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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-3 envelope, N-P-N complements are BDX63, BDX63A, BDX63B and BDX63C.

QUICK REFERENCE DATA

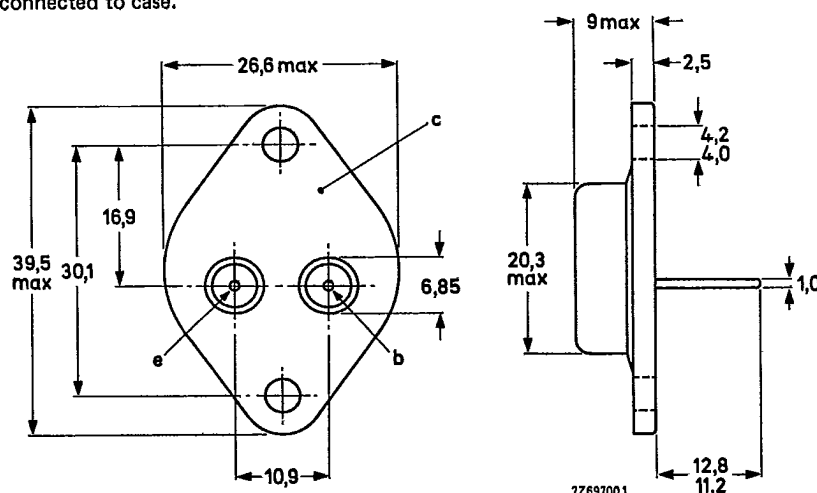
			BDX62	62A	62B	62C
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	100	120 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	100	120 V
Collector current (peak value)	$-I_{CM}$	max.		12		A
Total power dissipation up to $T_{mb} = 25^{\circ}\text{C}$	P_{tot}	max.		90		W
Junction temperature	T_j	max.		200		$^{\circ}\text{C}$
D.C. current gain						
$-I_C = 0,5\text{ A}; -V_{CE} = 3\text{ V}$	h_{FE}	typ.		1500		
$-I_C = 3,0\text{ A}; -V_{CE} = 3\text{ V}$	h_{FE}	>		1000		
Cut-off frequency						
$-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$	f_{hfe}	typ.		100		kHz

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-3.

Collector connected to case.



See also chapters Mounting instructions and Accessories.

BDX62; 62A
BDX62B; 62C

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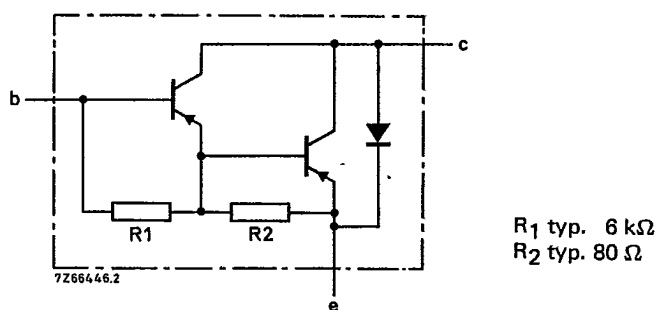


Fig. 2 Circuit diagram.

RATINGS

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

			BDX62	62A	62B	62C
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 $T_{mb} = 25^\circ\text{C}$	P_{tot}	max.			90	W
Storage temperature	T_{stg}			-65 to +200		$^\circ\text{C}$
Junction temperature*	T_j	max.		200		$^\circ\text{C}$

THERMAL RESISTANCE*

From junction to mounting base	$R_{th\ j-mb}$	=		1,94	K/W
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* 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.

CHARACTERISTICS

 $T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Collector cut-off current

$I_E = 0; -V_{CB} = -V_{CB0\max}$

$-I_{CBO} < 0,2\text{ mA}$

$I_E = 0; -V_{CB} = 40\text{ V}; T_j = 200\text{ }^{\circ}\text{C}; \text{BDX62}$

$I_E = 0; -V_{CB} = 50\text{ V}; T_j = 200\text{ }^{\circ}\text{C}; \text{BDX62A}$

$I_E = 0; -V_{CB} = 60\text{ V}; T_j = 200\text{ }^{\circ}\text{C}; \text{BDX62B}$

$I_E = 0; -V_{CB} = 70\text{ V}; T_j = 200\text{ }^{\circ}\text{C}; \text{BDX62C}$

$-I_{CBO} < 2\text{ mA}$

$I_B = 0; -V_{CE} = -\frac{1}{2}V_{CEO}$

$-I_{CEO} < 0,2\text{ mA}$

Emitter cut-off current

$I_C = 0; -V_{EB} = 5\text{ V}$

$-I_{EBO} < 5\text{ mA}$

D.C. current gain (note 1)

$-I_C = 0,5\text{ A}; -V_{CE} = 3\text{ V}$

$h_{FE} \text{ typ. } 1500$

$-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$

$h_{FE} > 1000$

$-I_C = 8\text{ A}; -V_{CE} = 3\text{ V}$

$h_{FE} \text{ typ. } 750$

Base-emitter voltage (notes 1 and 2)

$-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$

$-V_{BE} < 2,5\text{ V}$

Collector-emitter saturation voltage (note 1)

$-I_C = 3\text{ A}; -I_B = 12\text{ mA}$

$-V_{CEsat} < 2\text{ V}$

Collector capacitance at $f = 1\text{ MHz}$

$I_E = I_B = 0; -V_{CB} = 10\text{ V}$

$C_c \text{ typ. } 100\text{ pF}$

Cut-off frequency

$-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}$

$f_{hfe} \text{ typ. } 100\text{ kHz}$

Small-signal current gain

$-I_C = 3\text{ A}; -V_{CE} = 3\text{ V}; f = 1\text{ MHz}$

$h_{fe} \text{ typ. } 100$

Notes

1. Measured under pulse conditions: $t_p < 300\text{ }\mu\text{s}$, $\delta < 2\%$.2. $-V_{BE}$ decreases by about $3,6\text{ mV/K}$ with increasing temperature.

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CHARACTERISTICS (continued)

Switching times

(between 10% and 90% levels)

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

turn-on time

turn-off time

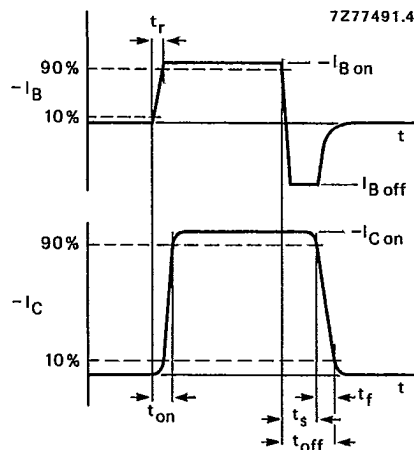
 t_{on} typ. $0,5 \mu\text{s}$ t_{off} typ. $2,5 \mu\text{s}$ 

Fig. 3 Switching times waveforms.

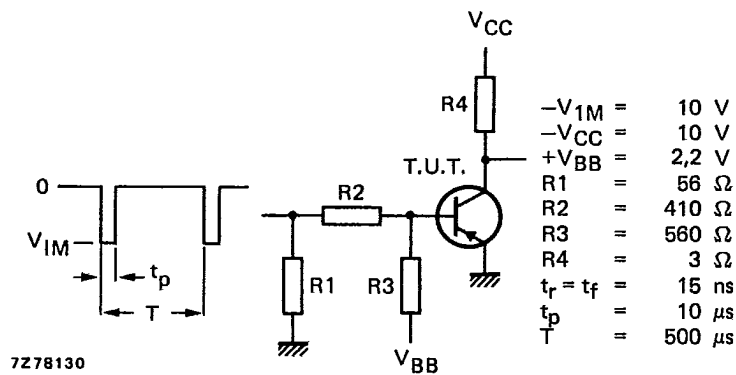


Fig. 4 Switching times test circuit.

Diode forward voltage
 $I_F = 3 \text{ A}$

 V_F typ. 1,8 V

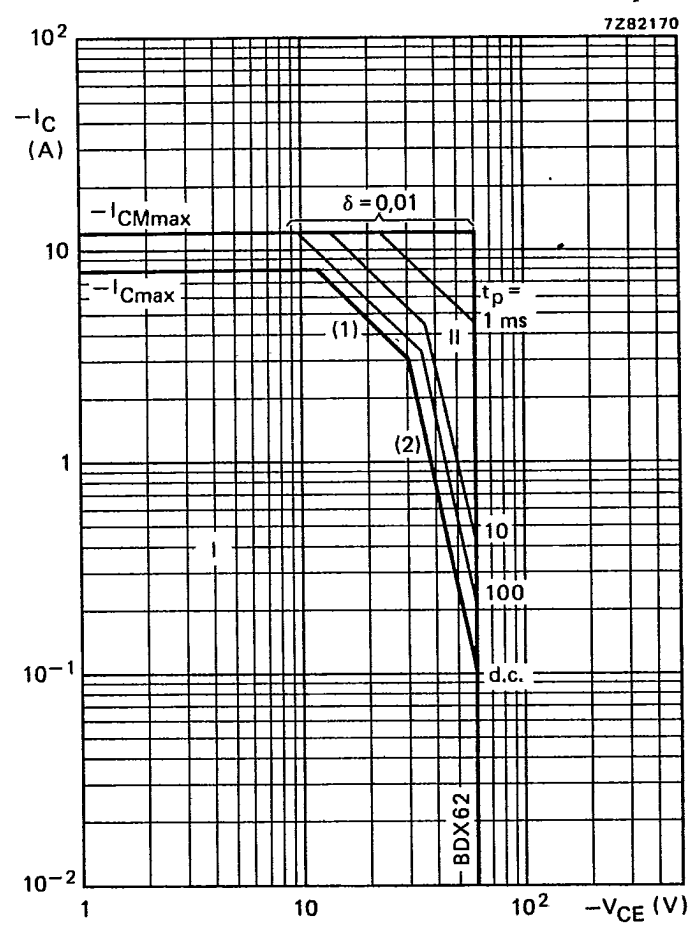


Fig. 5 Safe Operating Area; $T_{mb} = 25\text{ }^{\circ}\text{C}$.
I Region of permissible d.c. operation.
II Permissible extension for repetitive pulse operation.
(1) $P_{tot\text{ max}}$ and $P_{peak\text{ max}}$ lines.
(2) Second-breakdown limits.

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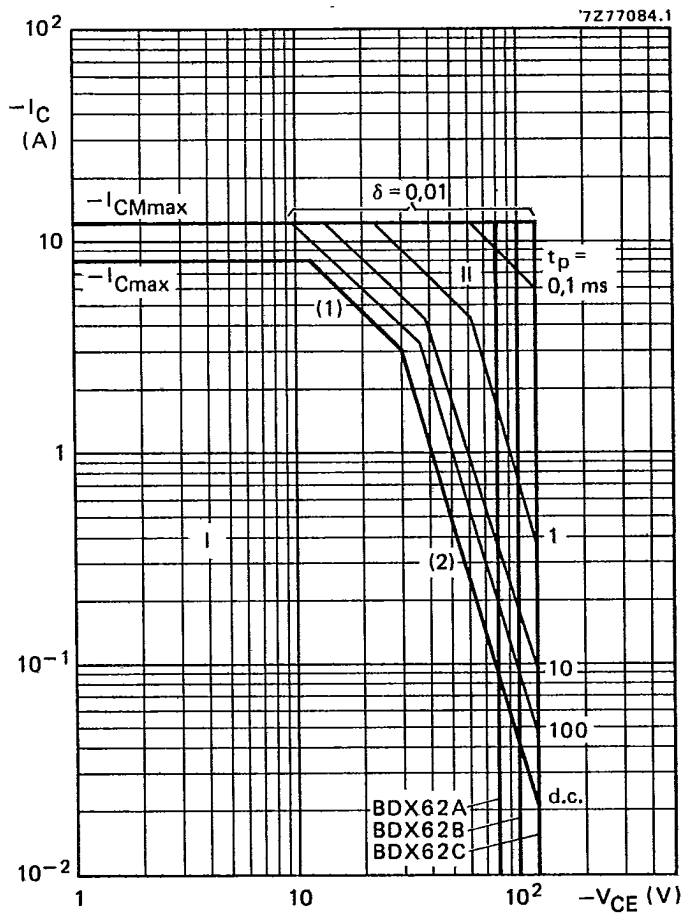


Fig. 6 Safe Operating Area; $T_{mb} = 25^\circ\text{C}$.

- 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.

Silicon Darlington power transistors

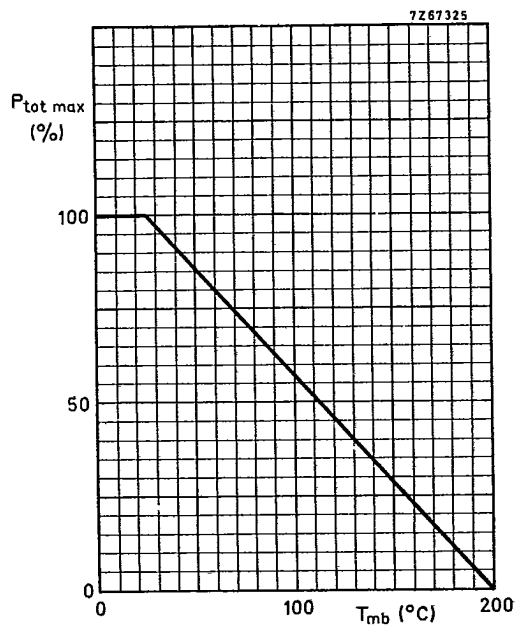
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Fig. 7 Power derating curve.

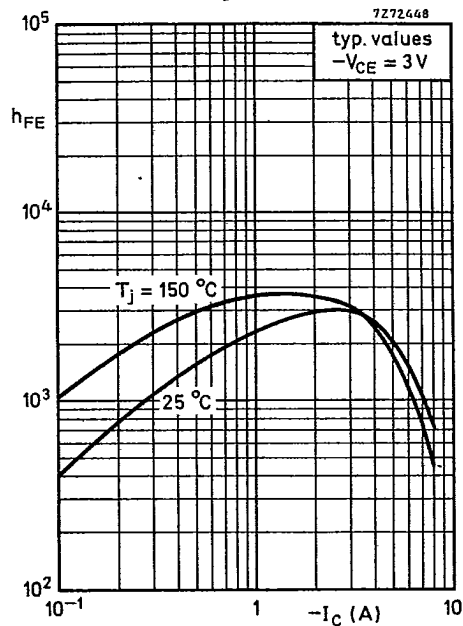


Fig. 8 D.C. current gain.

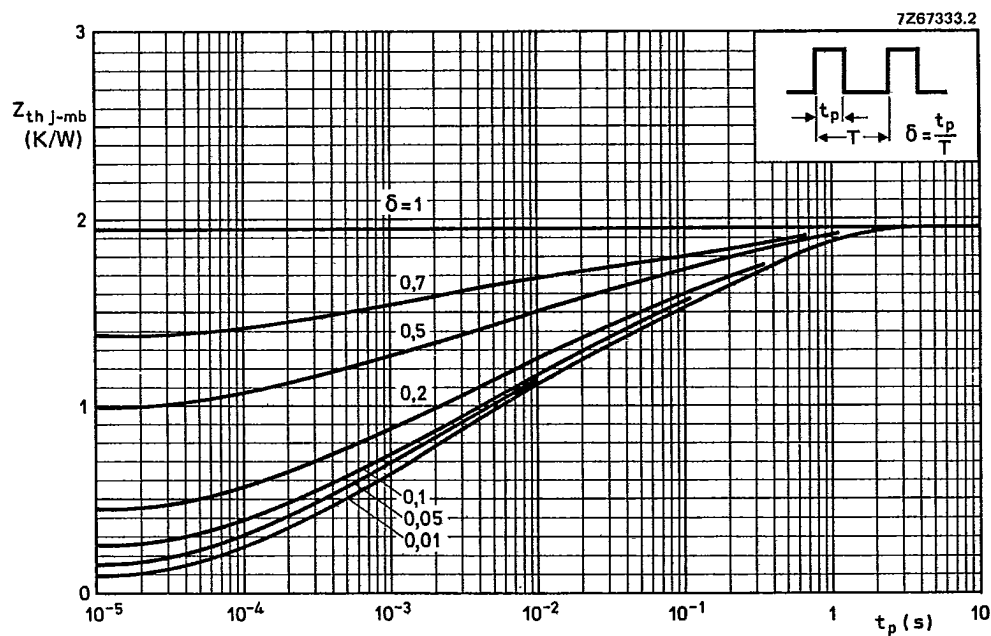
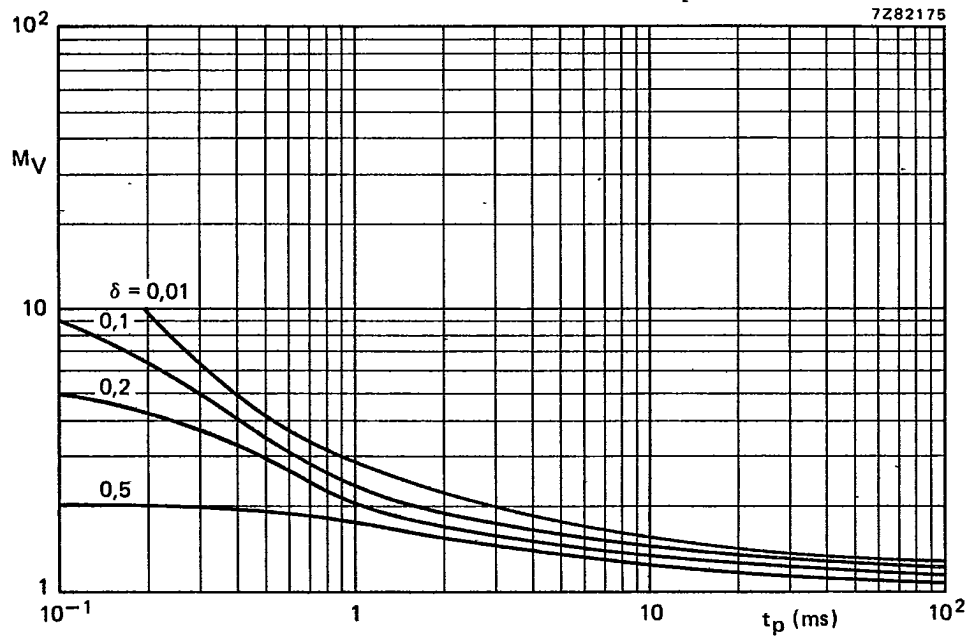
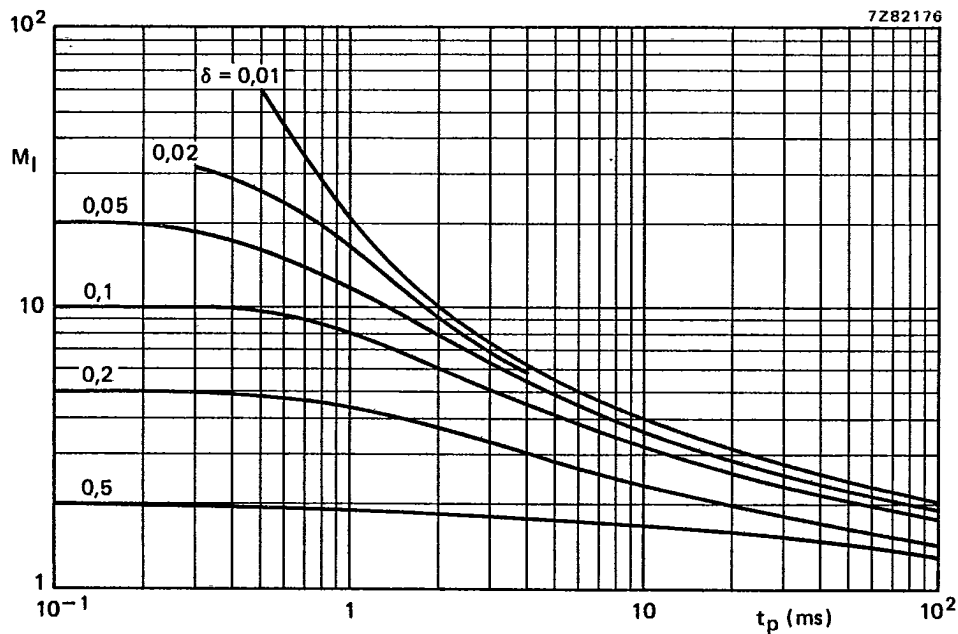


Fig. 9 Pulse power rating chart.

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Fig. 10 S.B. voltage multiplying factor at the I_{Cmax} level.Fig. 11 S.B. current multiplying factor at the V_{CEO} 100 V and 60 V level.

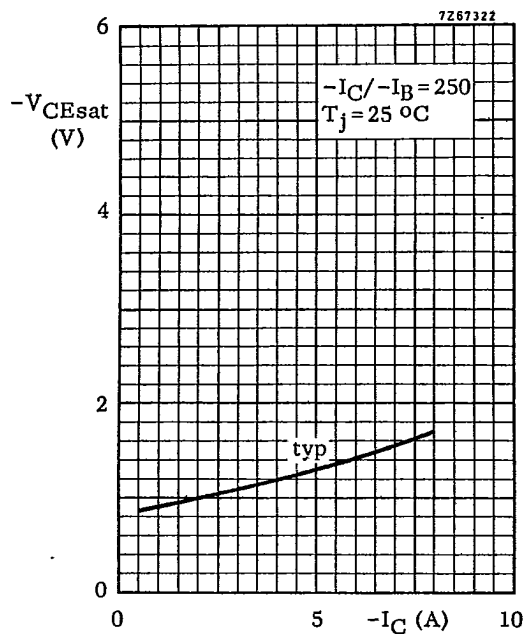


Fig. 12.

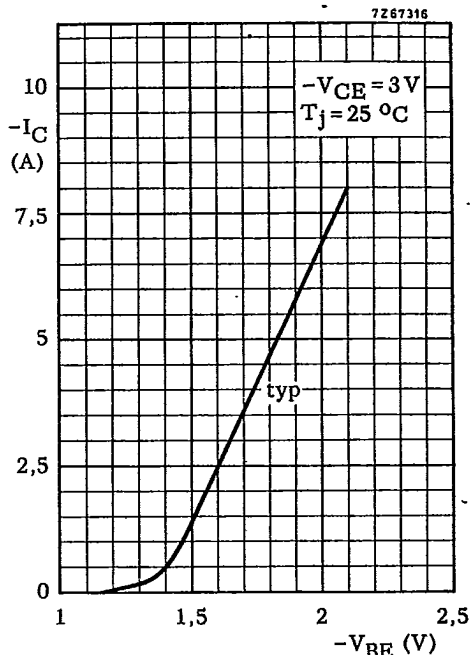


Fig. 13.

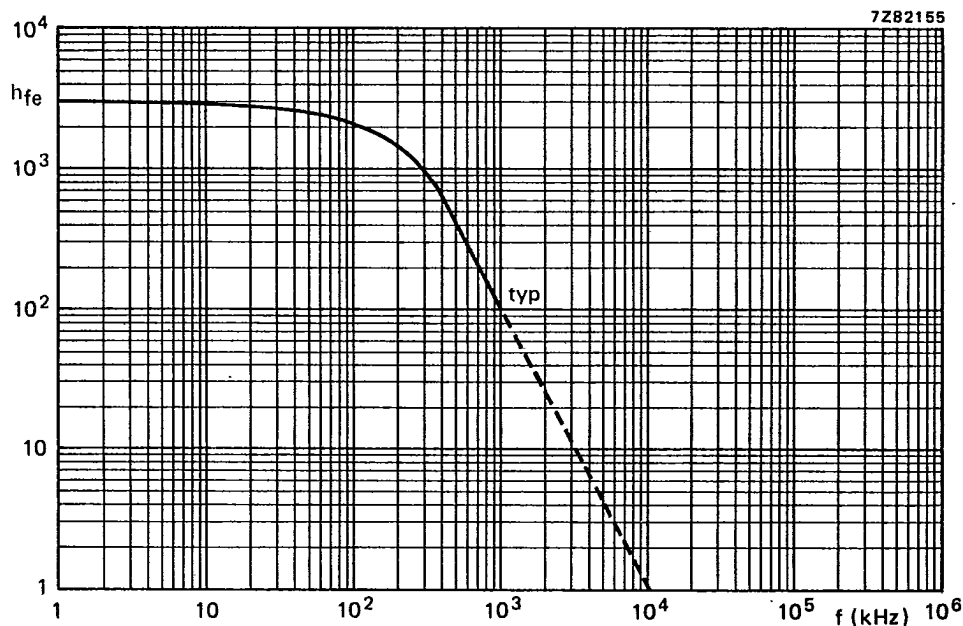


Fig. 14 Small signal current gain at $-I_C = 3 A$; $-V_{CE} = 3 V$.