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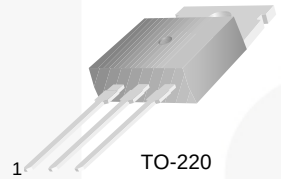
November 2014

TIP110 / TIP111 / TIP112
NPN Epitaxial Silicon Darlington Transistor

Features

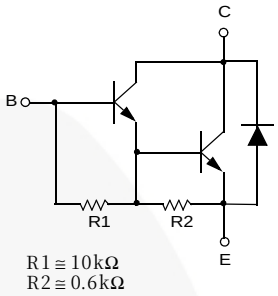
- Monolithic Construction with Built-in Base-Emitter Shunt Resistors
- Complementary to TIP115 / TIP116 / TIP117
- High DC Current Gain:
  h_{FE} = 1000 @ V_{CE} = 4 V, I_C = 1 A (Minimum)
- Low Collector-Emitter Saturation Voltage
- Industrial Use



TO-220

1.Base 2.Collector 3.Emitter

Equivalent Circuit



$R1 \cong 10k\Omega$
$R2 \cong 0.6k\Omega$

Ordering Information

Part Number	Top Mark	Package	Packing Method
TIP110	TIP110	TO-220 3L (Single Gauge)	Bulk
TIP110TU	TIP110	TO-220 3L (Single Gauge)	Rail
TIP111TU	TIP111	TO-220 3L (Single Gauge)	Rail
TIP112	TIP112	TO-220 3L (Single Gauge)	Bulk
TIP112TU	TIP112	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	TIP110	60	V
		TIP111	80	
		TIP112	100	
V_{CEO}	Collector-Emitter Voltage	TIP110	60	V
		TIP111	80	
		TIP112	100	
V_{EBO}	Emitter-Base Voltage		5	V
I_C	Collector Current (DC)		2	A
I_{CP}	Collector Current (Pulse)		4	A
I_B	Base Current (DC)		50	mA
T_J	Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-65 to 150	°C

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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)	50	

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	TIP110	I_C = 30 mA, I_B = 0	60		V
		TIP111		80		
		TIP112		100		
I_{CEO}	Collector Cut-Off Current	TIP110	V_{CE} = 30 V, I_B = 0		2	mA
		TIP111	V_{CE} = 40 V, I_B = 0		2	
		TIP112	V_{CE} = 50 V, I_B = 0		2	
I_{CBO}	Collector Cut-Off Current	TIP110	V_{CB} = 60 V, I_E = 0		1	mA
		TIP111	V_{CB} = 80 V, I_E = 0		1	
		TIP112	V_{CB} = 100 V, I_E = 0		1	
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 = 1 A	1000		
			V_{CE} = 4 V, I_C = 2 A	500		
V_{CE}(sat)	Collector-Emitter Saturation Voltage		I_C = 2 A, I_B = 8 mA		2.5	V
V_{BE}(on)	Base-Emitter On Voltage		V_{CE} = 4 V, I_C = 2 A		2.8	V
C_{ob}	Output Capacitance		V_{CB} = 10 V, I_E = 0, f = 0.1 MHz		100	pF

Note:

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

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Typical Performance Characteristics

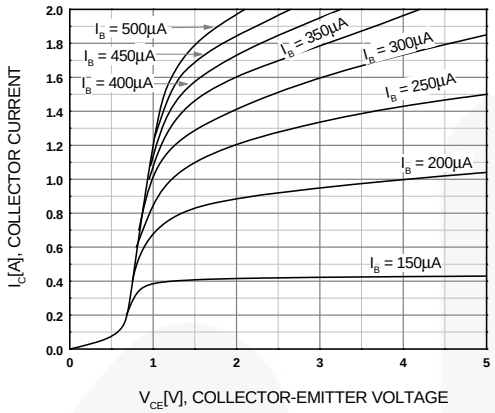

Figure 1. Static Characteristic

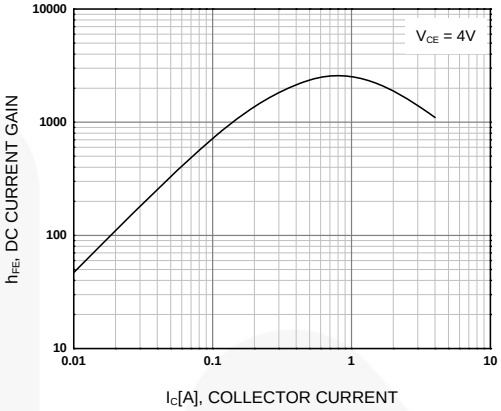

Figure 2. DC Current Gain

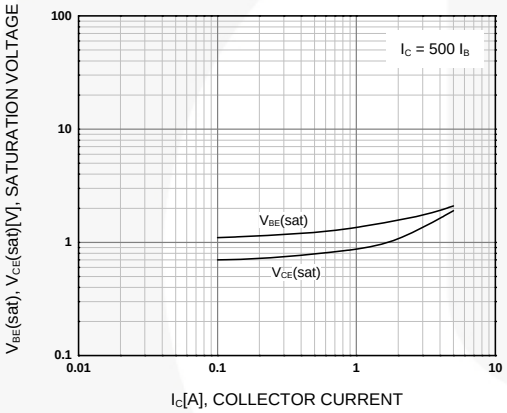

Figure 3. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

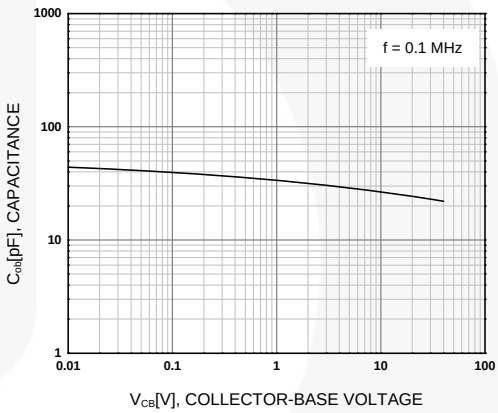

Figure 4. Collector Output Capacitance

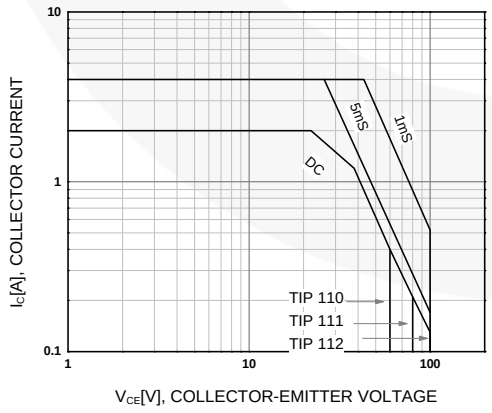

Figure 5. Safe Operating Area

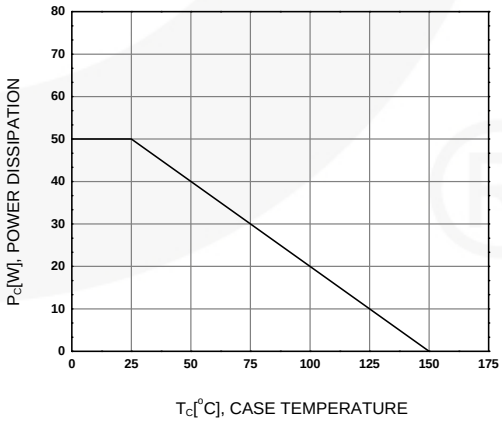

Figure 6. Power Derating

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Physical Dimensions

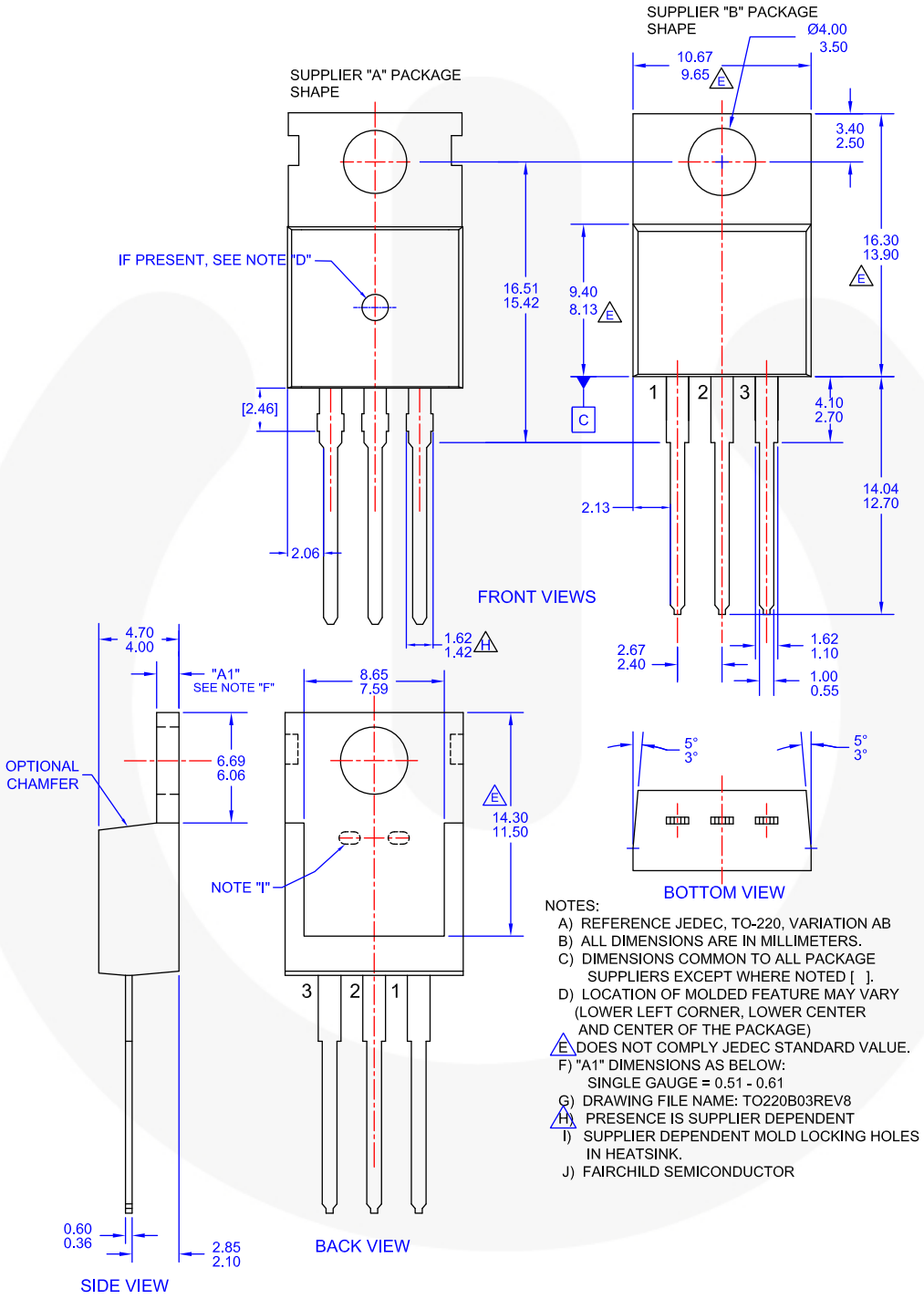

Figure 7. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

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