SILICON EPITAXIAL BASE POWER TRANSISTORS

P-N-P transistors in a plastic envelope intended for use in audio output stages and general amplifier and switching applications.
N-P-N complements are BDT91, BDT93 and BDT95.

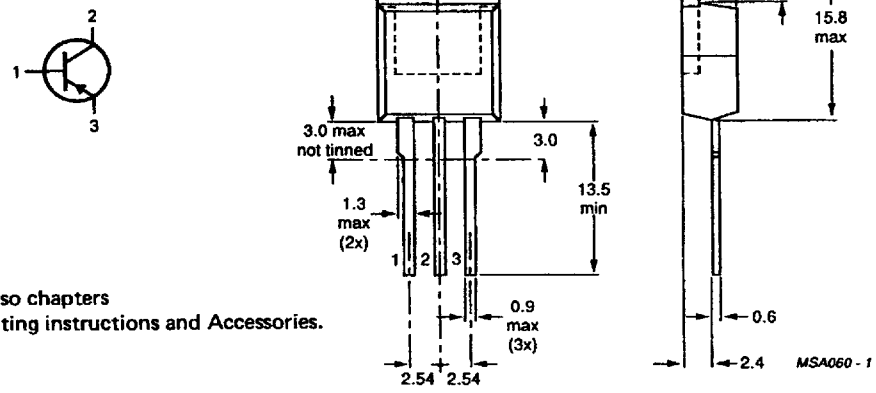
QUICK REFERENCE DATA

			BDT92	BDT94	BDT96	
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
Collector current (peak value)	$-I_{CM}$	max.		20		A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		90		W
Junction temperature	T_j	max.		150		°C
D.C. current gain						
$-I_C$ = 4 A; $-V_{CE}$ = 4 V	h_{FE}			20 to 200		
$-I_C$ = 10 A; $-V_{CE}$ = 4 V	h_{FE}	>		5		
Transition frequency						
$-I_C$ = 0,5 A; $-V_{CE}$ = 10 V	f_T	>		4		MHz

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-220.



See also chapters
Mounting instructions and Accessories.

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RATINGS

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

			BDT92	BDT94	BDT96	
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.		7		V
Collector current (d.c.)	$-I_C$	max.		10		A
Collector current (peak value)	$-I_{CM}$	max.		20		A
Base current (d.c.)	$-I_B$	max.		4		A
Total power dissipation up to $T_{mb} = 25\ ^oC$	P_{tot}	max.		90		W
Storage temperature	T_{stg}			−65 to +150		°C
Junction temperature	T_j	max.		150		°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	1,4	K/W
From junction to ambient (in free air)	$R_{th\ j\text{-}a}$	=	70	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
$I_E = 0; -V_{CB} = -½V_{CBOmax}; T_j = 150\ ^oC$	$-I_{CBO}$	<	1	mA
$I_B = 0; -V_{CE} = -V_{CEOmax}$	$-I_{CEO}$	<	0,2	mA
Emitter cut-off current				
$I_C = 0; -V_{EB} = 7\ V$	$-I_{EBO}$	<	0,1	mA
D.C. current gain (note 1)				
$-I_C = 4\ A; -V_{CE} = 4\ V$	h_{FE}		20 to 200	
$-I_C = 10\ A; -V_{CE} = 4\ V$	h_{FE}	>	5	
Base-emitter voltage (notes 1 and 2)				
$-I_C = 4\ A; -V_{CE} = 4\ V$	$-V_{BE}$	<	1,6	V
Collector-emitter saturation voltage (note 1)				
$-I_C = 4\ A; -I_B = 0,4\ A$	$-V_{CEsat}$	<	1	V
$-I_C = 10\ A; -I_B = 3,3\ A$	$-V_{CEsat}$	<	3	V
Transition frequency at f = 1 MHz				
$-I_C = 0,5\ A; -V_{CE} = 10\ V$	f_T	>	4	MHz
Cut-off frequency				
$-I_C = 0,5\ A; -V_{CE} = 10\ V$	f_{hfe}	>	20	kHz
D.C. current gain ratio of matched pairs				
BDT91/92; $-I_C = 3\ A; -V_{CE} = 3\ V$	h_{FE1}/h_{FE2}	<	2,5	

Notes

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

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Second-breakdown collector current $-V_{CE}$ = 60 V; t_p = 0,1 s	$-I_{(SB)}$	>	1,5 A
Switching times (between 10% and 90% levels) $-I_{Con}$ = 4 A; $-I_{Bon}$ = + I_{Boff} = 0,4 A			
Turn-on time	t_{on}	typ. <	0,5 μs 1,5 μs
Turn-off time	t_{off}	typ. <	1 μs 3 μs

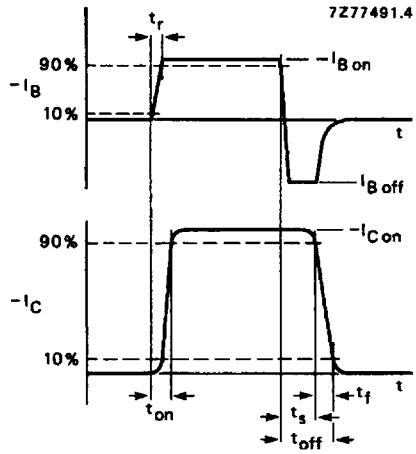
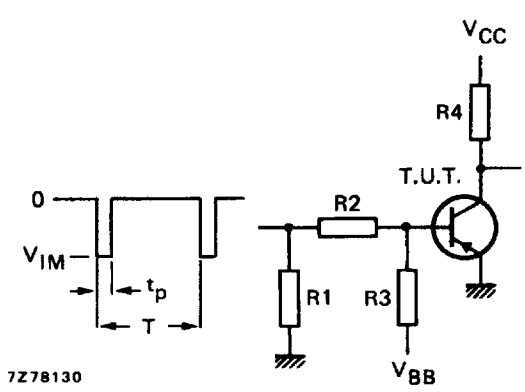


Fig. 2 Switching times waveforms.



$-V_{IM}$ = 45 V
$-V_{CC}$ = 20 V
V_{BB} = 3,5 V
R1 = 210 Ω
R2 = 56 Ω
R3 = 10 Ω
R4 = 5 Ω
$t_r = t_f$ = 15 ns
t_p = 10 μs
T = 500 μs

Fig. 3 Switching times test circuit.

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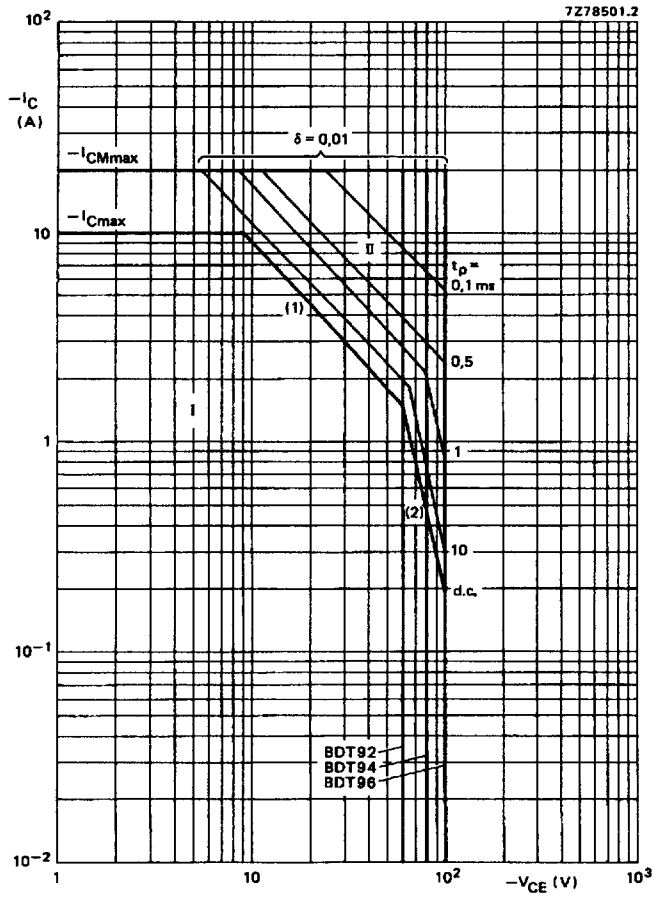

Fig. 4 Safe Operating Area, T_{mb} = 25 °C.

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

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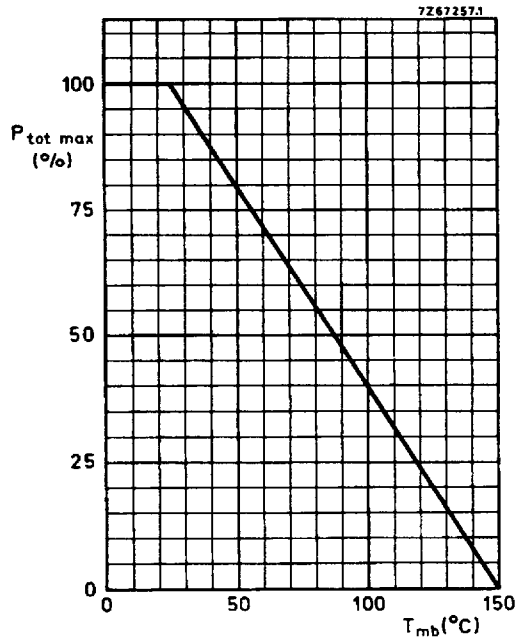

Fig. 5 Power derating curve.

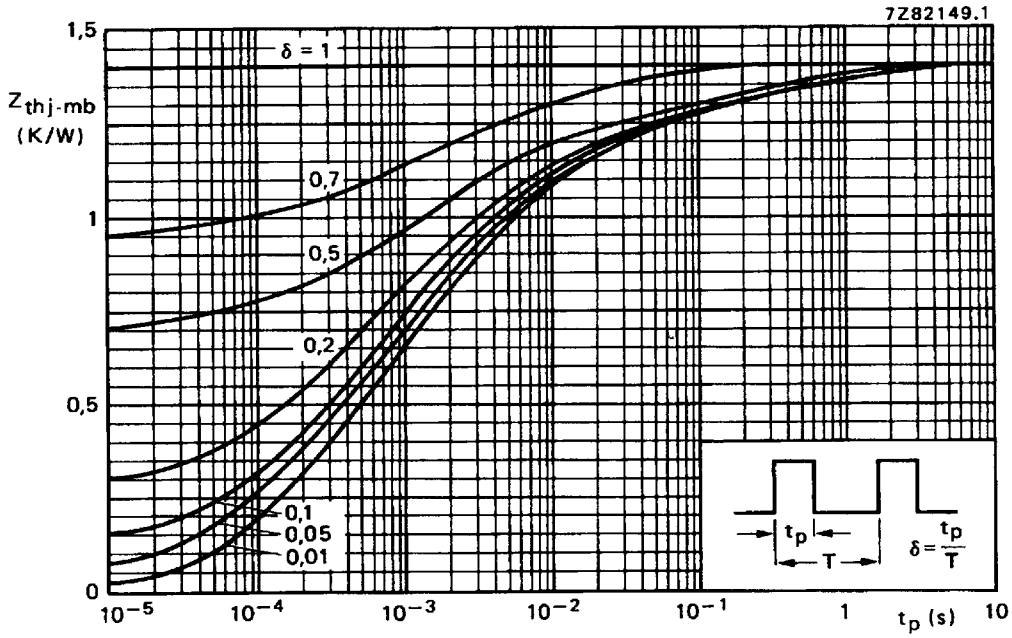

Fig. 6 Pulse power rating chart.

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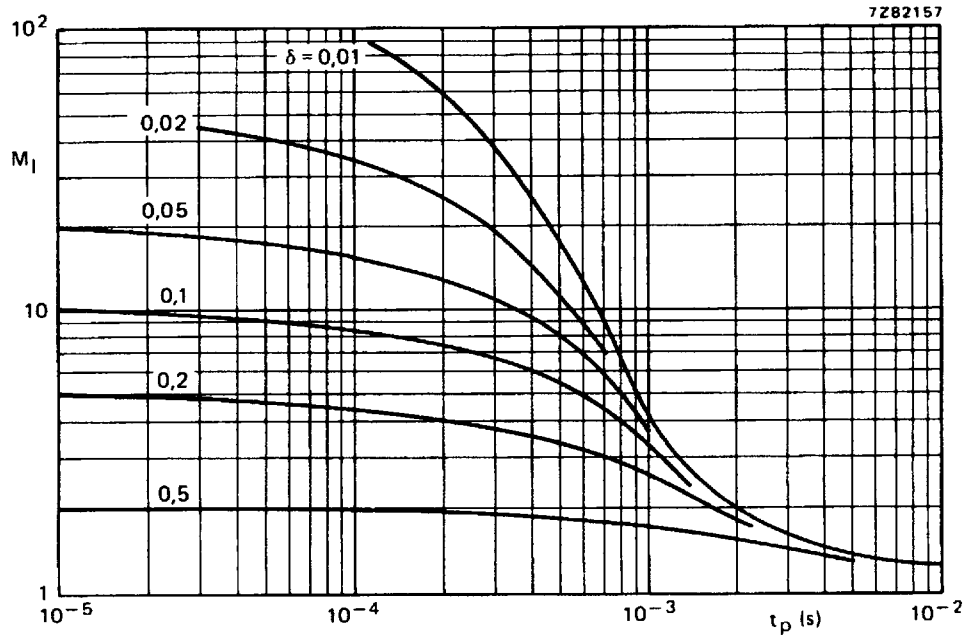

Fig. 7 S.B. current multiplying factor at the V_{CEOmax} level.

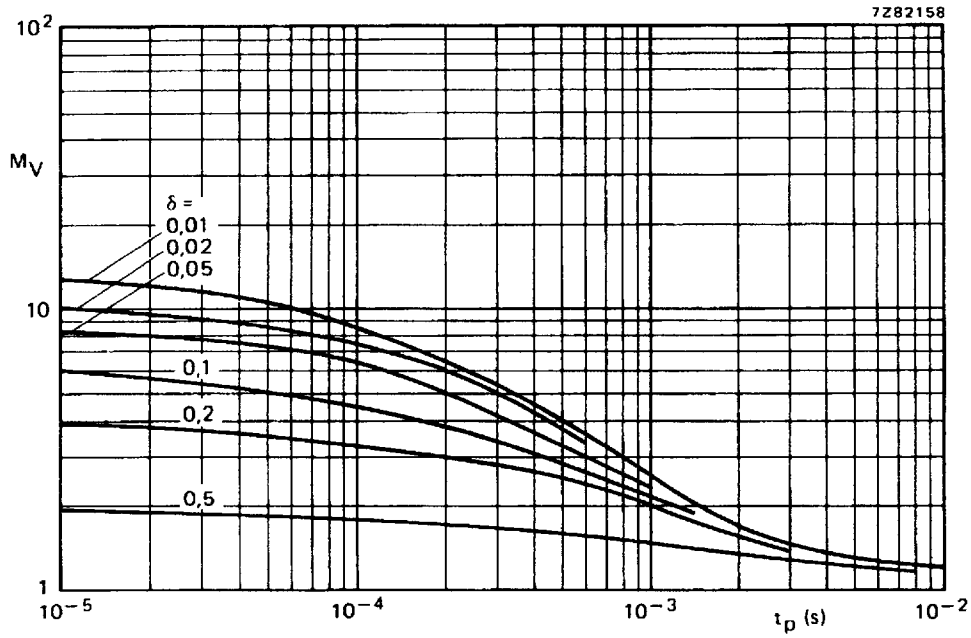

Fig. 8 S.B. voltage multiplying factor at the I_{Cmax} level.

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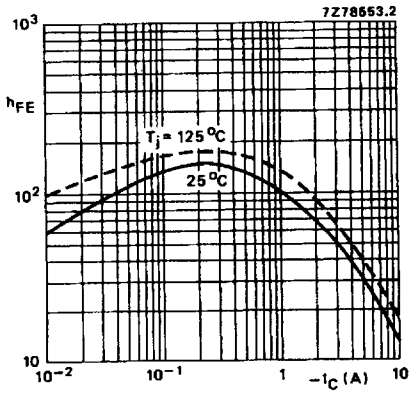

Fig. 9 Typical d.c. current gain at $-V_{CE} = 4$ V.

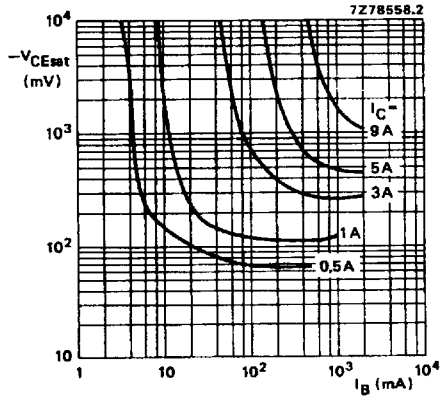

Fig. 10 Typical collector-emitter saturation voltage. $T_{mb} = 25$ °C.

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