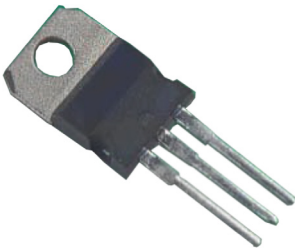


RoHS
Compliant



Features

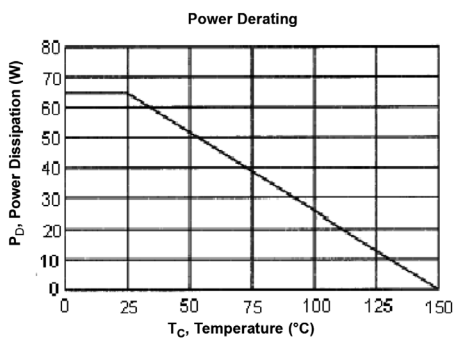
- Designed for general-purpose amplifier and low speed switching applications
- Collector-emitter sustaining voltage - $V_{CE(sus)}$ = 60V (minimum) - TIP120, TIP125
80V (minimum) - TIP121, TIP126
100V (minimum) - TIP122, TIP127
- Collector-emitter saturation voltage - $V_{CE(sat)}$ = 2V (maximum) at $I_C = 3A$
- Monolithic construction with built-in base-emitter shunt resistors

Maximum Ratings

Parameter	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}	5			
Collector Current - Continuous - Peak	I_C	5			A
	I_{CM}	8			
Base Current	I_B	120			mA
Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	65			W W / °C
		0.52			
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150			°C

Thermal Characteristics

Parameter	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.92	°C / W



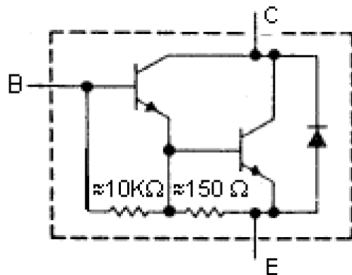
Electrical Characteristics (T_c = 25°C unless otherwise noted)

Characteristic	Symbol	Minimum	Maximum	Unit
Off Characteristics				
Collector-Emitter Breakdown Voltage (1) (I _C = 30 mA, I _B = 0)	V _{CEO(SUS)}	60	-	V
TIP120, TIP125		80		
TIP121, TIP126 TIP122, TIP127		100		
Collector Cut off Current (V _{CE} = 30 V, I _B = 0)	I _{CEO}	-	0.5	mA
(V _{CE} = 40 V, I _B = 0)			0.5	
(V _{CE} = 50 V, I _B = 0)			0.5	
Collector Cut off Current (V _{CE} = 60 V, I _B = 0)	I _{CBO}	-	0.2	mA
(V _{CE} = 80 V, I _B = 0)			0.2	
(V _{CE} = 100 V, I _B = 0)			0.2	
Collector Cut off Current (V _{EB} = 5V, I _C = 0)	I _{EBO}	-	2	
On Characteristics (1)				
DC Current Gain (I _C = 0.5A, V _{CE} = 3V)	h _{FE}	1,000	-	-
(I _C = 3A, V _{CE} = 3V)		1,000		
Collector-Emitter Saturation Voltage (I _C = 3A, I _B = 12mA)	V _{CE(sat)}	-	2	V
(I _C = 5A, I _B = 20mA)			4	
Base-Emitter on Voltage (I _C = 3A, V _{CE} = 3V)	V _{BE(on)}	-	2.5	
Dynamic Characteristics				
Small-Signal Current Gain (I _C = 3A, V _{CE} = 4V, f = 1MHz)	h _{fe}	4	-	-
Output Capacitance (V _{cb} = 10V, I _E = 0, f = 0.1MHz)	C _{ob}	-	300	pF
TIP120, TIP121, TIP122 TIP125, TIP126, TIP127			250	

(1) Pulse Test : Pulse width = 300μs, duty cycle ≤2%

Internal Schematic Diagram

NPN
TIP120
TIP121
TIP122



PNP
TIP125
TIP126
TIP127

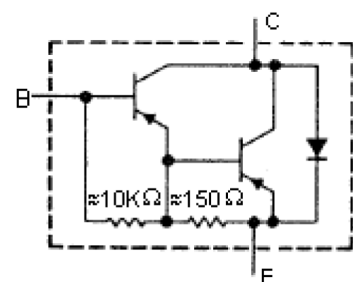


Figure - 2 Switching Time

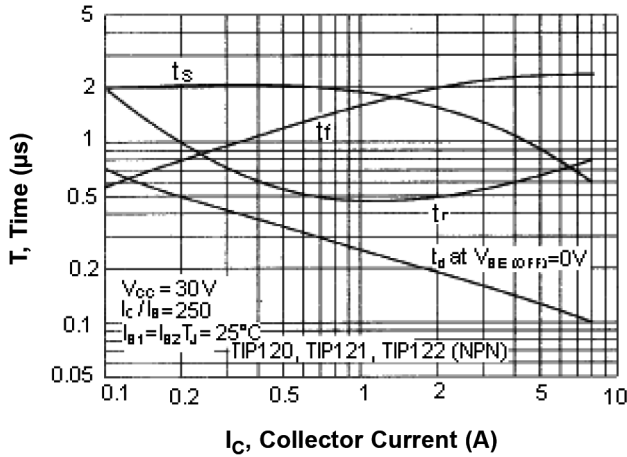


Figure - 3 Switching Time

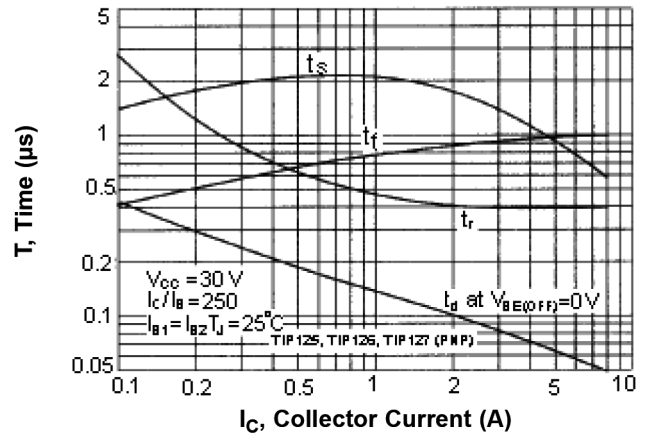


Figure - 4 Small Signal Current Gain

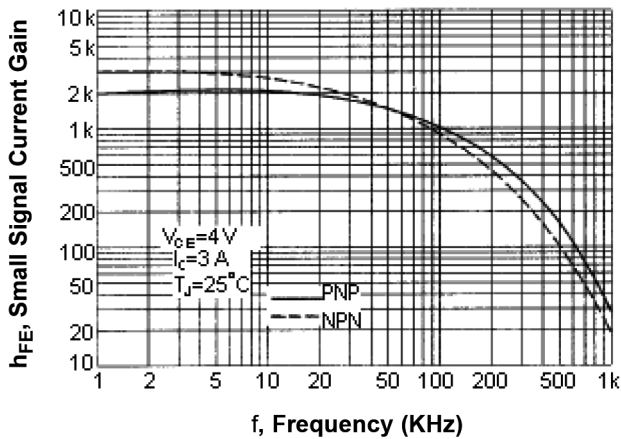


Figure - 5 Capacitances

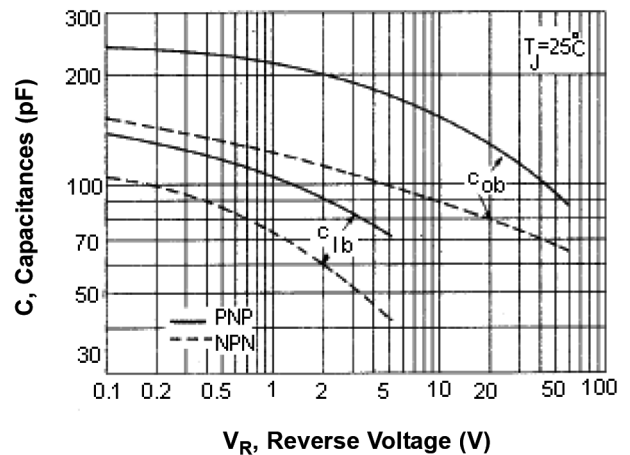
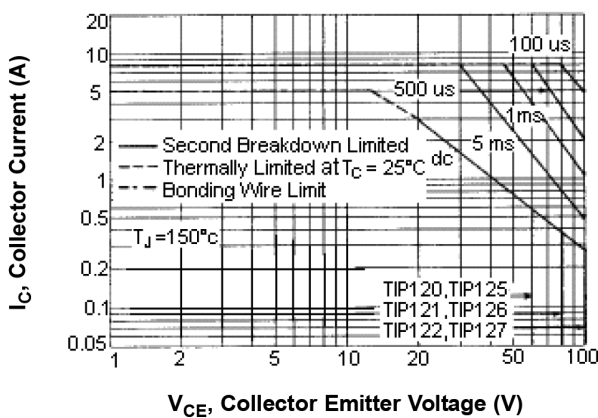


Figure - 6 Active Region Safe Operating Area



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

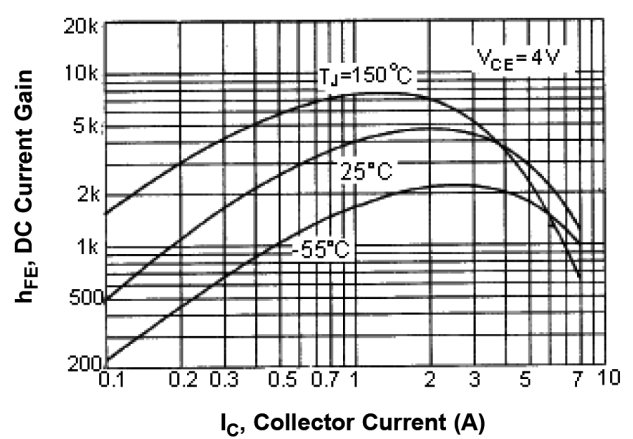
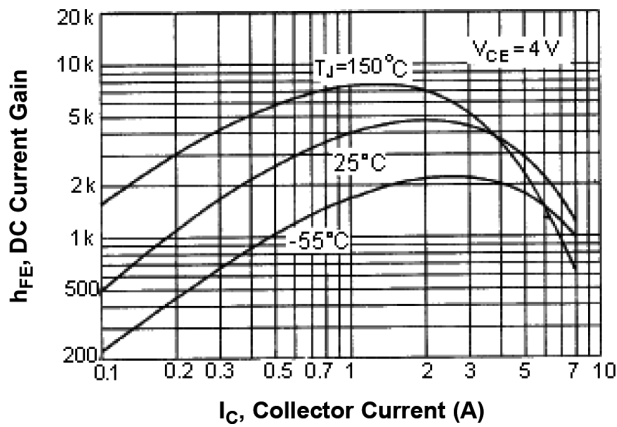


Figure - 8 Collector Saturation Region

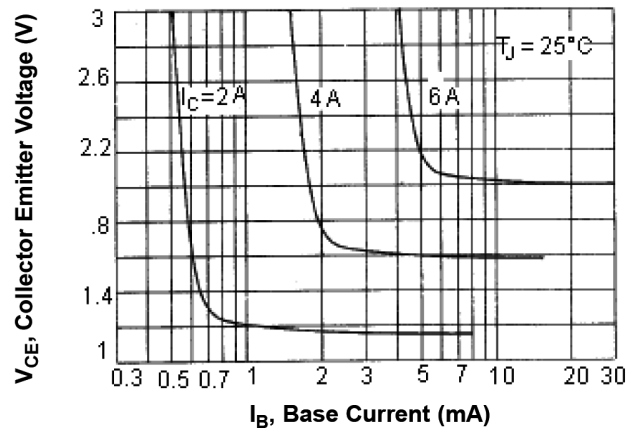
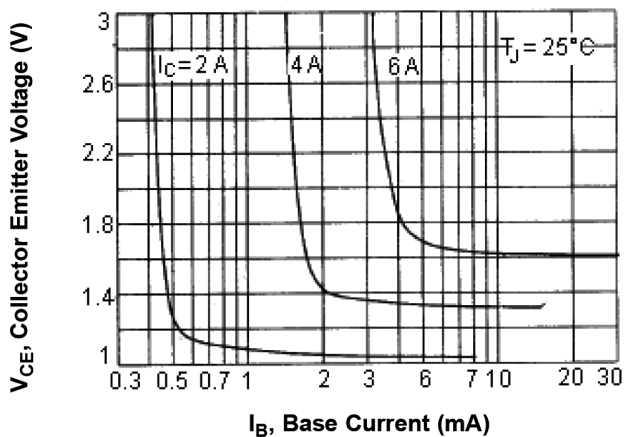
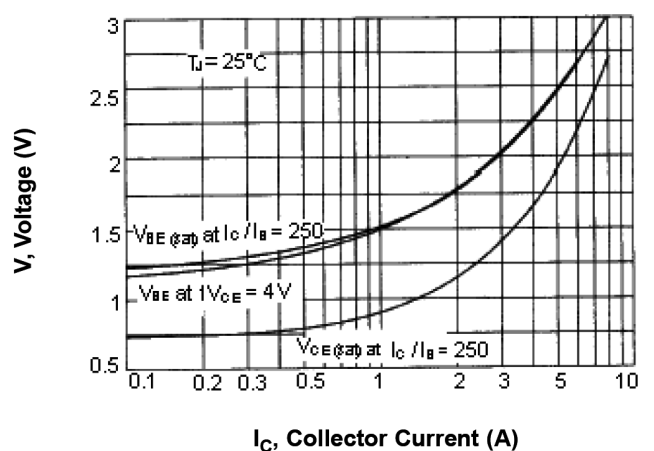
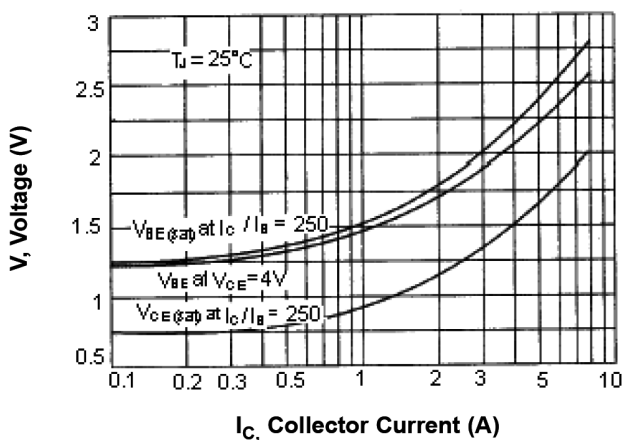


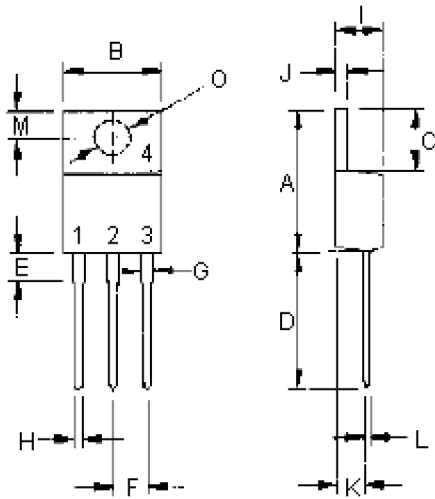
Figure - 9 "ON" Voltage



Specification Table

Ic A	V _{CEO} (Maximum) V	h _{FE} Minimum at I _c = 3A	P _{tot} at 25°C W	Package	Part Number	
					NPN	PNP
5	60	1,000	65	TO-220	TIP120	TIP125
	80				TIP121	TIP126
	100				TIP122	TIP127

Diagram



Dimensions	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	2.2	2.97
L	0.33	0.55
M	2.48	2.98
O	3.7	3.9

Dimensions : Millimetres

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