



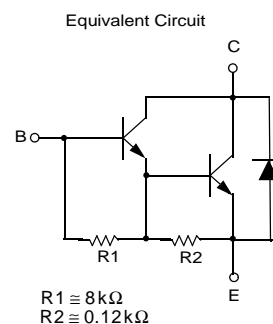
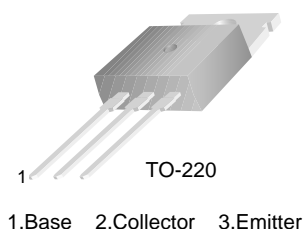
ON Semiconductor®

# TIP120 / TIP121 / TIP122

## NPN Epitaxial Darlington Transistor

### Features

- Medium Power Linear Switching Applications
- Complementary to TIP125 / TIP126 / TIP127



### Ordering Information

Part Number	Top Mark	Package	Packing Method
TIP120	TIP120	TO-220 3L (Single Gauge)	Bulk
TIP120TU	TIP120	TO-220 3L (Single Gauge)	Rail
TIP121	TIP121	TO-220 3L (Single Gauge)	Bulk
TIP121TU	TIP121	TO-220 3L (Single Gauge)	Rail
TIP122	TIP122	TO-220 3L (Single Gauge)	Bulk
TIP122TU	TIP122	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	TIP120	60	V
		TIP121	80	
		TIP122	100	
$V_{CEO}$	Collector-Emitter Voltage	TIP120	60	V
		TIP121	80	
		TIP122	100	
$V_{EBO}$	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
$T_J$	Junction Temperature		150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range		-65 to 150	$^\circ\text{C}$

## 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 ( $T_C = 25^\circ\text{C}$ )	65	

## Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Max.	Unit
$V_{CE(sus)}$	Collector-Emitter Sustaining Voltage	TIP120	60		V
		TIP121	80		
		TIP122	100		
$I_{CEO}$	Collector Cut-Off Current	TIP120		0.5	mA
		TIP121		0.5	
		TIP122		0.5	
$I_{CBO}$	Collector Cut-Off Current	TIP120		0.2	mA
		TIP121		0.2	
		TIP122		0.2	
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 5\text{ V}, I_C = 0$		2	mA
$h_{FE}$	DC Current Gain <sup>(1)</sup>	$V_{CE} = 3\text{ V}, I_C = 0.5\text{ A}$	1000		
		$V_{CE} = 3\text{ V}, I_C = 3\text{ A}$	1000		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(1)</sup>	$I_C = 3\text{ A}, I_B = 12\text{ mA}$		2.0	V
		$I_C = 5\text{ A}, I_B = 20\text{ mA}$		4.0	
$V_{BE(on)}$	Base-Emitter On Voltage <sup>(1)</sup>	$V_{CE} = 3\text{ V}, I_C = 3\text{ A}$		2.5	V
$C_{ob}$	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0,$ $f = 0.1\text{ MHz}$		200	pF

### Note:

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

## Typical Performance Characteristics

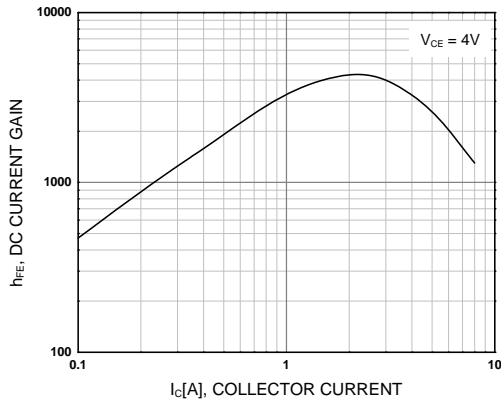


Figure 1. DC Current Gain

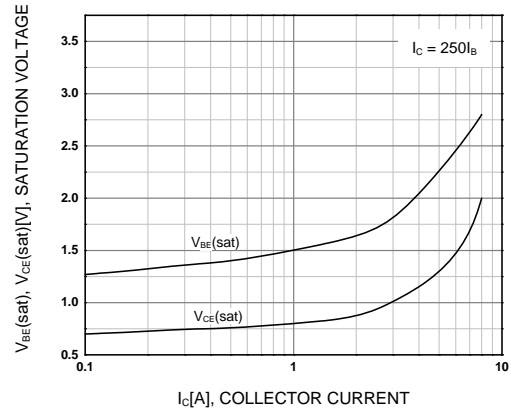


Figure 2. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

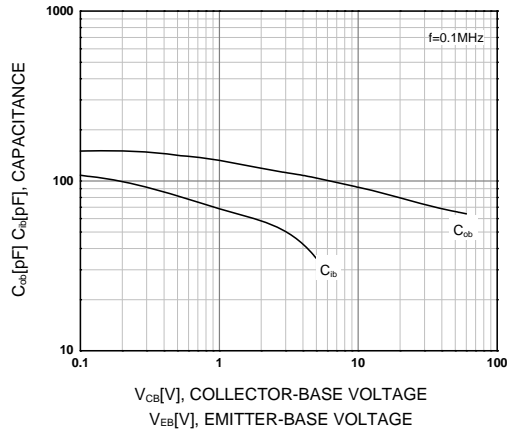


Figure 3. Output and Input Capacitance vs. Reverse Voltage

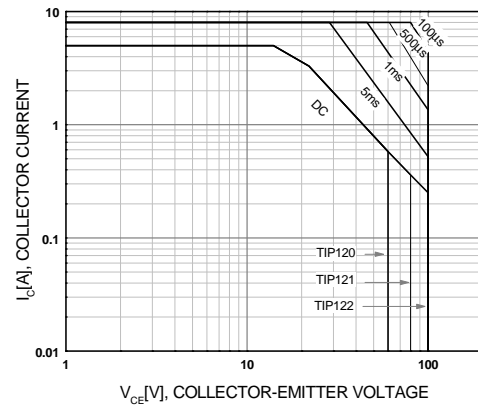


Figure 4. Safe Operating Area

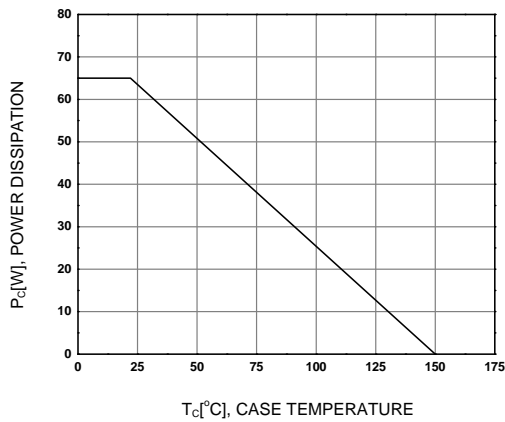


Figure 5. Power Derating

## Physical Dimensions

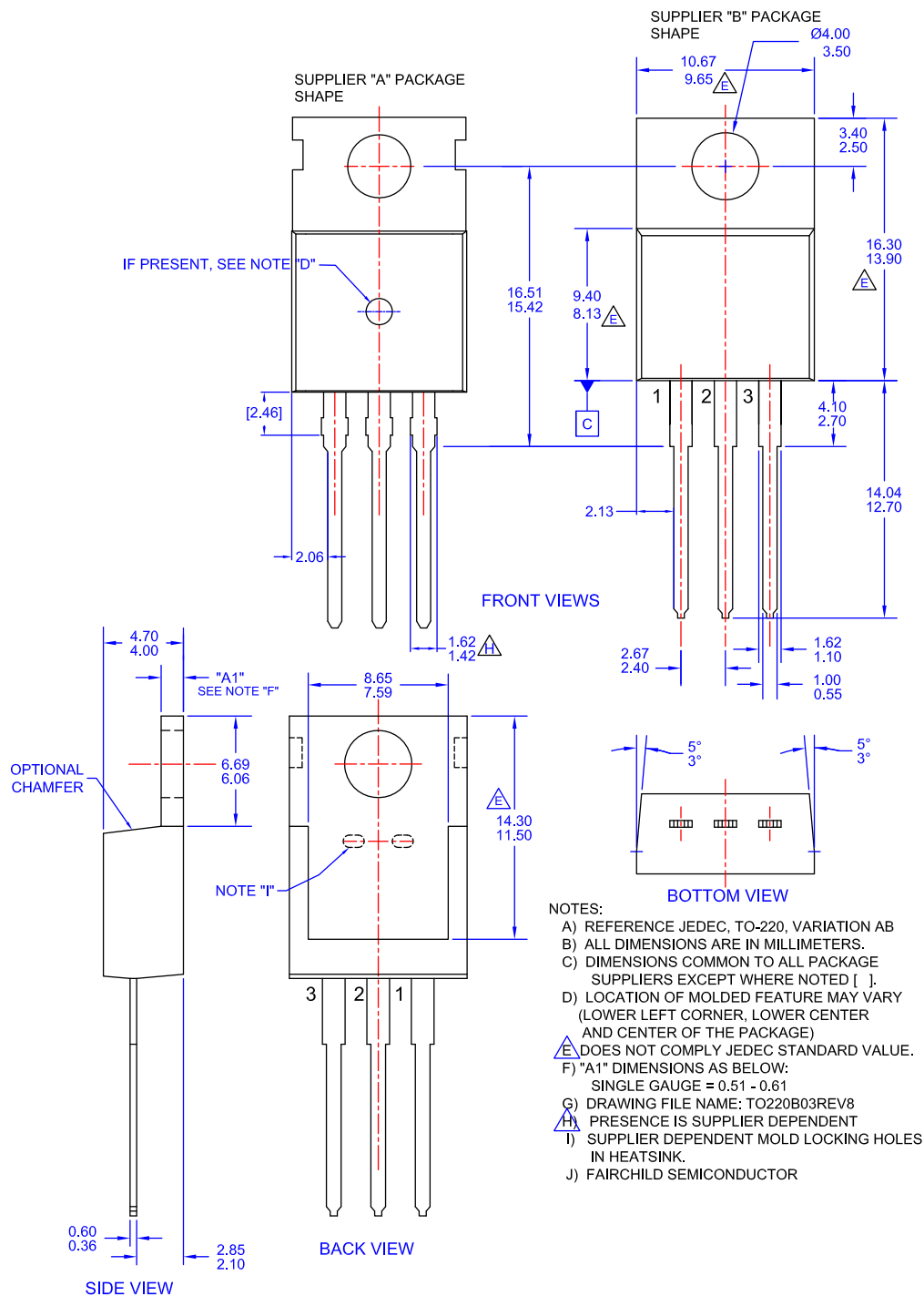


Figure 6. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

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