MOSPEC

PLASTIC MEDIUM-POWER
COPLEMENTARY SILICON TRANSISTORS

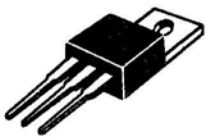
...designed for general-purpose amplifier and low speed switching applications

FEATURES:

* Collector-Emitter Sustaining Voltage-
  $V_{CEO(SUS)}$ = 60 V (Min) - TIP120,TIP125
  = 80 V (Min) - TIP121,TIP126
  = 100 V (Min) - TIP122,TIP127
* Collector-Emitter Saturation Voltage
  $V_{CE(sat)}$ = 2.0 V (Max.) @ I_C = 3.0 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



TO-220

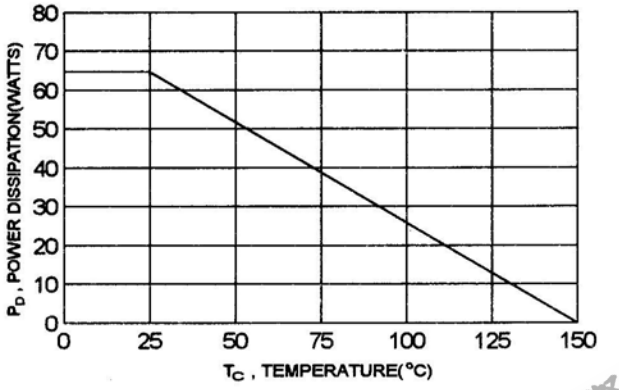
MAXIMUM RATINGS

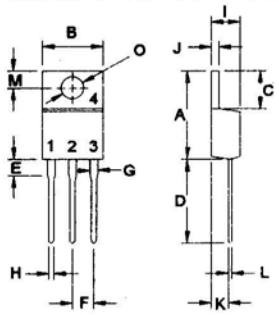
Characteristic	Symbol	TIP120 TIP125	TIP121 TIP126	TIP122 TIP127	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	100	V
COllector-Base Voltage	V_{CBO}	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	5.0 8.0			A
Base Current	I_B	120			mA
Total Power Dissipation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

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	Rθjc	1.92	°C/W

FIGURE -1 POWER DERATING





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

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	16.00
B	9.78	10.42
C	5.02	6.60
D	13.00	14.62
E	3.10	4.19
F	2.41	2.67
G	1.10	1.67
H	0.69	1.01
I	3.21	4.98
J	1.14	1.40
K	2.20	3.30
L	0.28	0.61
M	2.48	3.00
O	3.50	4.00

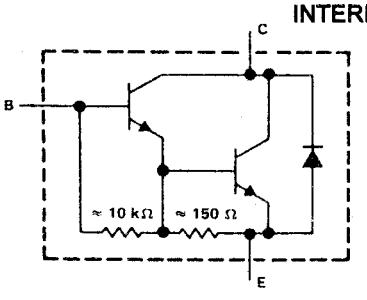
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Sustaining Voltage (1) (I_C = 30 mA, I_B = 0)	TIP120,TIP125 TIP121,TIP126 TIP122,TIP127	$V_{CEO(sus)}$	 60 80 100		V
Collector Cutoff Current (V_{CE} = 30 V, I_B = 0) (V_{CE} = 40 V, I_B = 0) (V_{CE} = 50 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 V, I_E = 0) (V_{CB} = 80 V, I_E = 0) (V_{CB} = 100 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 V, I_C = 0)		I_{EBO}		 2.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C = 0.5 A, V_{CE} = 3.0 V) (I_C = 3.0 A, V_{CE} = 3.0 V)		hFE	 1000 1000		
Collector-Emitter Saturation Voltage (I_C = 3.0 A, I_B = 12 mA) (I_C = 5.0 A, I_B = 20 mA)		$V_{CE(sat)}$		 2.0 4.0	V
Base-Emitter On Voltage (I_C = 3.0 A, V_{CE} = 3.0 V)		$V_{BE(on)}$		 2.5	V
DYNAMIC CHARACTERISTICS					
Small-Signal Current Gain (I_C = 3.0 A, V_{CE} = 4.0 V, f = 1.0 MHz)		h_{fe}	 4.0		
Output Capacitance (V_{CB} = 10 V, I_E = 0 , f = 0.1 MHz)	TIP120,TIP121,TIP122 TIP125,TIP126,TIP127	C_{ob}		 300 250	pF

(1) Pulse Test: Pulse width = 300 us , Duty Cycle ≦ 2.0%

INTERNAL SCHEMATIC DIAGRAM

NPN
TIP120
TIP121
TIP122



PNP
TIP125
TIP126
TIP127

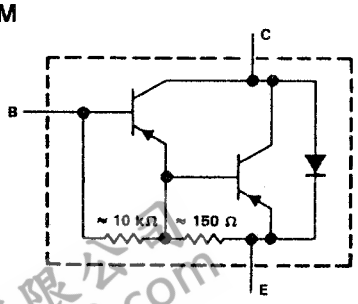


FIG-2 SWITCHING TIME

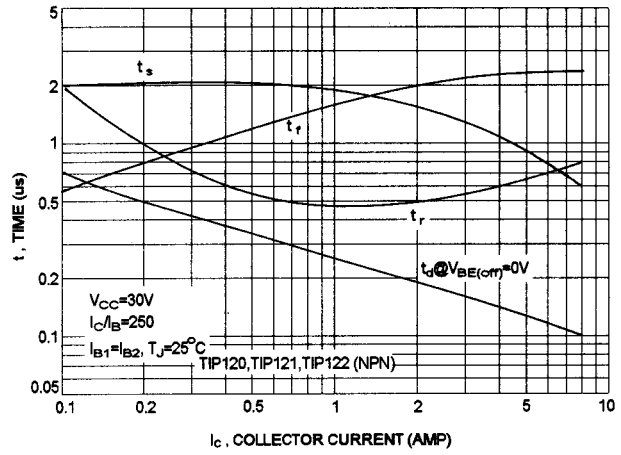


FIG-3 SWITCHING TIME

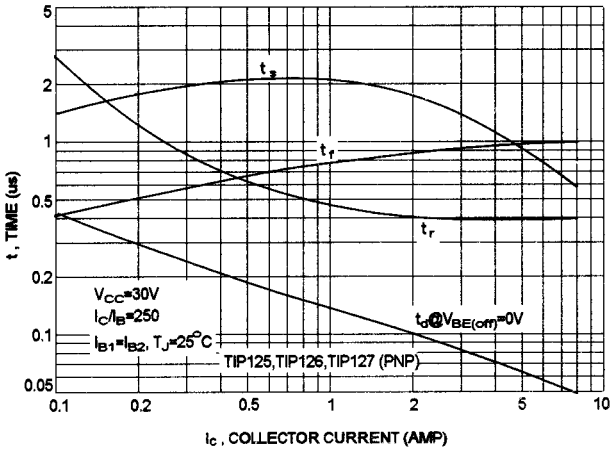


FIG-4 SMALL-SIGNAL CURRENT GAIN

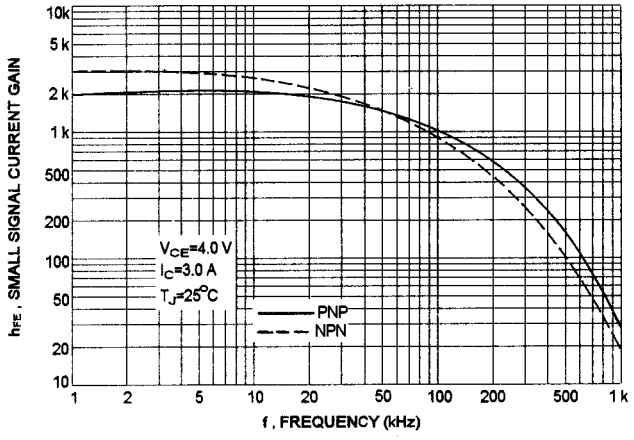


FIG-5 CAPACITANCES

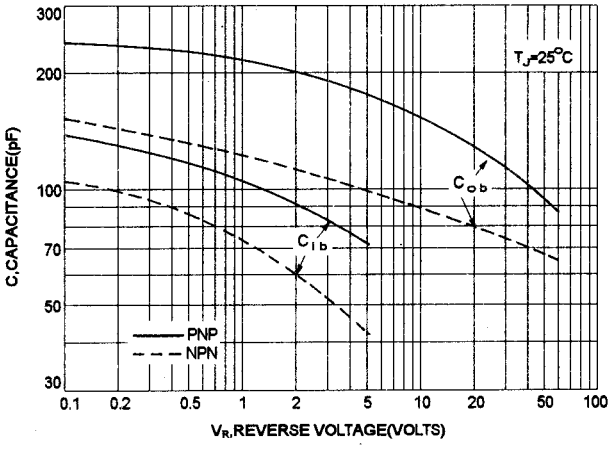
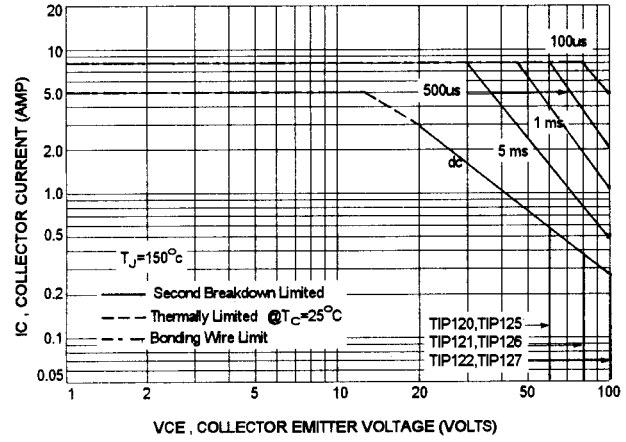


FIG-6 ACTIVE REGION SAFE OPERATING AREA



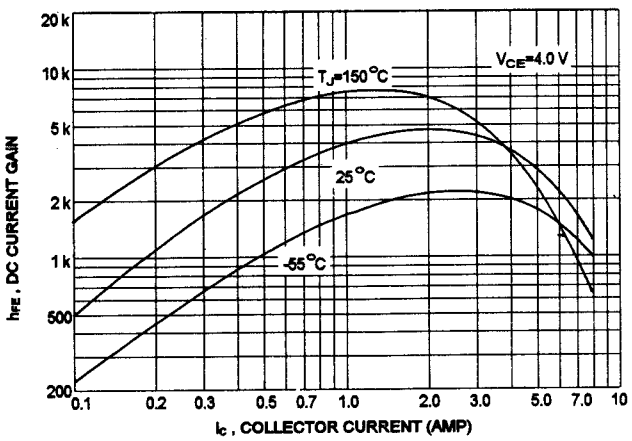
There are two limitation on the power handling ability of a transistor:average junction temperature and second breakdown safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation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

The data of FIG-6 is base on $T_{J(PK)}$=150 °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°C ,At high case temperatures,thermal limitation will reduce the power that can be handled to values less than the limi - tations imposed by second breakdown.

NPN TIP120,TIP121,TIP122

PNP TIP125,TIP126,TIP127

FIG-7 DC CURRENT GAIN



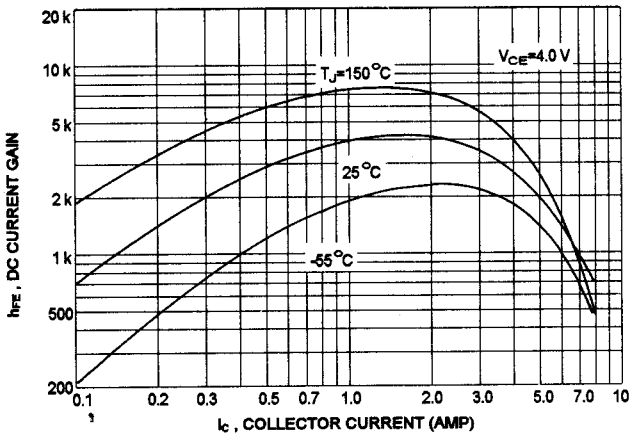
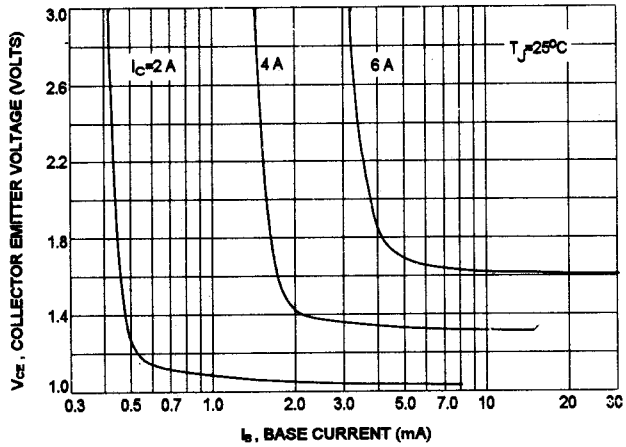


FIG-8 COLLECTOR SATURATION REGION



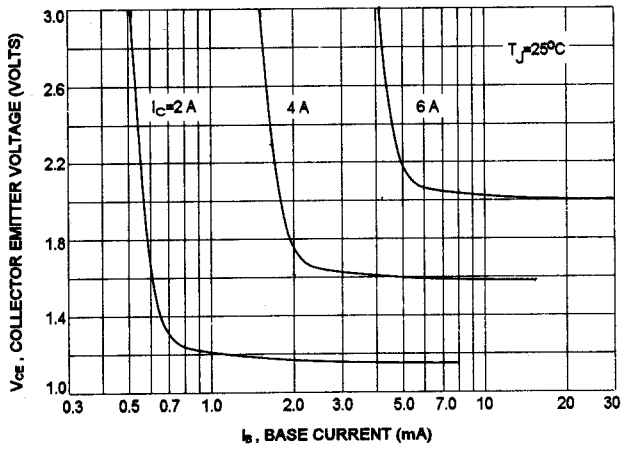
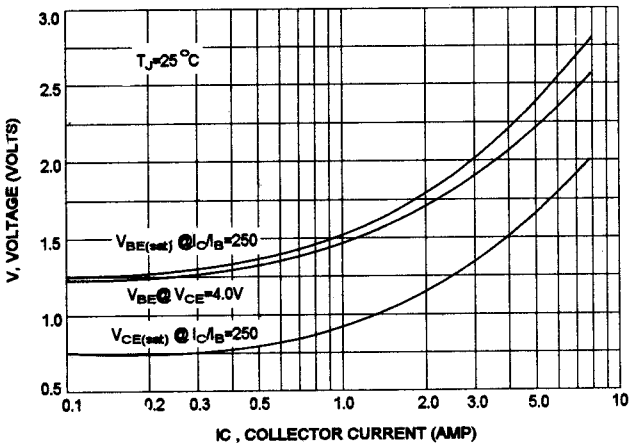
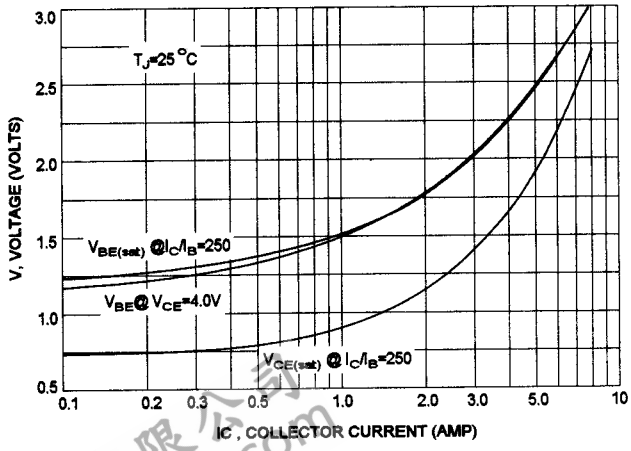


FIG-9 "ON" VOLTAGES





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