

TIP33A, TIP33C

NPN High-Power Transistors

... for general-purpose power amplifier and switching applications.

- ESD Ratings: Machine Model, C; > 400 V
Human Body Model, 3B; > 8000 V
- Epoxy Meets UL 94, V-0 @ 1/8"

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	TIP33A TIP33C	V_{CEO} 60 100	Vdc
Collector-Base Voltage	TIP33A TIP33C	V_{CBO} 60 100	Vdc
Emitter-Base Voltage		V_{EBO} 5.0	Vdc
Collector Current – Continuous Peak (Note 1)		I_C 10 15	Adc Apk
Base Current – Continuous		I_B 3.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C		P_D 80 0.64	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range		T_J, T_{stg} -65 to +150	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.56	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	35.7	$^\circ\text{C}/\text{W}$

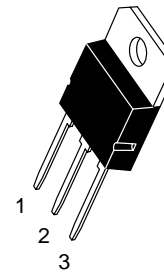
1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.



ON Semiconductor®

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10 A, 60 & 100 V, 80 W NPN SILICON POWER TRANSISTORS



TO-218
CASE 340D
STYLE 1

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
xxxxx = Device Code

ORDERING INFORMATION

Device	Package	Shipping
TIP33A	TO-218	30 Units / Rail
TIP33C	TO-218	30 Units / Rail

TIP33A, TIP33C

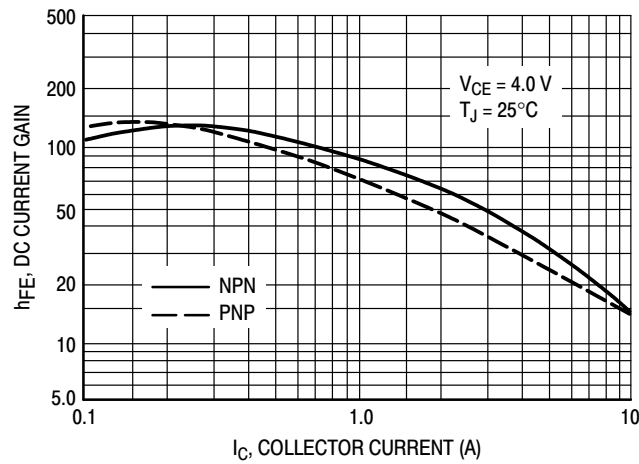


Figure 1. DC Current Gain

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit	
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (Note 1) (I _C = 30 mA, I _B = 0)	TIP33A TIP33C	V _{CEO(sus)}	60 100	— —	Vdc
Collector–Emitter Cutoff Current (V _{CE} = 30 V, I _B = 0) (V _{CE} = 60 V, I _B = 0)	TIP33A TIP33C	I _{CEO}	—	0.7	mA
Collector–Emitter Cutoff Current (V _{CE} = Rated V _{CEO} , V _{EB} = 0)		I _{CES}	—	0.4	mA
Emitter–Base Cutoff Current (V _{EB} = 5.0 V, I _C = 0)		I _{EBO}	—	1.0	mA

ON CHARACTERISTICS (Note 1)

DC Current Gain (I _C = 1.0 A, V _{CE} = 4.0 V) (I _C = 3.0 A, V _{CE} = 4.0 V)	h _{FE}	40 20	— 100	—
Collector–Emitter Saturation Voltage (I _C = 3.0 A, I _B = 0.3 A) (I _C = 10 A, I _B = 2.5 A)	V _{CE(sat)}	— —	1.0 4.0	Vdc
Base–Emitter On Voltage (I _C = 3.0 A, V _{CE} = 4.0 V) (I _C = 10 A, V _{CE} = 4.0 V)	V _{BE(on)}	— —	1.6 3.0	Vdc

DYNAMIC CHARACTERISTICS

Small–Signal Current Gain (I _C = 0.5 A, V _{CE} = 10 V, f = 1.0 kHz)	h _{fe}	20	—	—
Current–Gain — Bandwidth Product (I _C = 0.5 A, V _{CE} = 10 V, f = 1.0 MHz)	f _T	3.0	—	MHz

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

TIP33A, TIP33C

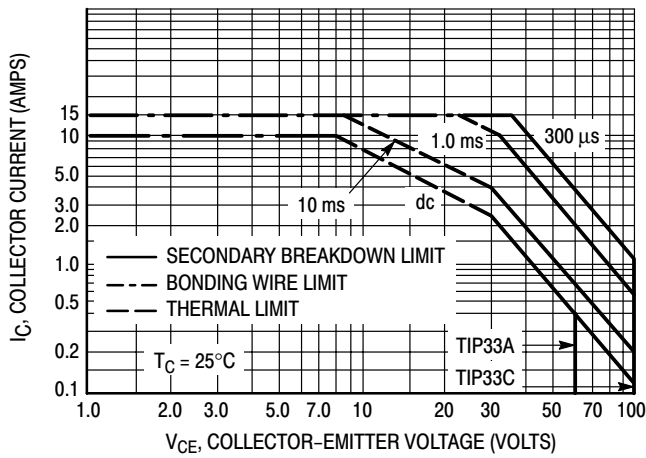


Figure 2. Maximum Rated Forward Bias Safe Operating Area

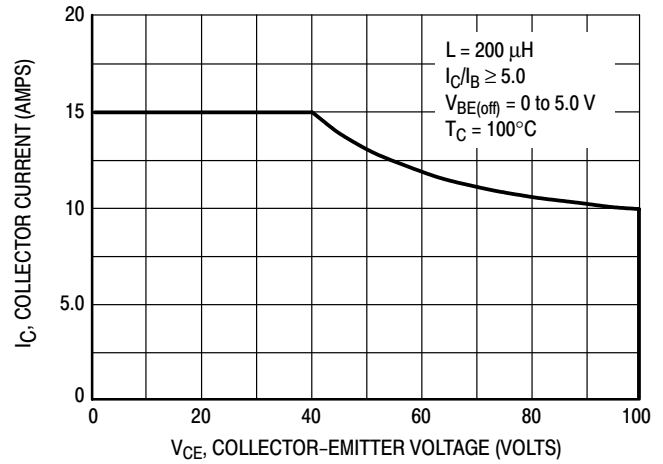


Figure 3. Maximum Rated Forward Bias Safe Operating Area

FORWARD BIAS

The Forward Bias Safe Operating Area represents the voltage and current conditions these devices can withstand during forward bias. The data is based on $T_C = 25^\circ\text{C}$; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10%, and must be derated thermally for $T_C > 25^\circ\text{C}$.

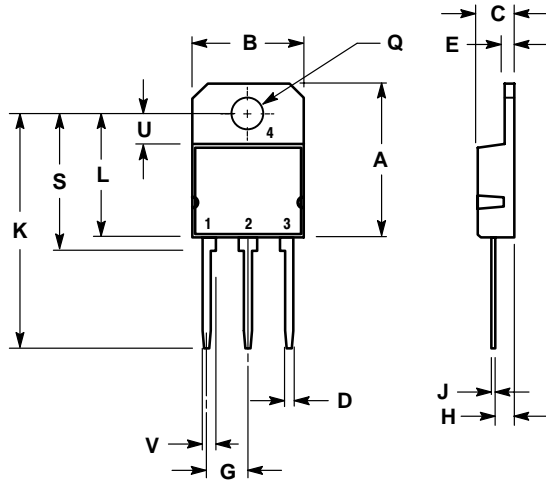
REVERSE BIAS

The Reverse Bias Safe Operating Area represents the voltage and current conditions these devices can withstand during reverse biased turn-off. This rating is verified under clamped conditions so the device is never subjected to an avalanche mode.

TIP33A, TIP33C

PACKAGE DIMENSIONS

CASE 340D-02
ISSUE E




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	20.35	---	0.801
B	14.70	15.20	0.579	0.598
C	4.70	4.90	0.185	0.193
D	1.10	1.30	0.043	0.051
E	1.17	1.37	0.046	0.054
G	5.40	5.55	0.213	0.219
H	2.00	3.00	0.079	0.118
J	0.50	0.78	0.020	0.031
K	31.00 REF		1.220 REF	
L	---	16.20	---	0.638
Q	4.00	4.10	0.158	0.161
S	17.80	18.20	0.701	0.717
U	4.00 REF		0.157 REF	
V	1.75 REF		0.069	

STYLE 1:

- PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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