

BDT64; 64A
BDT64B; 64C

SILICON DARLINGTON POWER TRANSISTORS

P-N-P epitaxial base transistors in monolithic Darlington circuit for audio output stages and general purpose amplifier and switching applications. TO-220 plastic envelope. N-P-N complements are BDT65, BDT65A, BDT65B and BDT65C.

QUICK REFERENCE DATA

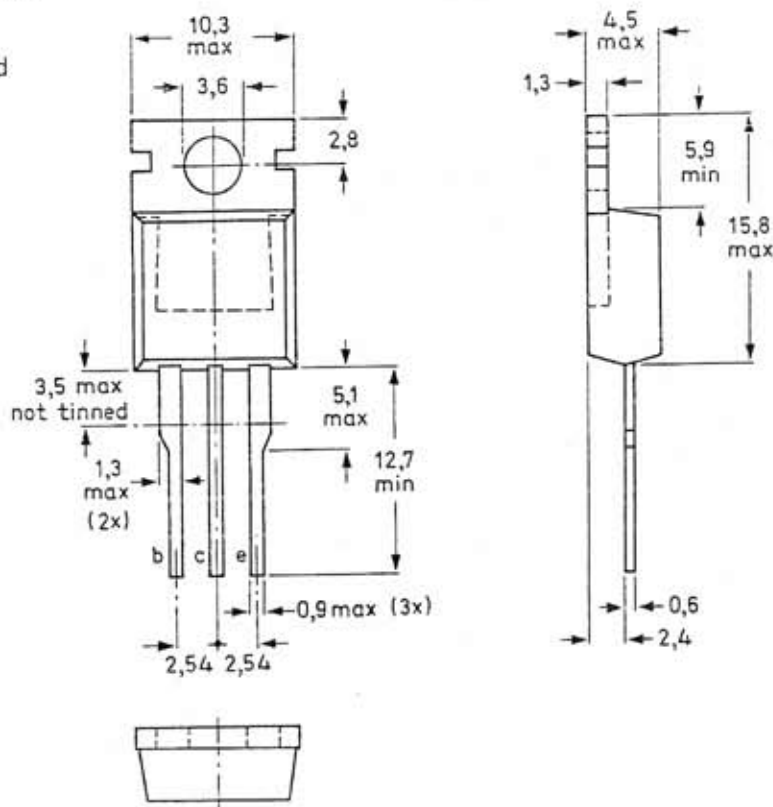
			BDT64	64A	64B	64C
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	100	120 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	100	120 V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	5	5 V
Collector current (peak value)	$-I_{CM}$	max.		20		A
Total power dissipation up to $T_{mb} = 25^{\circ}\text{C}$	P_{tot}	max.		125		W
Junction temperature	T_j	max.		150		$^{\circ}\text{C}$
D.C. current gain $-I_C = 5\text{ A}; -V_{CE} = 4\text{ V}$	h_{FE}	>		1000		

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-220AB.

Collector connected to mounting base.



BDT64; 64A
BDT64B; 64C

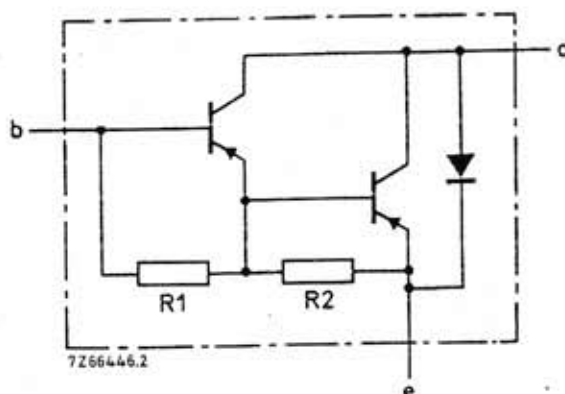


Fig. 2 Circuit diagram. R1 typ. 3 k Ω ; R2 typ. 45 Ω .

RATINGS

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

			BDT64	64A	64B	64C
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	100	120 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	100	120 V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	5	5 V
Collector current (d.c.)	$-I_C$	max.		12		A
Collector current (peak value)	$-I_{CM}$	max.		20		A
Base current (d.c.)	$-I_B$	max.		500		mA
Total power dissipation up to $T_{mb} = 25^\circ\text{C}$	P_{tot}	max.		125		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	K/W
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BDT64; 64A BDT64B; 64C

CHARACTERISTICS

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

Collector cut-off current

$-V_{CB} = -V_{CB0max}; I_E = 0$

$I_E = 0; -V_{CB} = -\frac{1}{2} V_{CB0max}; T_j = 150\text{ }^{\circ}\text{C}$

$I_B = 0; -V_{CE} = -\frac{1}{2} V_{CE0max}$

$-I_{CBO}$	<	0,4 mA
$-I_{CBO}$	<	2 mA
$-I_{CEO}$	<	1 mA

Emitter cut-off current

$I_C = 0; -V_{EB} = 5\text{ V}$

$-I_{EBO}$	<	5 mA
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D.C. current gain*

$-I_C = 1\text{ A}; -V_{CE} = 4\text{ V}$

$-I_C = 5\text{ A}; -V_{CE} = 4\text{ V}$

$-I_C = 12\text{ A}; -V_{CE} = 4\text{ V}$

h_{FE}	typ.	1500
h_{FE}	>	1000
h_{FE}	typ.	750

Base-emitter voltage

$-I_C = 5\text{ A}; -V_{CE} = 4\text{ V}$

$-V_{BE}$	<	2,5 V
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Collector-emitter saturation voltage*

$-I_C = 5\text{ A}; -I_B = 20\text{ mA}$

$-I_C = 10\text{ A}; -I_B = 100\text{ mA}$

$-V_{CEsat}$	<	2 V
$-V_{CEsat}$	<	3 V

Diode, forward voltage

$I_F = 5\text{ A}$

$I_F = 12\text{ A}$

V_F	<	2 V
V_F	typ.	2 V

Collector capacitance at $f = 1\text{ MHz}$

$-V_{CB} = 10\text{ V}; I_E = I_C = 0$

C_c	typ.	200 pF
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Second breakdown collector current

non-repetitive; without heatsink

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

$-I_{SB}$	>	2 A
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Switching times (see Figs 3 and 4)

$-I_{Con} = 5\text{ A}; -I_{Bon} = I_{Boff} = 20\text{ mA}$

$-V_{CC} = 30\text{ V}$

turn-on time

t_{on}	typ.	0,5 μs
	<	2 μs

turn-off time

t_{off}	typ.	2,5 μs
	<	5 μs

Small-signal current gain

$-I_C = 5\text{ A}; -V_{CE} = 3\text{ V}; f = 1\text{ MHz}$

h_{fe1}	typ.	40
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CHARACTERISTICS (continued)

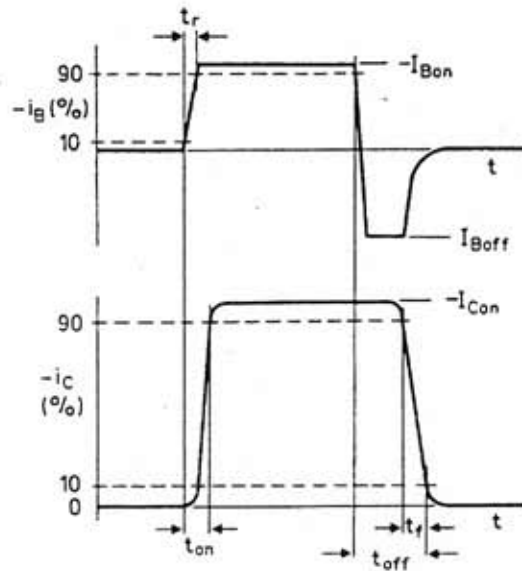
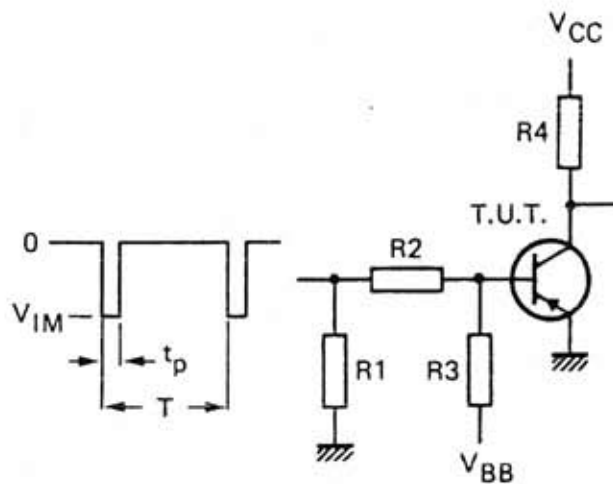


Fig. 3 Switching times waveforms.



$-V_{IM}$	=	15 V
$-V_{CC}$	=	30 V
V_{BB}	=	4 V
$R1$	=	56 Ω
$R2$	=	410 Ω
$R3$	=	560 Ω
$R4$	=	6 Ω
$t_r = t_f$	=	15 ns
t_p	=	10 μs
T	=	500 μs

Fig. 4 Switching times test circuit.

BDT64; 64A
BDT64B; 64C

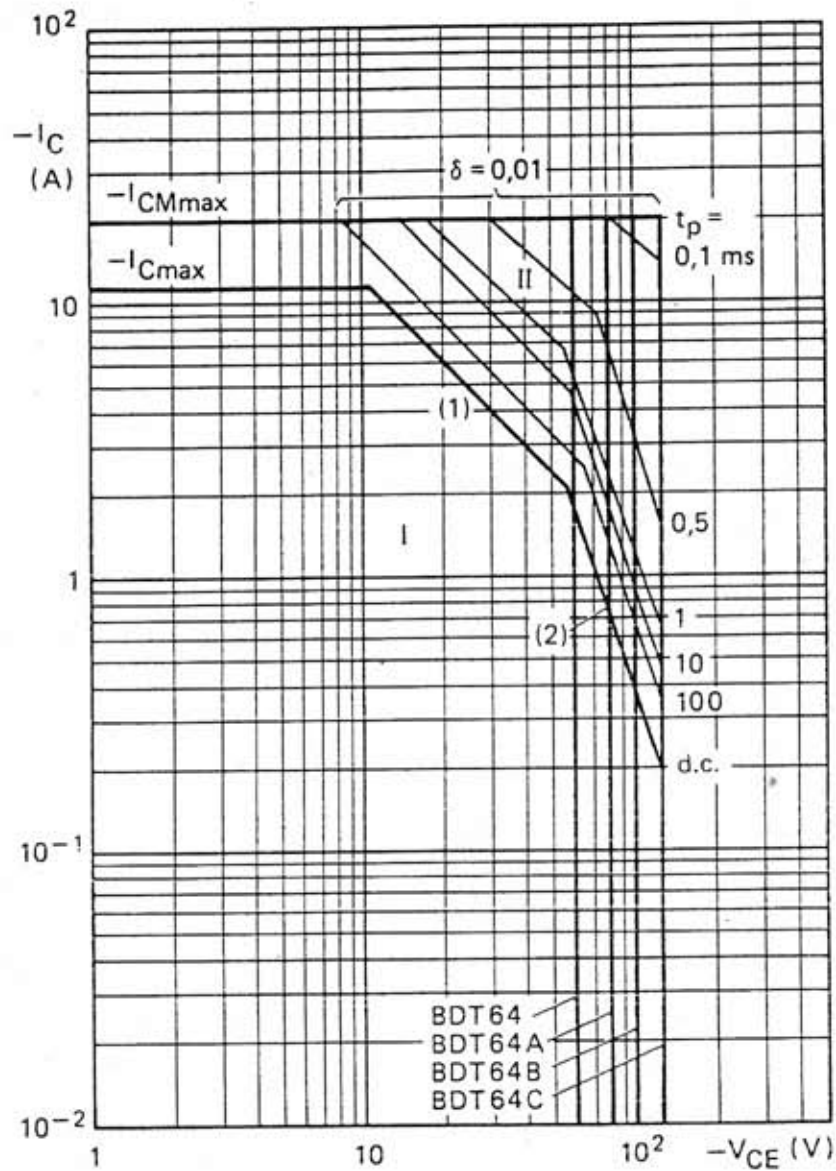


Fig. 5 Safe Operating Area; $T_{mb} = 25^{\circ}\text{C}$.

- 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).

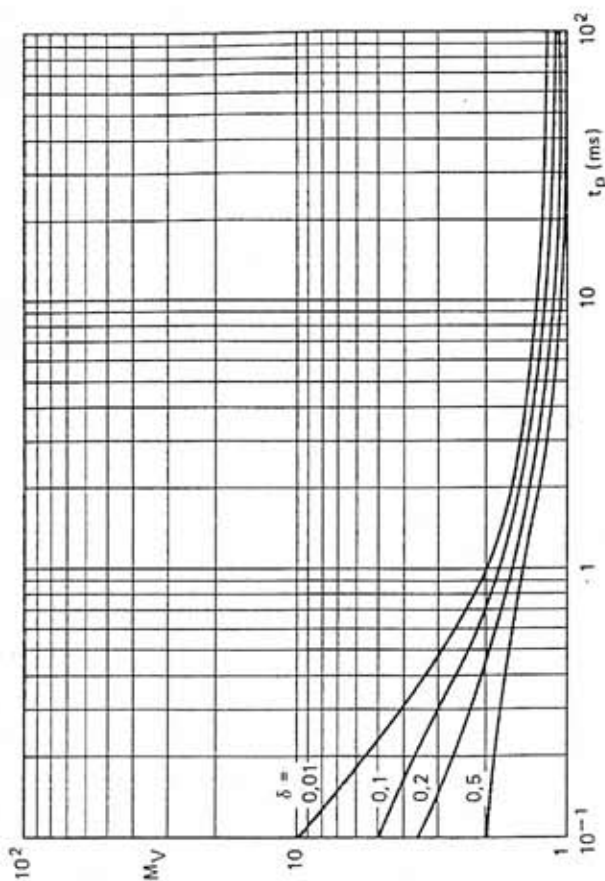


Fig. 9 S.B. voltage multiplying factor at the I_{Cmax} level.

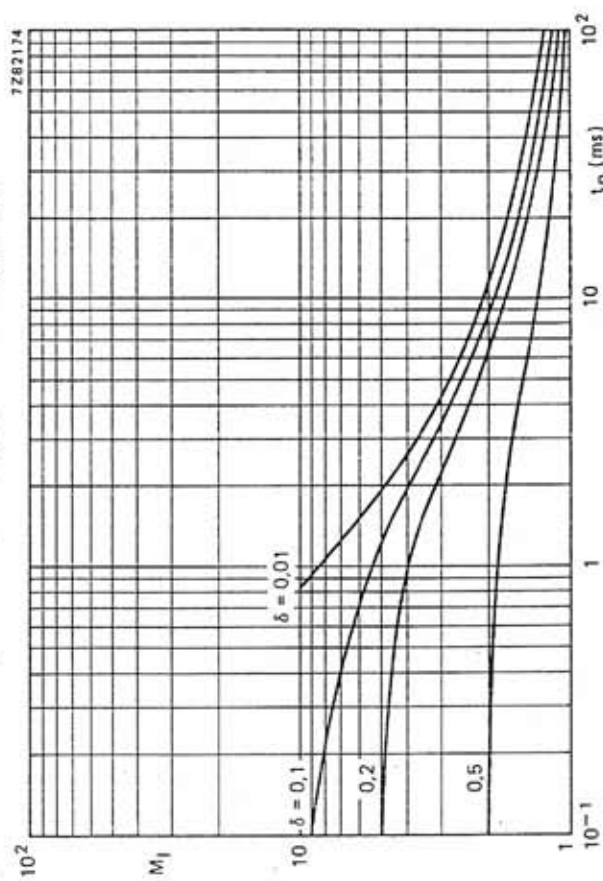


Fig. 10 S.B. current multiplying factor at the V_{CEmax} level.

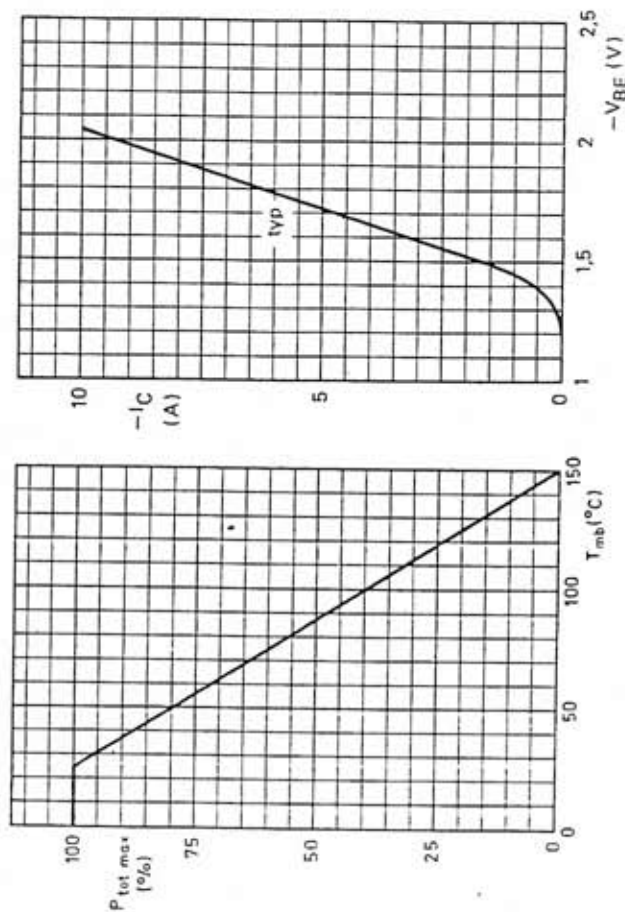


Fig. 6 Power derating curve.

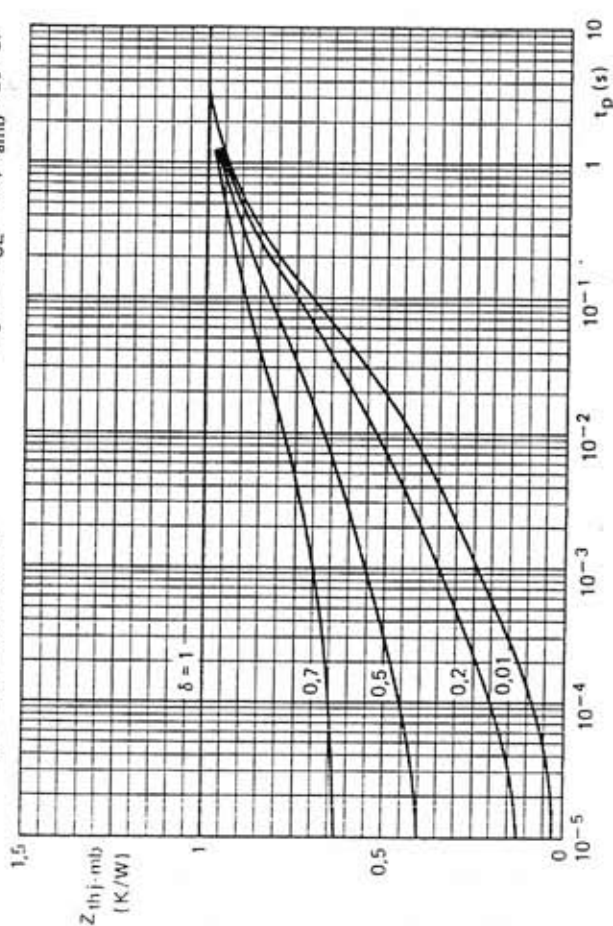


Fig. 7 $-V_{CE} = 3 \text{ V}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$.

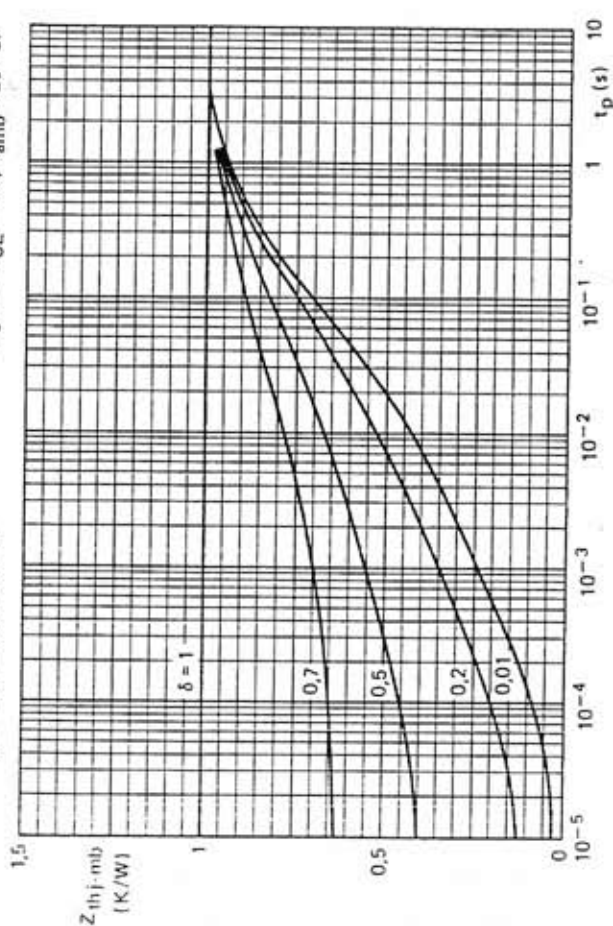


Fig. 8 Pulse power rating chart.