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## TIP31A, TIP31B, TIP31C Silicon NPN Transistors Medium Power Amp, Switch TO-220 Type Package

**Absolute Maximum Ratings:** ( $T_C = +25^\circ\text{C}$  unless otherwise specified)

Collector-Base Voltage, $V_{CBO}$		
TIP31A	60V	
TIP31B	80V	
TIP31C	100V	
Collector-Emitter Voltage, $V_{CEO}$		
TIP31A	60V	
TIP31B	80V	
TIP31C	100V	
Emitter-Base Voltage, $V_{EBO}$		5V
Continuous Current, $I_C$		
Continuous		3A
Pulse		5A
Continuous Base Current, $I_B$		1A
Power Dissipation, $P_D$		
$T_C = +25^\circ\text{C}$		40W
$T_A = +25^\circ\text{C}$		2W
Operating Junction Temperature, $T_J$		+150°C
Storage Temperature Range, $T_{stg}$		-65° to +150°C

**Electrical Characteristics:** ( $T_C = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 30\text{mA}, I_B = 0$ , Note 1	60	-	-	V
TIP31A						
TIP31B						
TIP31C			100	-	-	V
Collector Cutoff Current	$I_{CEO}$	$V_{CE} = 30\text{V}, I_B = 0$	-	-	0.3	mA
TIP31A						
TIP31B, TIP31C		$V_{CE} = 60\text{V}, I_B = 0$	-	-	0.3	mA
Collector Cutoff Current	$I_{CES}$	$V_{CE} = 60\text{V}, V_{EB} = 0$	-	-	200	$\mu\text{A}$
TIP31A						
TIP31B						
TIP31C		$V_{CE} = 80\text{V}, V_{EB} = 0$	-	-	200	$\mu\text{A}$
		$V_{CE} = 100\text{V}, V_{EB} = 0$	-	-	200	$\mu\text{A}$

Note 1. Pulsed: Pulse Duration  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

**Electrical Characteristics (Cont'd):** ( $T_C = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Emitter Cutoff Current	$I_{EBO}$	$V_{BE} = 5\text{V}, I_C = 0$	-	-	1.0	mA
DC Current Gain	$h_{FE}$	$V_{CE} = 4\text{V}, I_C = 1\text{A}, \text{Note 1}$	25	-	-	
		$V_{CE} = 4\text{V}, I_C = 3\text{A}, \text{Note 1}$	10	-	50	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 3\text{A}, I_B = 375\text{mA}, \text{Note 1}$	-	-	1.2	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$V_{CE} = 4\text{V}, I_C = 3\text{A}, \text{Note 1}$	-	-	1.8	V
Current Gain Bandwidth Product	$f_T$	$V_{CE} = 10\text{V}, I_C = 500\text{mA}, f = 1\text{MHz}$	3	-	-	MHz

Note 1. Pulsed: Pulse Duration  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

