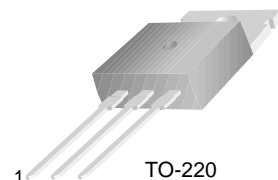


## TIP47/48/49/50

### High Voltage and Switching Applications

- High Sustaining Voltage :  $V_{CEO(sus)} = 250 - 400V$
- 1A Rated Collector Current



TO-220  
1.Base 2.Collector 3.Emitter

### NPN Silicon Transistor

#### Absolute Maximum Ratings $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CBO}$	Collector-Base Voltage : TIP47	350	V
	: TIP48	400	V
	: TIP49	450	V
	: TIP50	500	V
$V_{CEO}$	Collector-Emitter Voltage : TIP47	250	V
	: TIP48	300	V
	: TIP49	350	V
	: TIP50	400	V
$V_{EBO}$	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
$P_C$	Collector Dissipation ( $T_C=25^\circ C$ )	40	W
$P_C$	Collector Dissipation ( $T_a=25^\circ C$ )	2	W
$T_J$	Junction Temperature	150	$^\circ C$
$T_{STG}$	Storage Temperature	- 65 ~ 150	$^\circ C$

#### Electrical Characteristics $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
$V_{CEX(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 30mA, I_B = 0$	250	300	V
	: TIP47				
	: TIP48				
	: TIP49				
$I_{CEO}$	Collector Cut-off Current : TIP47	$V_{CE} = 150V, I_B = 0$		1	mA
	: TIP48	$V_{CE} = 200V, I_B = 0$		1	mA
	: TIP49	$V_{CE} = 250V, I_B = 0$		1	mA
	: TIP50	$V_{CE} = 300V, I_B = 0$		1	mA
$I_{CEX}$	Collector Cut-off Current : TIP47	$V_{CE} = 350V, V_{BE} = 0$		1	mA
	: TIP48	$V_{CE} = 400V, V_{BE} = 0$		1	mA
	: TIP49	$V_{CE} = 450V, V_{BE} = 0$		1	mA
	: TIP50	$V_{CE} = 500V, V_{BE} = 0$		1	mA
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 5V, I_C = 0$		1	mA
$h_{FE}$	* DC Current Gain	$V_{CE} = 10V, I_C = 0.3A$ $V_{CE} = 10V, I_C = 1A$	30	150	
$V_{CE(sat)}$	* Collector-Emitter Saturation Voltage	$I_C = 1A, I_B = 0.2A$		1	V
$V_{BE(sat)}$	* Base-Emitter Saturation Voltage	$V_{CE} = 10V, I_C = 1A$		1.5	V
$f_T$	Current Gain Bandwidth Product	$V_{CE} = 10V, I_C = 0.2A$	10		MHz
$t_{ON}$	Turn ON Time	$V_{CC} = 400V$ $5I_{B1} = -2.5I_{B2} = I_C = 6A$ $R_L = 66.7\Omega$		0.5	$\mu s$
$t_{STG}$	Storage Time			3	$\mu s$
$t_F$	Fall Time			0.3	$\mu s$

\* Pulse Test:  $PW \leq 300\mu s$ , duty Cycle  $\leq 2\%$  Pulse

# Typical Characteristics

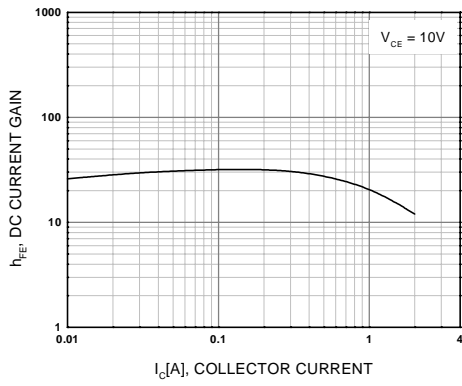


Figure 1. DC current Gain

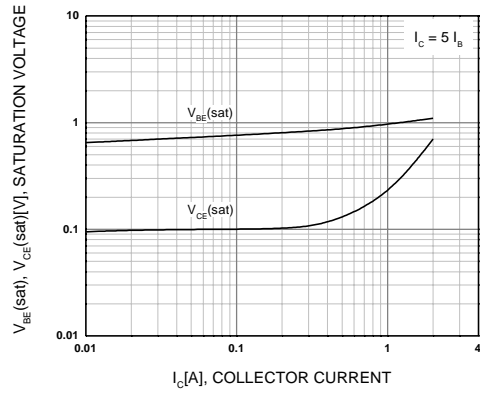


Figure 2. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage

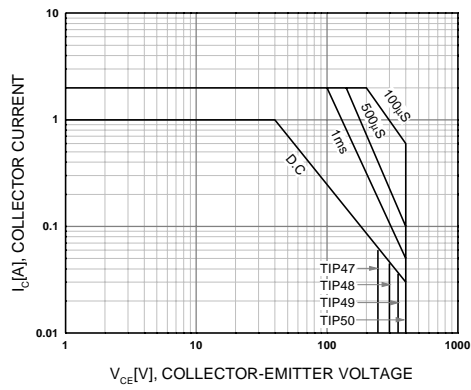


Figure 3. Safe Operating Area

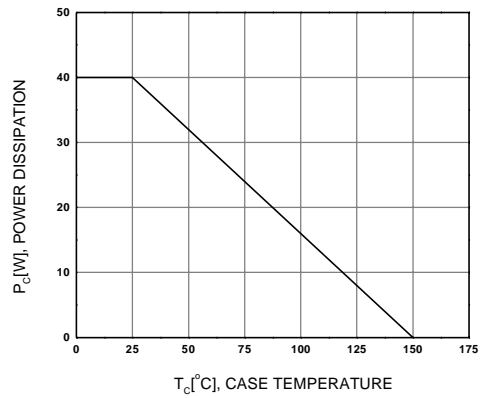


Figure 4. Power Derating

# Package Dimensions

## TO-220

TIP47/48/49/50



Dimensions in Millimeters

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E <sup>2</sup> CMOS™	PowerTrench®	VCX™
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