JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO., LTD

TO-220 Plastic-Encapsulate Transistors

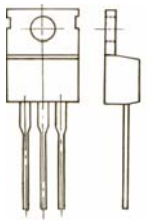
TIP120,121,122 Darlington TRANSISTOR (NPN)

TIP125,126,127 Darlington TRANSISTOR (PNP)

FEATURES

Power applications

TO-220



1.BASE

2.COLLECTOR

3.EMITTER

1 2 3

MAXIMUM RATINGS* T_A=25℃ unless otherwise noted

Symbol	Parameter	TIP120 TIP125	TIP121 TIP126	TIP122 TIP127	Units
V_{CBO}	Collector-Base Voltage	60	80	100	V
V_{CEO}	Collector-Emitter Voltage	60	80	100	V
V_{EBO}	Emitter-Base Voltage	5			V
I_C	Collector Current -Continuous	5			A
P_C	Collector Power Dissipation	2			W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5			℃/W
$R_{\theta Jc}$	Thermal Resistance Junction to Case	1.92			℃/W
T_{stg}	Storage Temperature Range	-65to+150			℃

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

ELECTRICAL CHARACTERISTICS(Tamb=25℃ unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage **TIP120,TIP125** **TIP121,TIP126** **TIP122,TIP127**	$V(BR)_{CBO}$	Ic= 1mA，I_E=0	60 80 100		V
Collector-emitter breakdown voltage **TIP120,TIP125** **TIP121,TIP126** **TIP122,TIP127**	$V_{CEO}(SUS)$	Ic= 30mA，I_B=0	60 80 100		V
Collector cut-off current **TIP120,TIP125** **TIP121,TIP126** **TIP122,TIP127**	I_{CBO}	V_{CB}= 60 V， I_E=0 V_{CB}= 80 V， I_E=0 V_{CB}= 100V， I_E=0		0.2	mA
Collector cut-off current **TIP120,TIP125** **TIP121,TIP126** **TIP122,TIP127**	I_{CEO}	V_{CE}=30 V， I_B=0 V_{CE}=40 V， I_B=0 V_{CE}=50 V， I_B=0		0.5	mA
Emitter cut-off current	I_{EBO}	V_{EB}=-5 V， I_C=0		2	mA
DC current gain	$h_{FE(1)}$	V_{CE}= 3V, I_C=0.5A	1000		
	$h_{FE(2)}$	V_{CE}= 3V, I_C=3 A	1000		
Collector-emitter saturation voltage	V_{CE}(sat)	I_C=3A,I_B=12 mA I_C=5 A,I_B=20 mA		2 4	V
Base-emitter ON voltage	V_{BE}(on)	V_{CE}=3V, I_C=3 A		2.5	V
Output Capacitance **TIP125,TIP126,TIP127** **TIP120,TIP121,TIP122**	Cob	$V_{CB=}$10V, I_E=0,f=0.1MHz		300 200	pF

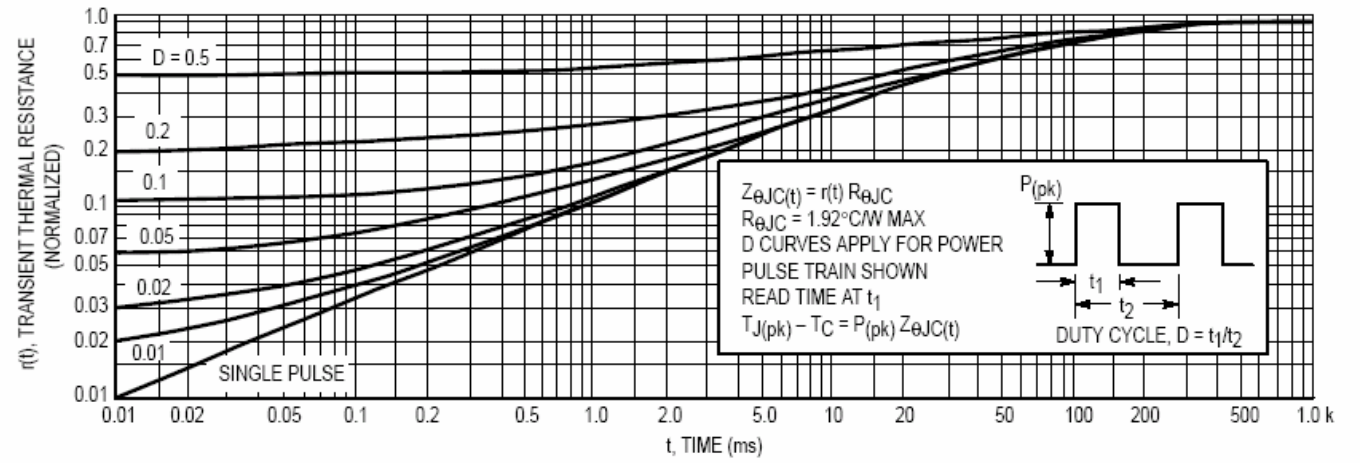


Figure 4. Thermal Response

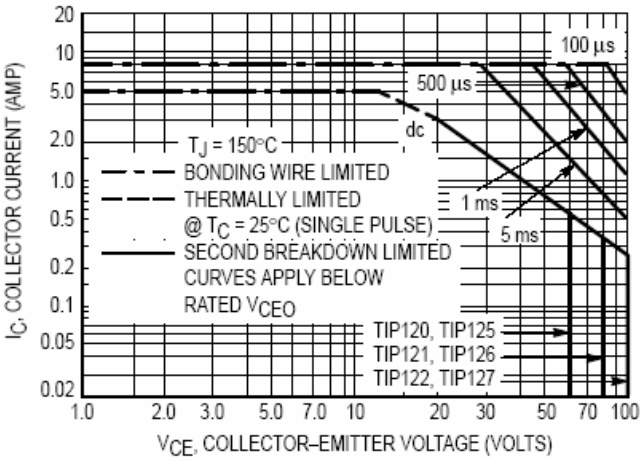


Figure 5. Active–Region Safe Operating Area

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

The data of Figure 5 is based on $T_{J(pk)}$ = 150°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)}$ < 150°C. $T_{J(pk)}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown

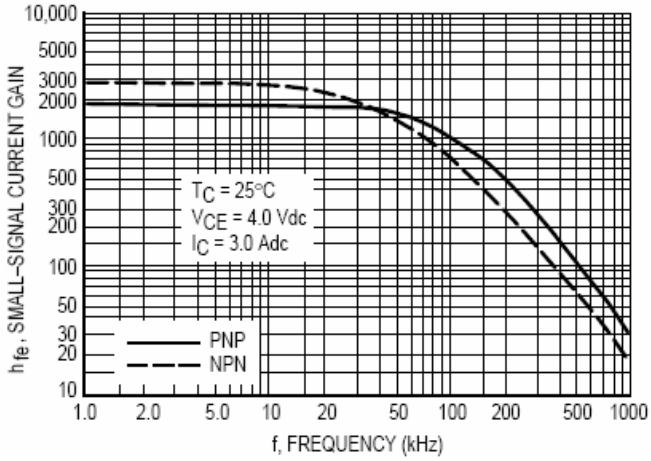


Figure 6. Small–Signal Current Gain

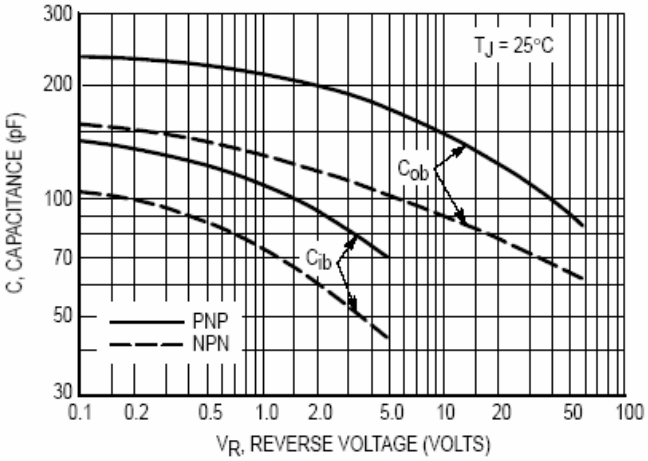


Figure 7. Capacitance

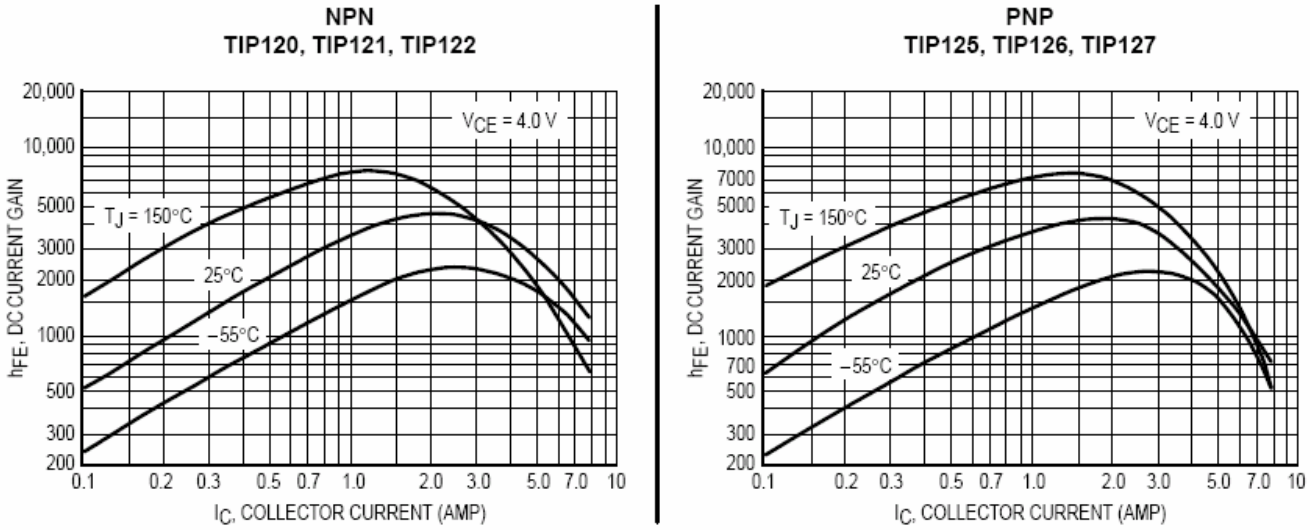


Figure 8. DC Current Gain

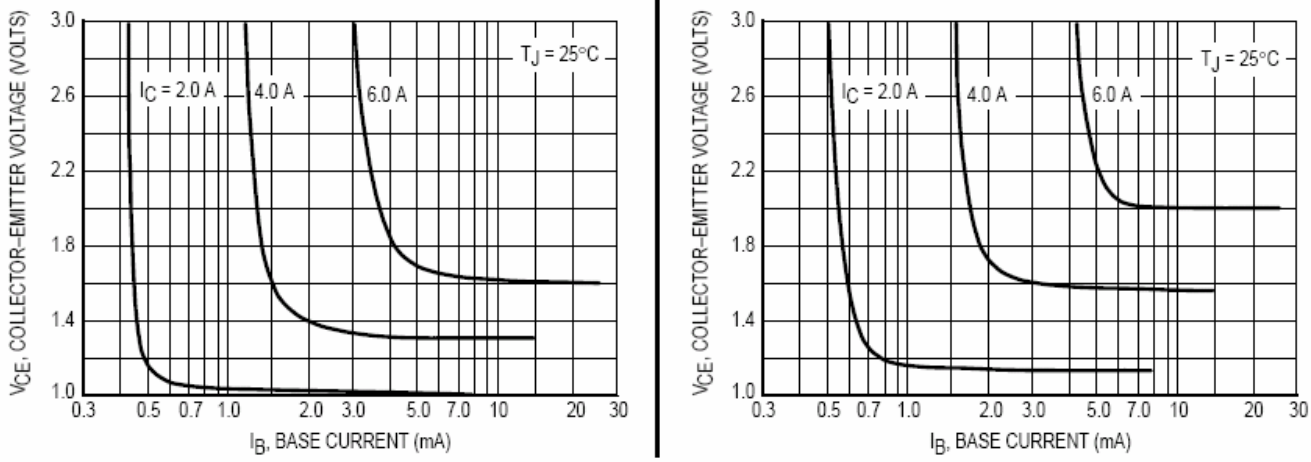


Figure 9. Collector Saturation Region

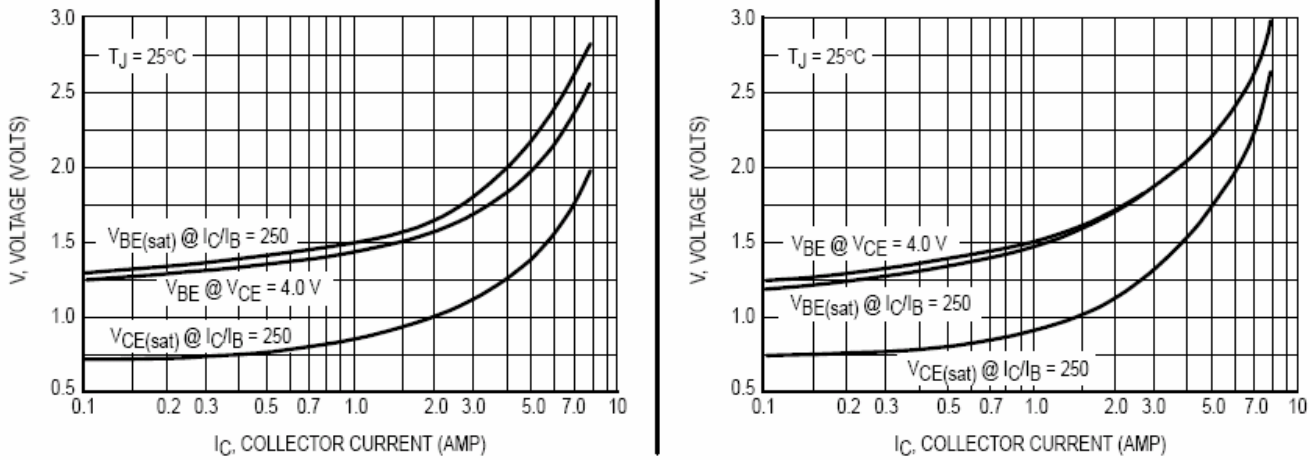


Figure 10. "On" Voltages