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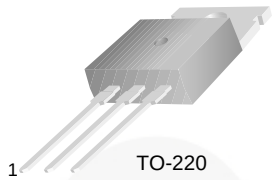
November 2014

TIP47 / TIP48 / TIP49 / TIP50
NPN Silicon Transistor

Features

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



TO-220

1.Base 2.Collector 3.Emitter

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°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	°C
T_{STG}	Storage Temperature Range		- 65 to 150	°C

Thermal Characteristics

Values are at T_C = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
P_C	Collector Dissipation (T_C = 25°C)	40	W
	Collector Dissipation (T_A = 25°C)	2	

Electrical Characteristics

Values are at T_C = 25°C unless otherwise noted.

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

Note:

1. Pulse test: pw ≤ 300 μs, duty cycle ≤ 2%.

Typical Performance Characteristics

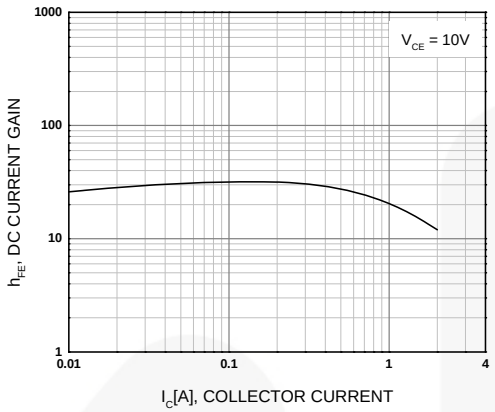


Figure 1. DC Current Gain

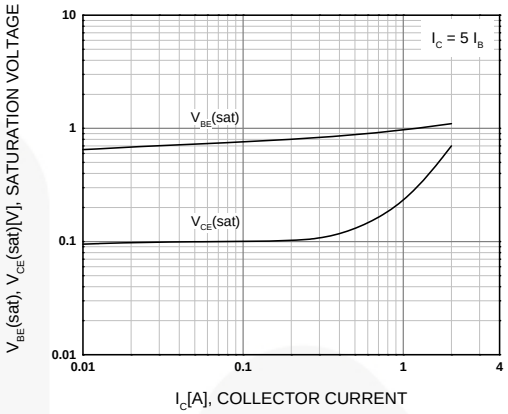


Figure 2. Collector-Emitter Saturation Voltage and Base-Emitter Saturation Voltage

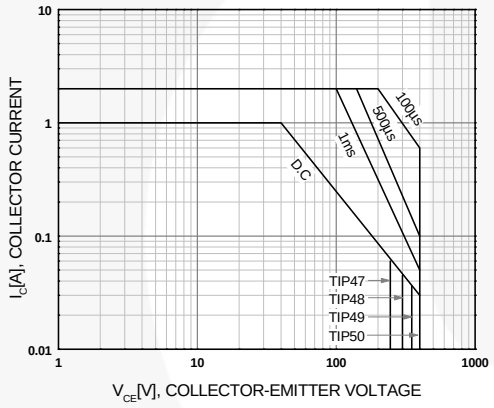


Figure 3. Safe Operating Area

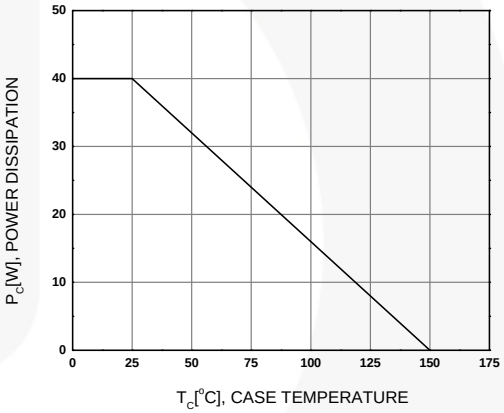


Figure 4. Power Derating

Physical Dimensions

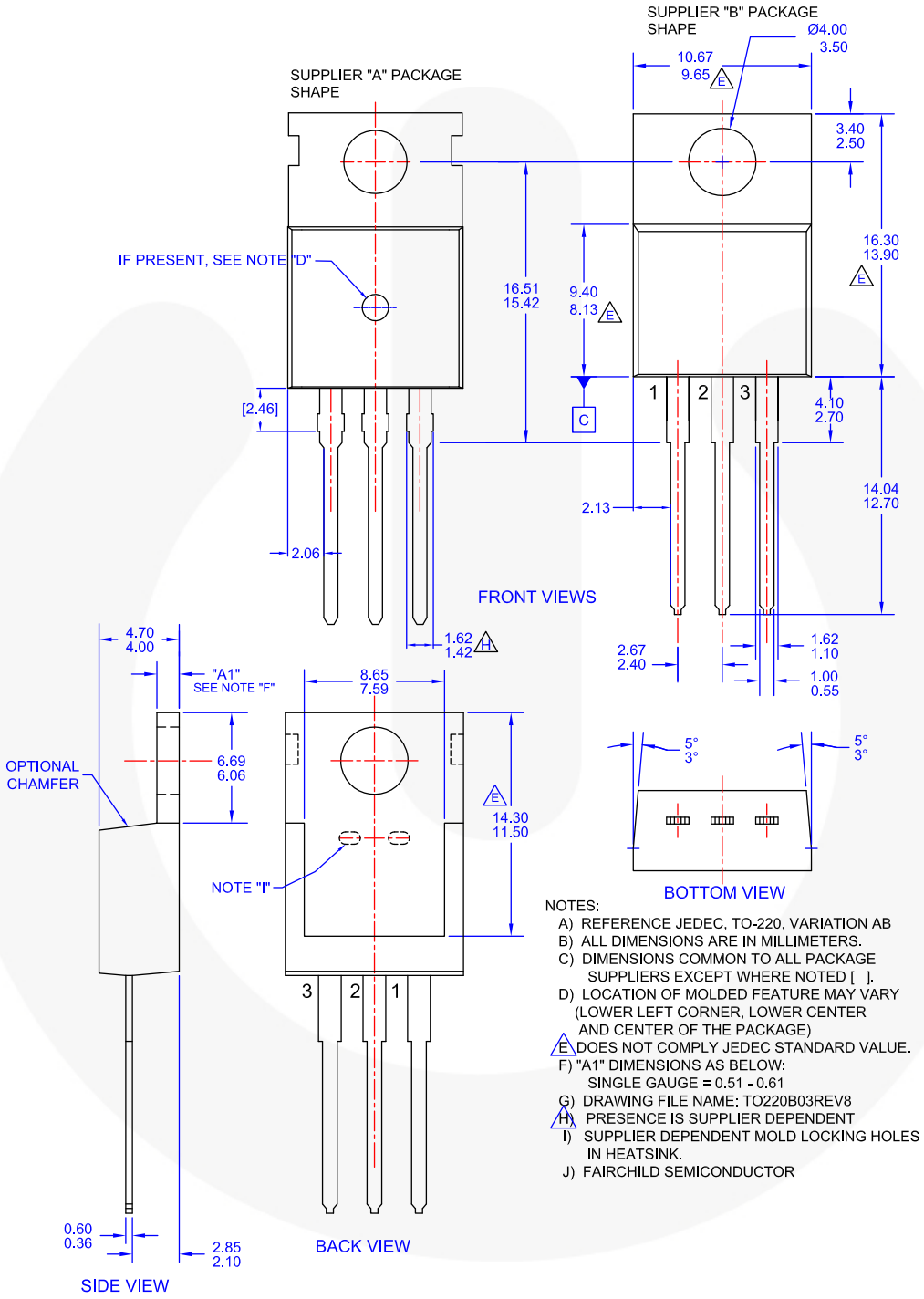


Figure 5. TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

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