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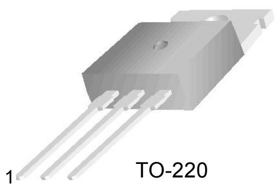
October 2008

TIP120/TIP121/TIP122

NPN Epitaxial Darlington Transistor

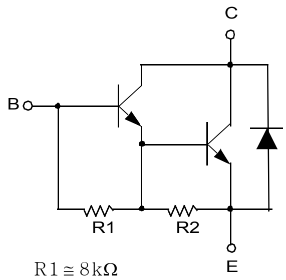
- Medium Power Linear Switching Applications
- Complementary to TIP125/126/127

Equivalent Circuit



TO-220

1.Base 2.Collector 3.Emitter



$R1 \cong 8k\Omega$
$R2 \cong 0.12k\Omega$

Absolute Maximum Ratings* T_a = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{CBO}	Collector-Base Voltage : TIP120	60	V
	: TIP121	80	V
	: TIP122	100	V
V_{CEO}	Collector-Emitter Voltage : TIP120	60	V
	: TIP121	80	V
	: TIP122	100	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	Collector Current (DC)	5	A
I_{CP}	Collector Current (Pulse)	8	A
I_B	Base Current (DC)	120	mA
P_C	Collector Dissipation (T_a=25°C)	2	W
	Collector Dissipation (T_C=25°C)	65	W
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature	- 65 ~ 150	°C

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

Electrical Characteristics* T_a=25°C unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V_{CEO}(sus)	Collector-Emitter Sustaining Voltage : TIP120 : TIP121 : TIP122	 I_C = 100mA, I_B = 0	 60 80 100			 V V V
I_{CEO}	Collector Cut-off Current : TIP120 : TIP121 : TIP122	 V_{CE} = 30V, I_B = 0 V_{CE} = 40V, I_B = 0 V_{CE} = 50V, I_B = 0			 0.5 0.5 0.5	 mA mA mA
I_{CBO}	Collector Cut-off Current : TIP120 : TIP121 : TIP122	 V_{CB} = 60V, I_E = 0 V_{CB} = 80V, I_E = 0 V_{CB} = 100V, I_E = 0			 0.2 0.2 0.2	 mA mA mA
I_{EBO}	Emitter Cut-off Current	V_{BE} = 5V, I_C = 0			2	mA
h_{FE}	* DC Current Gain	V_{CE} = 3V,I_C = 0.5A V_{CE} = 3V, I_C = 3A	1000 1000			
V_{CE}(sat)	* Collector-Emitter Saturation Voltage	I_C = 3A, I_B = 12mA I_C = 5A, I_B = 20mA			2.0 4.0	V V
V_{BE}(on)	* Base-Emitter On Voltage	V_{CE} = 3V, I_C = 3A			2.5	V
C_{ob}	Output Capacitance	V_{CB} = 10V, I_E = 0, f = 0.1MHz			200	pF

* Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

Typical characteristics

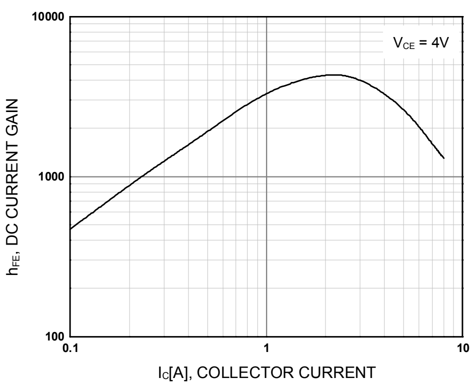


Figure 1. DC current Gain

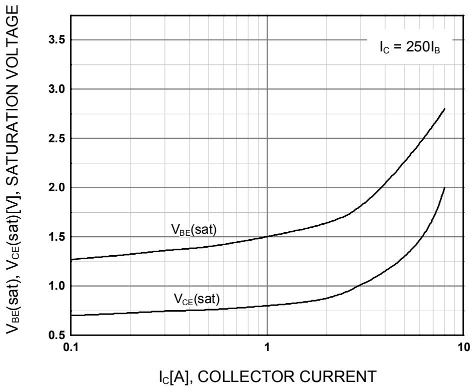


Figure 2. Base-Emitter Saturation Voltage Collector-Emitter Saturation Voltage

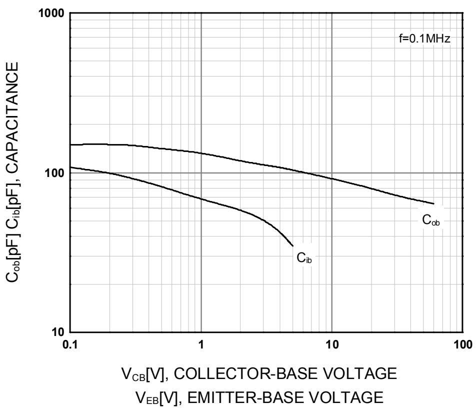


Figure 3. Output and Input Capacitance vs. Reverse Voltage

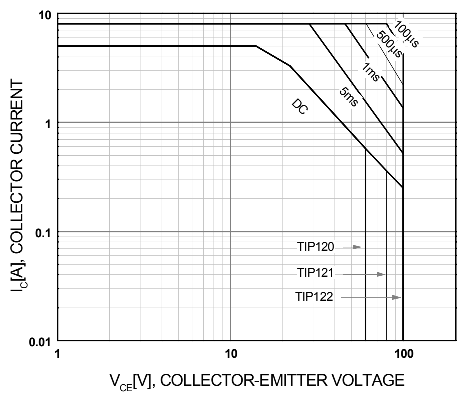


Figure 4. Safe Operating Area

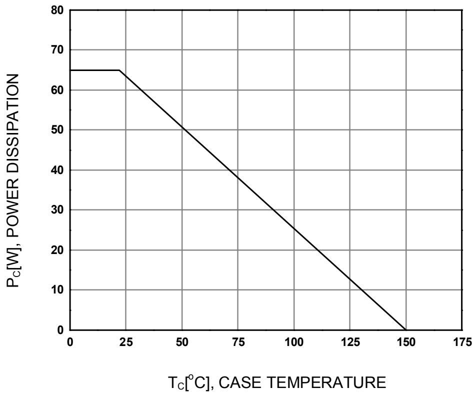
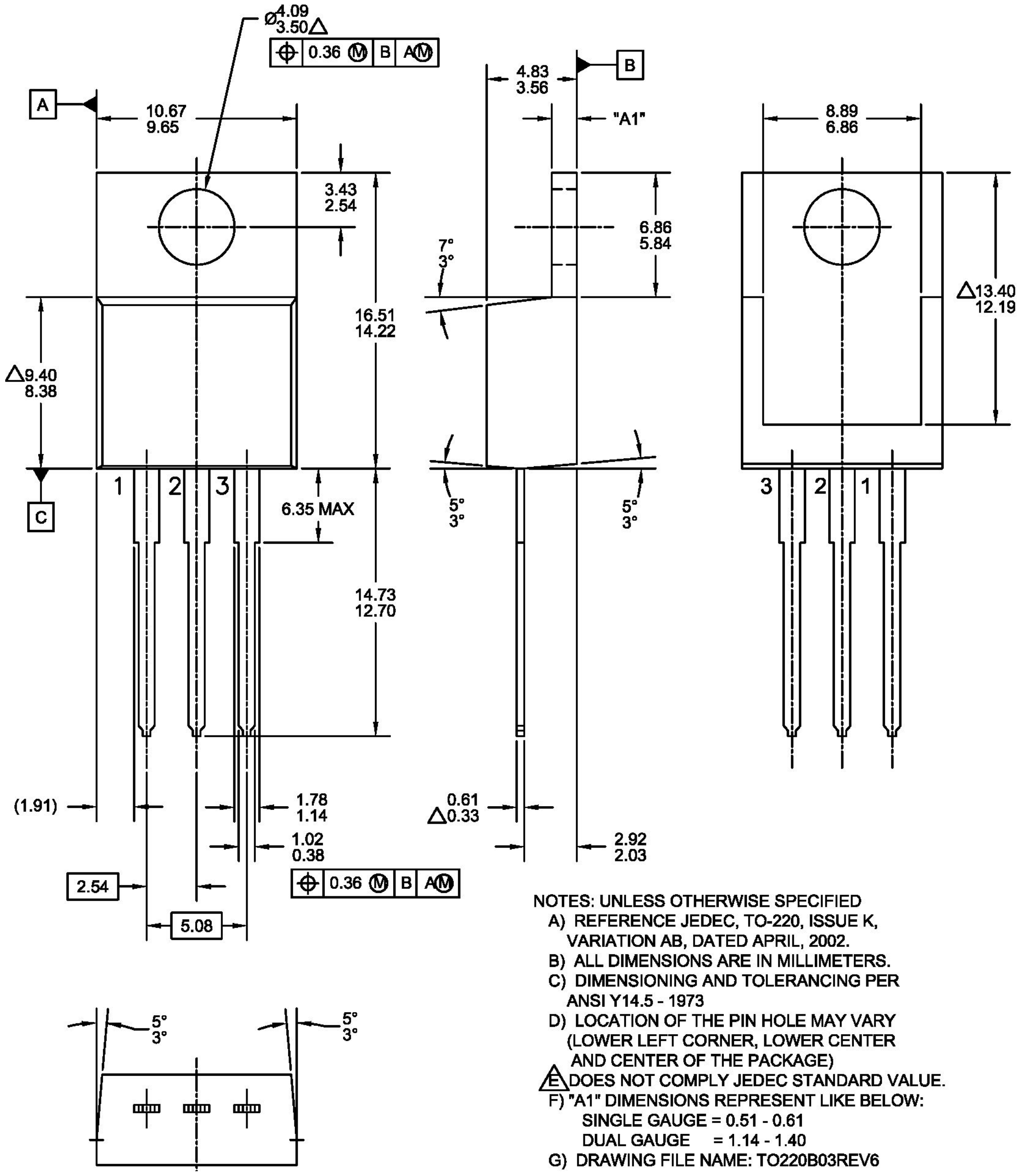


Figure 5. Power Derating

Mechanical Dimensions

TO220



NOTES: UNLESS OTHERWISE SPECIFIED
A) REFERENCE JEDEC, TO-220, ISSUE K, VARIATION AB, DATED APRIL, 2002.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1973
D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
E) DOES NOT COMPLY JEDEC STANDARD VALUE.
F) "A1" DIMENSIONS REPRESENT LIKE BELOW:
SINGLE GAUGE = 0.51 - 0.61
DUAL GAUGE = 1.14 - 1.40
G) DRAWING FILE NAME: TO220B03REV6

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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