

290 - 660

BDT91
BDT93
BDT95

SILICON EPITAXIAL BASE POWER TRANSISTORS

N-P-N transistors in a plastic envelope intended for use in audio output stages and general amplifier and switching applications.

P-N-P complements are BDT92, BDT94 and BDT96.

QUICK REFERENCE DATA

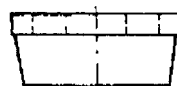
			BDT91	BDT93	BDT95
Collector-base voltage (open emitter)	V_{CBO}	max.	60	80	100 V
Collector-emitter voltage (open base)	V_{CEO}	max.	60	80	100 V
Collector current (d.c.)	I_C	max.		10	A
Collector current (peak value)	I_{CM}	max.		20	A
Total power dissipation up to $T_{mb} = 25^\circ\text{C}$	P_{tot}	max.		90	W
Junction temperature	T_j	max.		150	$^\circ\text{C}$
D.C. current gain				20 to 200	
$I_C = 4\text{ A}; V_{CE} = 4\text{ V}$	h_{FE}				
$I_C = 10\text{ A}; V_{CE} = 4\text{ V}$	h_{FE}	>		5	
Transition frequency				4	MHz
$I_C = 0,5\text{ A}; V_{CE} = 10\text{ V}$	f_T	>			

MECHANICAL DATA

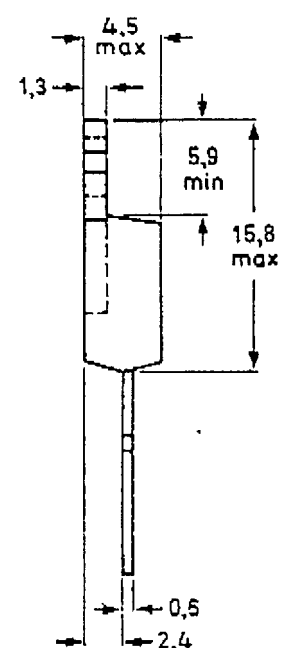
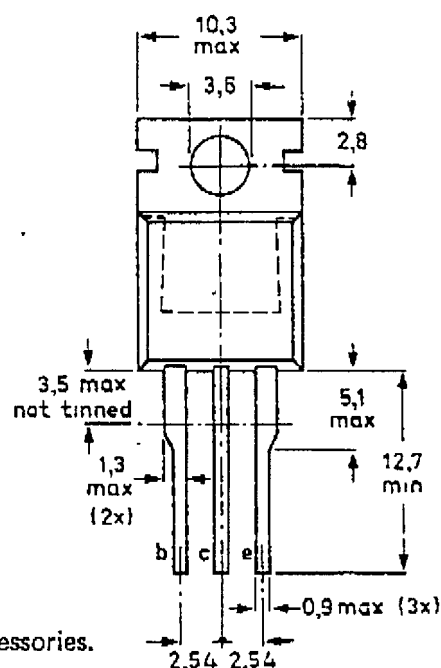
Dimensions in mm

Fig. 1 TO-220AB.

Collector connected
to mounting base.



top view



See also chapters
Mounting instructions and Accessories.



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RATINGS

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

			BDT91	BDT93	BDT95
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 $T_{mb} = 25\text{ }^{\circ}\text{C}$	P_{tot}	max.		90	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	$R_{th\ j-mb}$	=		1,4	K/W
From junction to ambient (in free air)	$R_{th\ j-a}$	=		70	K/W

CHARACTERISTICS

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

Collector cut-off current

$I_E = 0; V_{CB} = V_{CBOmax}$	I_{CBO}	<		0,1	mA
$I_E = 0; V_{CB} = \frac{1}{2}V_{CBOmax}; T_j = 150\text{ }^{\circ}\text{C}$	I_{CBO}	<		5	mA
$I_B = 0; V_{CE} = V_{CEOmax}$	I_{CEO}	<		1	mA

Emitter cut-off current

$I_C = 0; V_{EB} = 7\text{ V}$	I_{EBO}	<		1	mA
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D.C. current gain (note 1)

$I_C = 4\text{ A}; V_{CE} = 4\text{ V}$	h_{FE}			20 to 200	
$I_C = 10\text{ A}; V_{CE} = 4\text{ V}$	h_{FE}	>		5	

Base-emitter voltage (notes 1 and 2)

$I_C = 4\text{ A}; V_{CE} = 4\text{ V}$	V_{BE}	<		1,6	V
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Collector-emitter saturation voltage (note 1)

$I_C = 4\text{ A}; I_B = 0,4\text{ A}$	V_{CEsat}	<		1	V
$I_C = 10\text{ A}; I_B = 3,3\text{ A}$	V_{CEsat}	<		3	V

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

$I_C = 0,5\text{ A}; V_{CE} = 10\text{ V}$	f_T	>		4	MHz
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Cut-off frequency

$I_C = 0,5\text{ A}; V_{CE} = 10\text{ V}$	f_{hfe}	>		20	kHz
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Notes

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



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Second-breakdown collector current

$$V_{CE} = 60 \text{ V}; t_p = 0,1 \text{ s}$$

$$I_{(SB)} > 1,5 \text{ A}$$

Switching times

(between 10% and 90% levels)

$$I_{Con} = 4 \text{ A}; I_{Bon} = -I_{Boff} = 0,4 \text{ A}$$

Turn-on time

$$t_{on} \quad \text{typ.} \quad 0,5 \mu\text{s}$$

$$< 1 \mu\text{s}$$

Turn-off time

$$t_{off} \quad \text{typ.} \quad 2 \mu\text{s}$$

$$< 4 \mu\text{s}$$

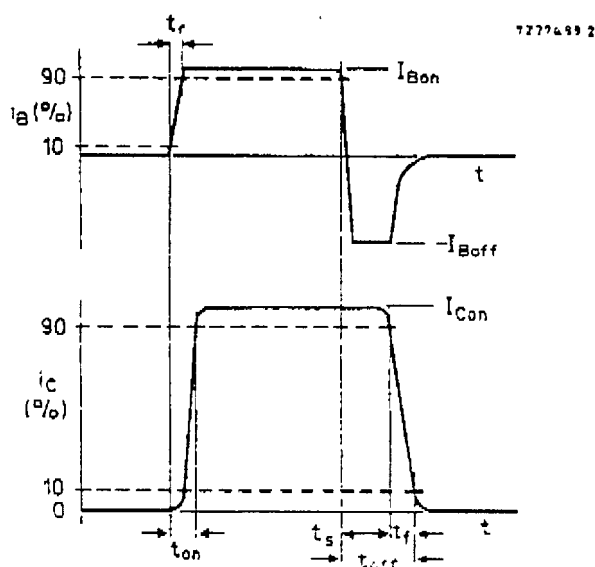


Fig. 2 Switching times waveforms.

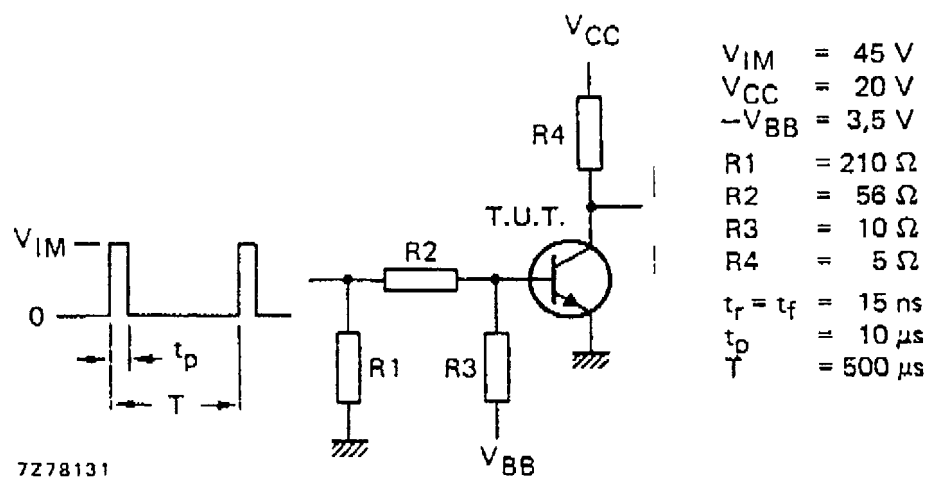


Fig. 3 Switching times test circuit.

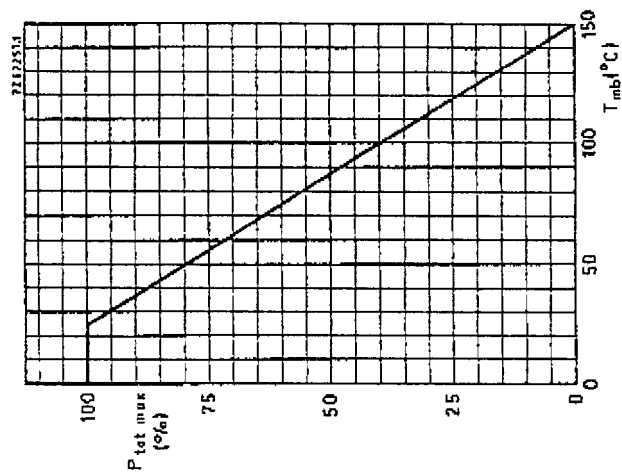


Fig. 5 Power derating curve.

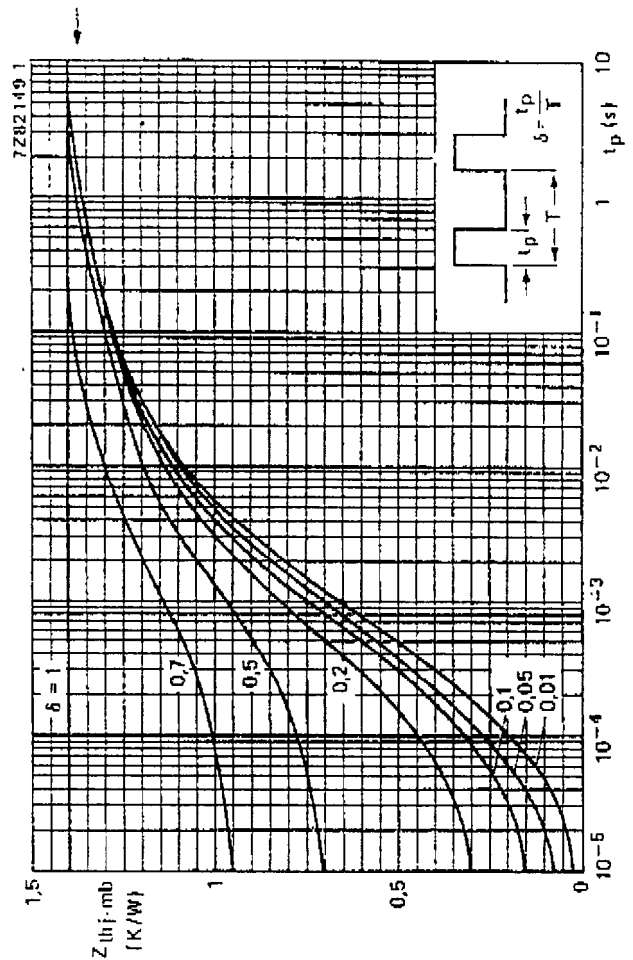
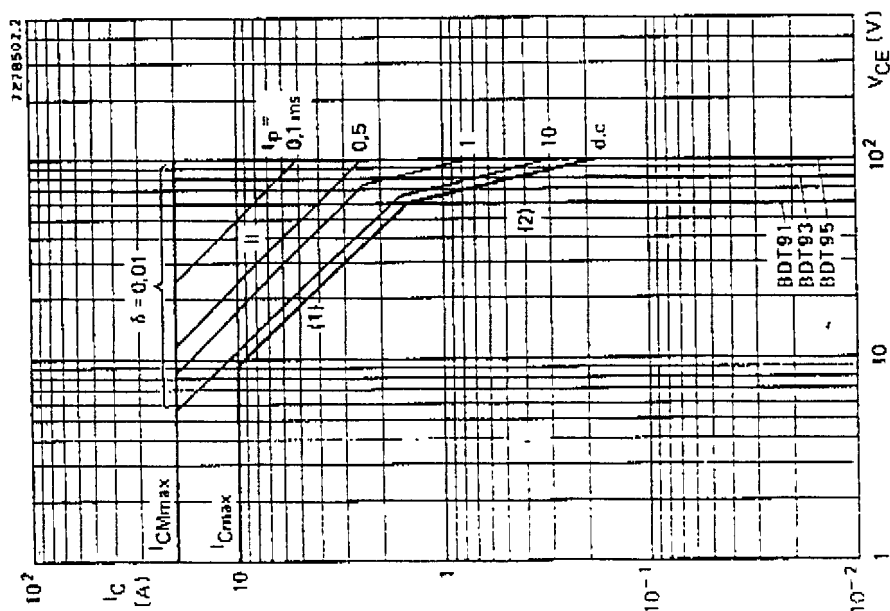


Fig. 6 Pulse power rating chart

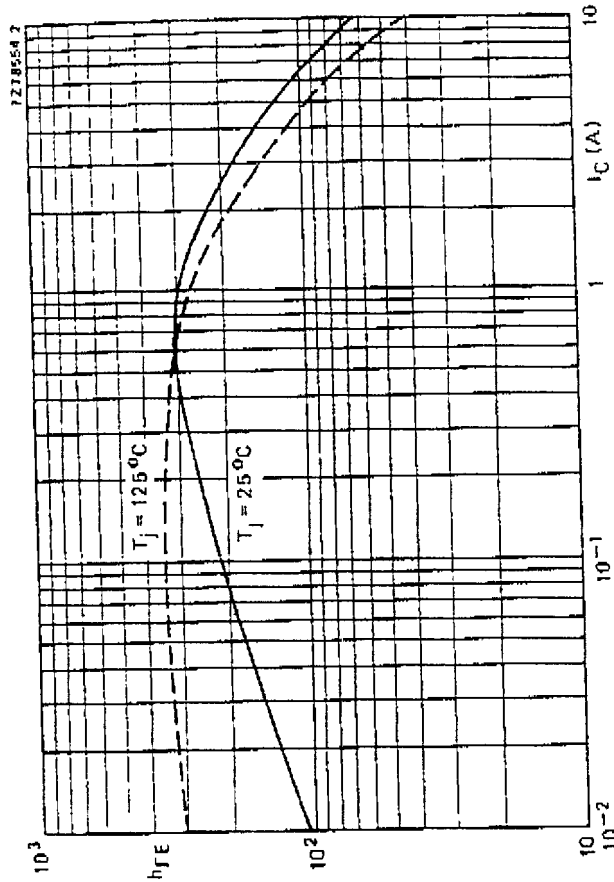
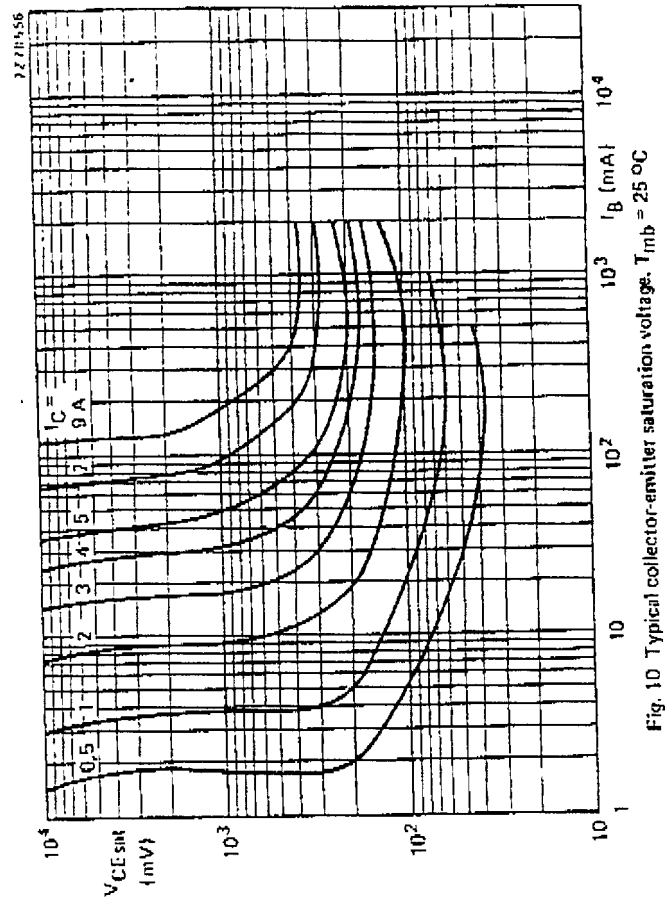
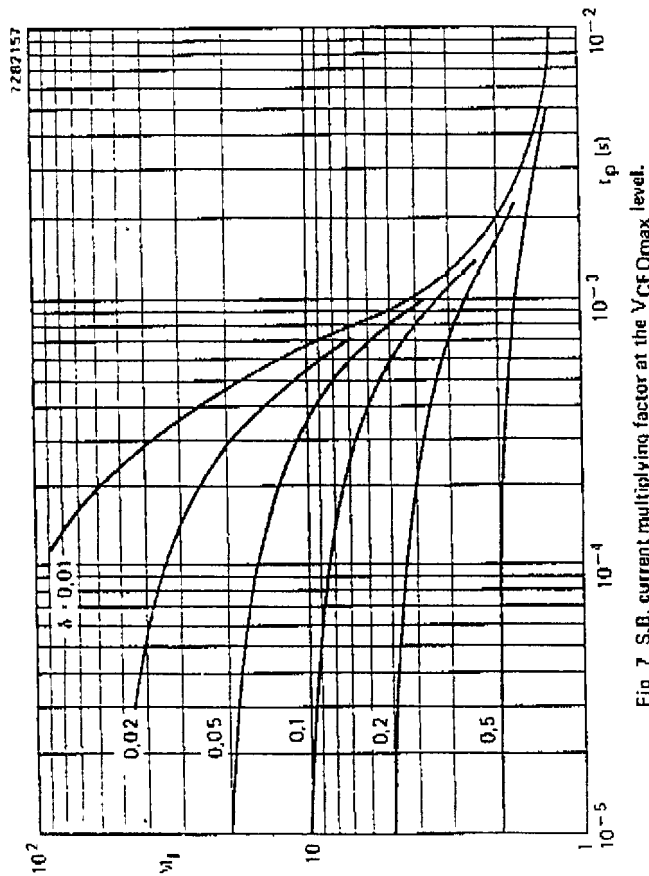
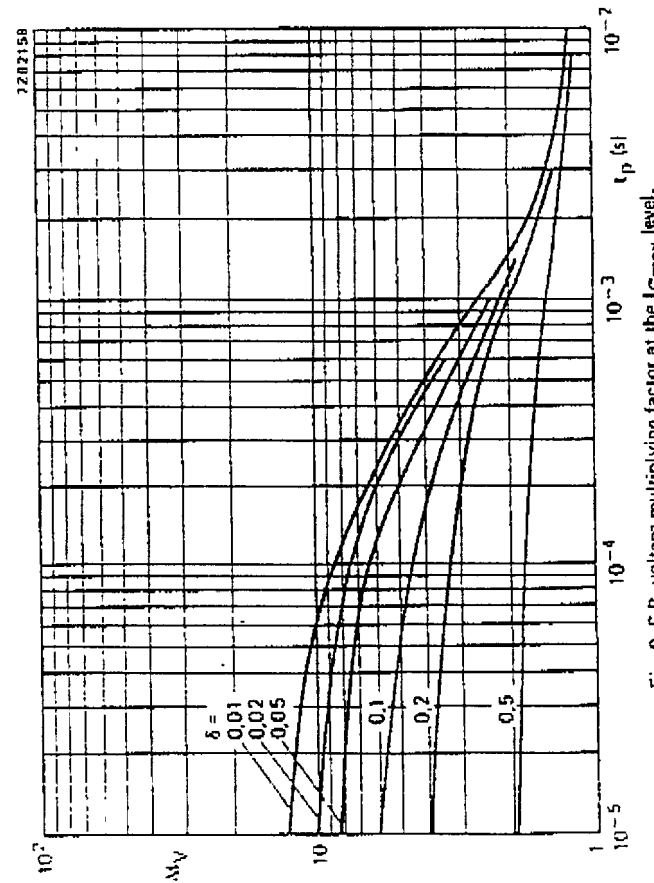
Fig. 4 Safe Operating Area; $T_{mb} = 25^\circ\text{C}$.

I Region of permissible d.c. operation.

II Permissible extension for repetitive pulse operation

(1) $P_{tot\ max}$ and $P_{peak\ max}$ lines.

(2) Second-breakdown limits (independent of temperature).

Fig. 9 Typical d.c. current gain at $V_{CE} = 4$ V.Fig. 10 Typical collector-emitter saturation voltage. $T_{mb} = 25$ °CFig. 7 S.B. current multiplying factor at the $V_{CE(omax)}$ level.Fig. 8 S.B. voltage multiplying factor at the I_{Cmax} level.