SILICON EPITAXIAL BASE POWER TRANSISTORS

N-P-N transistors in TO-3 envelope for audio output stages and general amplifier and switching applications. P-N-P complements are BDX92, BDX94 and BDX96.

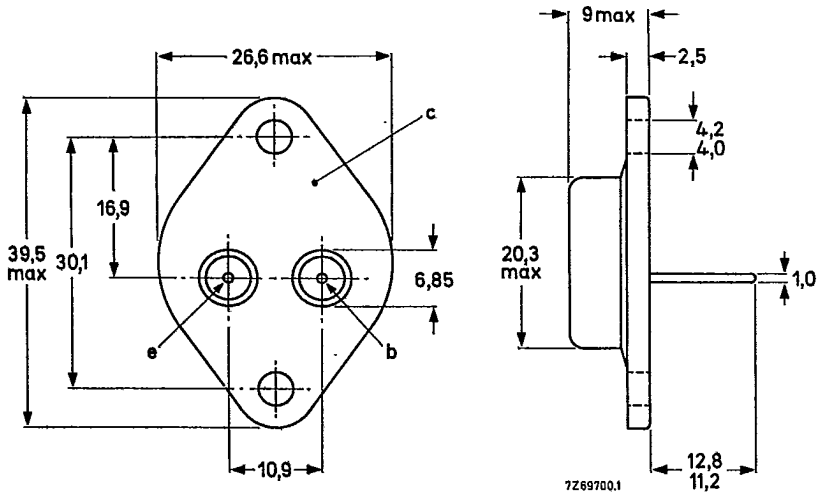
QUICK REFERENCE DATA

			BDX91	BDX93	BDX95	
Collector-base voltage (open emitter)	V_{CBO}	max.	60	80	100	V
Collector-emitter voltage (open base)	V_{CEO}	max.	60	80	100	V
Collector current (d.c.)	I_C	max.		10		A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		90		W
Junction temperature	T_j	max.		200		°C
D.C. current gain I_C = 3 A; V_{CE} = 2 V	h_{FE}	>		20		
Transition frequency I_C = 1 A; V_{CE} = 10 V	f_T	>		4		MHz

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-3.



See also chapters Mounting Instructions and Accessories.

RATINGS

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

			BDX91	BDX93	BDX95	
Collector-base voltage (open emitter)	V_{CBO}	max.	60	80	100	V
Collector-emitter voltage (open base)	V_{CEO}	max.	60	80	100	V
Emitter-base voltage (open collector)	V_{EBO}	max.	5	5	5	V
→ Collector current (d.c.)	I_C	max.		10		A
→ Collector current (peak value)	I_{CM}	max.		15		A
Total power dissipation up to $T_{mb} = 25\ ^oC$	P_{tot}	max.		90		W
Storage temperature	T_{stg}			−65 to +200		°C
Junction temperature	T_j	max.		200		°C

THERMAL RESISTANCE

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

CHARACTERISTICS

$T_j = 25\ ^oC$ unless otherwise specified

Collector cut-off current				
$I_E = 0$; $V_{CB} = V_{CBOmax}$	I_{CBO}	<	0,1	mA
$I_E = 0$; $V_{CB} = ½V_{CBOmax}$; $T_j = 200\ ^oC$	I_{CBO}	<	2	mA
→ $I_B = 0$; $V_{CE} = V_{CEOmax}$	I_{CEO}	<	0,2	mA
Emitter cut-off current				
→ $I_C = 0$; $V_{EB} = 5$ V	I_{EBO}	<	0,1	mA
D.C. current gain*				
$I_C = 3$ A; $V_{CE} = 2$ V	h_{FE}	>	20	
$I_C = 5$ A; $V_{CE} = 2$ V	h_{FE}	>	10	
Base-emitter voltage*				
$I_C = 3$ A; $V_{CE} = 2$ V	V_{BE}	<	1,4	V
Collector-emitter saturation voltage*				
$I_C = 3$ A; $I_B = 0,3$ A	V_{CEsat}	<	0,8	V
$I_C = 5$ A; $I_B = 1$ A	V_{CEsat}	<	1	V
Base-emitter saturation voltage*				
$I_C = 3$ A; $I_B = 0,3$ A	V_{BEsat}	<	1,5	V
$I_C = 5$ A; $I_B = 1$ A	V_{BEsat}	<	2	V

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

Small-signal current gain at f = 1 kHz						
I_C = 0,5 A; V_{CE} = 10 V	h_{fe}	>		40		
Transition frequency						
I_C = 1 A; V_{CE} = 10 V	f_T	>		4		MHz
			BDX91	BDX93	BDX95	
Collector-emitter breakdown voltage*						
I_C = 100 mA	$V_{(BR)CEO}$	>	60	80	100	V
Switching times						
(between 10% and 90% levels)						
I_{Con} = 3 A; I_{Bon} = $-I_{Boff}$ = 0,3 A						
Turn-on time	t_{on}	typ.		0,2		μs
		<		1		μs
Turn-off time	t_{off}	typ.		1,2		μs
		<		2		μs

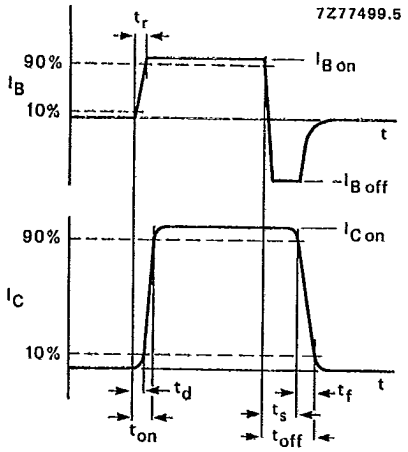
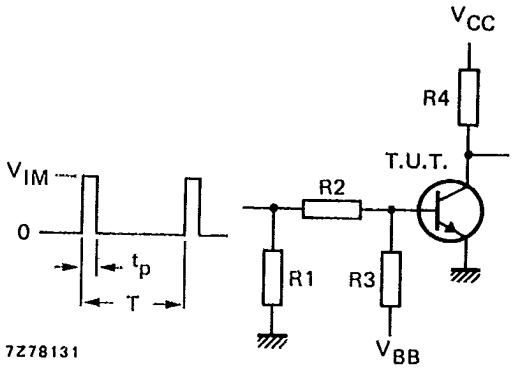


Fig. 2 Switching times waveforms.



V_{IM} = 55 V
V_{CC} = 30 V
$-V_{BB}$ = 5 V
R1 = 150 Ω
R2 = 82 Ω
R3 = 20 Ω
R4 = 10 Ω
$t_r = t_f \leqslant$ 15 ns
t_p = 10 μs
T = 500 μs

Fig. 3 Switching times test circuit.

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

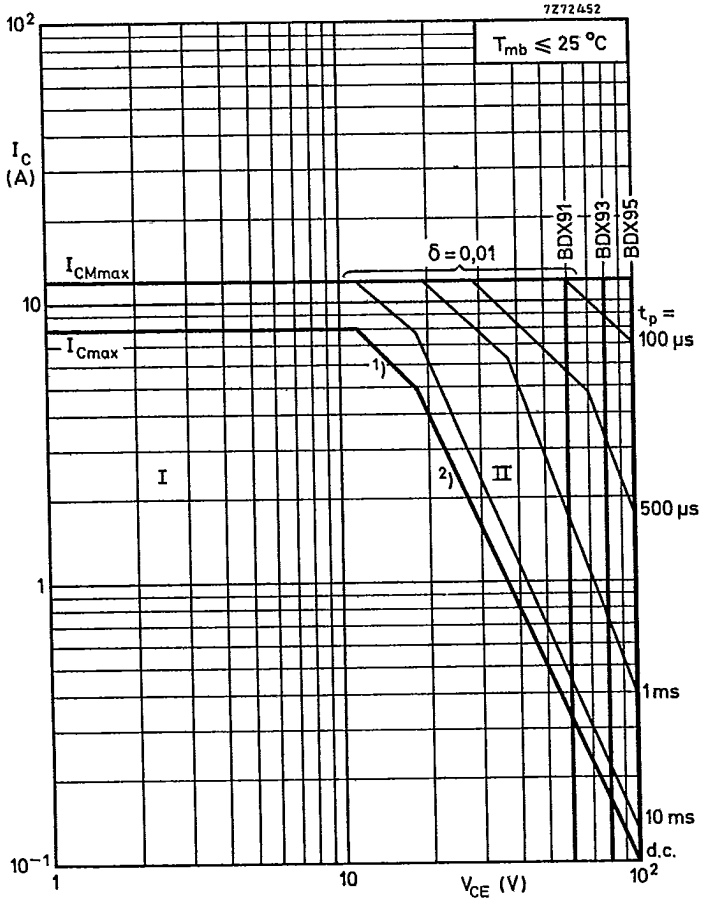


Fig. 4 Safe Operating AREa at $T_{mb} \leq 25$ °C.

I Region of permissible d.c. operation.
II Permissible extension for repetitive pulse operation.

(1) $P_{tot\,max}$ and $P_{tot\,peak\,max}$ lines.
(2) Second-breakdown limits.

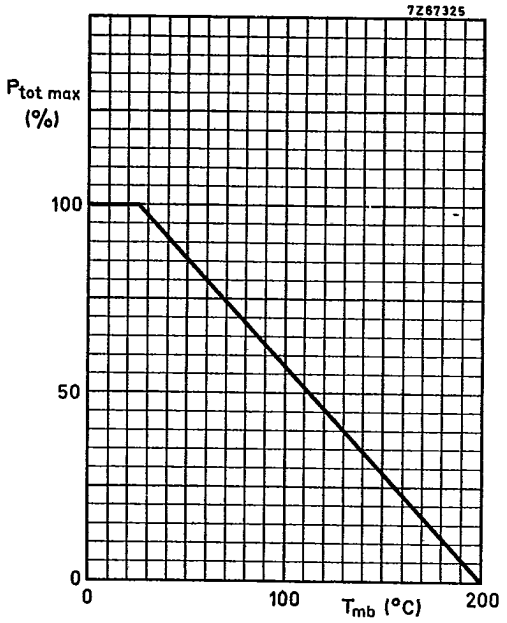


Fig. 5 Power derating curve

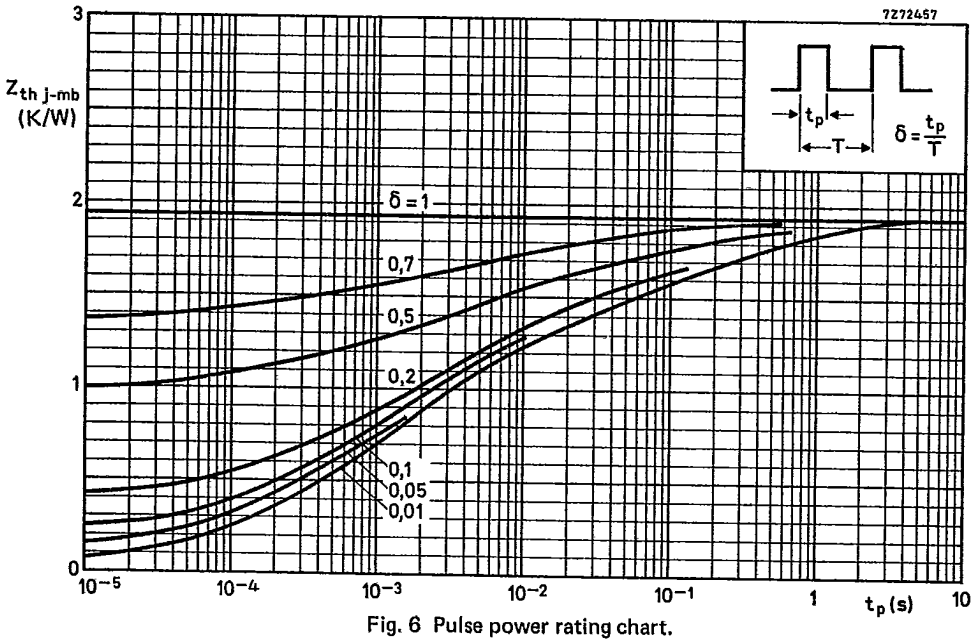


Fig. 6 Pulse power rating chart.

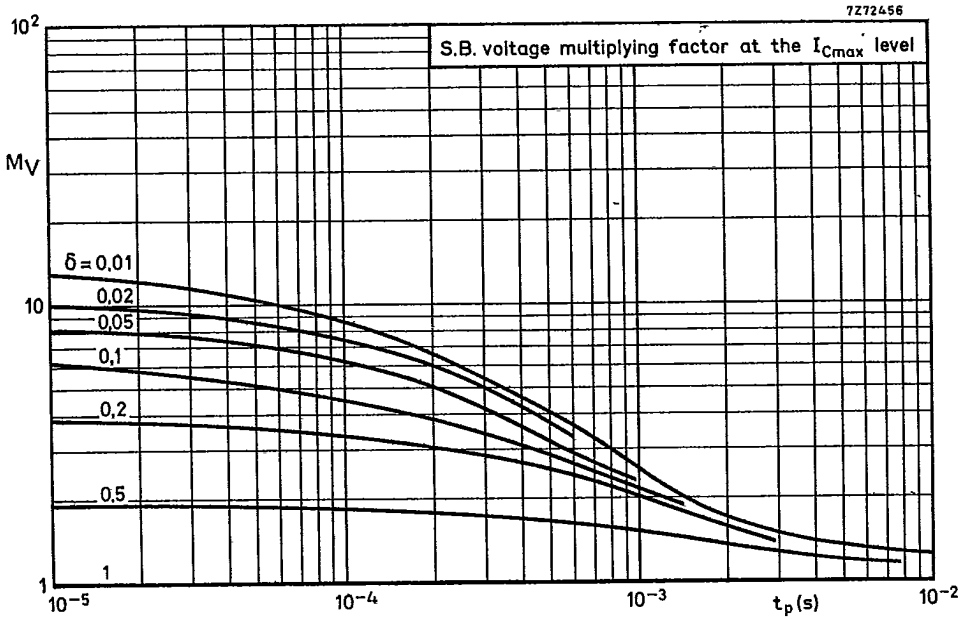


Fig. 7 S.B. voltage multiplying factor at the I_{Cmax} level.

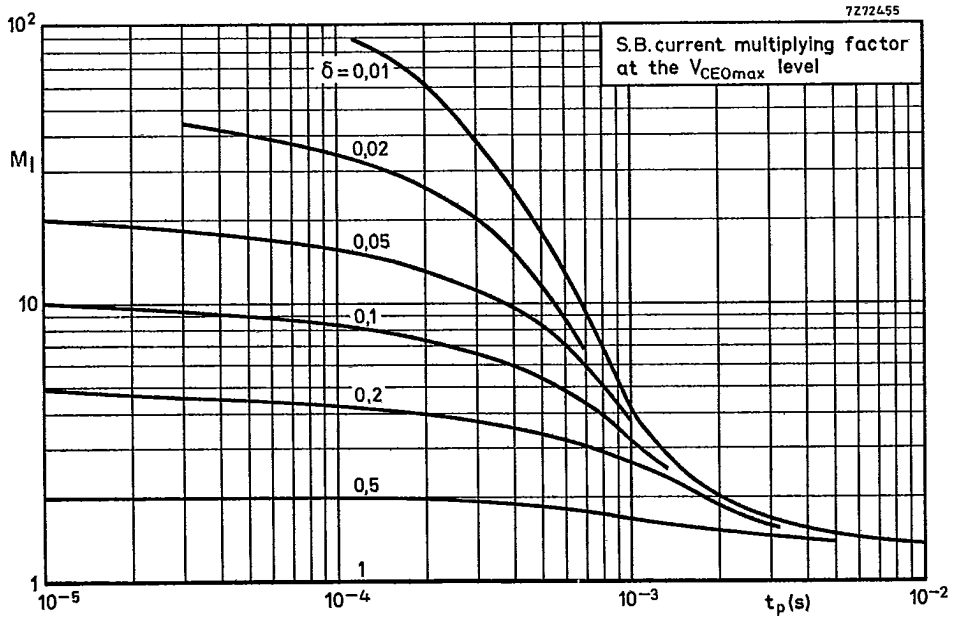


Fig. 8 S.B. current multiplying factor at the V_{CEOmax} level.

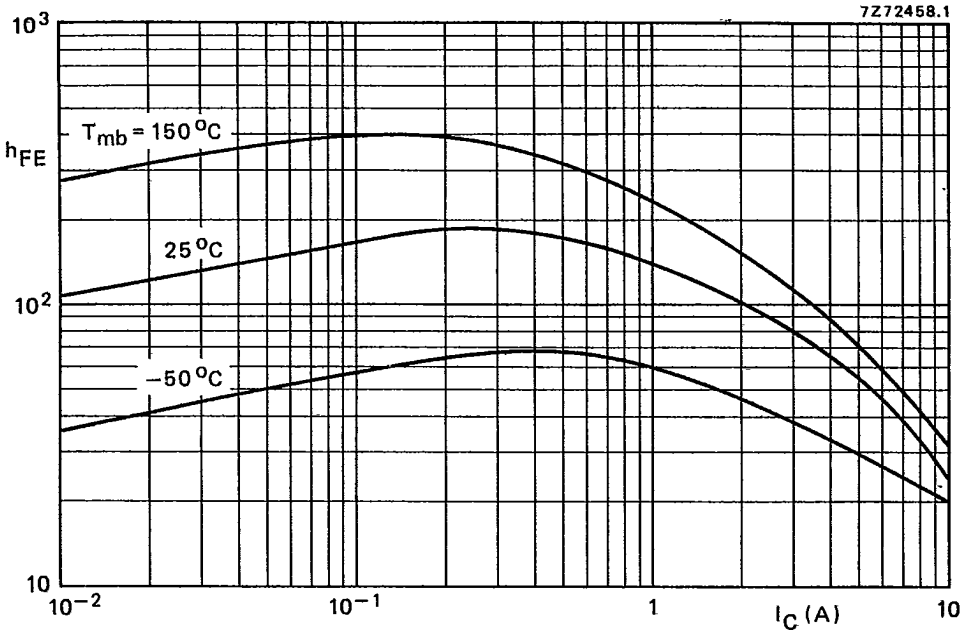


Fig. 9 D.C. current gain at V_{CE} = 2 V; T_j = 25 °C.

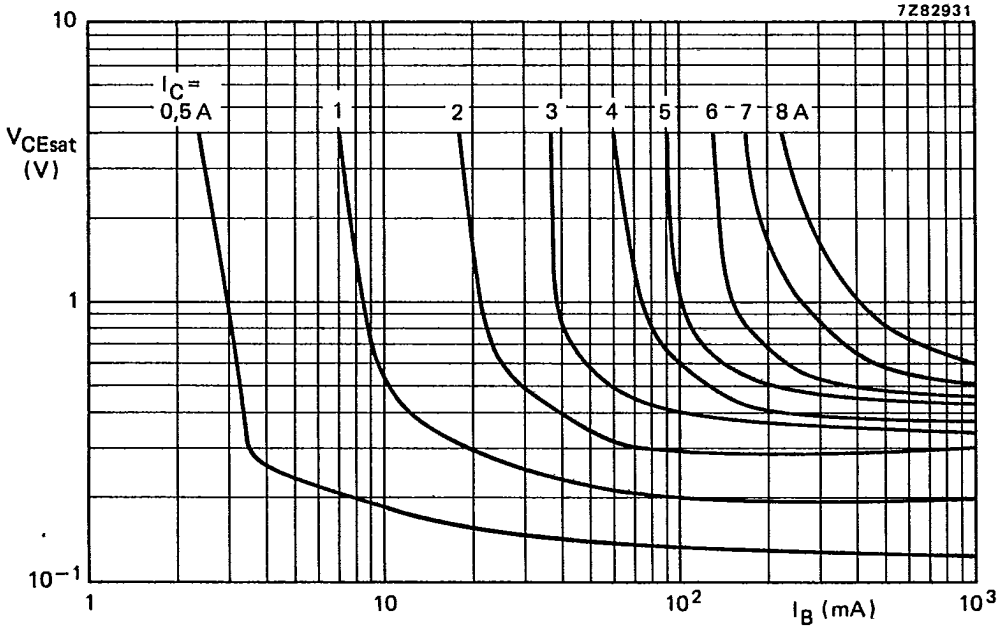


Fig. 10 Typical values collector-emitter saturation voltage.