SILICON EPITAXIAL BASE POWER TRANSISTORS

N-P-N silicon transistors in a plastic envelope intended for use in general purpose amplifier and switching applications. The TIP41 series is an equivalent type. P-N-P complements are BDT42 series.

QUICK REFERENCE DATA

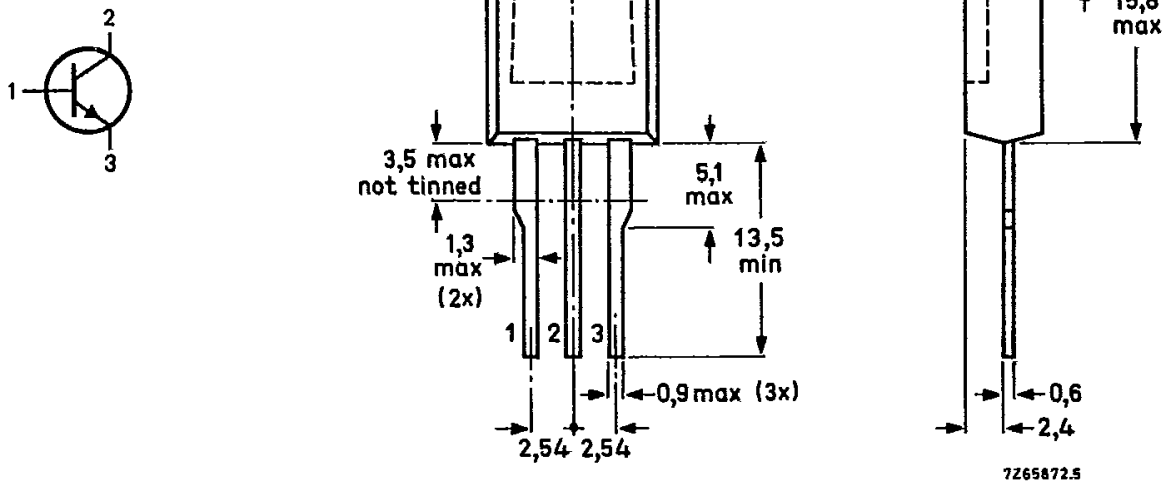
			BDT41	A	B	C	
Collector-base voltage (open emitter)	V_{CBO}	max.	80	100	120	140	V
Collector-emitter voltage (open base)	V_{CEO}	max.	40	60	80	100	V
Collector current (d.c.)	I_C	max.		6			A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		65			W
Junction temperature	T_j	max.		150			°C
D.C. current gain I_C = 3 A; V_{CE} = 4 V	h_{FE}			15 to 75			

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-220AB.

Collector connected to mounting base.



See also chapters Mounting Instructions and Accessories.

RATINGS

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

			BDT41	A	B	C	
Collector-base voltage (open emitter)	V_{CBO}	max.	80	100	120	140	V
Collector-emitter voltage (open base)	V_{CEO}	max.	40	60	80	100	V
Emitter-base voltage (open collector)	V_{EBO}	max.		5			V
Collector current (d.c.)	I_C	max.		6			A
Collector current (peak value)	I_{CM}	max.		10			A
Base current (d.c.)	I_B	max.		3			A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		65			W
Storage temperature	T_{stg}			−65 to + 150			°C
Junction temperature	T_j	max.		150			°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	1,92	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

			BDT41;A	B;C	
Collector cut-off current					
I_B = 0; V_{CE} = 30 V	I_{CEO}	<	0,2	−	mA
I_B = 0; V_{CE} = 60 V	I_{CEO}	<	−	0,2	mA
V_{BE} = 0; V_{CE} = V_{CEOmax}	I_{CES}	<	0,4		mA
Emitter cut-off current					
I_C = 0; V_{EB} = 5 V	I_{EBO}	<	0,5		mA
D.C. current gain*					
I_C = 0,3 A; V_{CE} = 4 V	h_{FE}	>	30		
I_C = 3 A; V_{CE} = 4 V	h_{FE}		15 to 75		
Base-emitter voltage**					
I_C = 6 A; V_{CE} = 4 V	V_{BE}	<	2		V
Collector-emitter saturation voltage*					
I_C = 6 A; I_B = 0,6 A	V_{CEsat}	<	1,5		V

			BDT41	A	B	C	
Collector-emitter breakdown voltage*							
I_B = 0; I_C = 30 mA	$V_{(BR)CEO}$	>	40	60	80	100	V
Small-signal current transfer ratio							
I_C = 0,5 A; V_{CE} = 10 V; f = 1 kHz	$\lvert h_{fe} \rvert$	>	20				
Transition frequency at f = 1 MHz							
I_C = 0,5 A; V_{CE} = 10 V	f_T	>	3				MHz

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

** V_{BE} decreases by about 2,3 mV/K with increasing temperature.

Turn-off breakdown energy with inductive load (Fig. 4)
$-I_{Boff} = 0$; $I_{CC} = 2{,}5$ A — $E_{(BR)}$ > 62,5 mJ

Switching times
(between 10% and 90% levels)
$I_{Con} = 6$ A; $I_{Bon} = -I_{Boff} = 0{,}6$ A

Turn-on time — t_{on} typ. 0,6 μs

Turn-off time — t_{off} typ. 1 μs

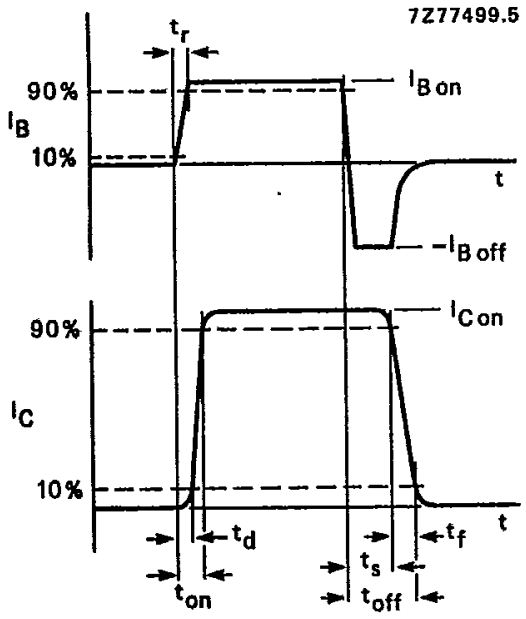
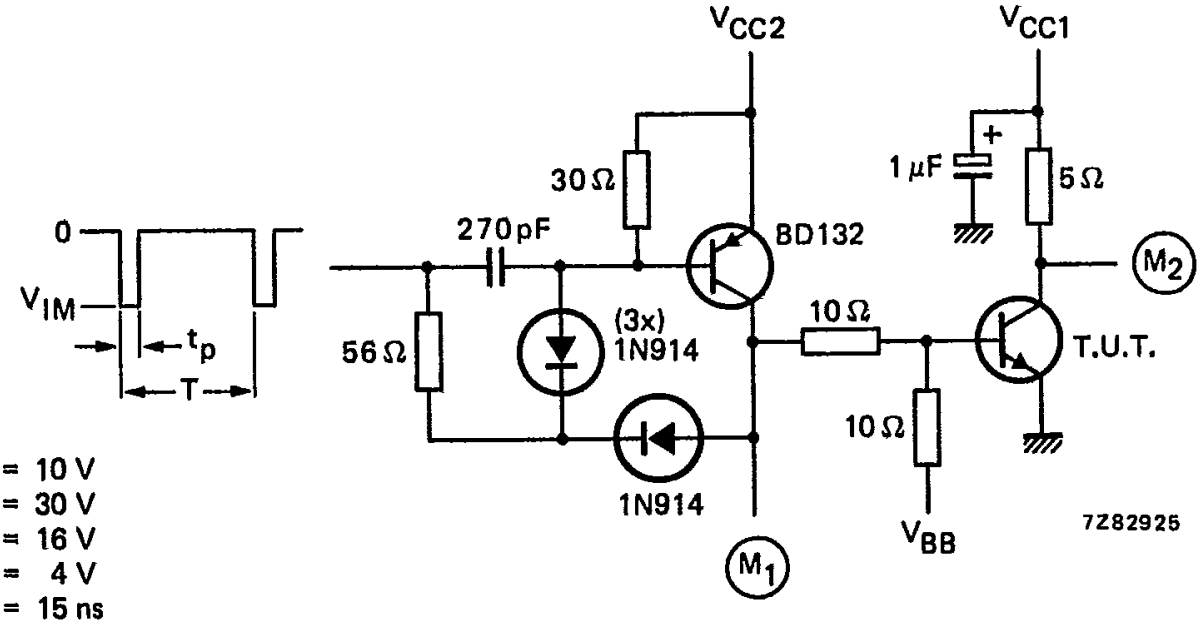


Fig. 2 Switching times waveforms.



$-V_{IM}$ = 10 V
V_{CC1} = 30 V
V_{CC2} = 16 V
$-V_{BB}$ = 4 V
$t_r = t_f$ = 15 ns
t_p = 20 μs
δ ⩽ 2 %

Fig. 3 Switching times test circuit.
Adjust V_{CC2} so that the input to M_1 = 14 V.

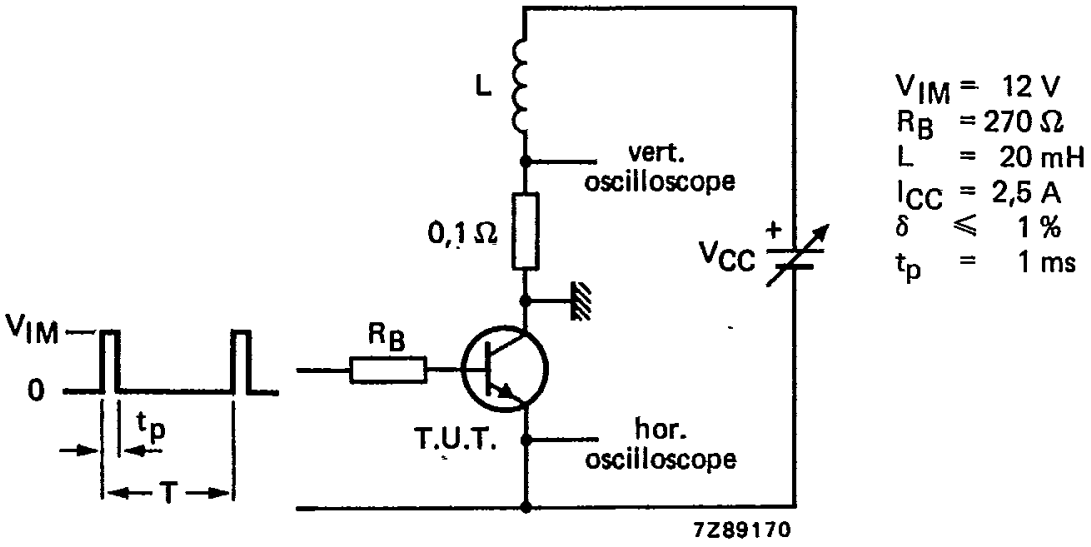


Fig. 4 Test circuit for turn-off breakdown energy.

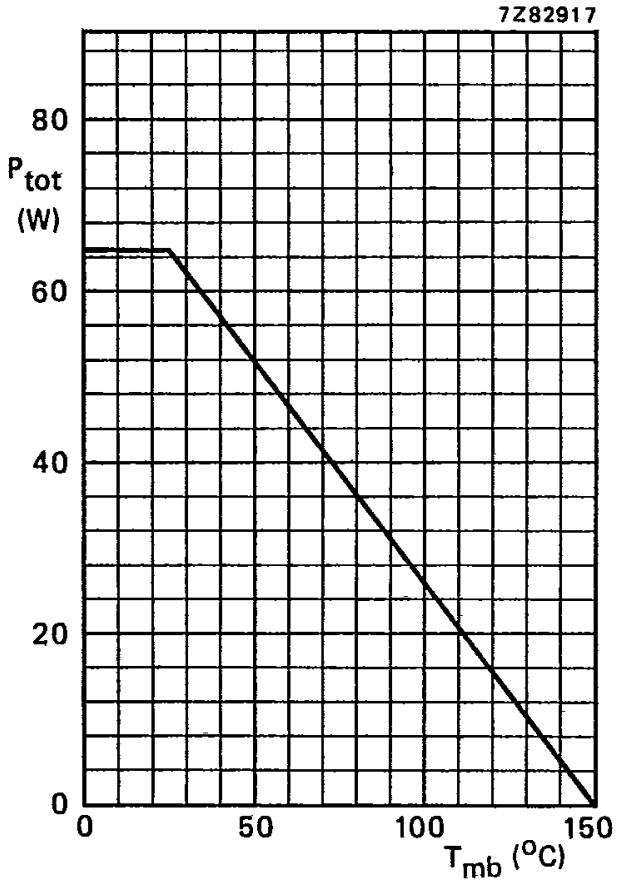


Fig. 5 Power derating curve.

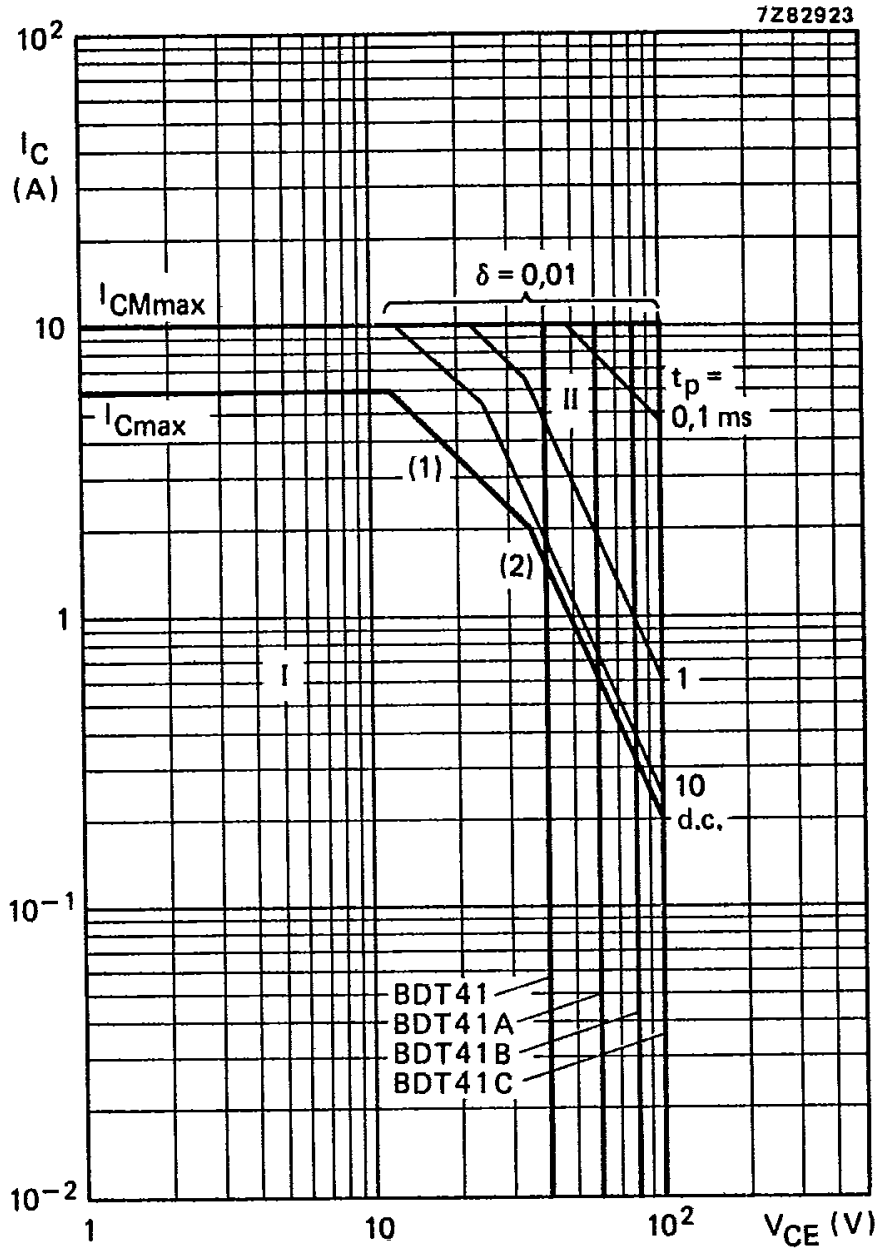


Fig. 6 Safe Operating ARea, T_{mb} = 25 °C.

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.

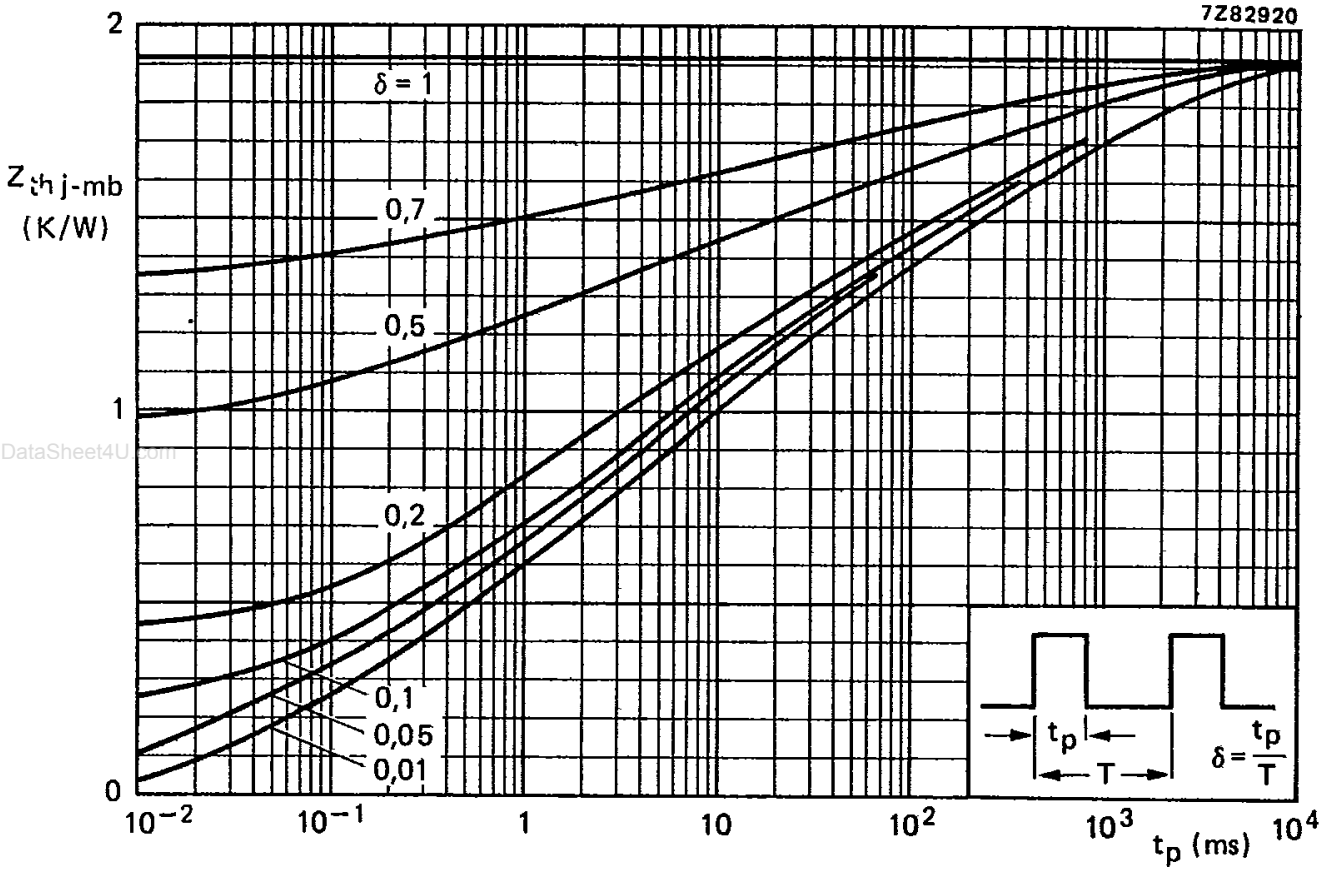


Fig. 7 Pulse power rating chart.

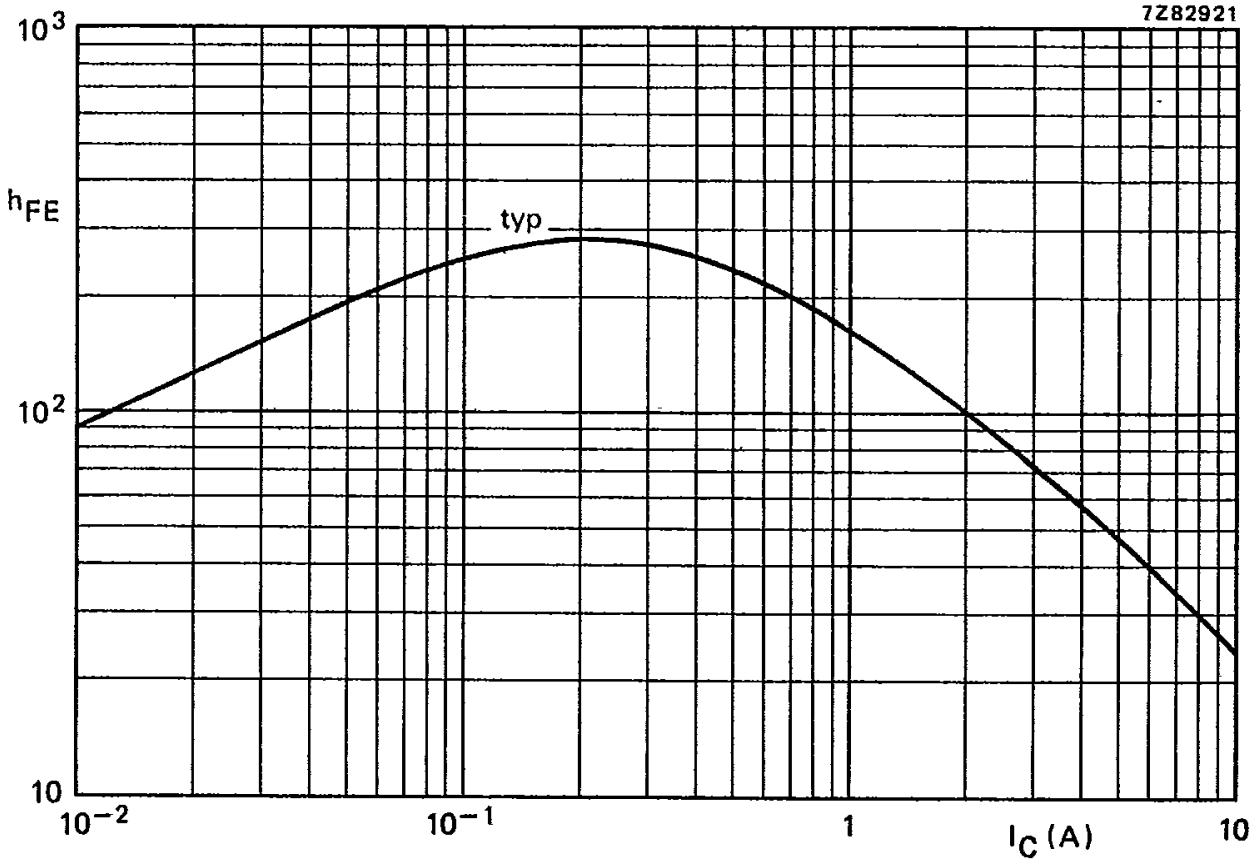


Fig. 8 D.C. current gain at V_{CE} = 4 V; T_j = 25 °C.

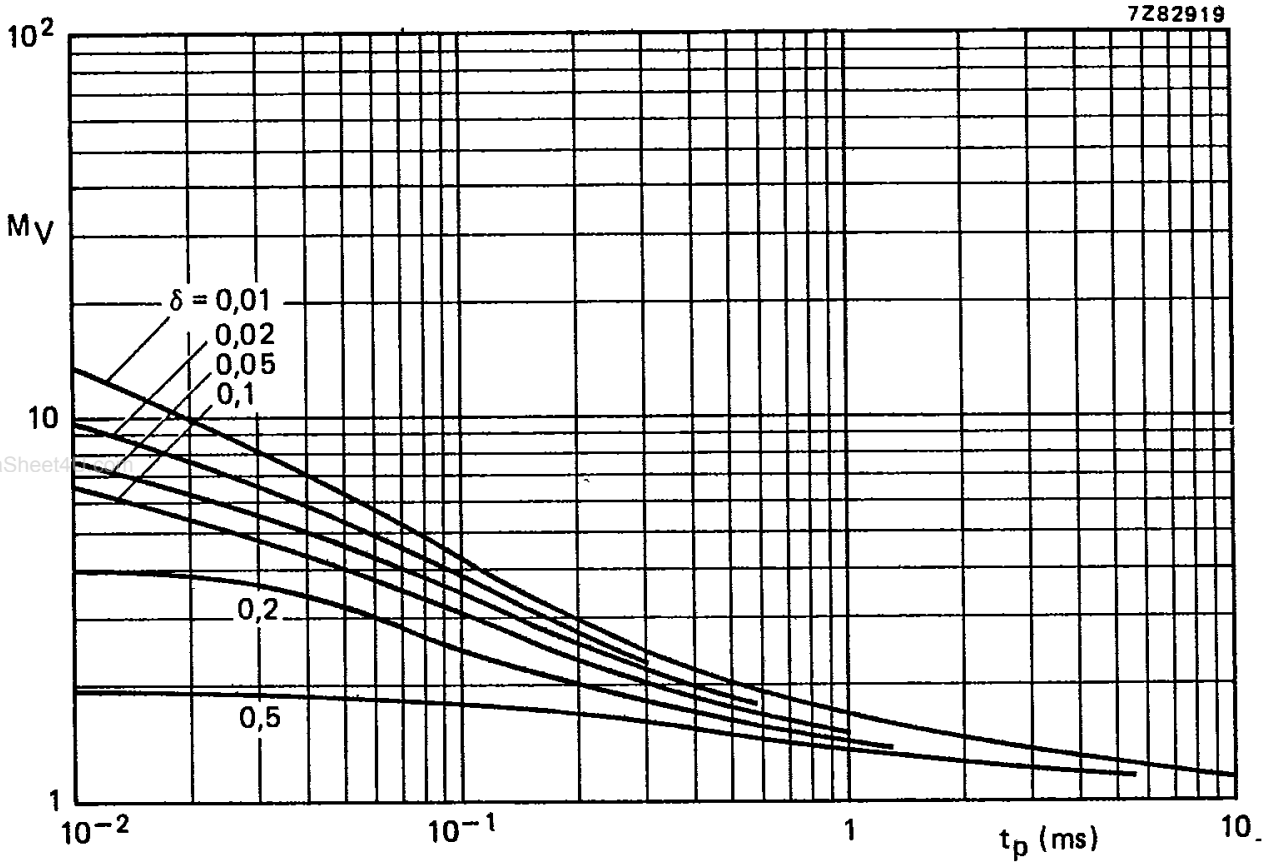


Fig. 9 S.B. voltage multiplying factor at the I_{Cmax} level.

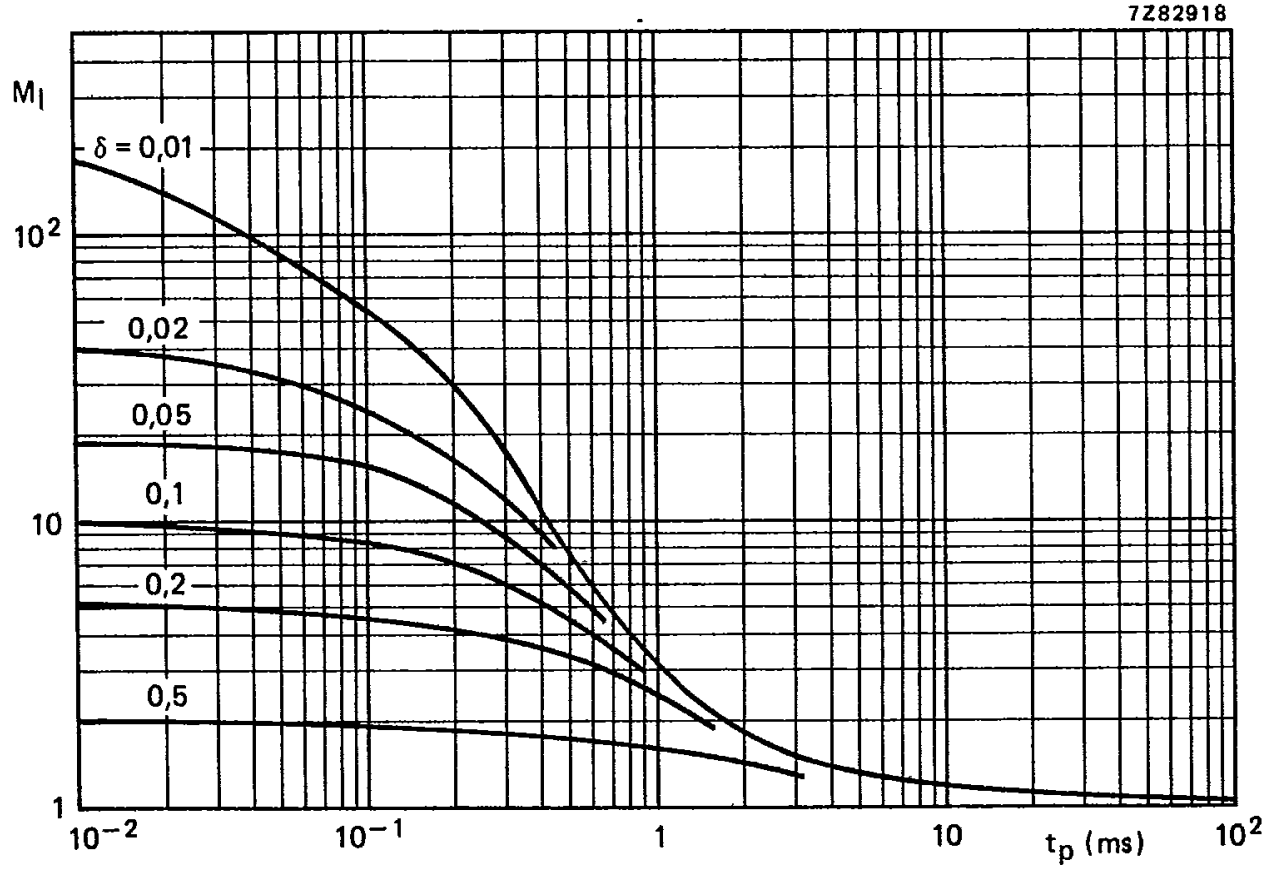


Fig. 10 S.B. current multiplying factor at the V_{CEOmax} level.

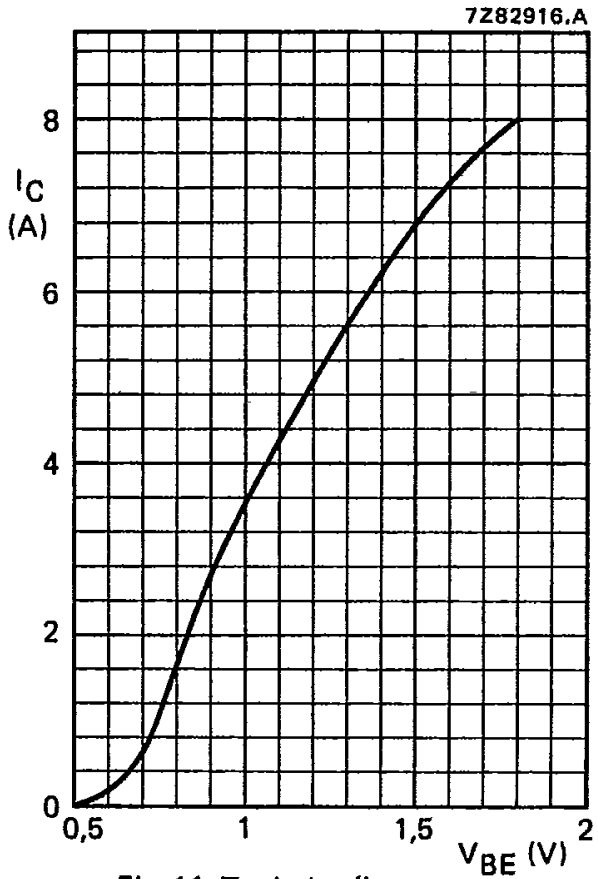


Fig. 11 Typical collector current.
V_{CE} = 4 V; T_j = 25 °C.