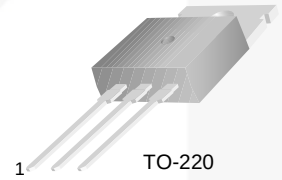
December 2014

TIP102
NPN Epitaxial Silicon Darlington Transistor

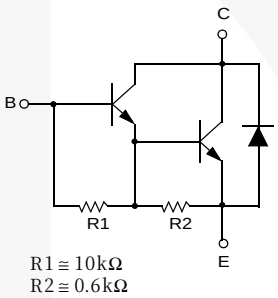
Features

- Monolithic Construction with Built-in Base-Emitter Shunt Resistors
- High DC Current Gain: h_{FE} = 1000 @ V_{CE} = 4 V, I_C = 3 A (Minimum)
- Collector-Emitter Sustaining Voltage
- Low Collector-Emitter Saturation Voltage
- Industrial Use
- Complementary to TIP107



1.Base 2.Collector 3.Emitter

Equivalent Circuit



R1 ≅ 10kΩ
R2 ≅ 0.6kΩ

Ordering Information

Part Number	Top Mark	Package	Packing Method
TIP102	TIP102	TO-220 3L (Single Gauge)	Bulk
TIP102TU	TIP102	TO-220 3L (Single Gauge)	Rail

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_C = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	100	V
V_{CEO}	Collector-Emitter Voltage	100	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	Collector Current (DC)	8	A
I_{CP}	Collector Current (Pulse)	15	A
I_B	Base Current (DC)	1	A
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-65 to 150	°C

Thermal Characteristics

Values are at T_C = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
P_C	Collector Dissipation (T_A = 25°C)	2	W
	Collector Dissipation (T_C = 25°C)	80	

Electrical Characteristics[1]

Values are at T_C = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
V_{CEO}(sus)	Collector-Emitter Sustaining Voltage	I_C = 30 mA, I_B = 0	100		V
I_{CEO}	Collector Cut-Off Current	V_{CE} = 50 V, I_B = 0		50	µA
I_{CBO}	Collector Cut-Off Current	V_{CB} = 100 V, I_E = 0		50	µA
I_{EBO}	Emitter Cut-Off Current	V_{EB} = 5 V, I_C = 0		2	mA
h_{FE}	DC Current Gain	V_{CE} = 4 V, I_C = 3 A	1000	20000	
		V_{CE} = 4 V, I_C = 8 A	200		
V_{CE}(sat)	Collector-Emitter Saturation Voltage	I_C = 3 A, I_B = 6 mA		2.0	V
		I_C = 8 A, I_B = 80 mA		2.5	
V_{BE}(on)	Base-Emitter On Voltage	V_{CE} = 4 V, I_C = 8 A		2.8	V
C_{ob}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 0.1 MHz		200	pF

Note:

1. Pulse test: pw ≤ 300 µs, duty cycle ≤ 2%.

Typical Performance Characteristics

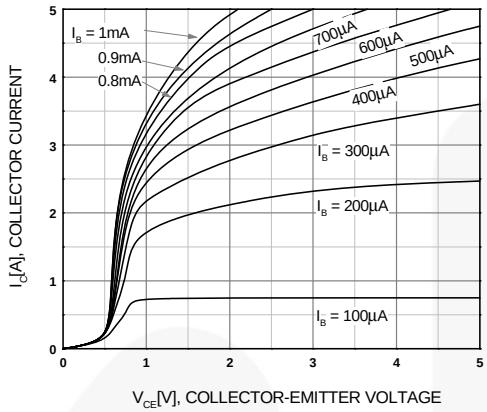


Figure 1. Static Characteristic

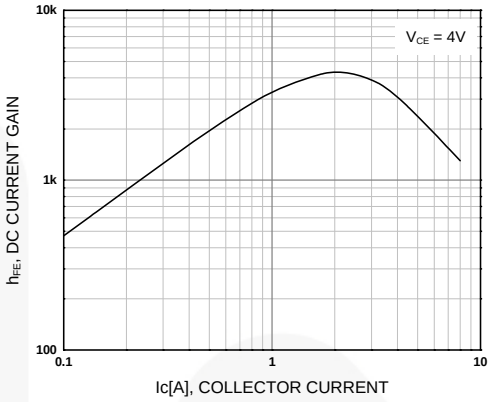


Figure 2. DC Current Gain

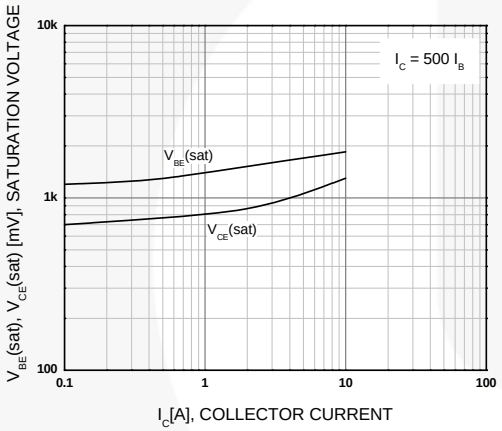


Figure 3. Collector-Emitter Saturation Voltage and Base-Emitter Saturation Voltage

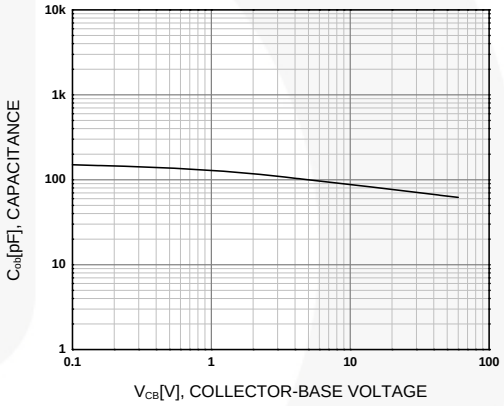


Figure 4. Collector Output Capacitance

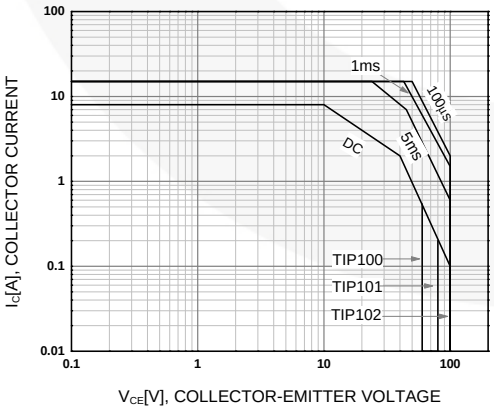


Figure 5. Safe Operating Area

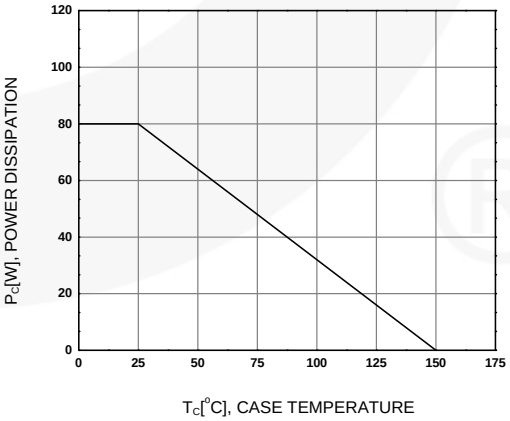


Figure 6. Power Derating

Physical Dimensions

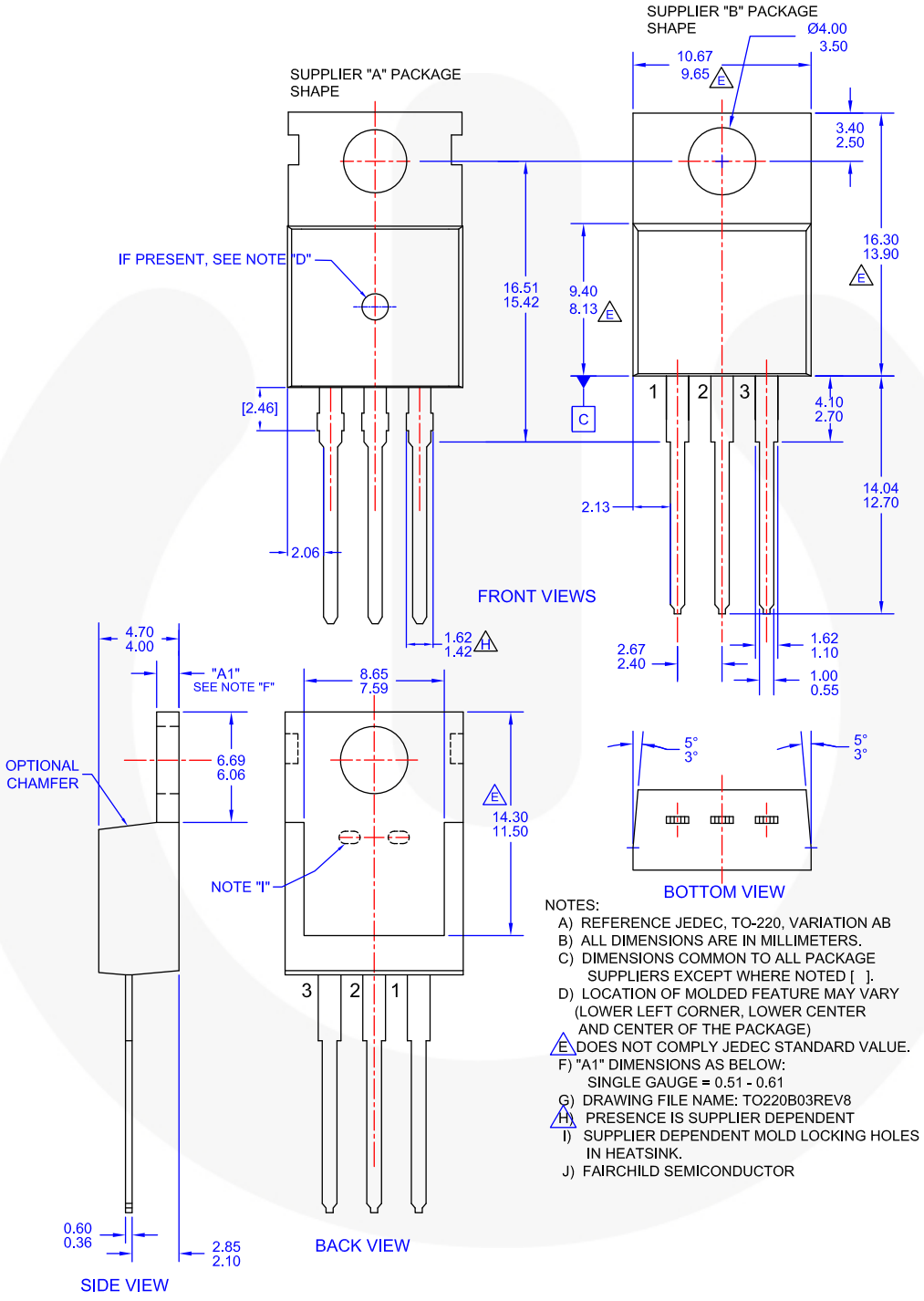


Figure 7. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

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