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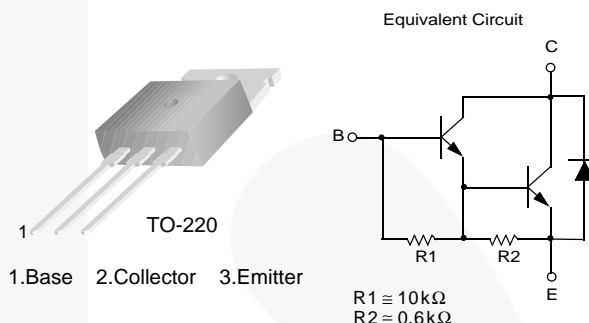
November 2014

# 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



### 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  $T_C = 25^\circ\text{C}$  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	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range		-65 to 150	$^\circ\text{C}$

TIP110 / TIP111 / TIP112 — NPN Epitaxial Silicon Darlington Transistor

## Thermal Characteristics

Values are at  $T_C = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$P_C$	Collector Dissipation ( $T_A = 25^\circ\text{C}$ )	2	W
	Collector Dissipation ( $T_C = 25^\circ\text{C}$ )	50	

## Electrical Characteristics<sup>(1)</sup>

Values are at  $T_C = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	TIP110	60		V
		TIP111	80		
		TIP112	100		
$I_{CEO}$	Collector Cut-Off Current	TIP110	$V_{CE} = 30\text{ V}, I_B = 0$	2	mA
		TIP111	$V_{CE} = 40\text{ V}, I_B = 0$	2	
		TIP112	$V_{CE} = 50\text{ V}, I_B = 0$	2	
$I_{CBO}$	Collector Cut-Off Current	TIP110	$V_{CB} = 60\text{ V}, I_E = 0$	1	mA
		TIP111	$V_{CB} = 80\text{ V}, I_E = 0$	1	
		TIP112	$V_{CB} = 100\text{ V}, I_E = 0$	1	
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 5\text{ V}, I_C = 0$		2	mA
$h_{FE}$	DC Current Gain	$V_{CE} = 4\text{ V}, I_C = 1\text{ A}$	1000		
		$V_{CE} = 4\text{ V}, I_C = 2\text{ A}$	500		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 2\text{ A}, I_B = 8\text{ mA}$		2.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	$V_{CE} = 4\text{ V}, I_C = 2\text{ A}$		2.8	V
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 0.1\text{ MHz}$		100	pF

### Note:

1. Pulse test:  $p_w \leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

## Typical Performance Characteristics

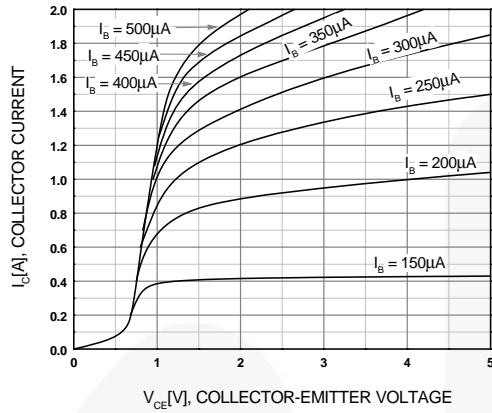


Figure 1. Static Characteristic

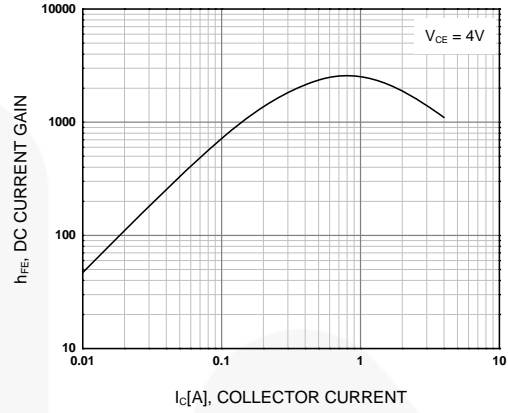


Figure 2. DC Current Gain

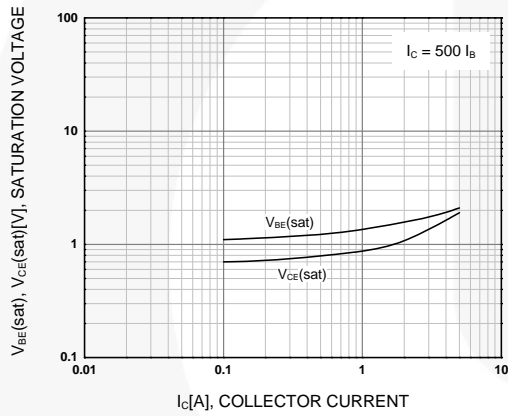


Figure 3. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

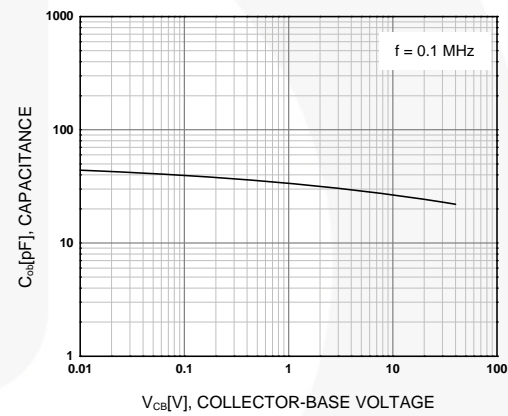


Figure 4. Collector Output Capacitance

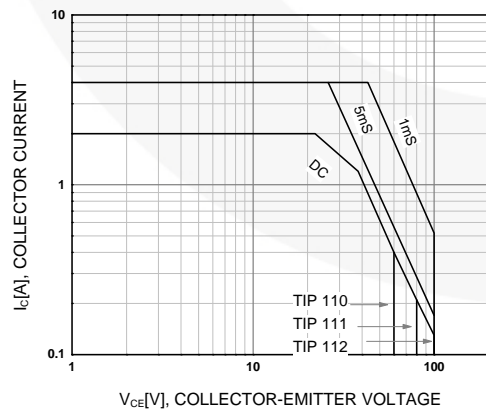


Figure 5. Safe Operating Area

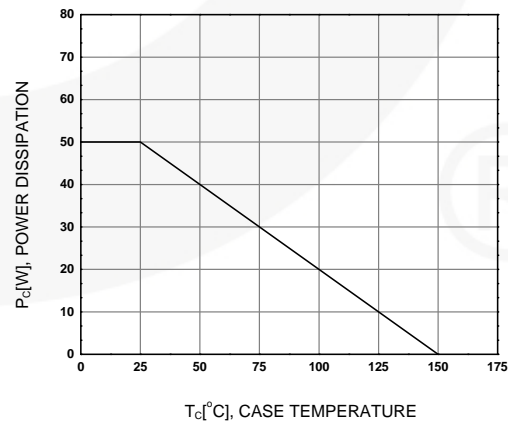


Figure 6. Power Derating

## Physical Dimensions

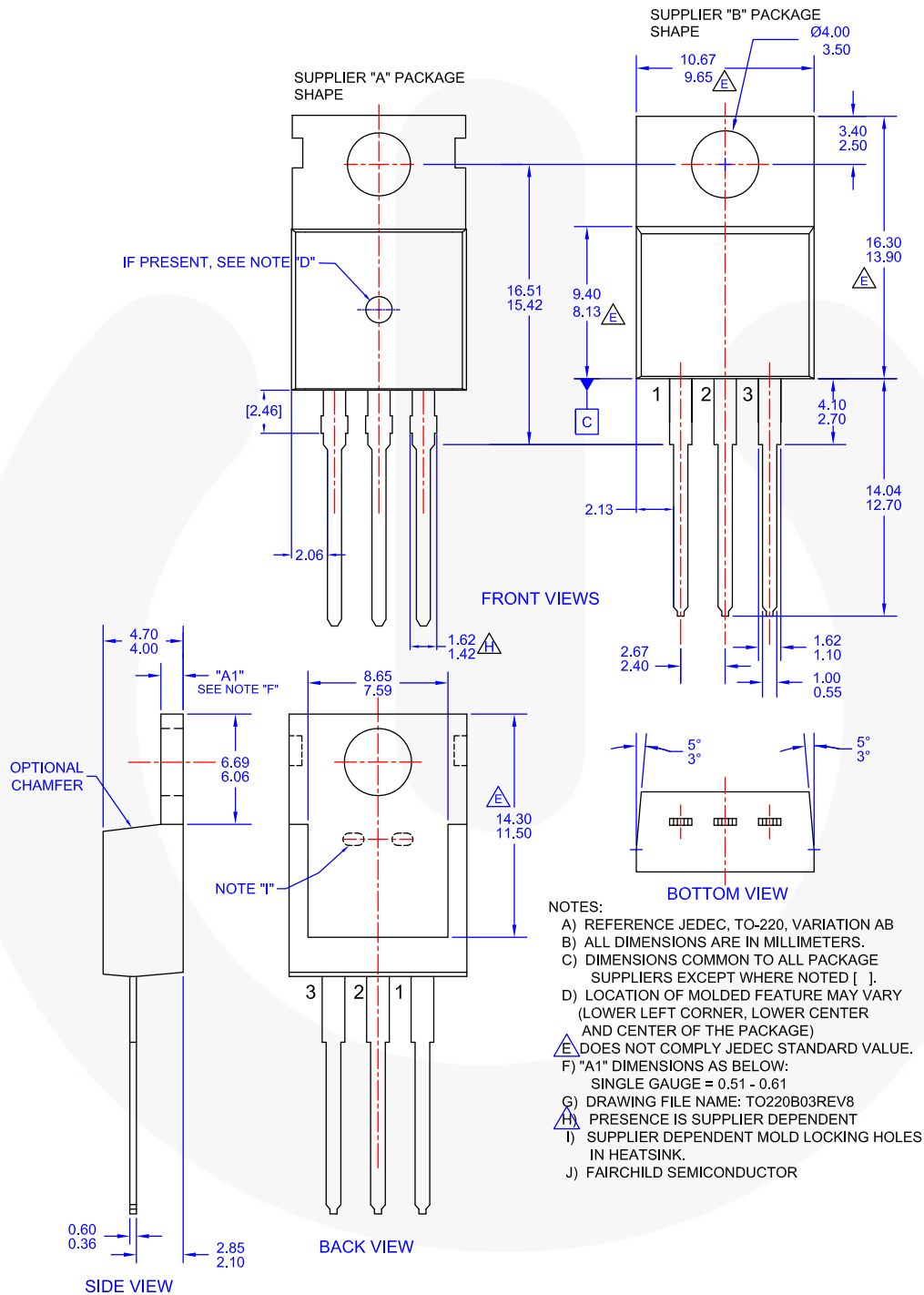


Figure 7. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB



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