

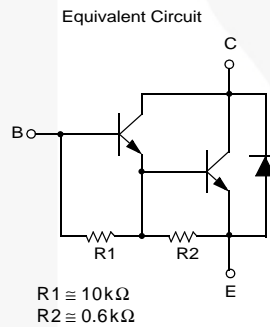
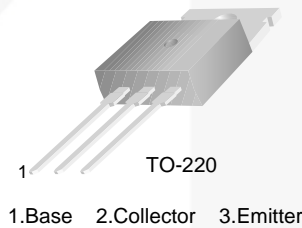


December 2014

# 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



## 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  $T_C = 25^\circ\text{C}$  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	$^\circ\text{C}$
$T_{STG}$	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 ( $T_C = 25^\circ\text{C}$ )	80	

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

### Note:

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

Typical Performance Characteristics

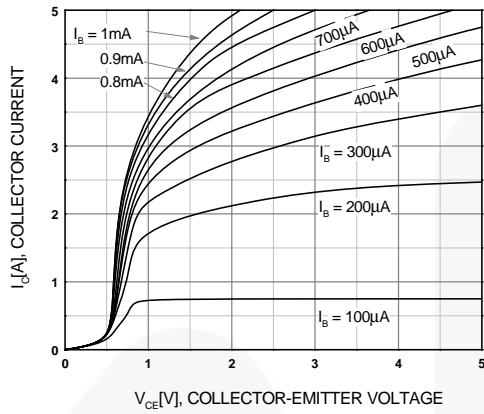


Figure 1. Static Characteristic

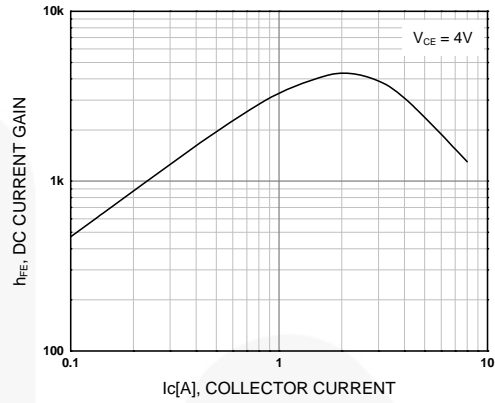


Figure 2. DC Current Gain

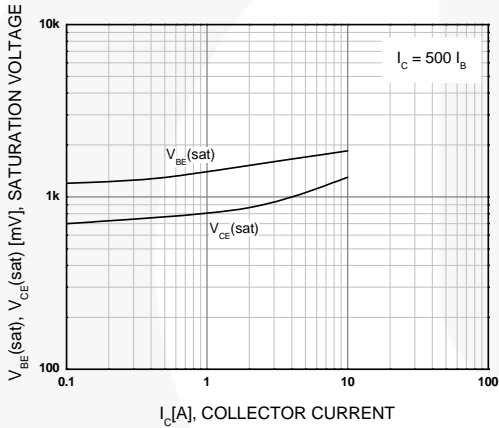


Figure 3. Collector-Emitter Saturation Voltage and Base-Emitter Saturation Voltage

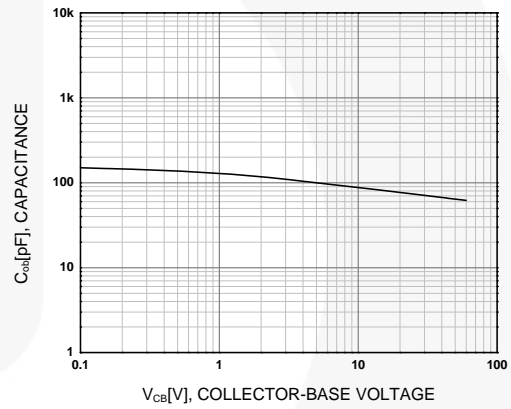


Figure 4. Collector Output Capacitance

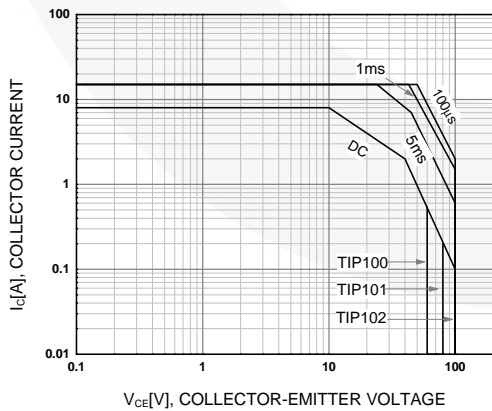


Figure 5. Safe Operating Area

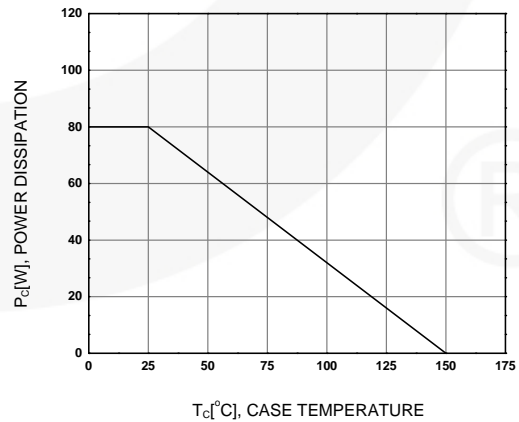


Figure 6. Power Derating

Physical Dimensions

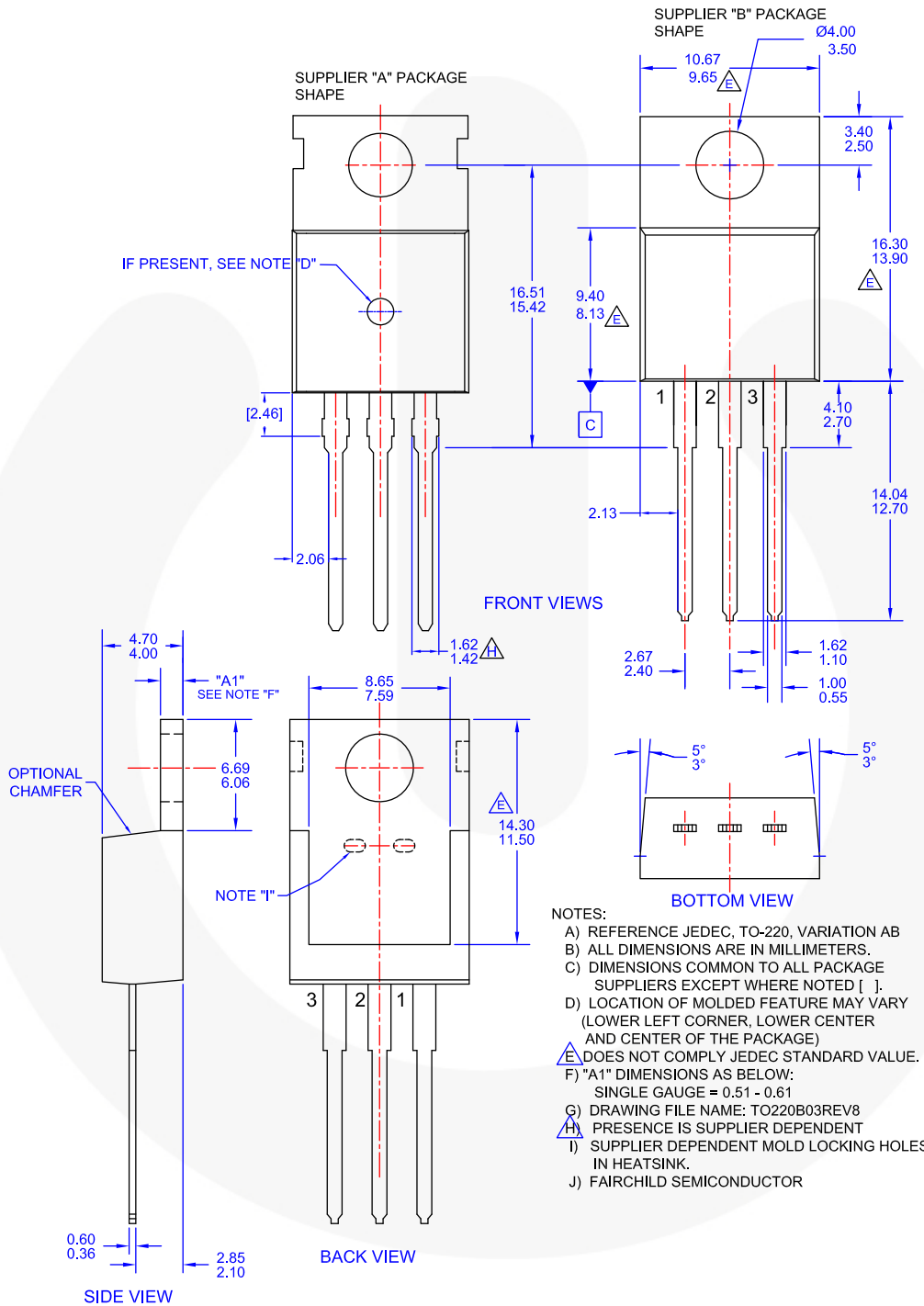


Figure 7. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB



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Rev. I72