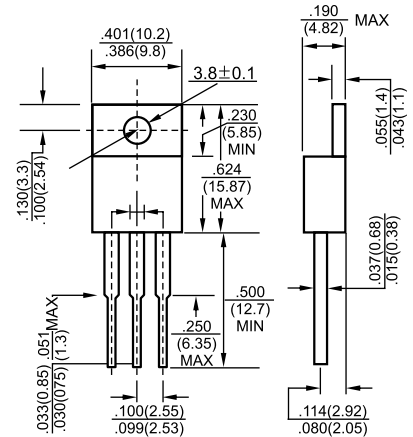


1. BASE
2. COLLECTOR
3. EMITTER

TO-220



Features

- ✧ Medium Power Linear Switching Applications

MAXIMUM RATINGS ($T_A=25^\circ\text{C}$ unless otherwise noted)

Dimensions in inches and (millimeters)

Symbol	Parameter	TIP31	TIP31A	TIP31B	TIP31C	Units
V_{CBO}	Collector-Base Voltage	40	60	80	100	V
V_{CEO}	Collector-Emitter Voltage	40	60	80	100	V
V_{EBO}	Emitter-Base Voltage	5				V
I_C	Collector Current -Continuous	3				A
P_C	Collector Power Dissipation	2				W
T_j	Junction Temperature	150				$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-55to+150				$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_{amb}=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	TIP31 TIP31A TIP31B TIP31C	$V(BR)_{CBO}$ $I_C=1\text{mA}, I_E=0$	40 60 80 100		V
Collector-emitter breakdown voltage *	TIP31 TIP31A TIP31B TIP31C	$V(BR)_{CEO}$ $I_C=30\text{mA}, I_B=0$	40 60 80 100		V
Emitter-base breakdown voltage		$V(BR)_{EBO}$ $I_E=1\text{mA}, I_C=0$	5		V
Collector cut-off current	TIP31 TIP31A TIP31B TIP31C	I_{CBO} $V_{CB}=40\text{V}, I_E=0$ $V_{CB}=60\text{V}, I_E=0$ $V_{CB}=80\text{V}, I_E=0$ $V_{CB}=100\text{V}, I_E=0$		200	μA
Collector cut-off current	TIP31/31A TIP31B/31C	I_{CEO} $V_{CE}=30\text{V}, I_B=0$ $V_{CE}=60\text{V}, I_B=0$		0.3	mA
Emitter cut-off current		I_{EBO} $V_{EB}=5\text{V}, I_C=0$		1	mA
DC current gain	$h_{FE(1)}$	$V_{CE}=4\text{V}, I_C=1\text{A}$	25		
	$h_{FE(2)}$	$V_{CE}=4\text{V}, I_C=3\text{A}$	10	50	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=3\text{A}, I_B=0.375\text{A}$		1.2	V
Base-emitter voltage	$V_{BE(on)}$	$V_{CE}=4\text{V}, I_C=3\text{A}$		1.8	V
Transition frequency	f_T	$V_{CE}=10\text{V}, I_C=0.5\text{A}$	3		MHz

* Pulse Test: $PW \leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

Typical Characteristics

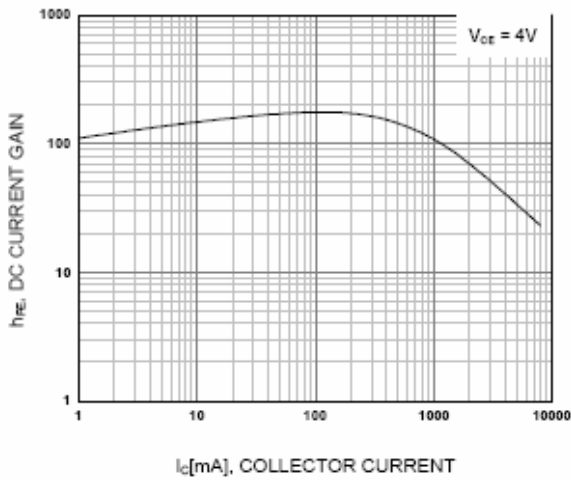


Figure 1. DC current Gain

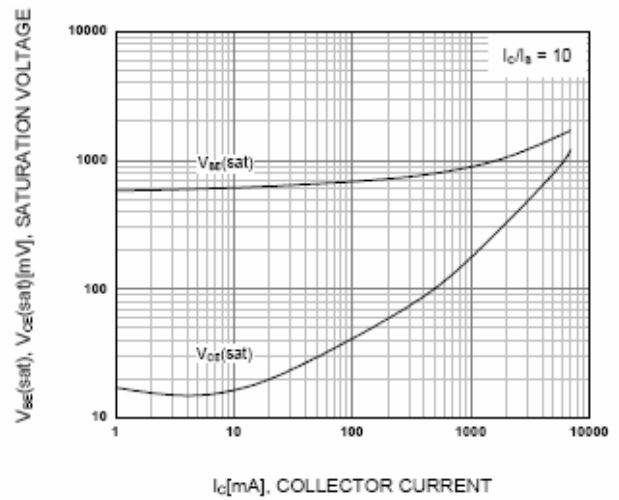


Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

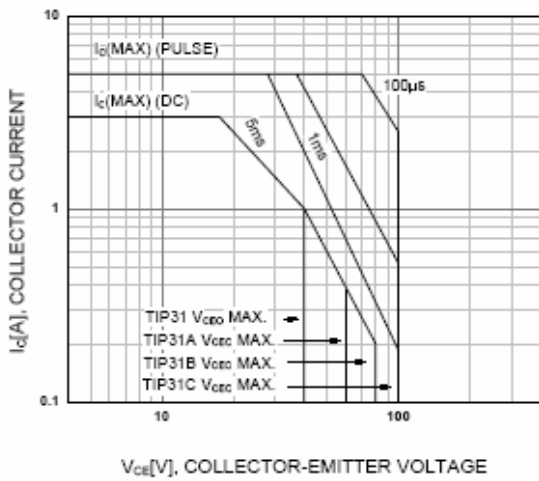


Figure 3. Safe Operating Area

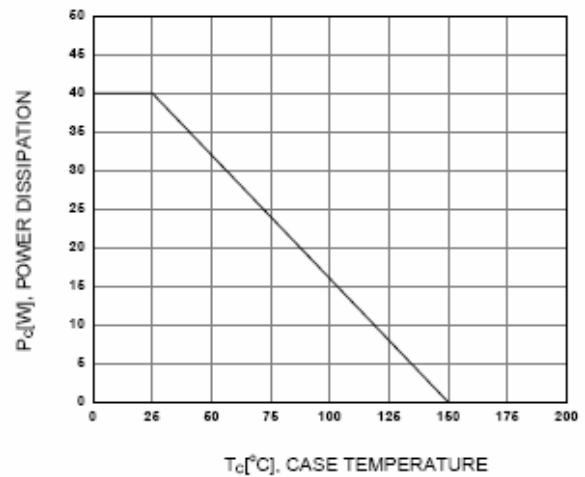


Figure 4. Power Derating