SILICON DARLINGTON POWER TRANSISTORS

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

QUICK REFERENCE DATA

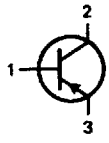
			BDT64	64A	64B	64C	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	100	120	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	100	120	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	5	5	V
Collector current (d.c.)	$-I_C$	max.		12			A
Total power dissipation up to T_{mb} = 25 °C	P_{tot}	max.		125			W
Junction temperature	T_j	max.		150			°C
D.C. current gain $-I_C$ = 5 A; $-V_{CE}$ = 4 V	h_{FE}	>		1000			

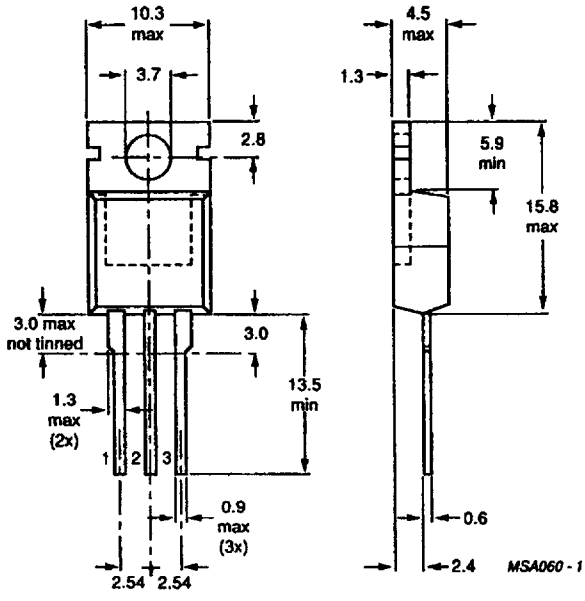
MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-220.

Collector connected to mounting base.





See also chapters Mounting instructions and Accessories.

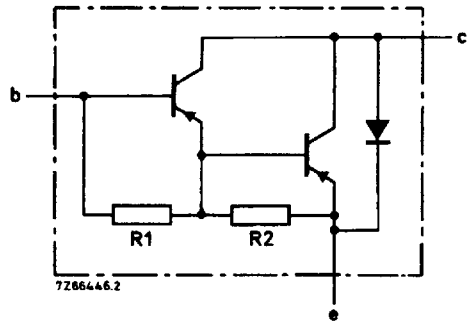


Fig. 2 Circuit diagram. R1 typ. 3 kΩ; R2 typ. 45 Ω.

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 °C	P_{tot}	max.		125			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	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

Collector cut-off current			
$-V_{CB} = -V_{CBOmax}$; $I_E = 0$	$-I_{CBO}$	<	0,4 mA
$I_E = 0$; $-V_{CB} = -½\ V_{CBOmax}$; T_j = 150 °C	$-I_{CBO}$	<	2 mA
$I_B = 0$; $-V_{CE} = -½\ V_{CEOmax}$	$-I_{CEO}$	<	0,2 mA
Emitter cut-off current			
$I_C = 0$; $-V_{EB}$ = 5 V	$-I_{EBO}$	<	5 mA
D.C. current gain*			
$-I_C$ = 1 A; $-V_{CE}$ = 4 V	h_{FE}	typ.	1500
$-I_C$ = 5 A; $-V_{CE}$ = 4 V	h_{FE}	>	1000
$-I_C$ = 12 A; $-V_{CE}$ = 4 V	h_{FE}	typ.	750
Base-emitter voltage			
$-I_C$ = 5 A; $-V_{CE}$ = 4 V	$-V_{BE}$	<	2,5 V
Collector-emitter saturation voltage*			
$-I_C$ = 5 A; $-I_B$ = 20 mA	$-V_{CEsat}$	<	2 V
$-I_C$ = 10 A; $-I_B$ = 100 mA	$-V_{CEsat}$	<	3 V
Diode, forward voltage			
I_F = 5 A	V_F	<	2 V
I_F = 12 A	V_F	typ.	2 V
Collector capacitance at f = 1 MHz			
$-V_{CB}$ = 10 V; $I_E = I_e = 0$	C_c	typ.	200 pF
Second breakdown collector current			
non-repetitive; without heatsink			
$-V_{CE}$ = 60 V; t_p = 0,1 s	$-I_{SB}$	>	2 A
Switching times (see Figs 3 and 4)			
$-I_{Con}$ = 5 A; $-I_{Bon} = I_{Boff}$ = 20 mA			
$-V_{CC}$ = 30 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 A; $-V_{CE}$ = 3 V; f = 1 MHz	h_{fe}	>	10

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

CHARACTERISTICS (continued)

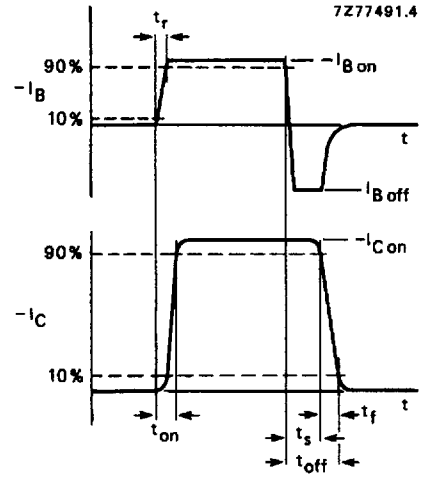
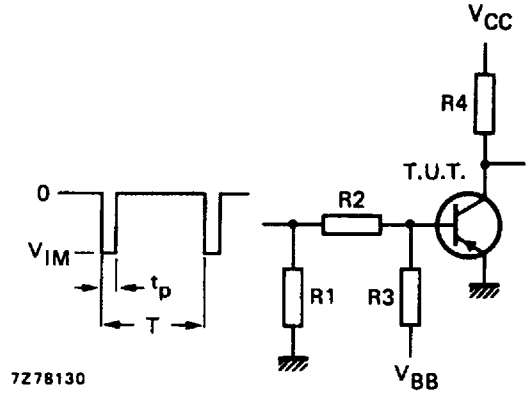


Fig. 3 Switching times waveforms.



$-V_{IM}$	=	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.

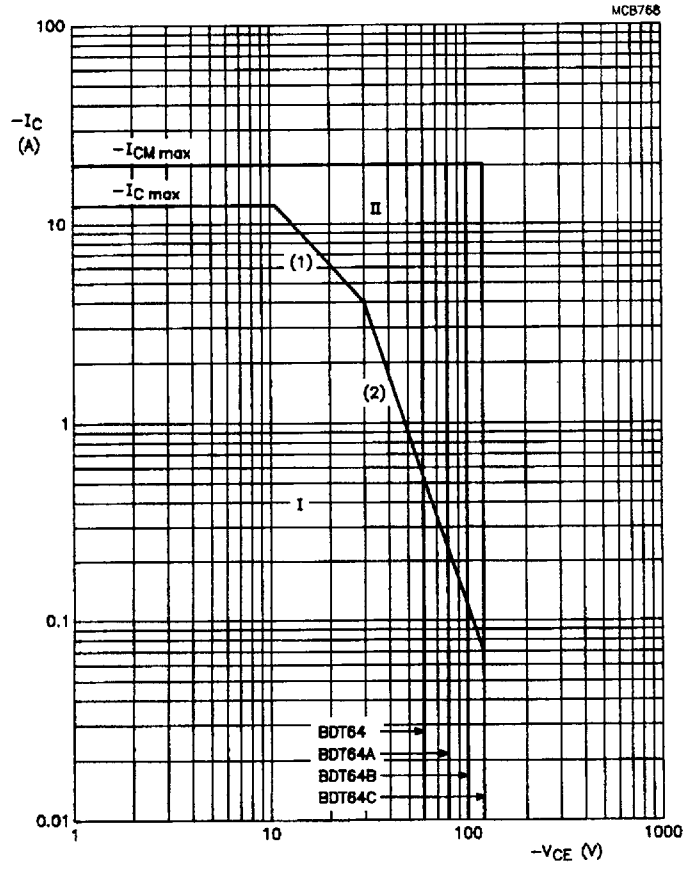


Fig. 5 Safe Operating Area; T_{mb} = 25 °C.

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.

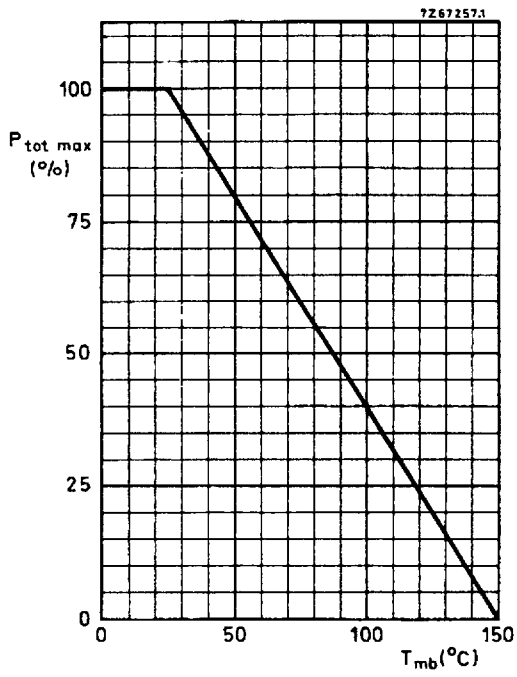


Fig. 6 Power derating curve.

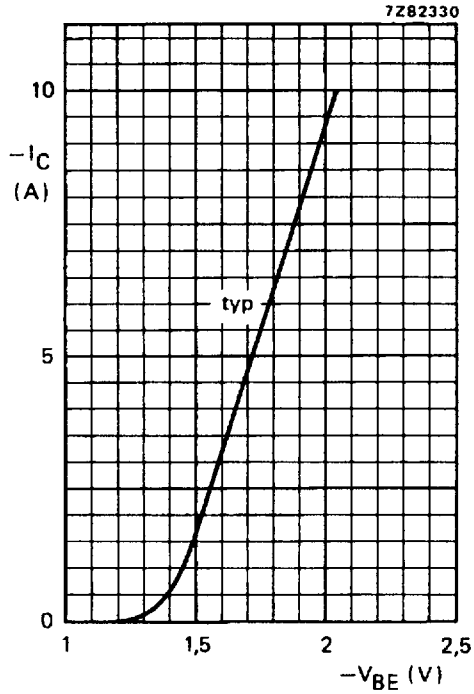


Fig. 7 $-V_{CE}$ = 3 V; T_{amb} = 25 °C.

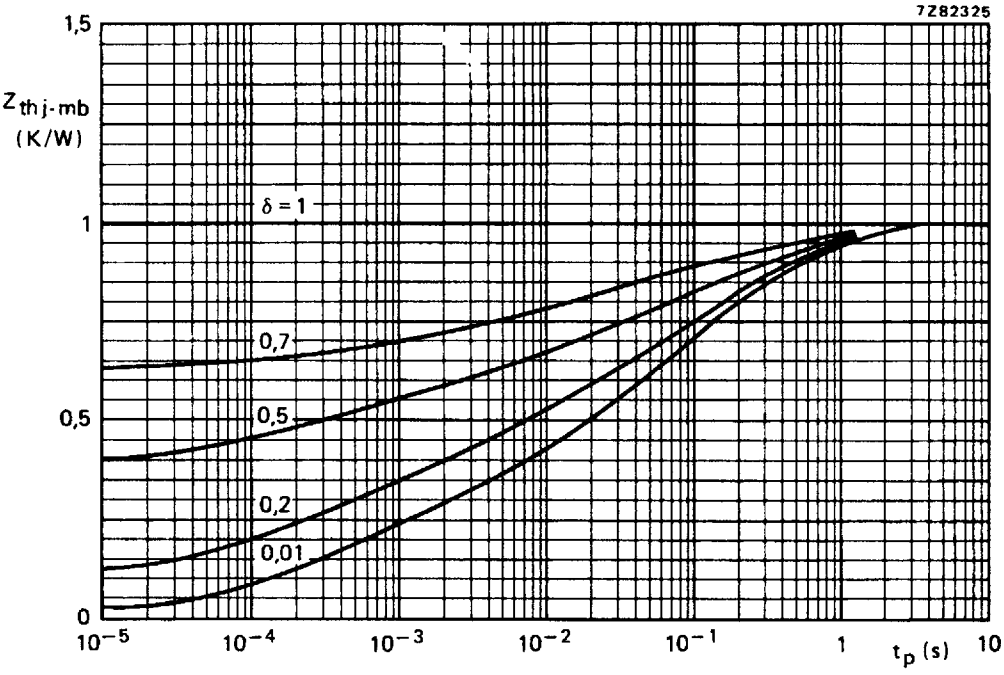


Fig. 8 Pulse power rating chart.

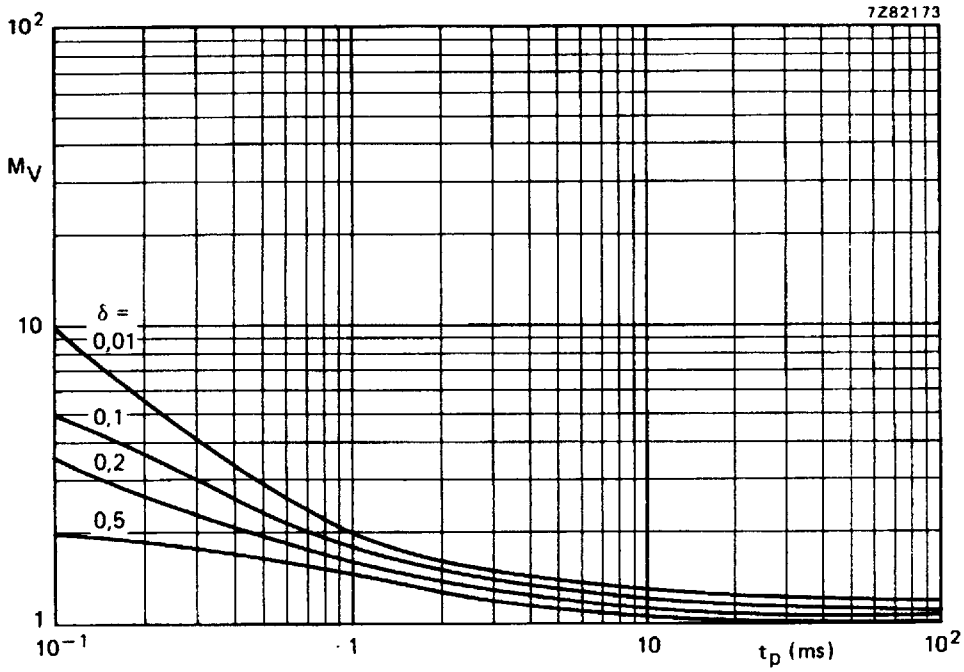


Fig. 9 S.B. voltage multiplying factor at the I_{Cmax} level.

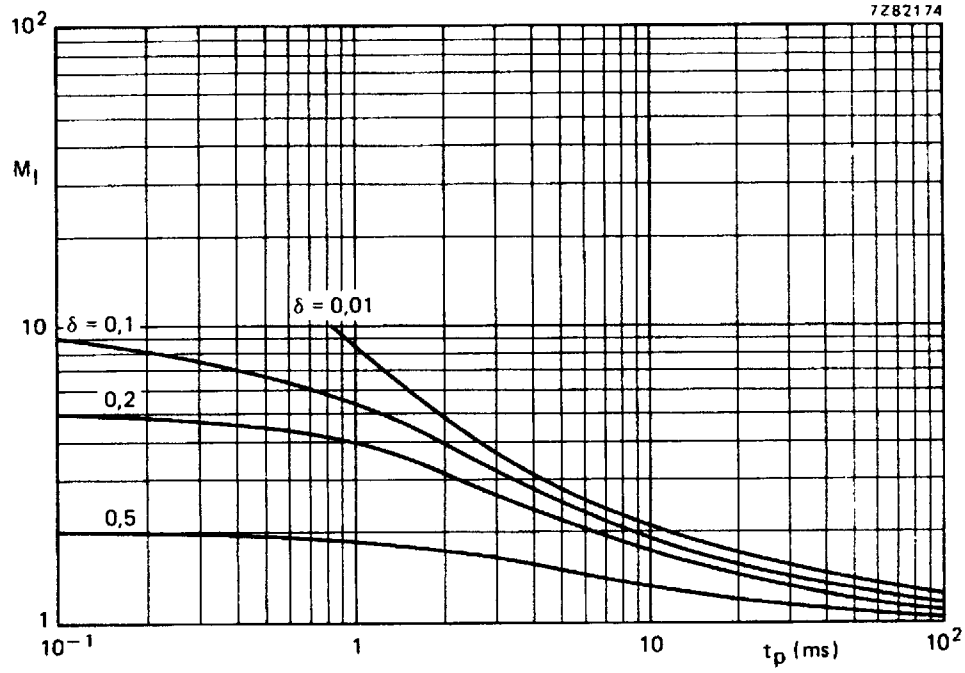


Fig. 10 S.B. current multiplying factor at the V_{CEOmax} level.

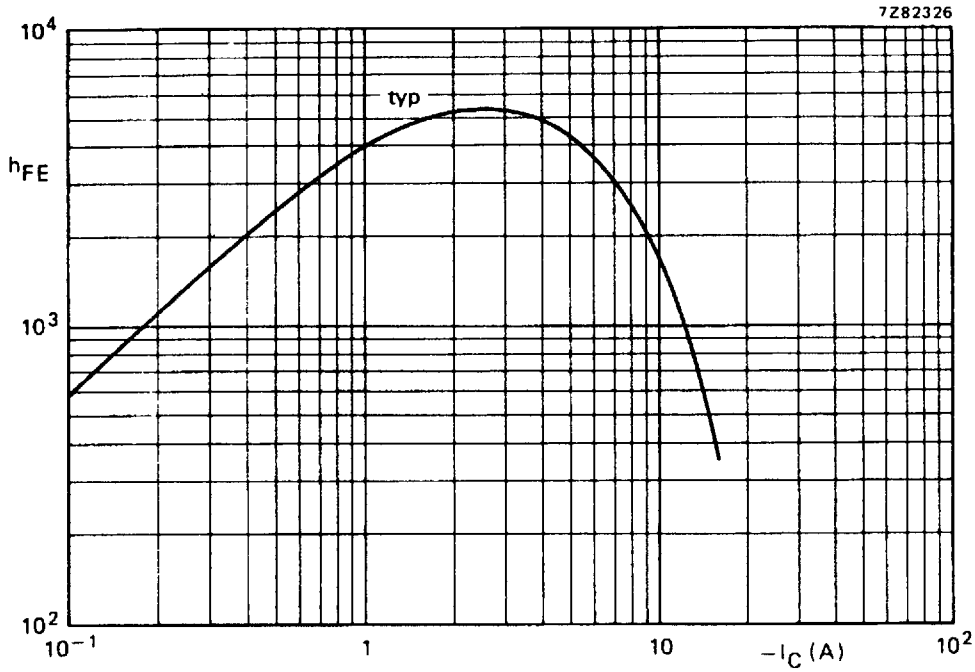


Fig. 11 D.C. current gain. $-V_{CE} = 3$ V; $T_j = 25$ °C.

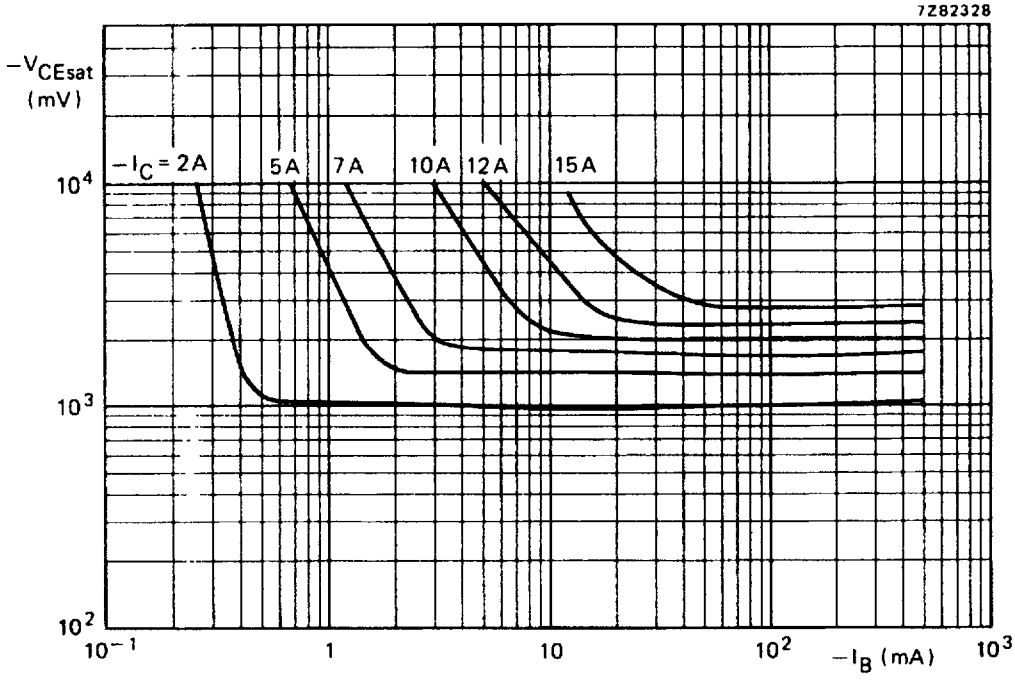


Fig. 12 Typical collector-emitter saturation voltages.