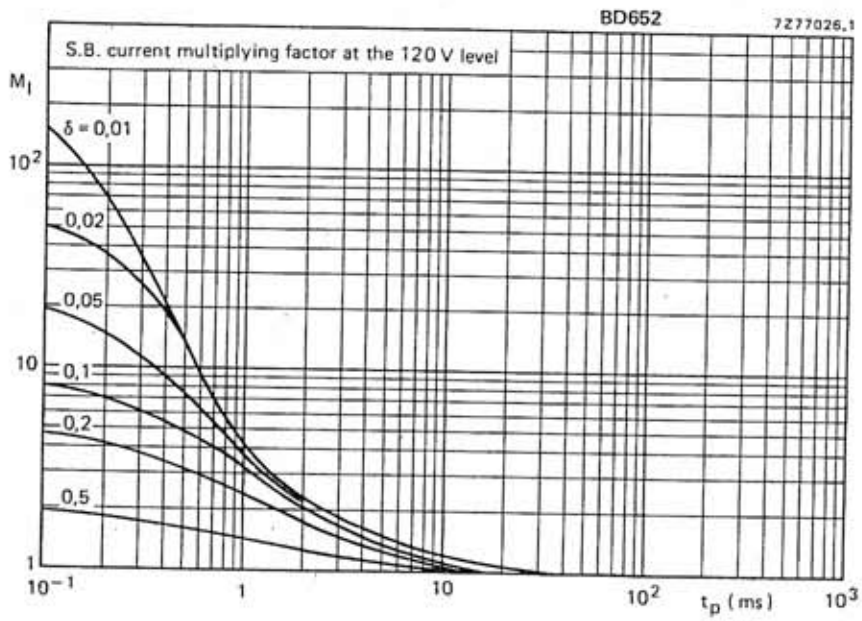

Fig. 12.

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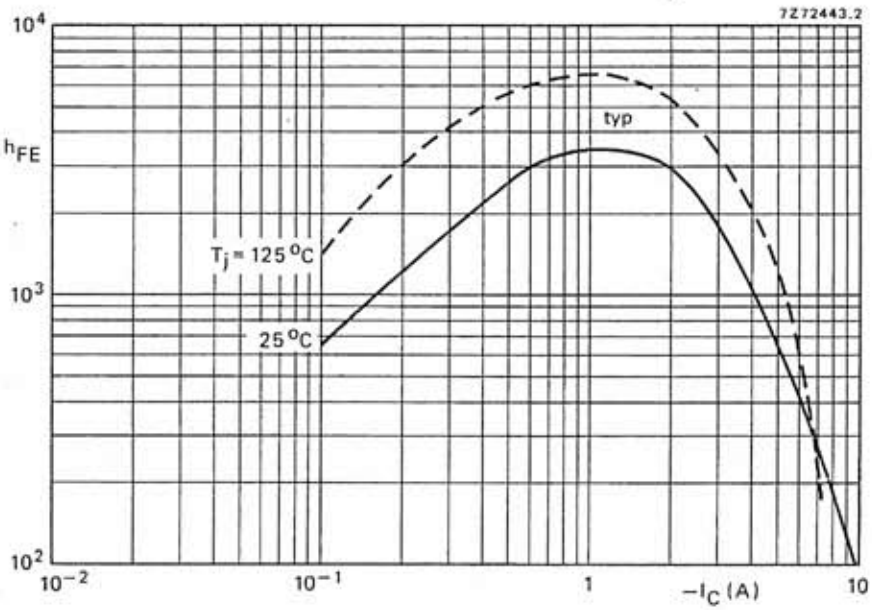

Fig. 13 D.C. current gain at $-V_{CE}$ = 3 V.

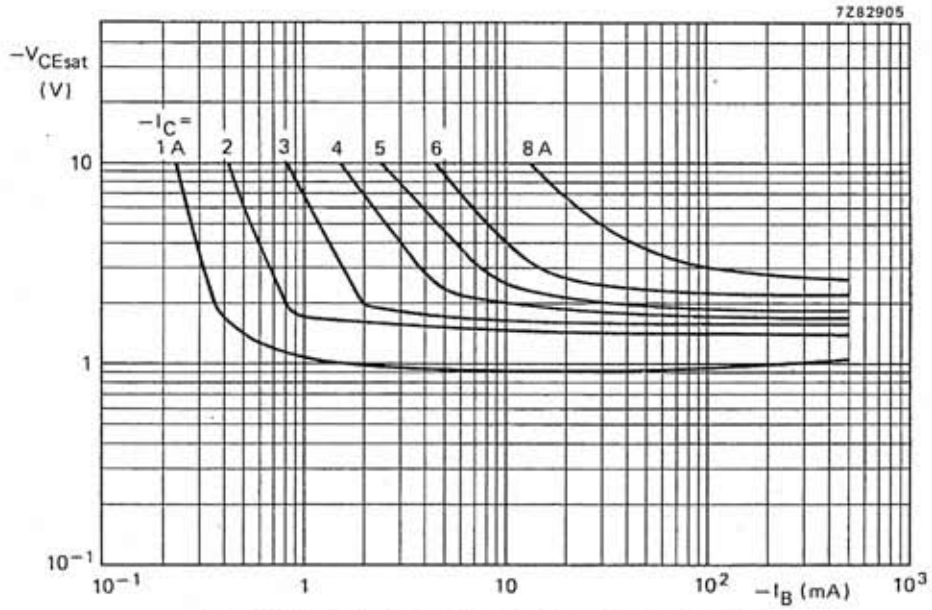

Fig. 14 Typical collector-emitter saturation voltage at T_j = 25 °C.

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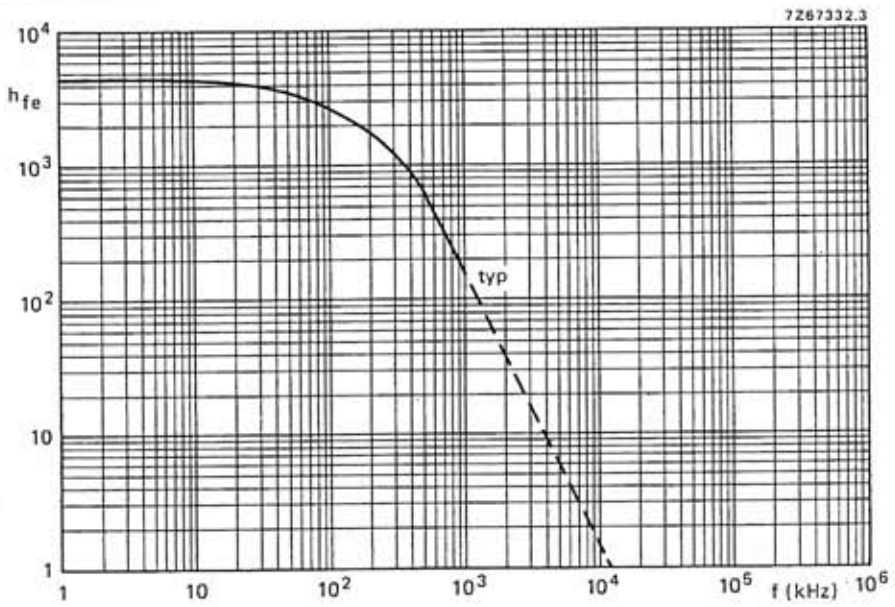

Fig. 15 Small signal current gain at $-I_C = 3$ A; $-V_{CE} = 3$ V.

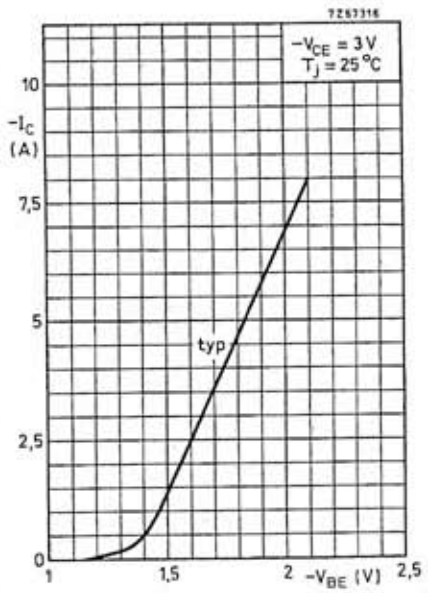

Fig. 16 Collector current.