

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.

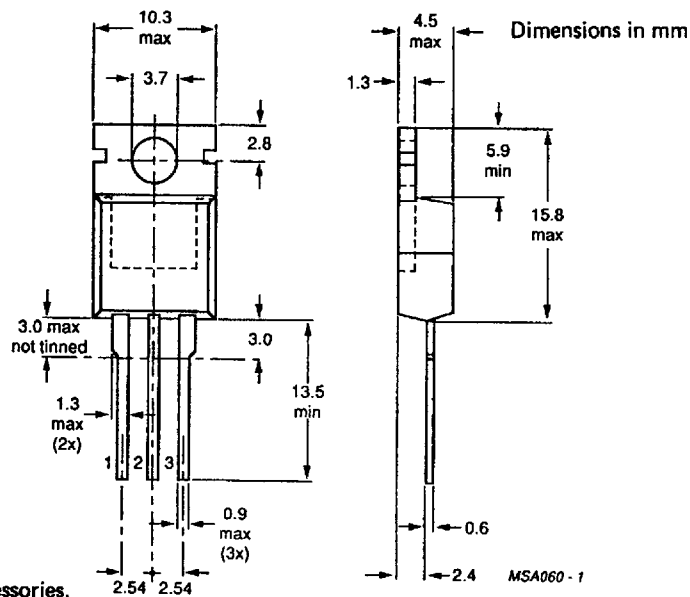
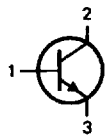
QUICK REFERENCE DATA

			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

Fig. 1 TO-220.

Collector connected to mounting base.



See also chapters
Mounting instructions and Accessories.

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

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.

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

$$t_{on} \begin{matrix} \text{typ.} & 0,5 \mu\text{s} \\ < & 1 \mu\text{s} \end{matrix}$$

Turn-off time

$$t_{off} \begin{matrix} \text{typ.} & 2 \mu\text{s} \\ < & 4 \mu\text{s} \end{matrix}$$

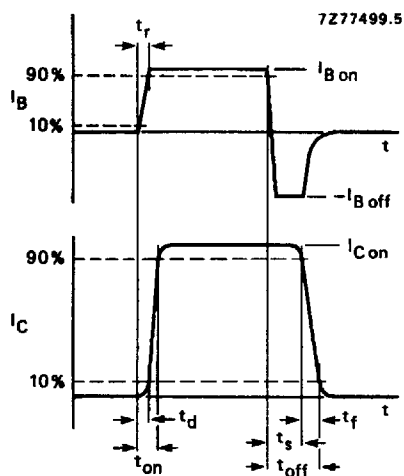


Fig. 2 Switching times waveforms.

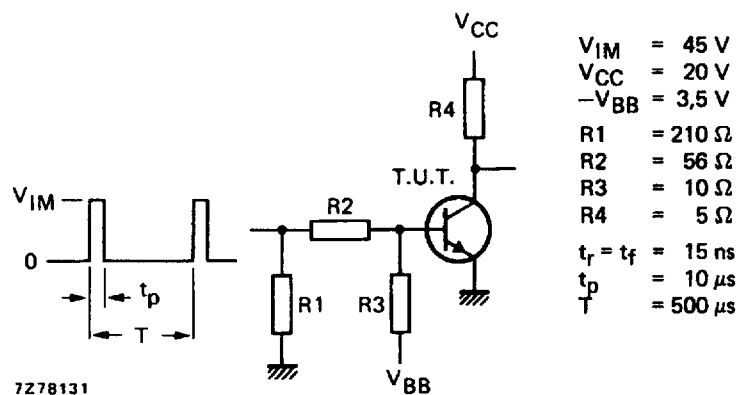


Fig. 3 Switching times test circuit.

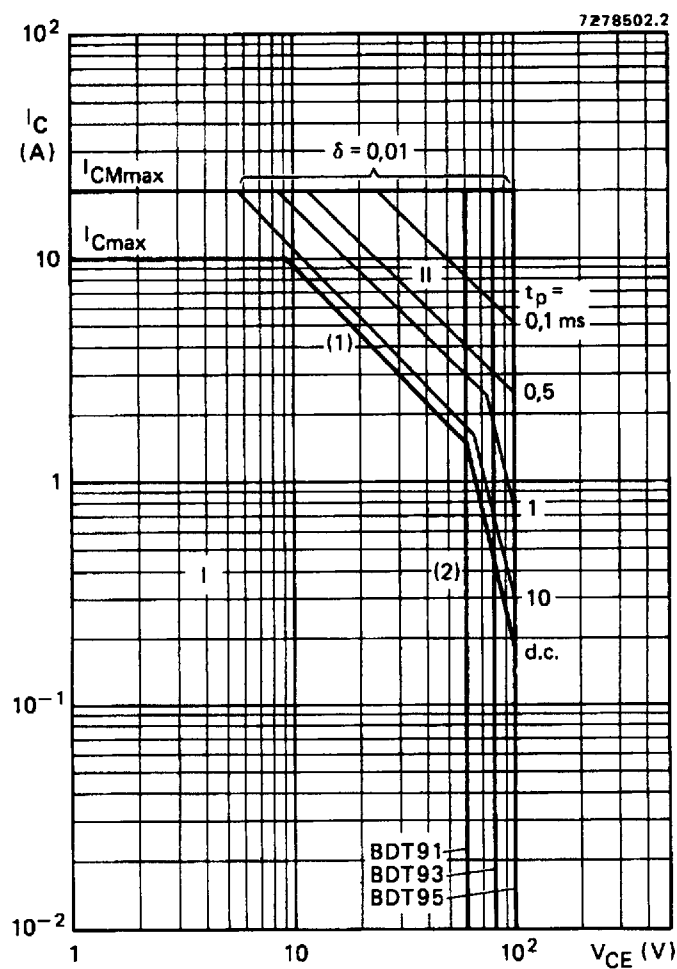


Fig. 4 Safe Operating Area, $T_{mb} = 25^\circ\text{C}$.

- 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.

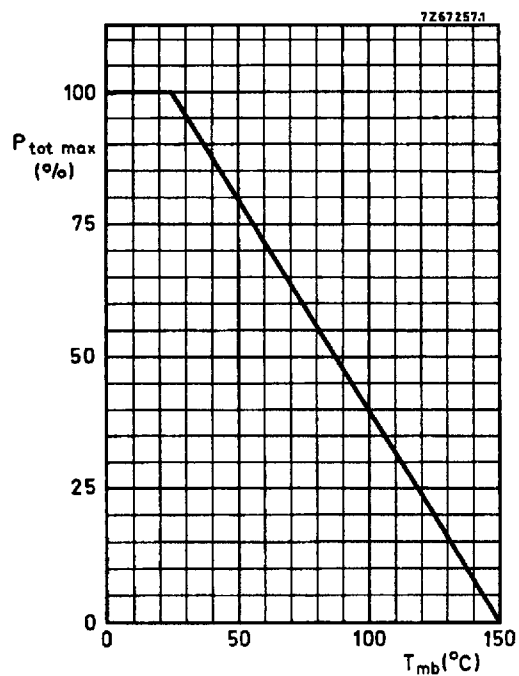


Fig. 5 Power derating curve.

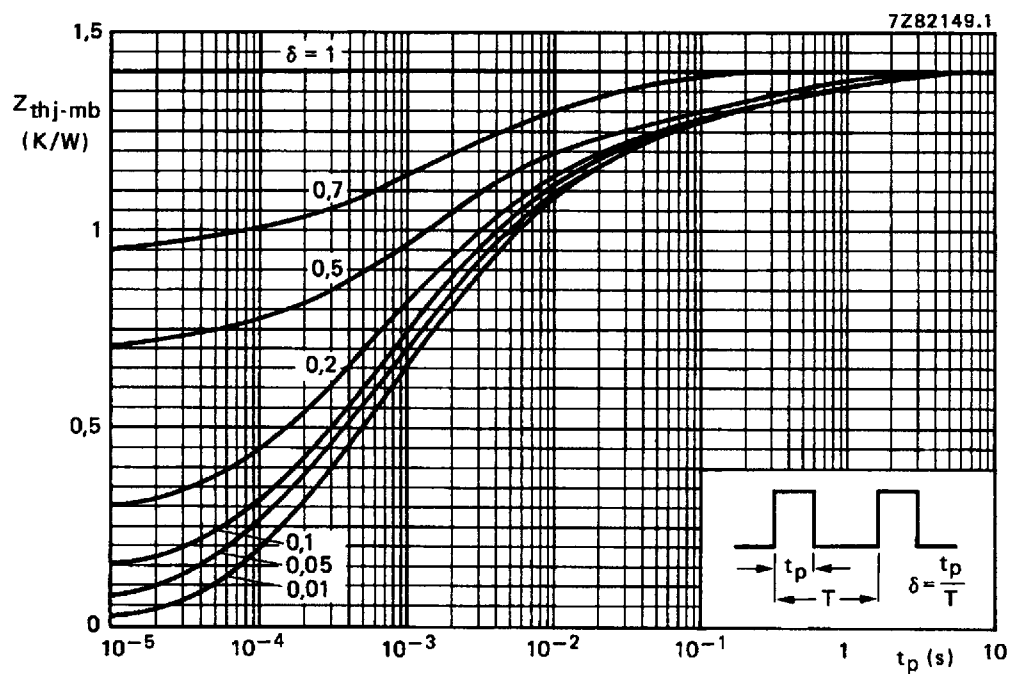


Fig. 6 Pulse power rating chart.

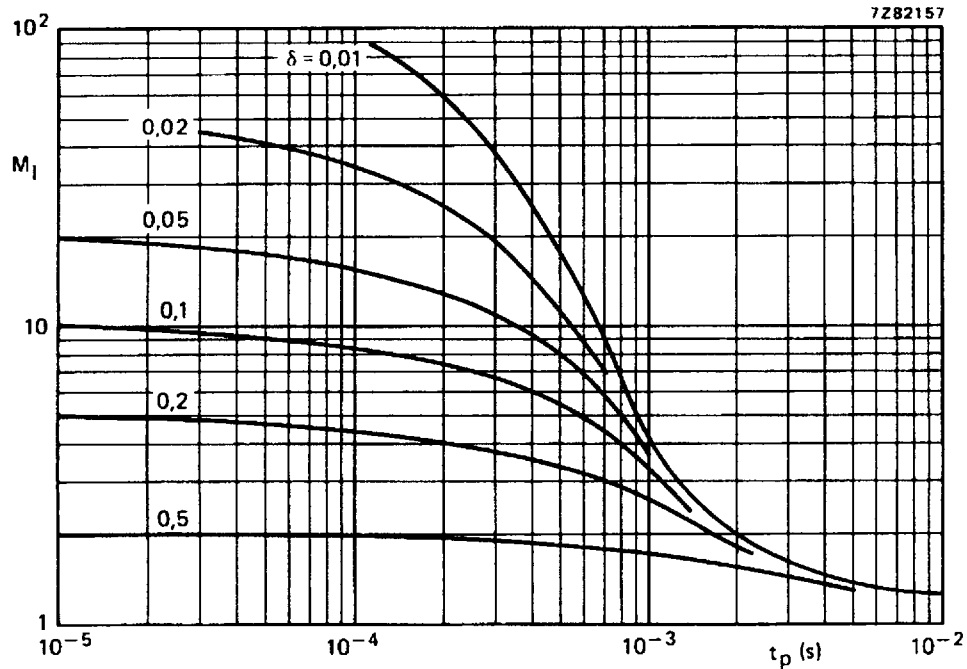


Fig. 7 S.B. current multiplying factor at the V_{CE0max} level.

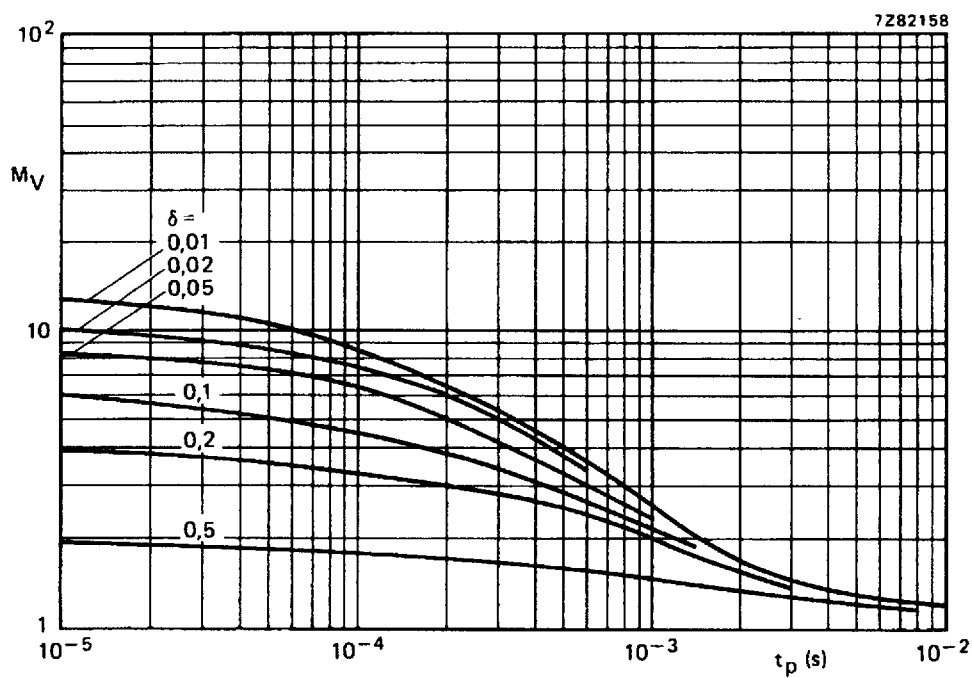


Fig. 8 S.B. voltage multiplying factor at the I_{Cmax} level.

