

SILICON EPITAXIAL BASE POWER TRANSISTORS

P-N-P silicon transistors in a plastic envelope intended for use in audio output stages and general purpose amplifiers. N-P-N complements are BD943; 945 and 947.

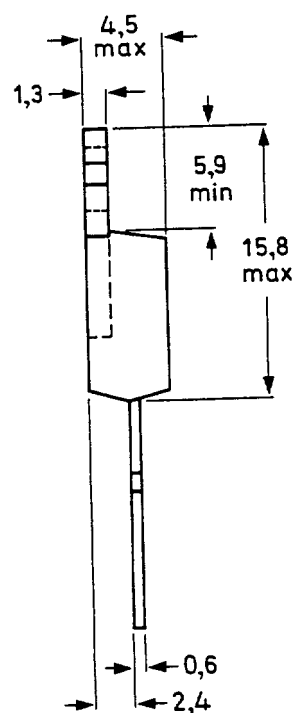
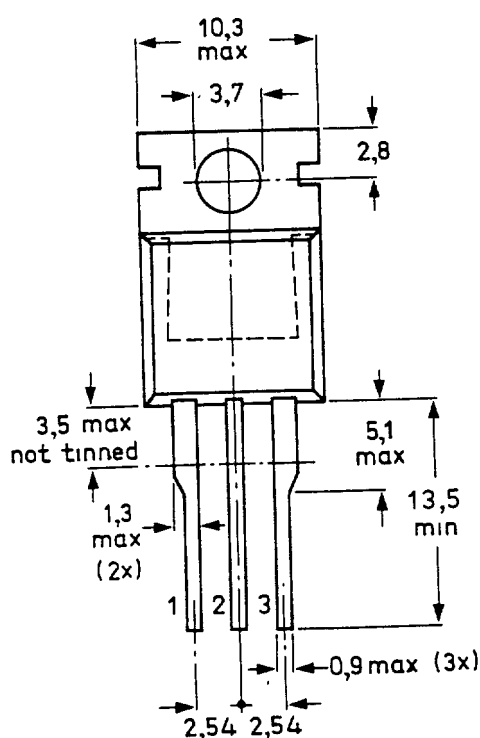
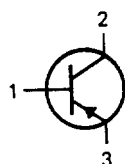
QUICK REFERENCE DATA

			BD944	946	948
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	22	32	45 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	22	32	45 V
Collector current (d.c.)	$-I_C$	max.		5	A
Total power dissipation up to $T_{mb} = 25^\circ\text{C}$	P_{tot}	max.		40	W
Junction temperature	T_j	max.		150	$^\circ\text{C}$
D.C. current gain				25	
$-I_C = 10\text{ mA}; -V_{CE} = 5\text{ V}$	h_{FE}	$>$		85 to 475	
$-I_C = 500\text{ mA}; -V_{CE} = 1\text{ V}$	h_{FE}	$>$	50	50	40
$-I_C = 2\text{ A}; -V_{CE} = 1\text{ V}$	h_{FE}	$>$			
Transition frequency at $f = 1\text{ MHz}$	f_T	$>$		3	MHz
$-I_C = 250\text{ mA}; -V_{CE} = 1\text{ V}$					

MECHANICAL DATA

Fig. 1 TO-220AB.

Collector connected to mounting base.



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See also chapters Mounting instructions and Accessories.

BD944
BD946
BD948

RATINGS

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

			BD944	946	948
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	22	32	45 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	22	32	45 V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.		5	V
Collector current (d.c.)	$-I_C$	max.		5	A
Collector current (peak value)	$-I_{CM}$	max.		8	A
Base current (d.c.)	$-I_B$	max.		1	A
Total power dissipation up to $T_{mb} = 25^\circ\text{C}$	P_{tot}	max.		40	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	$R_{th\ j-mb}$	=		3,12	K/W
From junction to ambient (in free air)	$R_{th\ j-a}$	=		70	K/W

CHARACTERISTICS

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

→ Collector cut-off current					
$I_E = 0; -V_{CB} = -V_{CBOmax}$	$-I_{CBO}$	<		50	μA
$I_E = 0; -V_{CB} = -V_{CBOmax}; T_j = 150^\circ\text{C}$	$-I_{CBO}$	<		1	mA
$I_B = 0; -V_{CE} = 15\text{ V}; \text{BD944}$	$-I_{CEO}$	<		0,1	mA
$-V_{CE} = 20\text{ V}; \text{BD946}$					
$-V_{CE} = 25\text{ V}; \text{BD948}$					
→ Emitter cut-off current					
$-I_C = 0; -V_{EB} = 5\text{ V}$	$-I_{EBO}$	<		0,2	mA
D.C. current gain (note 1)					
$-I_C = 10\text{ mA}; -V_{CE} = 5\text{ V}$	h_{FE}	>		25	
$-I_C = 500\text{ mA}; -V_{CE} = 1\text{ V}$	h_{FE}			85 to 475	
$-I_C = 2\text{ A}; -V_{CE} = 1\text{ V}$	h_{FE}	>	50	50	40
$-I_C = 3\text{ A}; -V_{CE} = 1\text{ V}$	h_{FE}	>	—	—	30
Base-emitter voltage (notes 1 and 2)					
$-I_C = 2\text{ A}; -V_{CE} = 1\text{ V}$	$-V_{BE}$	<	1,1	1,1	— V
$-I_C = 3\text{ A}; -V_{CE} = 1\text{ V}$	$-V_{BE}$	<	—	—	1,3 V
Collector-emitter saturation voltage (note 1)					
$-I_C = 2\text{ A}; -I_B = 0,2\text{ A}$	$-V_{CEsat}$	<	0,5	0,5	— V
$-I_C = 3\text{ A}; -I_B = 0,3\text{ V}$	$-V_{CEsat}$	<	—	—	0,7 V

Notes

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

Knee voltage *

$-I_C = 2 \text{ A}$; $-I_B = \text{value for which}$

$-I_C = 2,2 \text{ A}$ and $-V_{CE} = 1 \text{ V}$

Transition frequency at $f = 1 \text{ MHz}$

$-I_C = 250 \text{ mA}$; $-V_{CE} = 1 \text{ V}$

$-V_{CEK} < 0,8 \text{ V}$

$f_T > 3 \text{ MHz}$

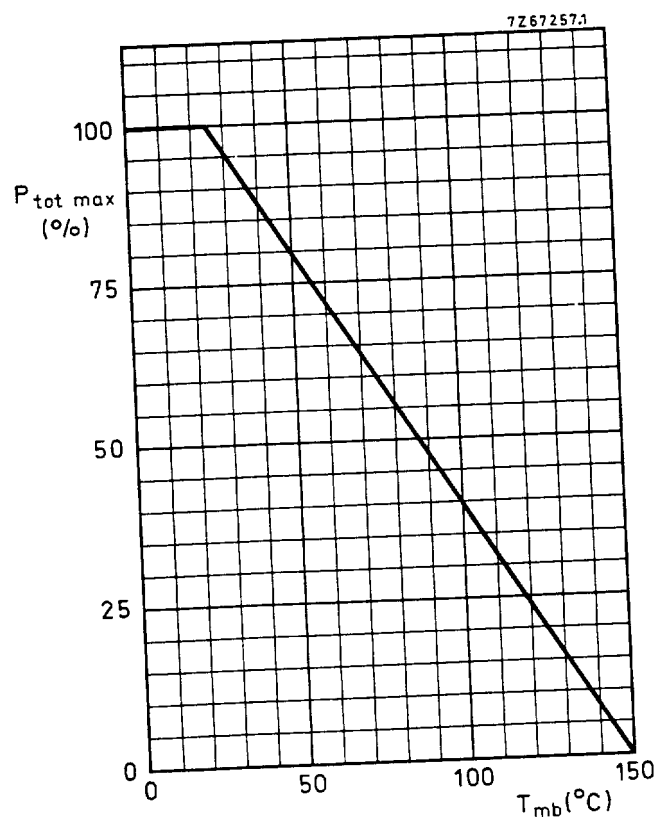


Fig. 2 Power derating curve.

* Measured under pulse conditions; $t_p \leq 300 \mu\text{s}$; $\delta < 2\%$.

BD944
BD946
BD948

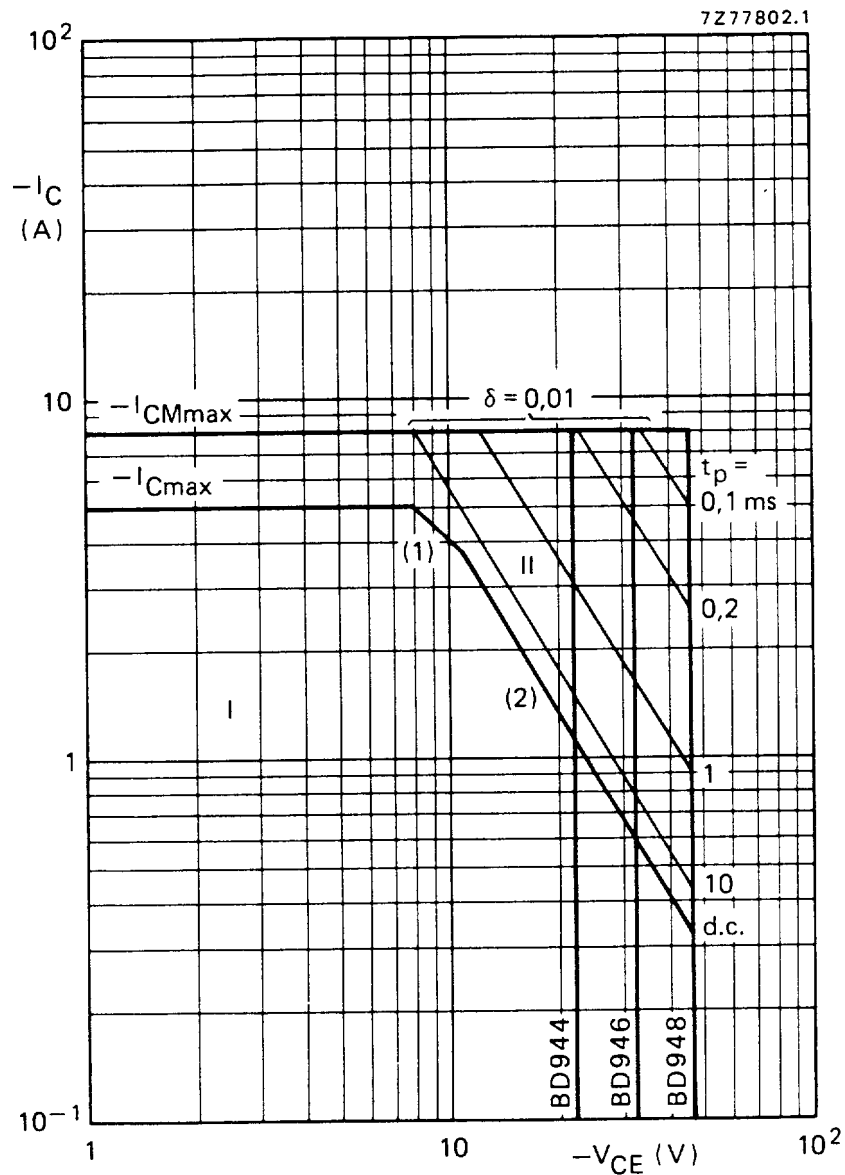


Fig. 3 Safe Operating Area, $T_{mb} = 25^\circ\text{C}$.

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.

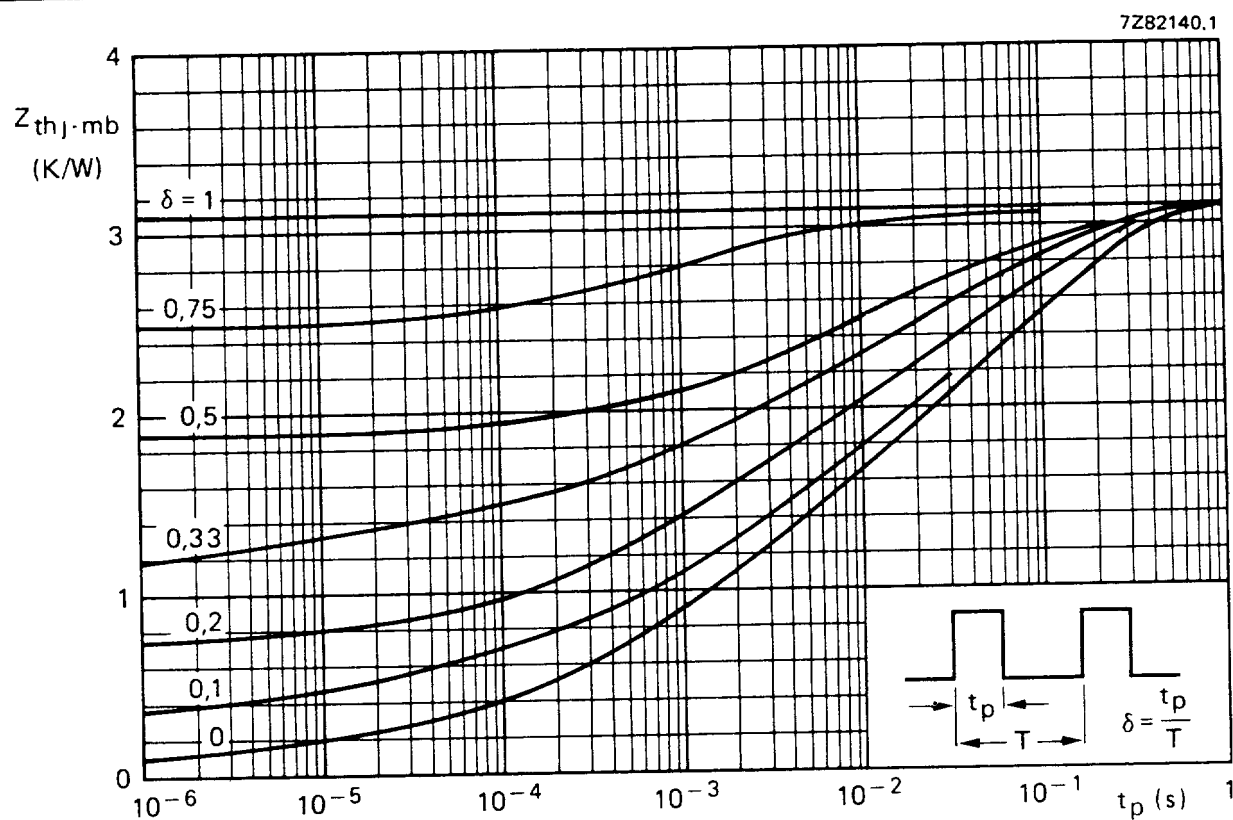
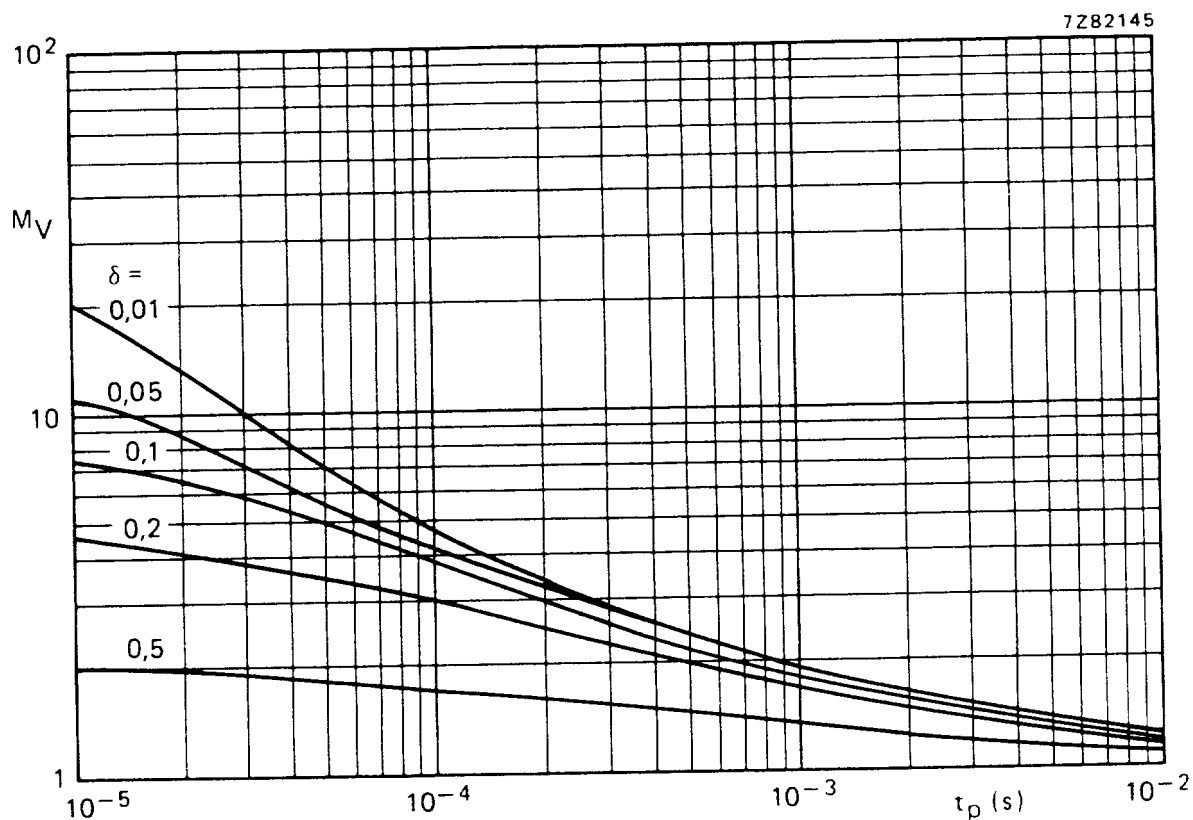


Fig. 4 Pulse power rating chart.

Fig. 5 S.B. voltage multiplying factor at the $-I_{Cmax}$ level.

BD944
BD946
BD948

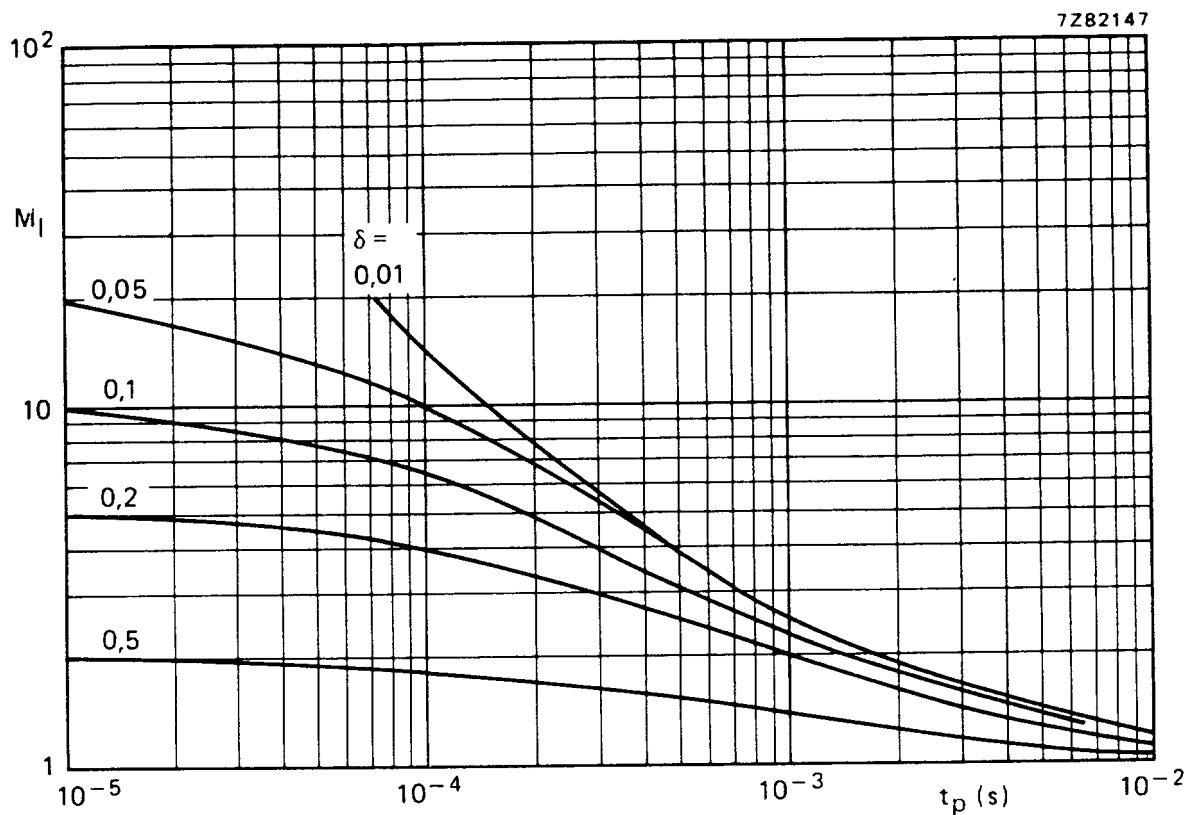


Fig. 6 S.B. current multiplying factor at the $-V_{CEOmax}$ level for BD944/946.

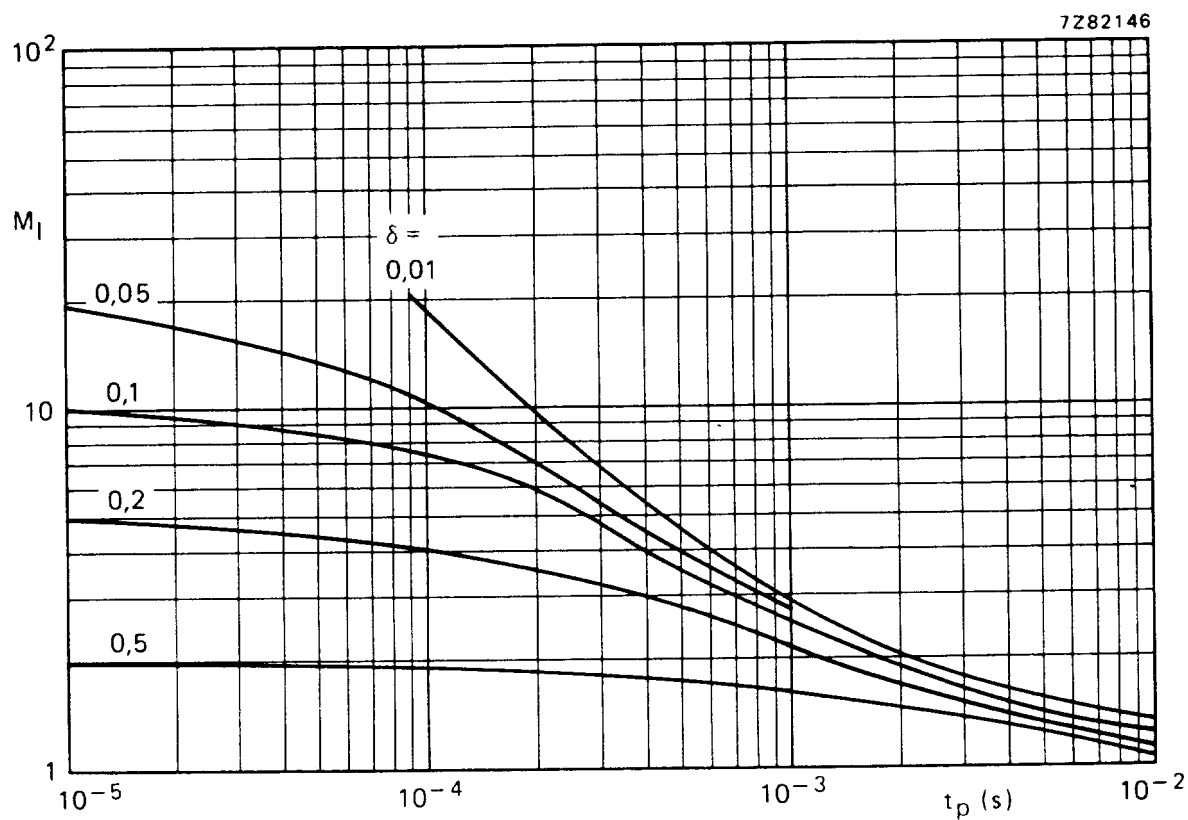


Fig. 7 S.B. current multiplying factor at the $-V_{CEOmax}$ level for BD948.

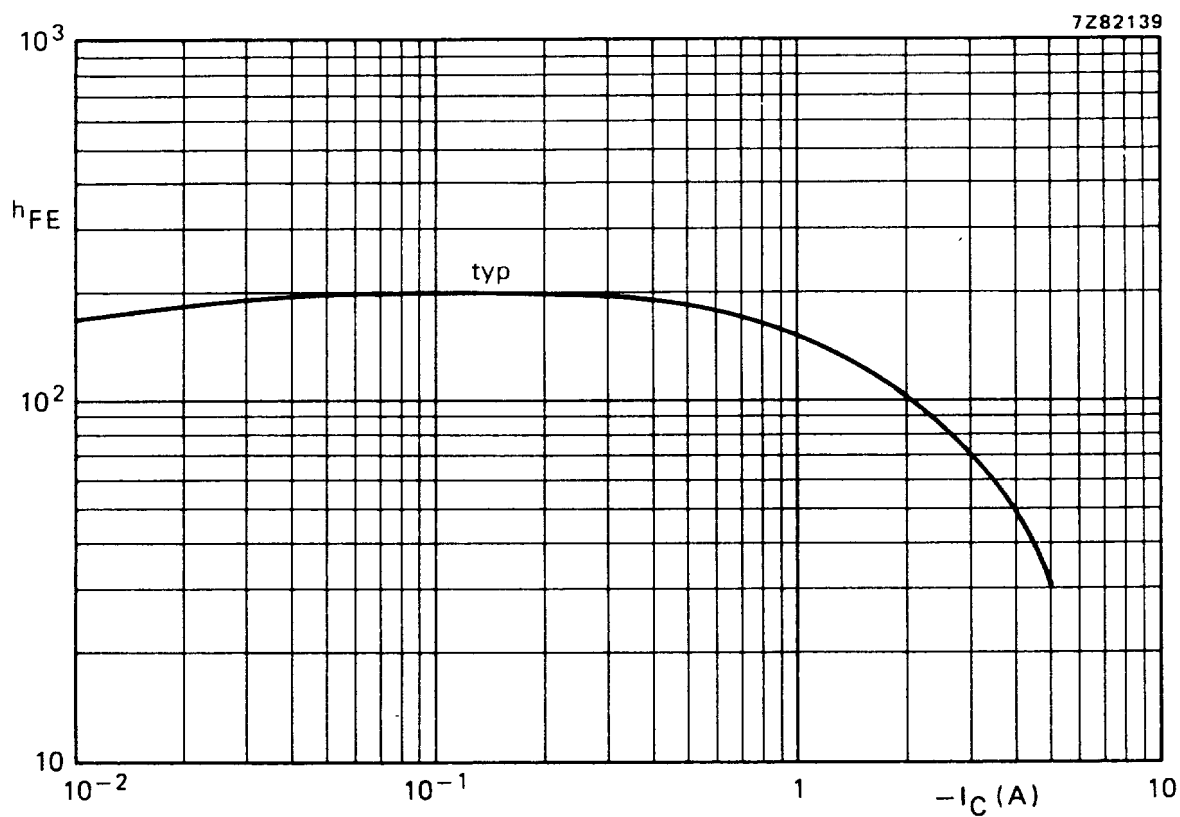


Fig. 8 Typical d.c. current gain at $-V_{CE} = 1$ V; $T_j = 25$ °C.