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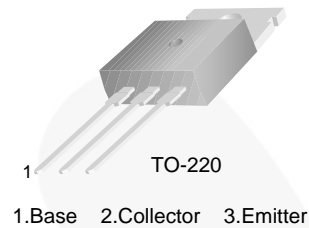
November 2014

# TIP31A / TIP31C

## NPN Epitaxial Silicon Transistor

### Features

- Medium Power Linear Switching Applications
- Complementary to TIP32 Series



### Ordering Information

Part Number	Top Mark	Package	Packing Method
TIP31A	TIP31A	TO-220 3L (Single Gauge)	Bulk
TIP31C	TIP31C	TO-220 3L (Single Gauge)	Bulk
TIP31CTU	TIP31C	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	TIP31A	60	V
		TIP31C	100	
$V_{CEO}$	Collector-Emitter Voltage	TIP31A	60	V
		TIP31C	100	
$V_{EBO}$	Emitter-Base Voltage	5	V	
$I_C$	Collector Current (DC)	3	A	
$I_{CP}$	Collector Current (Pulse)	5	A	
$I_B$	Base Current	1	A	
$T_J$	Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-65 to 150	$^\circ\text{C}$	

TIP31A / TIP31C — NPN Epitaxial Silicon 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 ( $T_C = 25^\circ\text{C}$ )	40	

## 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 <sup>(1)</sup>	TIP31A	$I_C = 30\text{ mA}, I_B = 0$	60		V
		TIP31C		100		
$I_{CEO}$	Collector Cut-Off Current	TIP31A	$V_{CE} = 30\text{ V}, I_B = 0$		0.3	mA
		TIP31C	$V_{CE} = 60\text{ V}, I_B = 0$		0.3	
$I_{CES}$	Collector Cut-Off Current	TIP31A	$V_{CE} = 60\text{ V}, V_{EB} = 0$		200	$\mu\text{A}$
		TIP31C	$V_{CE} = 100\text{ V}, V_{EB} = 0$		200	
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 5\text{ V}, I_C = 0$		1	mA	
$h_{FE}$	DC Current Gain <sup>(1)</sup>	$V_{CE} = 4\text{ V}, I_C = 1\text{ A}$	25			
		$V_{CE} = 4\text{ V}, I_C = 3\text{ A}$	10	50		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(1)</sup>	$I_C = 3\text{ A}, I_B = 375\text{ mA}$		1.2	V	
$V_{BE(on)}$	Base-Emitter On Voltage <sup>(1)</sup>	$V_{CE} = 4\text{ V}, I_C = 3\text{ A}$		1.8	V	
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 10\text{ V}, I_C = 500\text{ mA}, f = 1\text{ MHz}$	3.0		MHz	

### Note:

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

## Typical Performance Characteristics

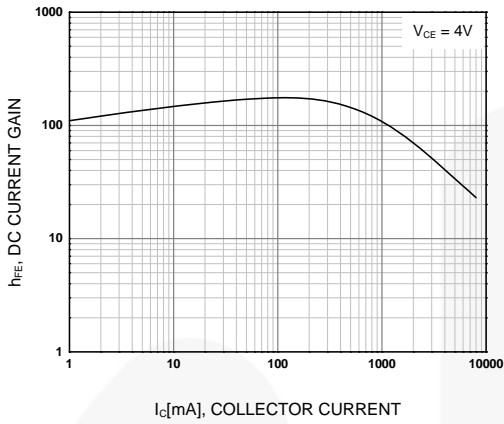


Figure 1. DC Current Gain

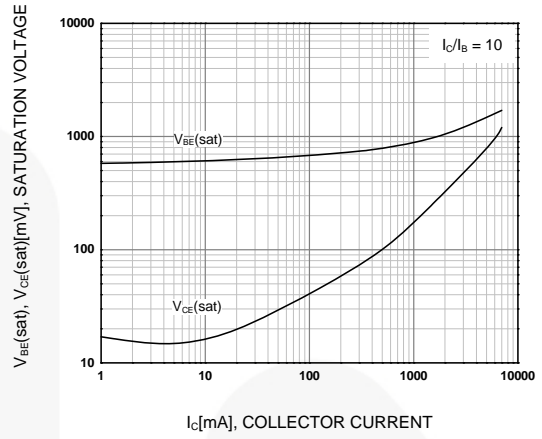


Figure 2. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

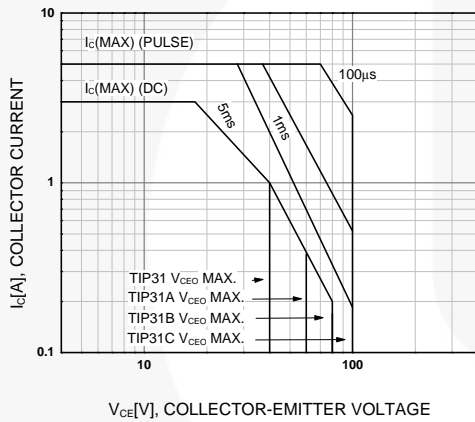


Figure 3. Safe Operating Area

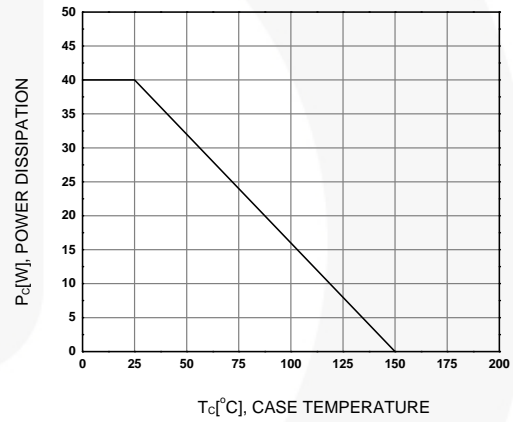


Figure 4. Power Derating

Physical Dimensions



Figure 5. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB



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