

SILICON DARLINGTON POWER TRANSISTORS

P-N-P epitaxial-base transistors in monolithic Darlington circuit for audio output stages and general amplifier and switching applications. TO-220 plastic envelope. N-P-N complements are TIP120, TIP121 and TIP122.

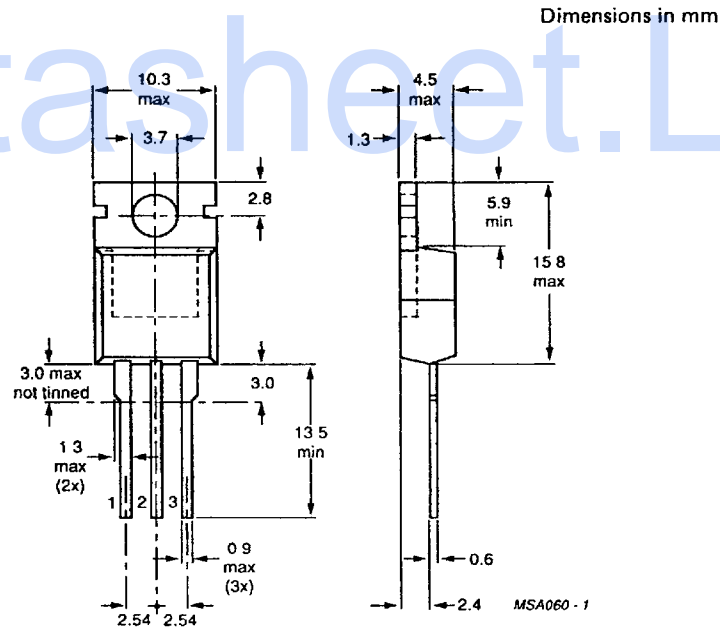
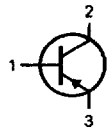
QUICK REFERENCE DATA

			TIP125	TIP126	TIP127
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.		5	A
Collector current (peak value; $t_p \leq 0,3$ ms)	$-I_{CM}$	max.		8	A
Total power dissipation up to $T_{mb} = 25$ °C	P_{tot}	max.		65	W
D.C. current gain				1000	
$-V_{CE} = 3$ V; $-I_C = 3$ A	h_{FE}	>			
Collector-emitter saturation voltage				2,0	V
$-I_C = 3$ A; $-I_B = 12$ mA	$-V_{CEsat}$	<			

MECHANICAL DATA

Fig. 1 TO-220.

Collector connected to mounting base.



CIRCUIT DIAGRAM

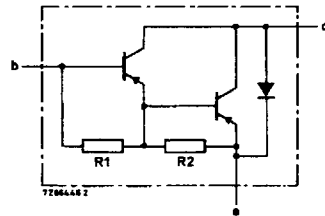


Fig. 2.
R1 typ. 4 kΩ
R2 typ. 80 Ω

RATINGS

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

			TIP125	TIP126	TIP127	
Collector-base voltage ($I_E = 0$)	$-V_{CBO}$	max.	60	80	100	V
Collector-emitter voltage ($I_B = 0$)	$-V_{CEO}$	max.	60	80	100	V
Emitter-base voltage ($I_C = 0$)	$-V_{EBO}$	max.		5		V
Collector current (d.c.)	$-I_C$	max.		5		A
Collector current (peak value); $t_p \leq 0,3$ ms	$-I_{CM}$	max.		8		A
Base current (d.c.)	$-I_B$	max.		0,1		A
Total power dissipation up to $T_{mb} = 25$ °C	P_{tot}	max.		65		W
Total power dissipation in free air	P_{tot}	max.		2		W
Storage temperature	T_{stg}		-65 to + 150			°C
Junction temperature	T_j	max.		150		°C

THERMAL RESISTANCE

From junction to mounting base	R_{thj-mb}	=		1,92		K/W
From junction to ambient in free air	R_{thj-a}	=		62,5		K/W

CHARACTERISTICS

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

Collector cut-off currents

$V_{CB} = V_{CB0max}; I_E = 0$	$-I_{CBO}$	<	0,1	mA
$V_{CE} = 1/2 V_{CE0max}; I_B = 0$	$-I_{CEO}$	<	0,2	mA

Emitter cut-off current

$-V_{EB} = 5\text{ V}; I_C = 0$	$-I_{EBO}$	<	5,0	mA
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Collector-emitter sustaining voltage

$-I_C = 30\text{ mA}; I_B = 0$	TIP125 $-V_{CE0sust}$	>	60	V
	TIP126 $-V_{CE0sust}$	>	80	V
	TIP127 $-V_{CE0sust}$	>	100	V

D.C. current gain

$-V_{CE} = 3\text{ V}; -I_C = 0,5\text{ A}$	h_{FE}	>	1000
$-V_{CE} = 3\text{ V}; -I_C = 3\text{ A}$	h_{FE}	>	1000

Base-emitter voltage

$-V_{CE} = 3\text{ V}; -I_C = 3\text{ A}$	$-V_{BE}$	<	2,5	V
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Collector-emitter saturation voltage

$-I_C = 3\text{ A}; -I_B = 12\text{ mA}$	$-V_{CEsat}$	<	2,0	V
$-I_C = 5\text{ A}; -I_B = 20\text{ mA}$	$-V_{CEsat}$	<	4,0	V

Switching times

$-I_C = 3\text{ A}; -I_{Bon} = I_{Boff} = 12\text{ mA};$
 $-V_{CC} = 30\text{ V}$

turn-on time	t_{on}	typ.	1,5	μs
turn-off time	t_{off}	typ.	8,5	μs

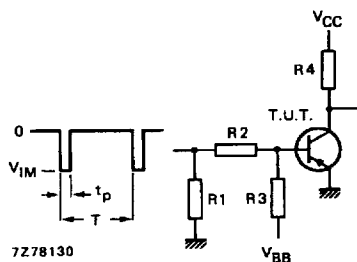


Fig. 3 Switching times test circuit.

$-V_{IM} = 10\text{ V}$ $R1 = 56\text{ }\Omega$ $t_r = t_f = 15\text{ ns}$
 $-V_{CC} = 30\text{ V}$ $R2 = 410\text{ }\Omega$ $t_p = 10\text{ }\mu\text{s}$
 $+V_{BB} = 5\text{ V}$ $R3 = 560\text{ }\Omega$ $T = 500\text{ }\mu\text{s}$
 $R4 = 10\text{ }\Omega$

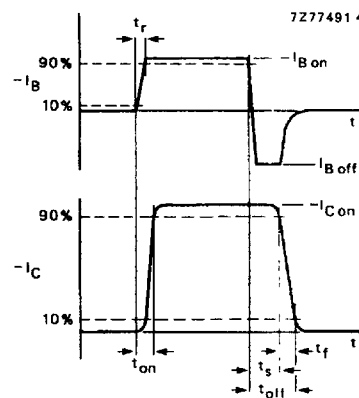


Fig. 4 Switching times waveforms.

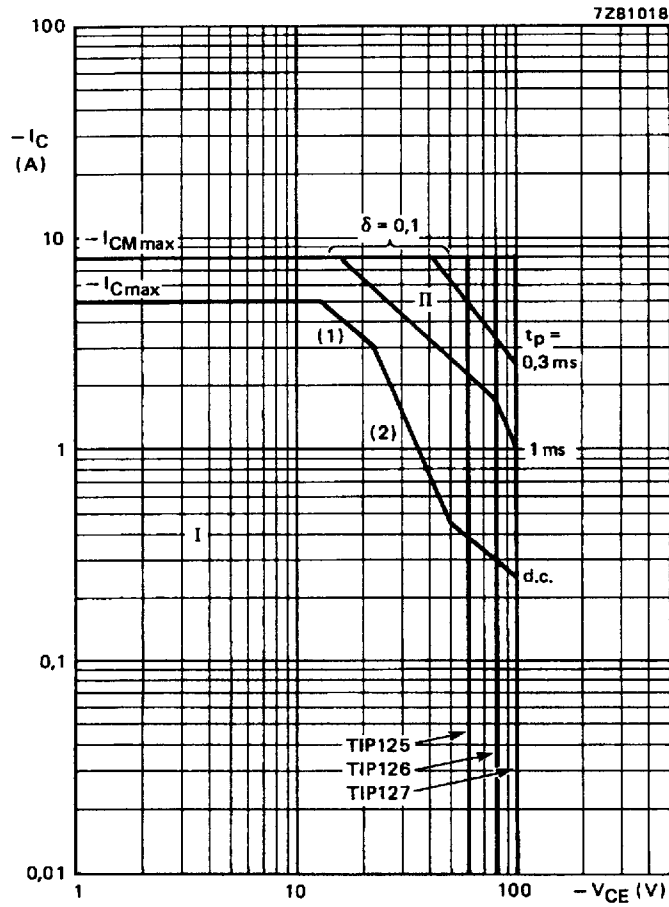


Fig. 5 Safe Operating Area at $T_{mb} = 25\text{ }^{\circ}\text{C}$.

- 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.

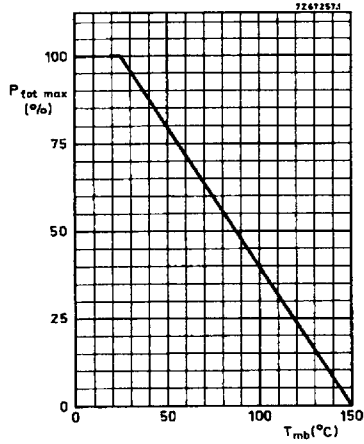


Fig. 6 Power derating curve.

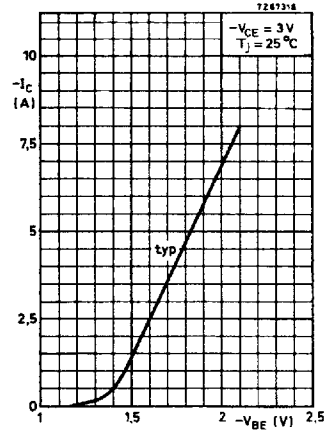


Fig. 7.

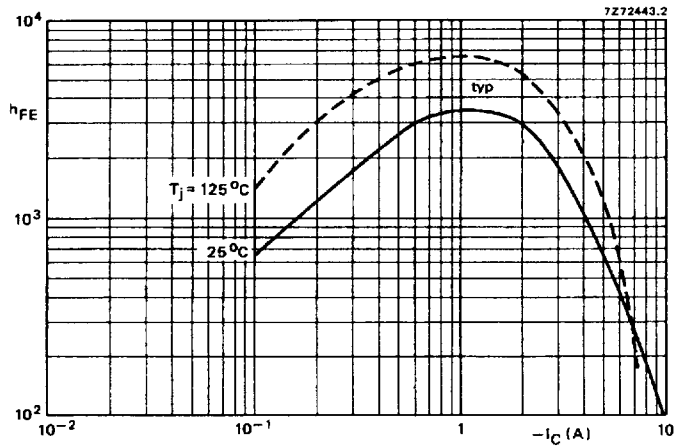


Fig. 8 D.C. current gain at $-V_{CE} = 3V$.

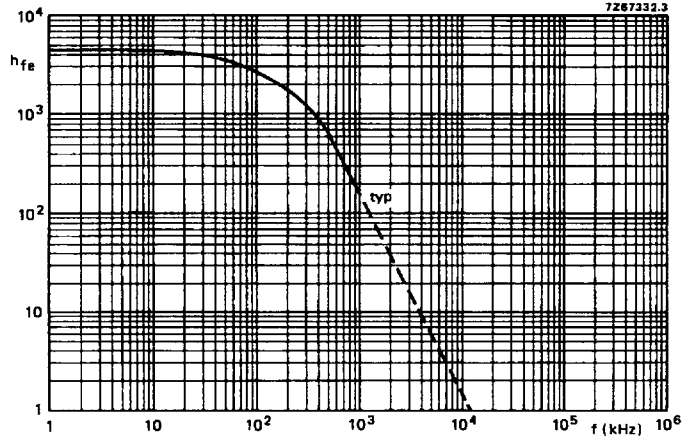


Fig. 9 Small-signal current gain at $-I_C = 3$ A; $-V_{CE} = 3$ V; $T_j = 25$ °C.

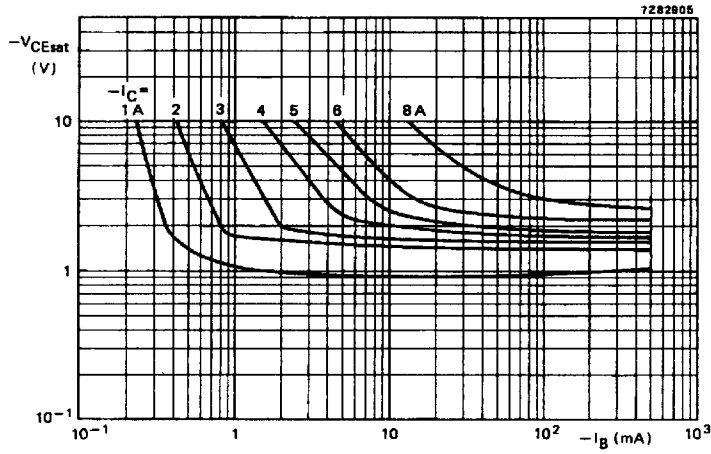


Fig. 10 Typical collector-emitter saturation voltage at $T_j = 25$ °C.