Semelab plc

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SILICON EPITAXIAL BASE POWER TRANSISTORS

BD944
BD946
BD948

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

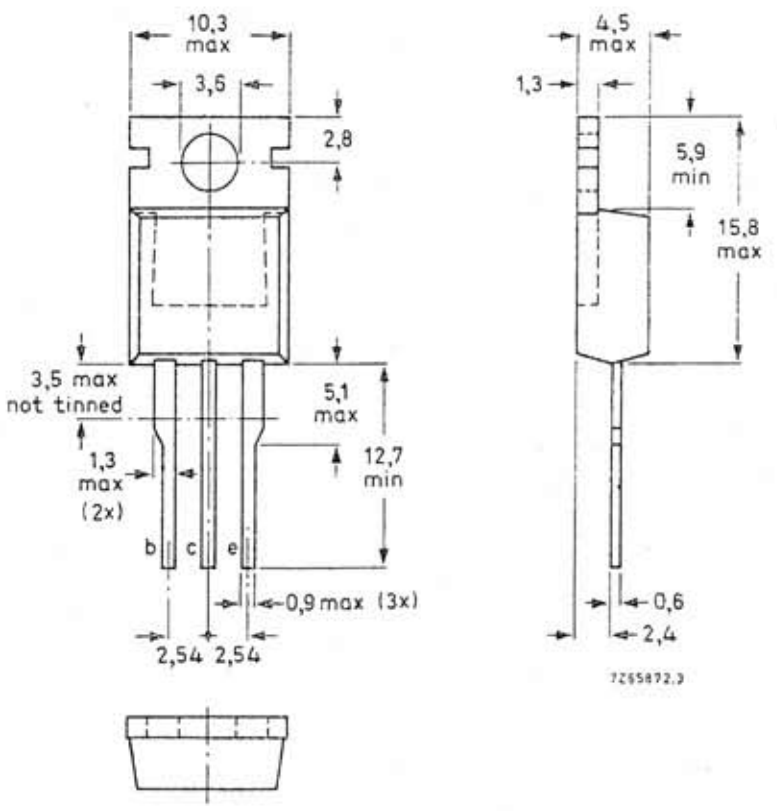
			BD944	946	948	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	22	32	45	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	22	32	45	V
Collector current (d.c.)	$-I_C$	max.		5		A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		40		W
Junction temperature	T_j	max.		150		°C
D.C. current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

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-220AB.

Collector connected to mounting base.



See also chapters Mounting instructions and Accessories.

SEME LAB

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 °C	P_{tot}	max.		40		W
Storage temperature	T_{stg}			−65 to + 150		°C
Junction temperature	T_j	max.		150		°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	3,12	K/W
From junction to ambient (in free air)	$R_{th\ j\text{-}a}$	=	70	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

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

Notes

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

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Silicon epitaxial base power transistors

Knee voltage *			
$-I_C$ = 2 A; $-I_B$ = value for which			
$-I_C$ = 2,2 A and $-V_{CE}$ = 1 V	$-V_{CEK}$	<	0,8 V
Transition frequency at f = 1 MHz			
$-I_C$ = 250 mA; $-V_{CE}$ = 1 V	f_T	>	3 MHz

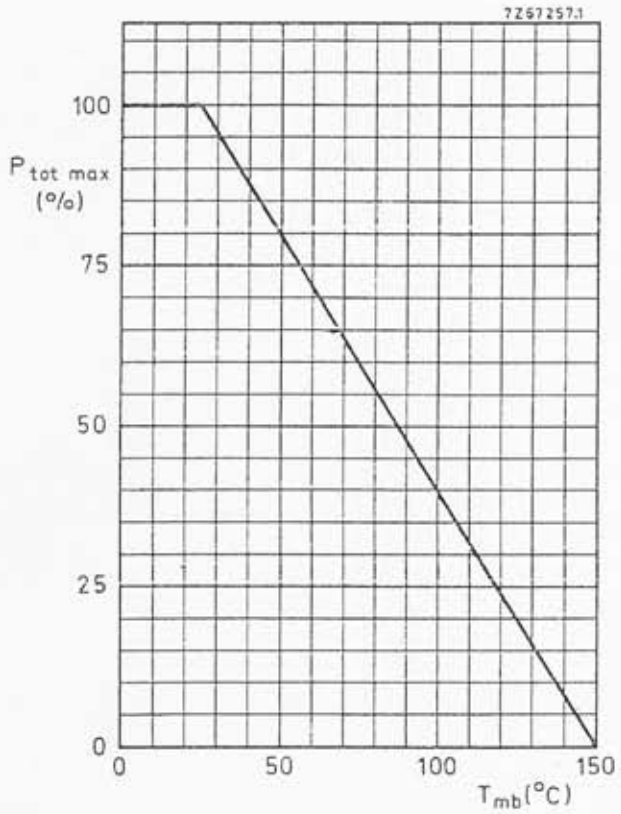

Fig. 2 Power derating curve.

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

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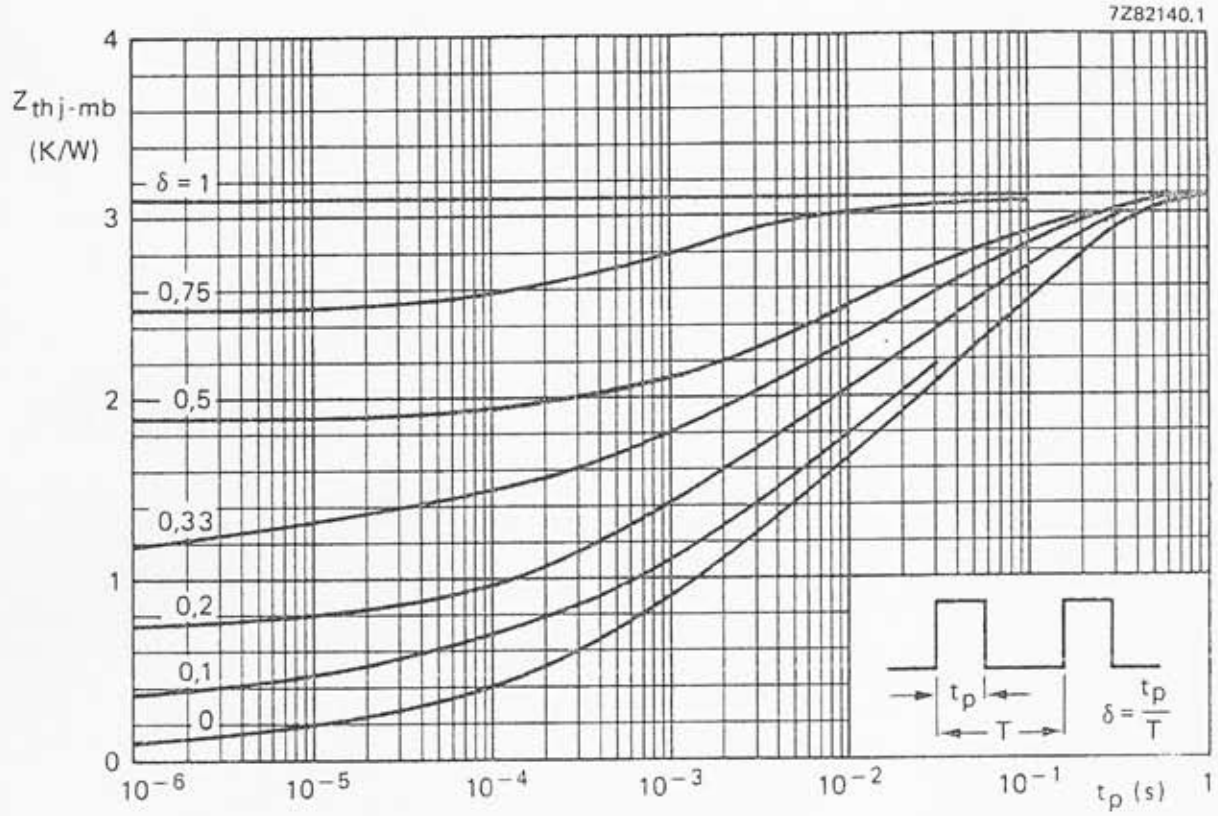

Fig. 4 Pulse power rating chart.

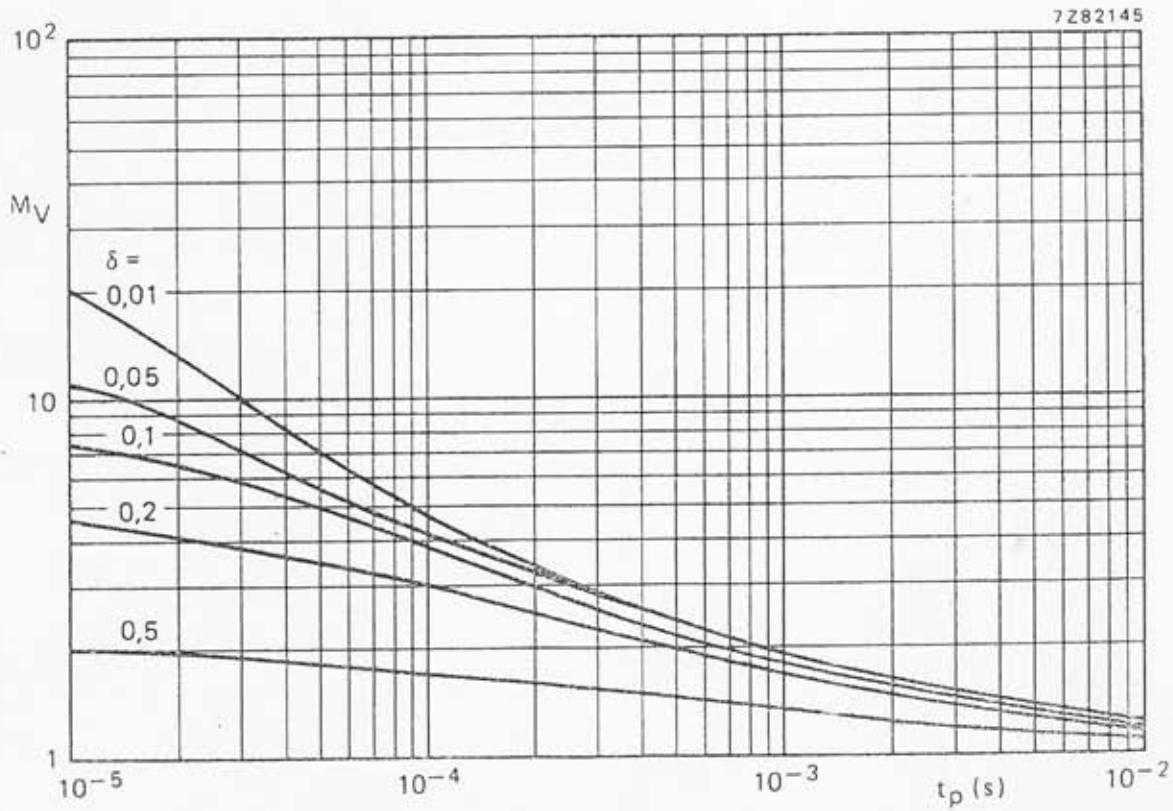

Fig. 5 S.B. voltage multiplying factor at the $-I_{Cmax}$ level.

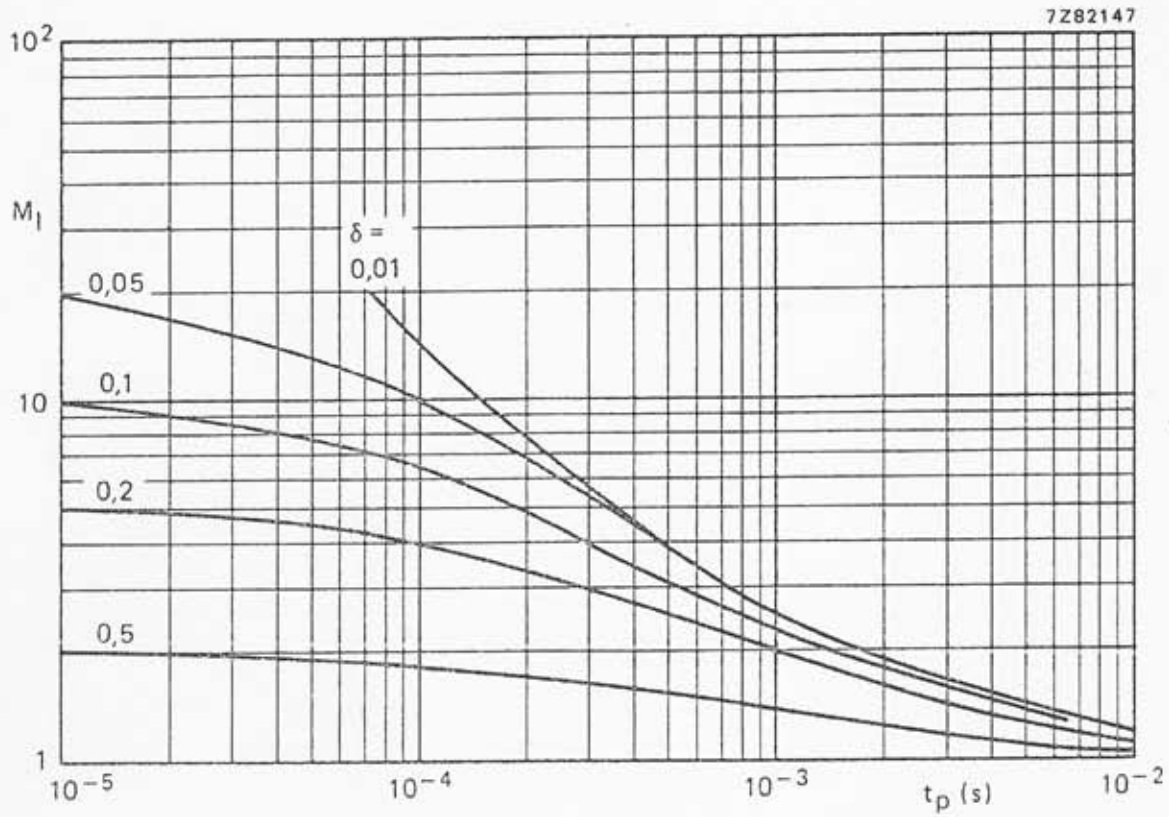

Fig. 6 S.B. current multiplying factor at the $-V_{CEOmax}$ level for BD944/946.

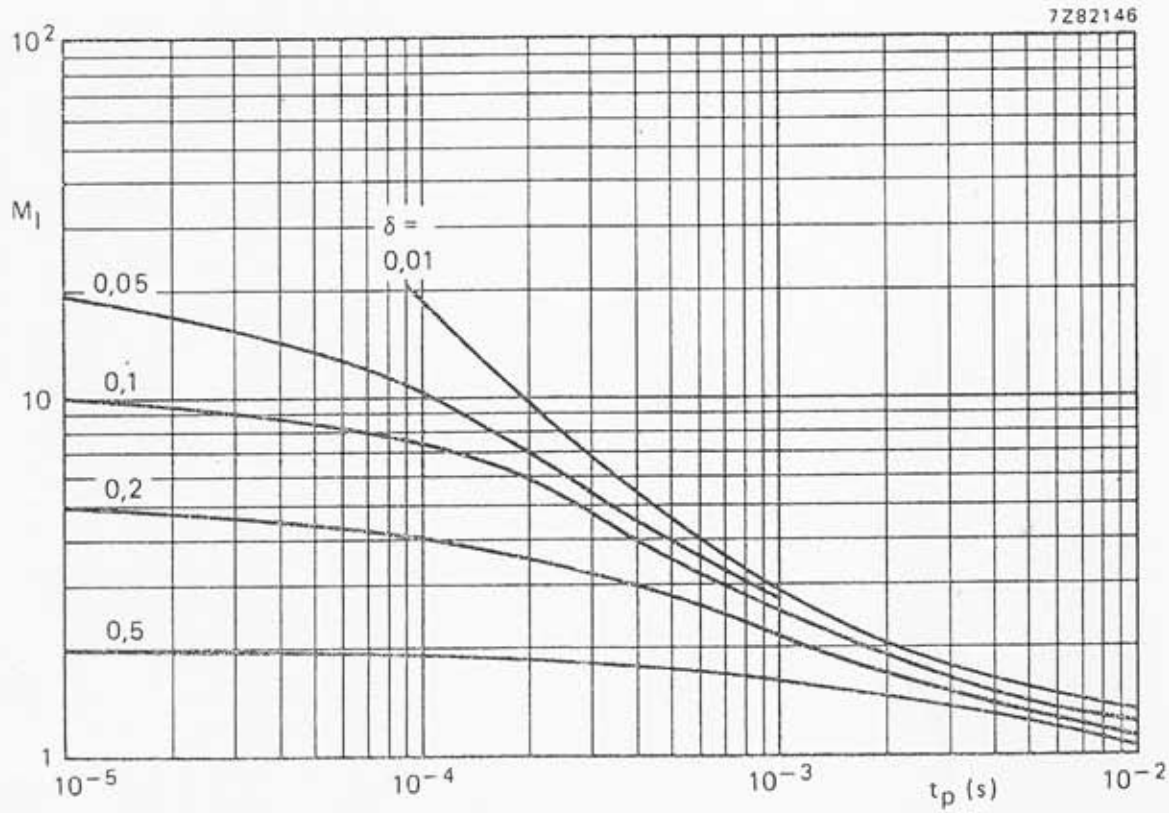

Fig. 7 S.B. current multiplying factor at the $-V_{CEOmax}$ level for BD948.

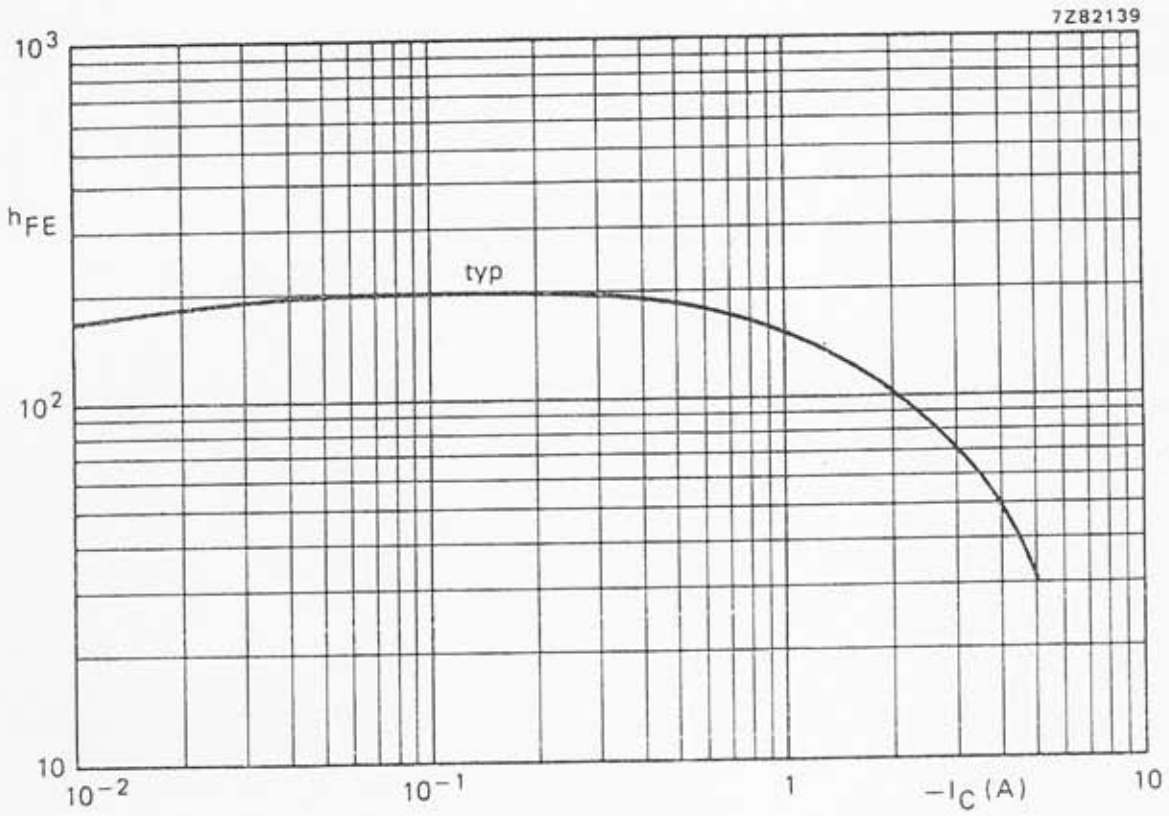

Fig. 8 Typical d.c. current gain at $-V_{CE}$ = 1 V; T_j = 25 °C.

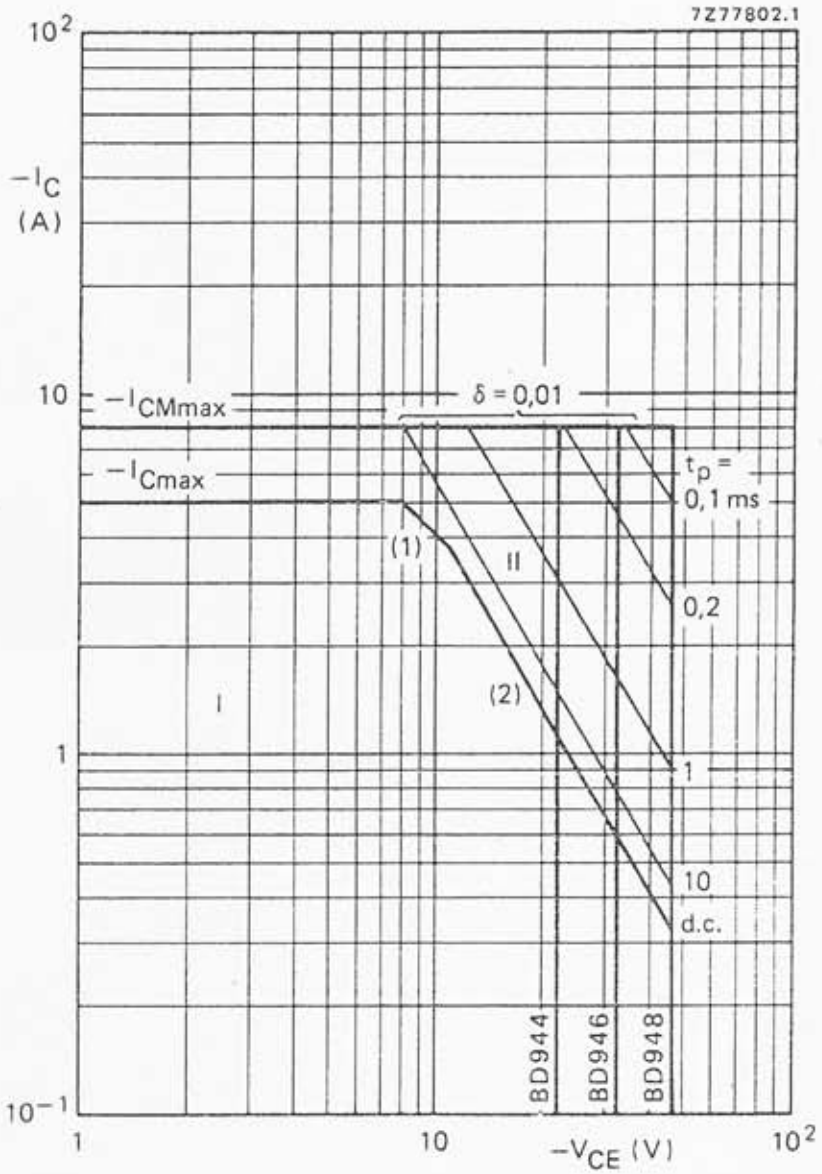

Fig. 3 Safe Operating ARea, T_{mb} = 25 °C.

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).