

PLASTIC MEDIUM-POWER COMPLEMENTARY SILICON TRANSISTORS

...designed for general-purpose amplifier and low speed switching applications

FEATURES:

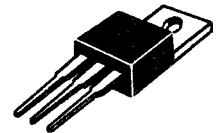
- * Collector-Emitter Sustaining Voltage-
 $V_{CE(sus)} = 60 \text{ V (Min) - TIP120, TIP125}$
 $= 80 \text{ V (Min) - TIP121, TIP126}$
 $= 100 \text{ V (Min) - TIP122, TIP127}$
- * Collector-Emitter Saturation Voltage
 $V_{CE(sat)} = 2.0 \text{ V (Max.) @ } I_C = 3.0 \text{ A}$
- * Monolithic Construction with Built-in Base-Emitter Shunt Resistor

NPN	PNP
TIP120	TIP125
TIP121	TIP126
TIP122	TIP127

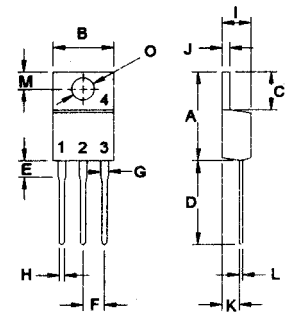
5.0 AMPERE
DARLINGTON
COMPLEMENTARY SILICON
POWER TRANSISTORS
60-100 VOLTS
65 WATTS

MAXIMUM RATINGS

Characteristic	Symbol	TIP120 TIP125	TIP121 TIP126	TIP122 TIP127	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	100	V
Collector-Base Voltage	V_{CBO}	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	5.0 8.0			A
Base Current	I_B	120			mA
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	65 0.52			W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	- 65 to +150			$^\circ\text{C}$



TO-220

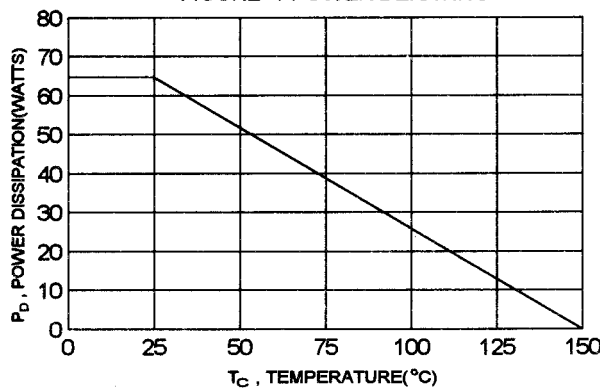


PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR(CASE)

THERMAL CHARACTERISTICS

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

FIGURE -1 POWER DERATING



DIM	MILLIMETERS	
	MIN	MAX
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

TIP120, TIP121, TIP122 NPN / TIP125, TIP126, TIP127 PNP

ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector - Emitter Sustaining Voltage (1) ($I_C = 30\text{ mA}$, $I_B = 0$)	TIP120,TIP125 TIP121,TIP126 TIP122,TIP127	$V_{CE(sus)}$	60 80 100	V
Collector Cutoff Current ($V_{CE} = 30\text{ V}$, $I_B = 0$) ($V_{CE} = 40\text{ V}$, $I_B = 0$) ($V_{CE} = 50\text{ V}$, $I_B = 0$)	TIP120,TIP125 TIP121,TIP126 TIP122,TIP127	I_{CEO}	0.5 0.5 0.5	mA
Collector Cutoff Current ($V_{CB} = 60\text{ V}$, $I_E = 0$) ($V_{CB} = 80\text{ V}$, $I_E = 0$) ($V_{CB} = 100\text{ V}$, $I_E = 0$)	TIP120,TIP125 TIP121,TIP126 TIP122,TIP127	I_{CBO}	0.2 0.2 0.2	mA
Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}$, $I_C = 0$)		I_{EBO}	2.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 0.5\text{ A}$, $V_{CE} = 3.0\text{ V}$) ($I_C = 3.0\text{ A}$, $V_{CE} = 3.0\text{ V}$)	h_{FE}	1000 1000		
Collector-Emitter Saturation Voltage ($I_C = 3.0\text{ A}$, $I_B = 12\text{ mA}$) ($I_C = 5.0\text{ A}$, $I_B = 20\text{ mA}$)	$V_{CE(sat)}$		2.0 4.0	V
Base-Emitter On Voltage ($I_C = 3.0\text{ A}$, $V_{CE} = 3.0\text{ V}$)	$V_{BE(on)}$		2.5	V

DYNAMIC CHARACTERISTICS

Small-Signal Current Gain ($I_C = 3.0\text{ A}$, $V_{CE} = 4.0\text{ V}$, $f = 1.0\text{ MHz}$)	h_{fe}	4.0		
Output Capacitance ($V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 0.1\text{ MHz}$)	C_{ob}		300 250	pF

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

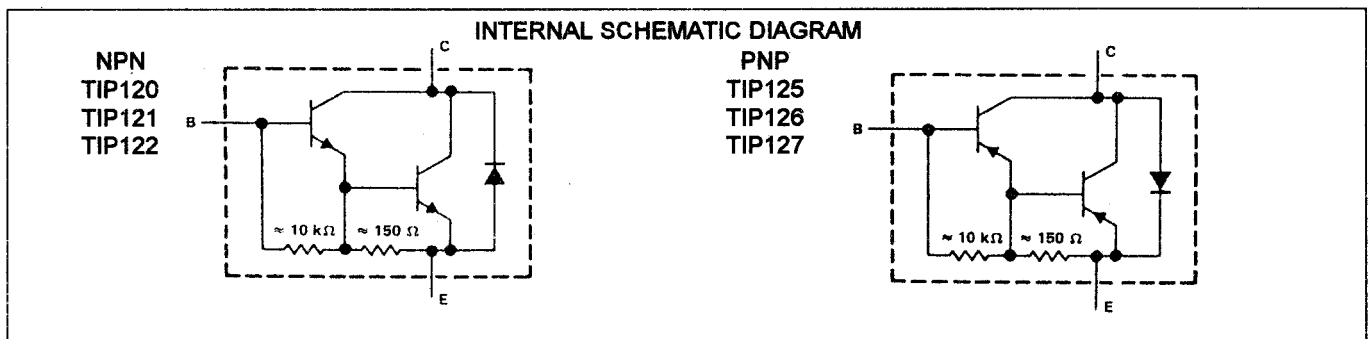


FIG-2 SWITCHING TIME

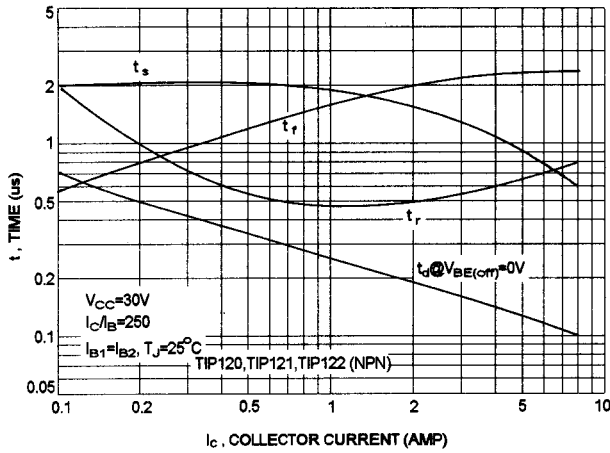


FIG-3 SWITCHING TIME

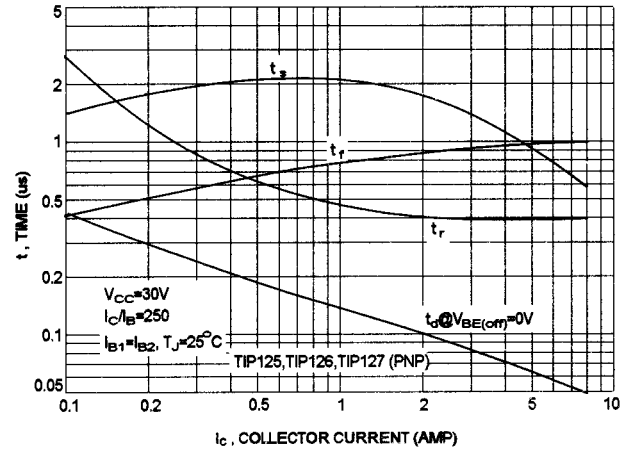


FIG-4 SMALL-SIGNAL CURRENT GAIN

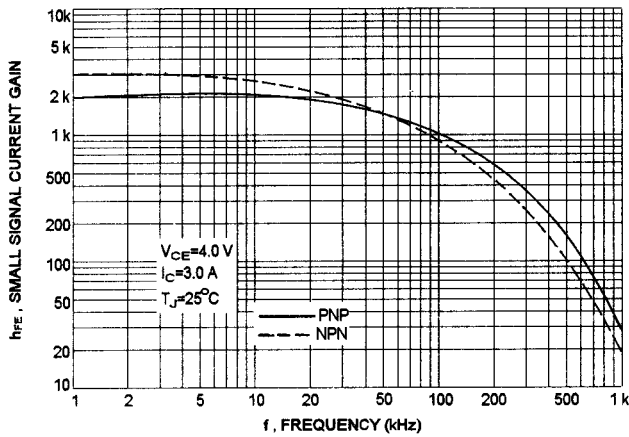


FIG-5 CAPACITANCES

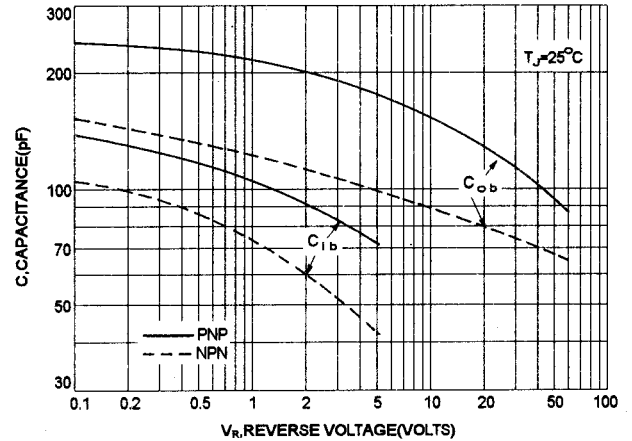
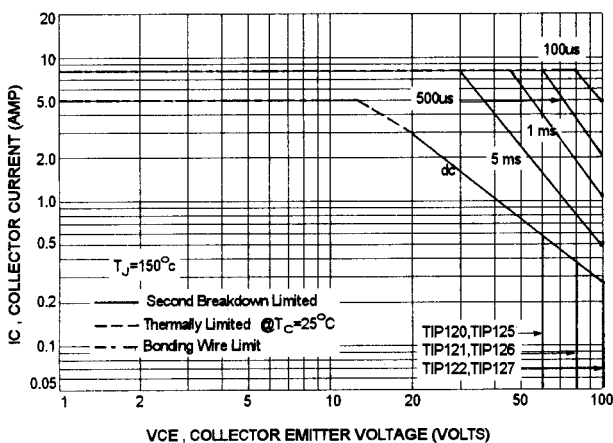


FIG-6 ACTIVE REGION SAFE OPERATING AREA



There are two limitation 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 be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

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

TIP120, TIP121, TIP122 NPN / TIP125, TIP126 TIP127 PNP

NPN TIP120,TIP121,TIP122

PNP TIP125,TIP126,TIP127

FIG-7 DC CURRENT GAIN

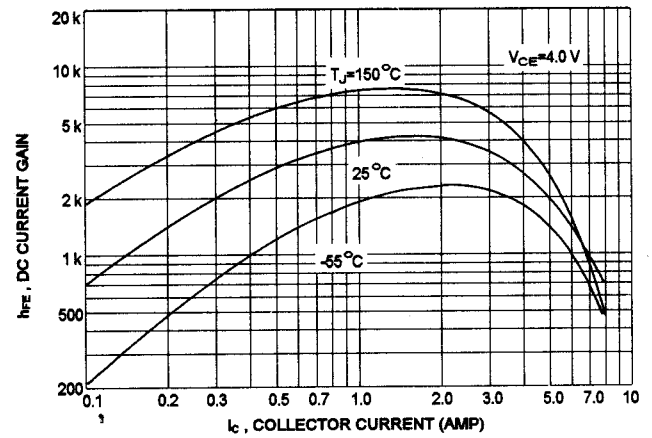
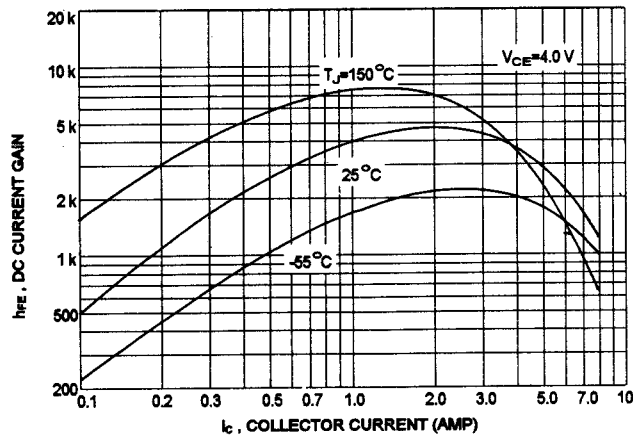


FIG-8 COLLECTOR SATURATION REGION

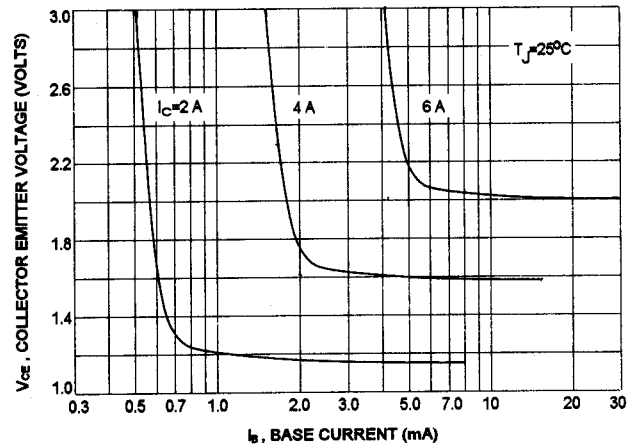
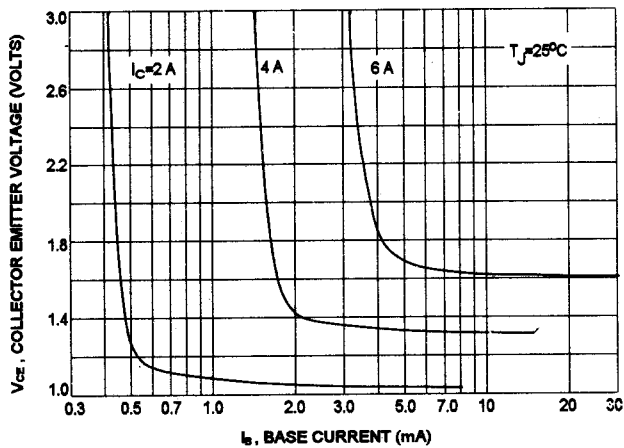


FIG-9 "ON" VOLTAGES

