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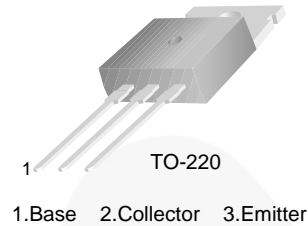


November 2014

# TIP47 / TIP48 / TIP49 / TIP50 NPN Silicon Transistor

## Features

- High-Voltage and Switching Applications
- High Sustaining Voltage:  $V_{CEO(sus)} = 250\text{ V}, 300\text{ V}, 350\text{ V}, 400\text{ V}$
- 1 A Rated Collector Current



## Ordering Information

Part Number	Top Mark	Package	Packing Method
TIP47	TIP47	TO-220 3L (Single Gauge)	Bulk
TIP47TU	TIP47	TO-220 3L (Single Gauge)	Rail
TIP48	TIP48	TO-220 3L (Single Gauge)	Bulk
TIP48TU	TIP48	TO-220 3L (Single Gauge)	Rail
TIP49	TIP49	TO-220 3L (Single Gauge)	Bulk
TIP50	TIP50	TO-220 3L (Single Gauge)	Bulk
TIP50TU	TIP50	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	TIP47	350	V
		TIP48	400	
		TIP49	450	
		TIP50	500	
$V_{CEO}$	Collector-Emitter Voltage	TIP47	250	V
		TIP48	300	
		TIP49	350	
		TIP50	400	
$V_{EBO}$	Emitter-Base Voltage	5	V	
$I_C$	Collector Current (DC)	1	A	
$I_{CP}$	Collector Current (Pulse)	2	A	
$I_B$	Base Current	0.6	A	
$T_J$	Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	- 65 to 150	$^\circ\text{C}$	

TIP47 / TIP48 / TIP49 / TIP50 — NPN Silicon Transistor

## Thermal Characteristics

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

Symbol	Parameter	Value	Unit
$P_C$	Collector Dissipation ( $T_C = 25^\circ\text{C}$ )	40	W
	Collector Dissipation ( $T_A = 25^\circ\text{C}$ )	2	

## Electrical Characteristics

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit	
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage <sup>(1)</sup>	TIP47	$I_C = 30\text{ mA}, I_B = 0$	250			V
		TIP48		300			
		TIP49		350			
		TIP50		400			
$I_{CEO}$	Collector Cut-Off Current	TIP47	$V_{CE} = 150\text{ V}, I_B = 0$			1	mA
		TIP48	$V_{CE} = 200\text{ V}, I_B = 0$			1	
		TIP49	$V_{CE} = 250\text{ V}, I_B = 0$			1	
		TIP50	$V_{CE} = 300\text{ V}, I_B = 0$			1	
$I_{CES}$	Collector Cut-Off Current	TIP47	$V_{CE} = 350\text{ V}, V_{EB} = 0$			1	mA
		TIP48	$V_{CE} = 400\text{ V}, V_{EB} = 0$			1	
		TIP49	$V_{CE} = 450\text{ V}, V_{EB} = 0$			1	
		TIP50	$V_{CE} = 500\text{ V}, V_{EB} = 0$			1	
$I_{EBO}$	Emitter Cut-Off Current	$V_{BE} = 5\text{ V}, I_C = 0$			1	mA	
$h_{FE}$	DC Current Gain <sup>(1)</sup>	$V_{CE} = 10\text{ V}, I_C = 0.3\text{ A}$	30		150		
		$V_{CE} = 10\text{ V}, I_C = 1\text{ A}$	10				
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(1)</sup>	$I_C = 1\text{ A}, I_B = 0.2\text{ A}$			1	V	
$V_{BE(on)}$	Base-Emitter On Voltage <sup>(1)</sup>	$V_{CE} = 10\text{ V}, I_C = 1\text{ A}$			1.5	V	
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 10\text{ V}, I_C = 0.2\text{ A}, f = 1\text{ MHz}$	10			MHz	

### Note:

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

## Typical Performance Characteristics

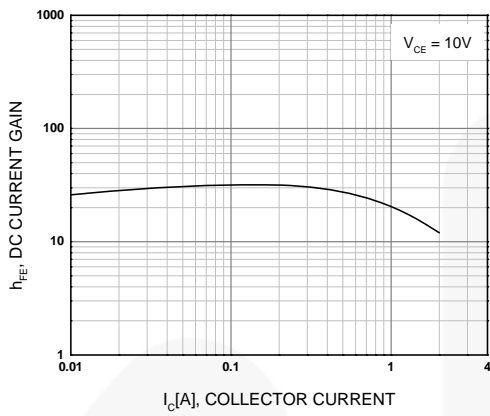


Figure 1. DC Current Gain

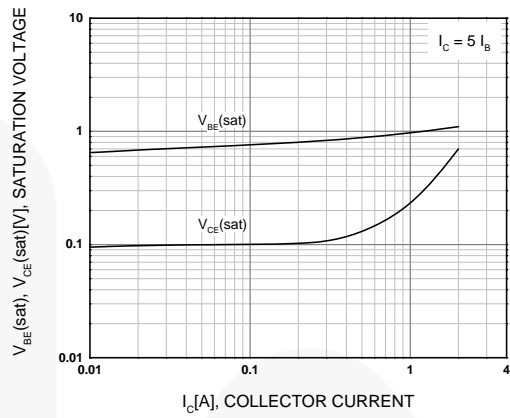


Figure 2. Collector-Emitter Saturation Voltage and Base-Emitter Saturation Voltage

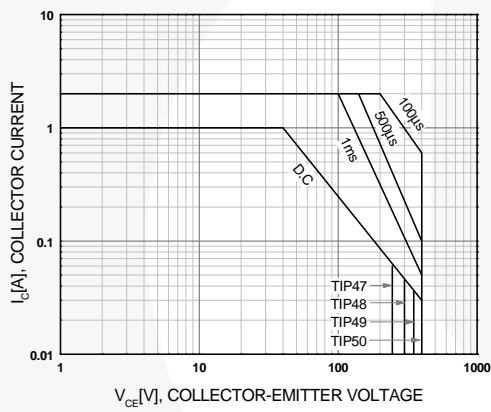


Figure 3. Safe Operating Area

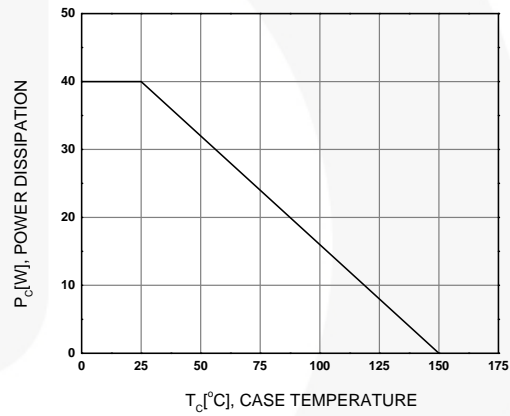


Figure 4. Power Derating

Physical Dimensions

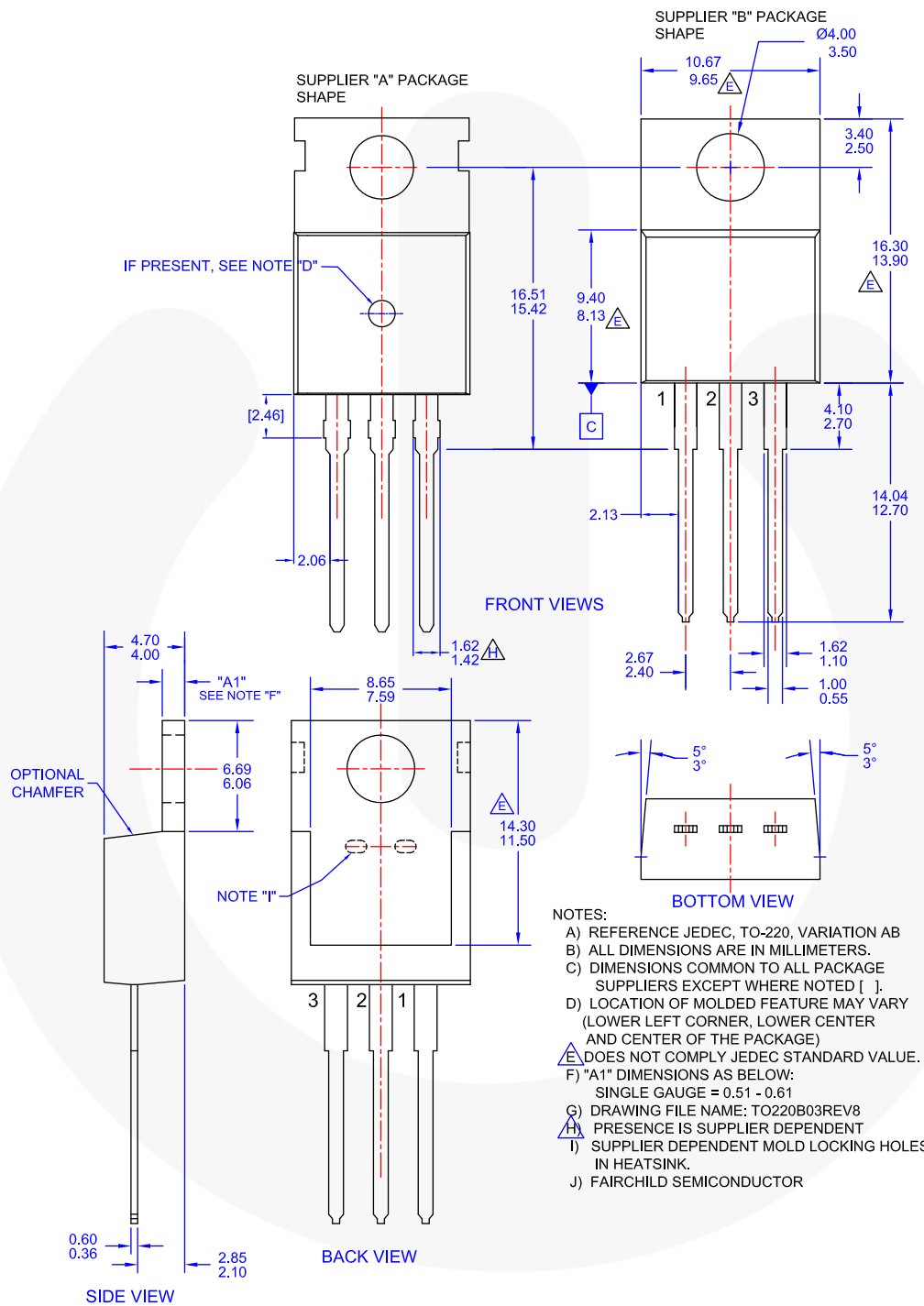


Figure 5. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB



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