TIP31/31A/31B/31C TRANSISTOR (NPN)

TO-220C

1.BASE
2.COLLECTOR
3.EMITTER

FEATURES

Medium Power Linear Switching Applications

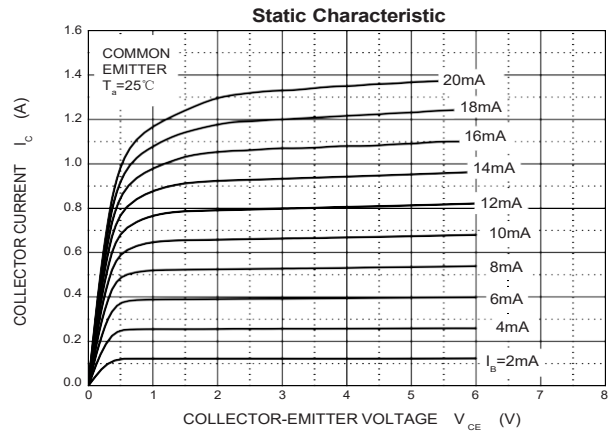
MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

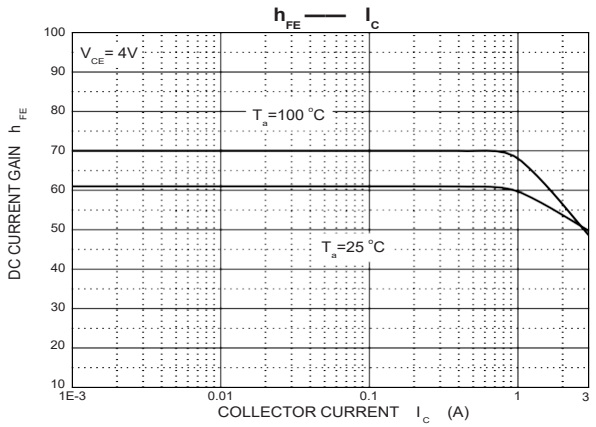
Symbol	Parameter	TIP31	TIP31A	TIP31B	TIP31C	Unit
V_{CBO}	Collector-Base Voltage	40	60	80	100	V
V_{CEO}	Collector-Emitter Voltage	40	60	80	100	V
V_{EBO}	Emitter-Base Voltage	5				V
I_C	Collector Current	3				A
P_C	Collector Power Dissipation	2				W
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	62.5				℃/W
T_j,T_{stg}	Operation Junction and Storage Temperature Range	-55~+150				℃

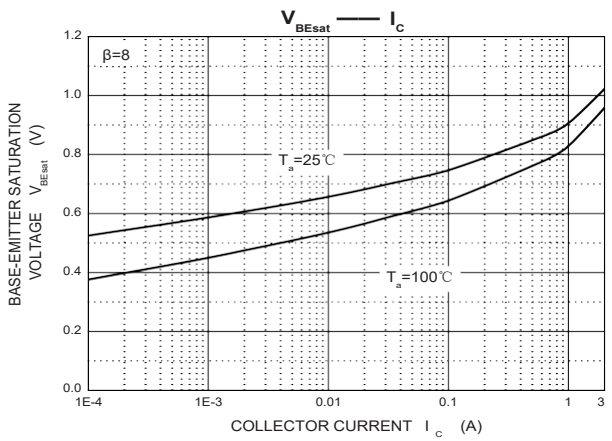
ELECTRICAL CHARACTERISTICS (T_a=25℃ unless other wise specified)

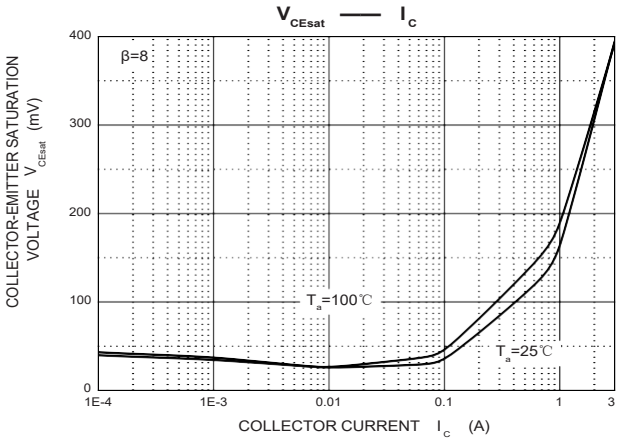
Parameter		Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	TIP31	$V_{(BR)CBO}$	I_C= 1mA, I_E=0	40		V
	TIP31A			60		
	TIP31B			80		
	TIP31C			100		
Collector-emitter breakdown voltage *	TIP31	$V_{CEO(sus)}$	I_C= 30mA, I_B=0	40		V
	TIP31A			60		
	TIP31B			80		
	TIP31C			100		
Emitter-base breakdown voltage		$V_{(BR)EBO}$	I_E= 1mA, I_C=0	5		V
Collector cut-off current	TIP31	I_{CBO}	V_{CB}=40V, I_E=0		200	μA
	TIP31A		V_{CB}=60V, I_E=0			
	TIP31B		V_{CB}=80V, I_E=0			
	TIP31C		V_{CB}=100V, I_E=0			
Collector cut-off current	TIP31/31A	I_{CEO}	V_{CE}= 30V, I_B= 0		0.3	mA
	TIP31B/31C		V_{CE}= 60V, I_B= 0			
Emitter cut-off current		I_{EBO}	V_{EB}=5V, I_C=0		1	mA
DC current gain		$h_{FE(1)}$	V_{CE}= 4V, I_C= 1A	25		
		$h_{FE(2)}$	V_{CE}=4 V, I_C= 3A	15	75	
Collector-emitter saturation voltage		$V_{CE(sat)}$	I_C=3A, I_B=0.375A		1.2	V
Base-emitter voltage		$V_{BE(on)}$	V_{CE}= 4V, I_C=3A		1.8	V
Transition frequency		f_T	V_{CE}=10V , I_C=0.5A	3		MHz

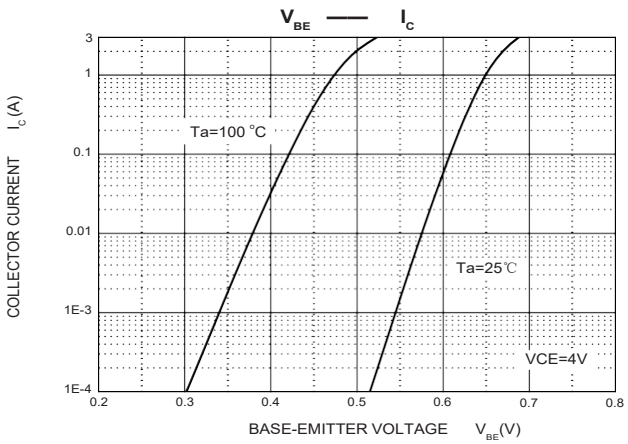
* Pulse Test: PW≤300μs, Duty Cycle≤2%.

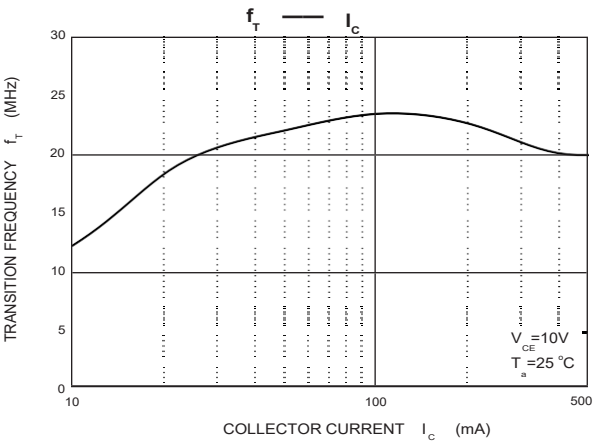

Static Characteristic
COMMON EMITTER
T_a=25℃
20mA
18mA
16mA
14mA
12mA
10mA
8mA
6mA
4mA
I_B=2mA
COLLECTOR CURRENT I_C (A)
COLLECTOR-EMITTER VOLTAGE V_CE (V)

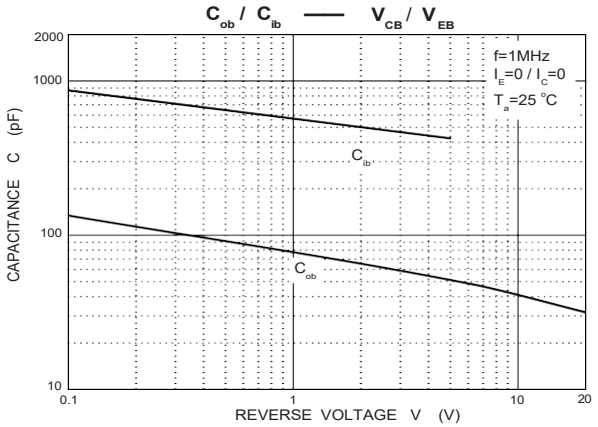

h_FE —— I_C
V_CE= 4V
T_a=100 °C
T_a=25 °C
DC CURRENT GAIN h_FE
COLLECTOR CURRENT I_C (A)

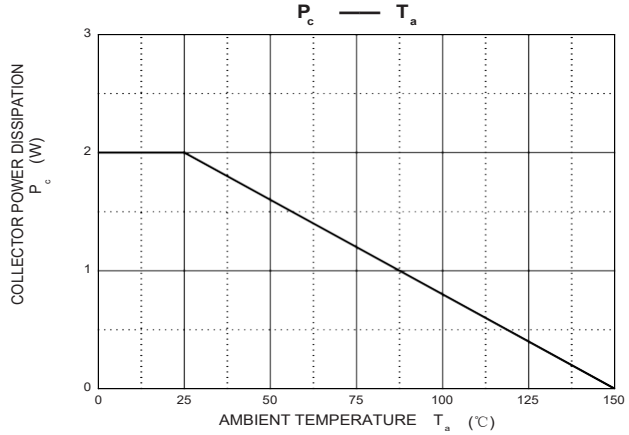

V_BEsat —— I_C
β=8
T_a=25℃
T_a=100℃
BASE-EMITTER SATURATION VOLTAGE V_BEsat (V)
COLLECTOR CURRENT I_C (A)


V_CEsat —— I_C
β=8
T_a=100℃
T_a=25℃
COLLECTOR-EMITTER SATURATION VOLTAGE V_CEsat (mV)
COLLECTOR CURRENT I_C (A)


V_BE —— I_C
Ta=100 °C
Ta=25℃
VCE=4V
COLLECTOR CURRENT I_C (A)
BASE-EMITTER VOLTAGE V_BE(V)


f_T —— I_C
V_CE=10V
T_a=25 °C
TRANSITION FREQUENCY f_T (MHz)
COLLECTOR CURRENT I_C (mA)


C_ob / C_ib —— V_CB / V_EB
f=1MHz
I_E=0 / I_C=0
T_a=25 °C
C_ib
C_ob
CAPACITANCE C (pF)
REVERSE VOLTAGE V (V)


P_c —— T_a
COLLECTOR POWER DISSIPATION P_c (W)
AMBIENT TEMPERATURE T_a (℃)