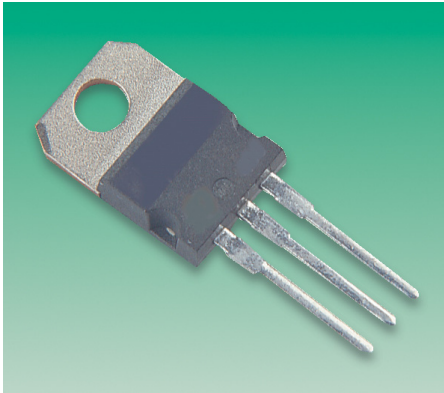


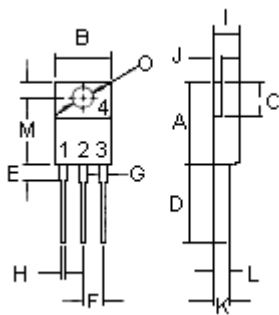
TIP120, 121, 122, 125, 126, 127

Darlington Transistors



Features:

- Designed for general-purpose amplifier and low speed switching applications.
- Collector-Emitter sustaining voltage- $V_{CE(sus)} = 60V$ (Minimum) - TIP120, TIP125
80V (Minimum) - TIP121, TIP126
100V (Minimum) - TIP122, TIP127.
- Collector-Emitter saturation voltage- $V_{CE(sat)} = 2.0V$ (Maximum) at $I_C = 3.0A$.
- Monolithic construction with built-in-base-emitter shunt resistors.



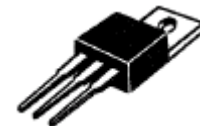
- Pin 1. Base
2. Collector
3. Emitter
4. Collector (Case)

	Minimum	Maximum
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

Dimensions : Millimetres

NPN	PNP
TIP120	TIP 125
TIP121	TIP 126
TIP122	TIP 127

5.0 Ampere
Darlington
Complementary Silicon
Power Transistors
60 - 100 Volts
65 Watts



TO-220

Maximum Ratings

Characteristic	Symbol	TIP120	TIP121	TIP122	Unit
		TIP125	TIP126	TIP127	
Collector-Emitter Voltage	V _{CEO}	60	80	100	V
Collector-Base Voltage	V _{CBO}				
Emitter-Base Voltage	V _{EBO}				
Collector Current -Continuous	I _C	5.0			A
-Peak	I _{CM}	8.0			
Base Current	I _B	120			mA
Total Power Dissipation at T _C = 25°C	P _D	65			W
Derate above 25°C		0.52			W/°C
Operating and Storage Junction Temperature Range	T _J , T _{STG}	-65 to +150			°C

Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.92	$^\circ C/W$

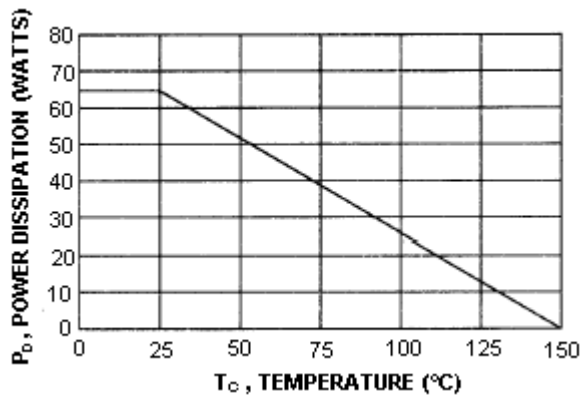


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FIGURE-1 POWER DERATING



Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Minimum	Maximum	Unit
OFF Characteristics				
Collector-Emitter Sustaining Voltage (1) (I _C = 30mA, I _B = 0) TIP120, TIP125 TIP121, TIP126 TIP122, TIP127	V _{CEO(sus)}	60 80 100	-	V
Collector Cut off Current (V _{CE} = 30V, I _B = 0) (V _{CE} = 40V, I _B = 0) (V _{CE} = 50V, I _B = 0) TIP120, TIP125 TIP121, TIP126 TIP122, TIP127	I _{CEO}	-	0.5 0.5 0.5	mA
Collector Cut off Current (V _{CB} = 60V, I _B = 0) (V _{CB} = 80V, I _B = 0) (V _{CB} = 100V, I _B = 0) TIP120, TIP125 TIP121, TIP126 TIP122, TIP127	I _{CBO}	-	0.2 0.2 0.2	
Collector Cut off Current (V _{EB} =5.0V, I _C = 0)	I _{EBO}	-	2.0	
ON Characteristics (1)				
DC Current Gain (I _C = 0.5A, V _{CE} = 3.0V) (I _C = 3.0A, V _{CE} = 3.0V)	h _{FE}	1000 1000	-	-
Collector-Emitter Saturation Voltage (I _C = 3.0A, I _B = 12mA) (I _C = 5.0A, I _B = 20mA)	V _{CE(sat)}	-	2.0 4.0	V
Base-Emitter On Voltage (I _C = 3.0A, V _{CE} = 3.0V)	V _{BE(on)}	-	2.5	
Dynamic Characteristics				
Small-Signal Current Gain (I _C = 3.0A, V _{CE} = 4.0V, f = 1.0MHz)	h _{fe}	4.0	-	-
Output Capacitance (V _{CB} = 10V, I _E = 0, f = 0.1MHz) TIP120, TIP121, TIP122 TIP125, TIP126, TIP127	C _{ob}	-	300 250	pF

(1) Pulse Test : Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$



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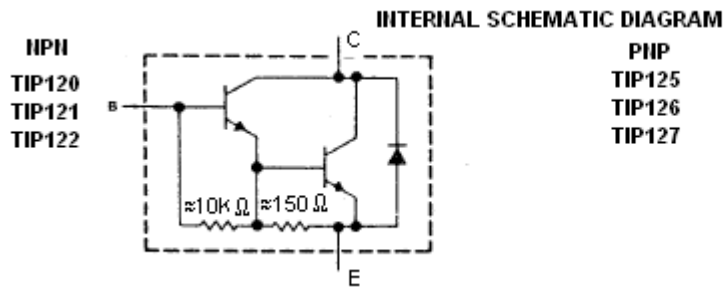


FIGURE - 2 SWITCHING TIME

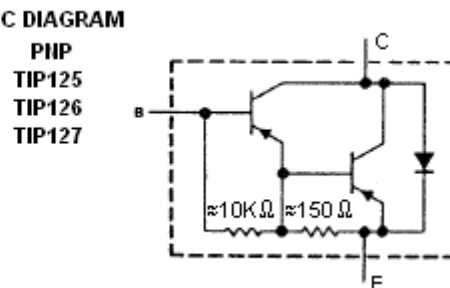


FIGURE - 3 SWITCHING TIME

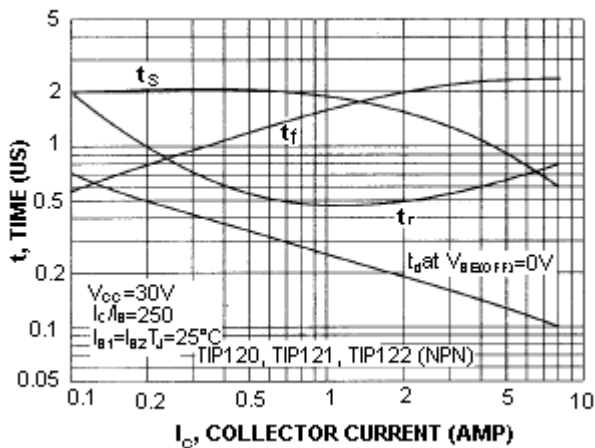


FIGURE - 4 SMALL SIGNAL CURRENT GAIN

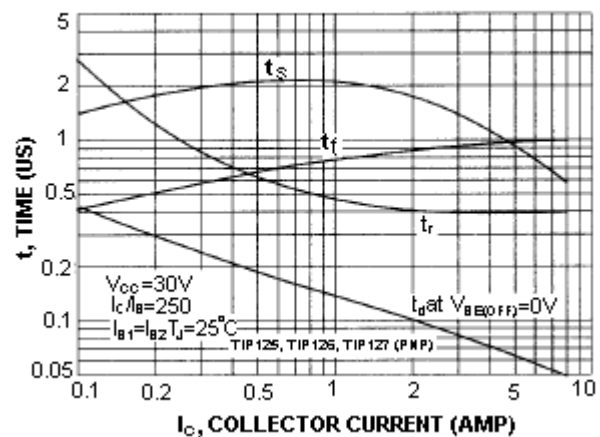
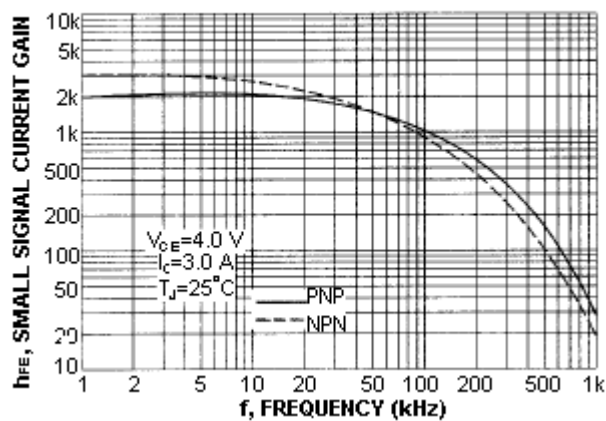
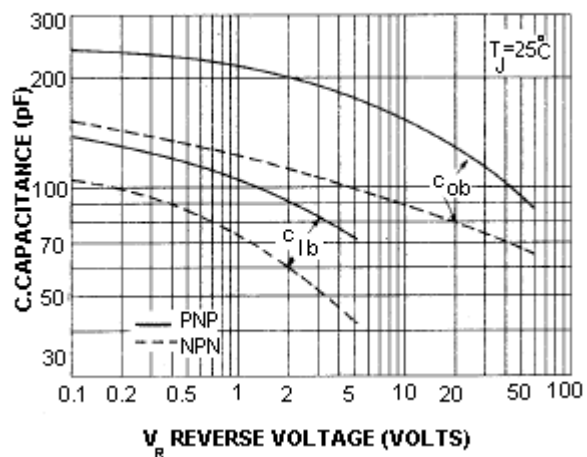


FIGURE - 5 CAPACITANCES

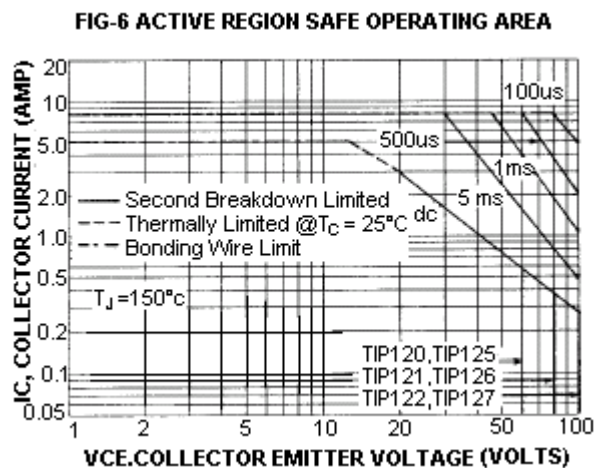


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FIGURE - 6 ACTIVE REGION SAFE OPERATING AREA



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate I_C - V_{CE} limits of the transistor that must not be subjected to greater dissipation than the curves indicate.

The data of Figure - 6 is based on $T_{J(PK)} = 150^\circ\text{C}$; T_C is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

FIGURE - 7 DC CURRENT GAIN

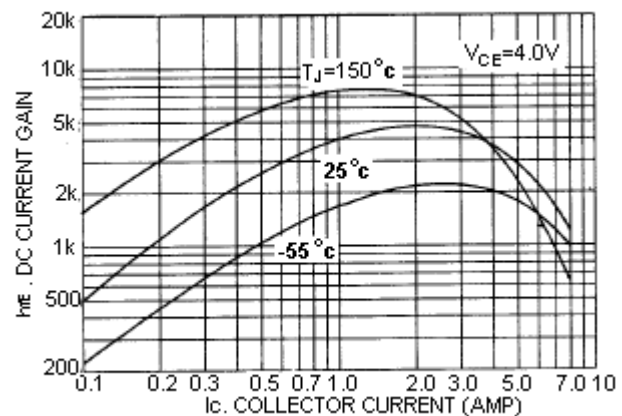
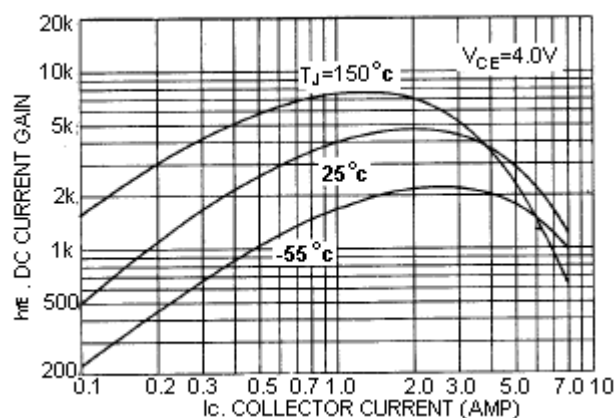
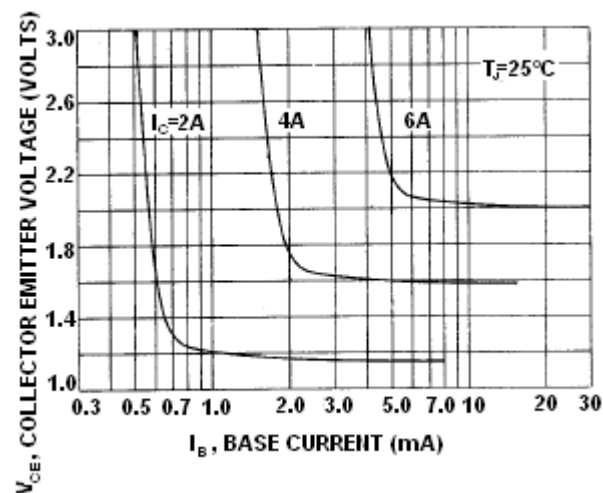
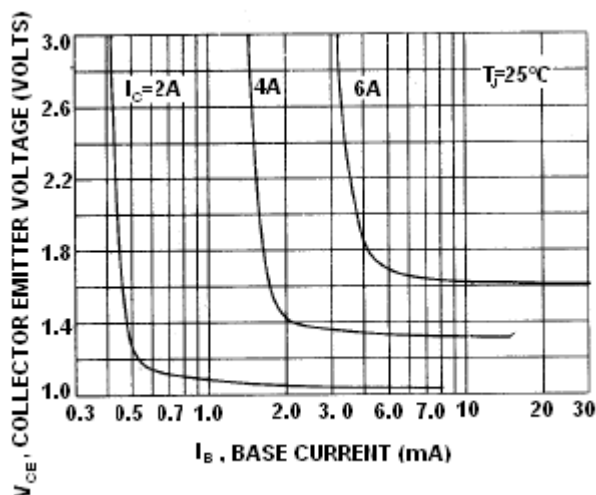


FIGURE - 8 COLLECTOR SATURATION REGION

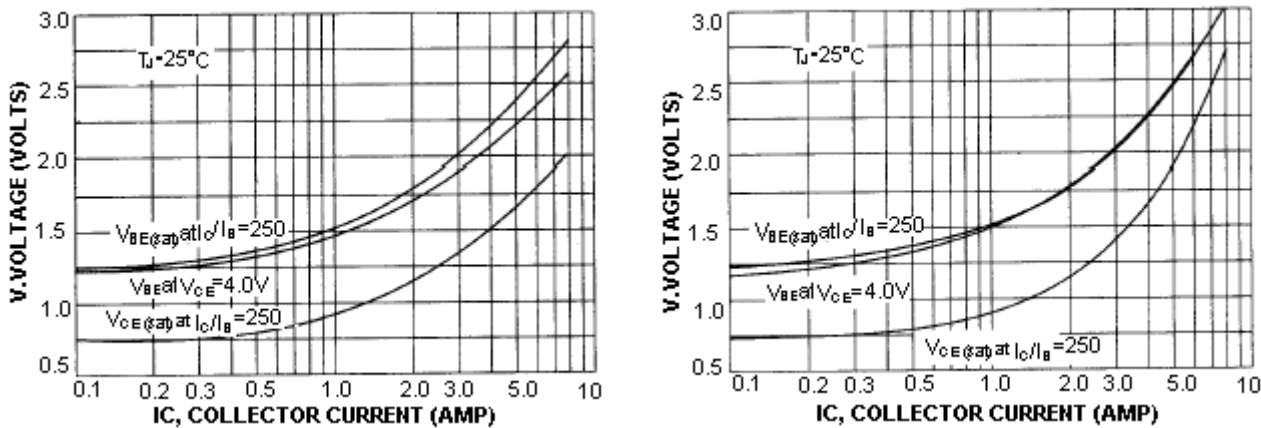


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FIGURE - 9 "ON" VOLTAGES



Specifications

I_C A	V_{CEO} (maximum) V	h_{FE} minimum at $I_C = 3\text{A}$	P_{tot} at 25°C W	Package	Part Number	
					NPN	PNP
5	60	1000	65	TO-220	TIP120	TIP125
	80				TIP121	TIP126
	100				TIP122	TIP127



TIP120, 121, 122, 125, 126, 127

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