

ON Semiconductor

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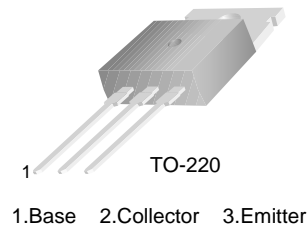


ON Semiconductor®

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	$^\circ\text{C}$

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	
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage ⁽¹⁾	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	μA
		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 ⁽¹⁾		$V_{CE} = 4\text{ V}, I_C = 1\text{ A}$	25		
			$V_{CE} = 4\text{ V}, I_C = 3\text{ A}$	10	50	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ⁽¹⁾	$I_C = 3\text{ A}, I_B = 375\text{ mA}$		1.2	V	
$V_{BE(on)}$	Base-Emitter On Voltage ⁽¹⁾	$V_{CE} = 4\text{ V}, I_C = 3\text{ A}$		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: $p_w \leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

Typical Performance Characteristics

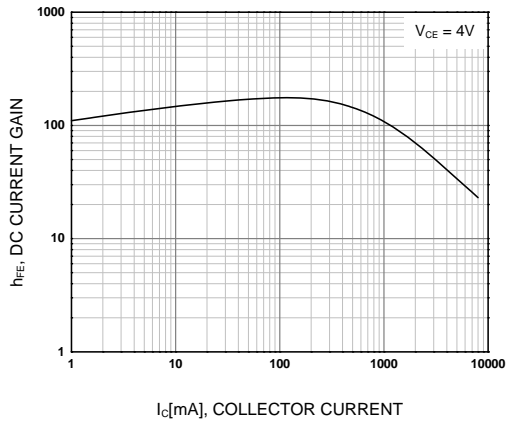


Figure 1. DC Current Gain

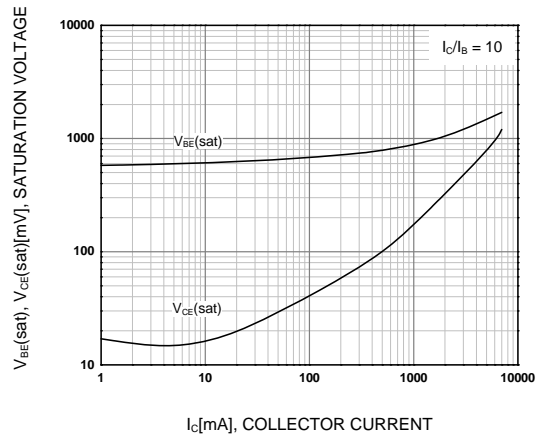


Figure 2. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

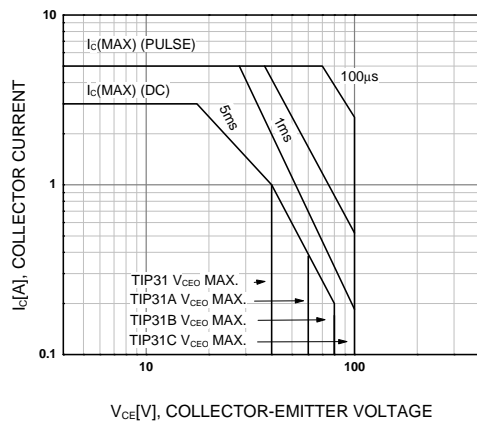


Figure 3. Safe Operating Area

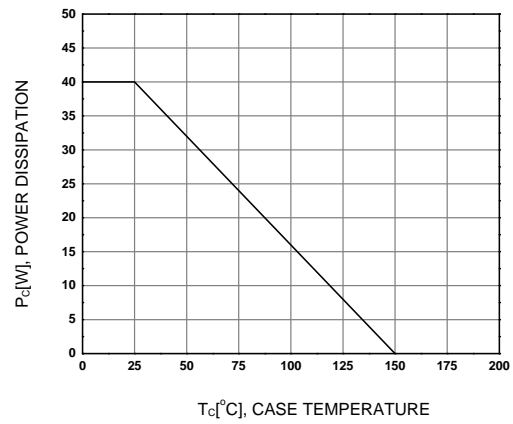


Figure 4. Power Derating

Physical Dimensions

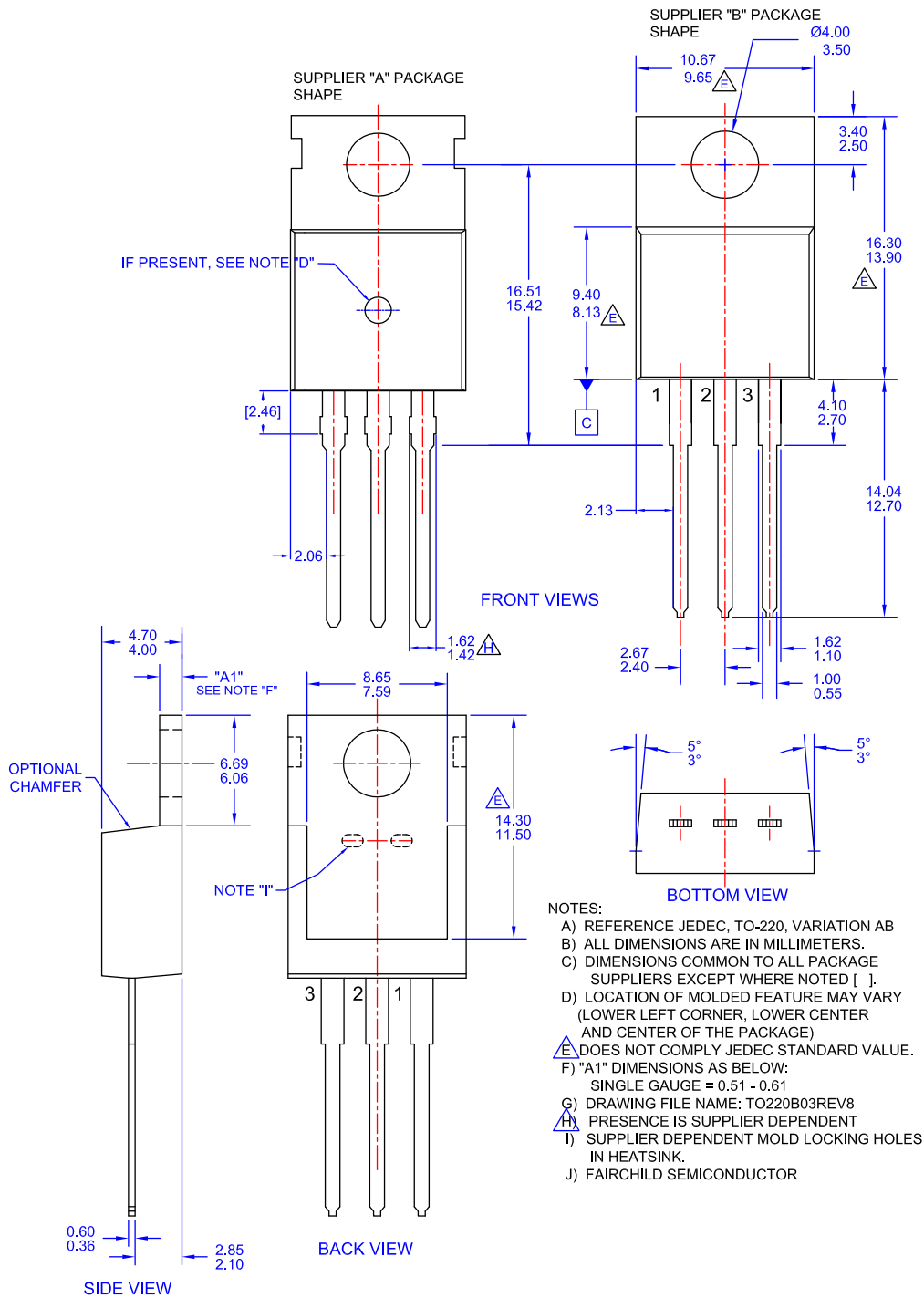


Figure 5. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

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