MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

NPN	PNP
TIP33	TIP34
TIP33A	TIP34A
TIP33B	TIP34B
TIP33C	TIP34C

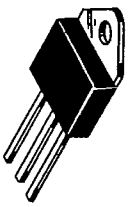
COMPLEMENTARY SILICON HIGH-POWER TRANSISTORS

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

- 10 A Collector Current
- Low Leakage Current — I_{CEO} = 0.7 mA @ 30 and 60 V
- Excellent dc Gain — h_{FE} = 40 Typ @ 3.0 A
- High Current Gain Bandwidth Product — h_{fe} = 3.0 min @ I_C = 0.5 A, f = 1.0 MHz

10 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS

40-100 VOLTS
80 WATTS



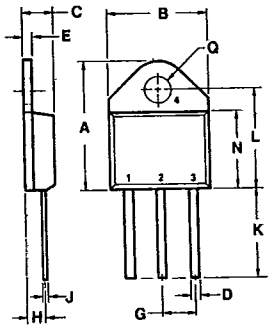
MAXIMUM RATINGS

Rating	Symbol	TIP33 TIP34	TIP33A TIP34A	TIP33B TIP34B	TIP33C TIP34C	Unit
Collector-Emitter Voltage	V_{CEO}	40 V	60 V	80 V	100 V	Vdc
Collector-Base Voltage	V_{CB}	40 V	60 V	80 V	100 V	Vdc
Emitter-Base Voltage	V_{EB}	5.0				Vdc
Collector Current — Continuous Peak (1)	I_C	10 15				Adc
Base Current — Continous	I_B	3.0				Adc
Total Power Dissipation @ T_C = 25°C	P_D	80				Watts
Derate above 25°C		0.64				W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150				°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.56	°C/W
Junction-To-Free-Air Thermal Resistance	$R_{\theta JA}$	35.7	°C/W

(1) Pulse Test: Pulse Width = 10 ms, Duty Cycle ≤10%.

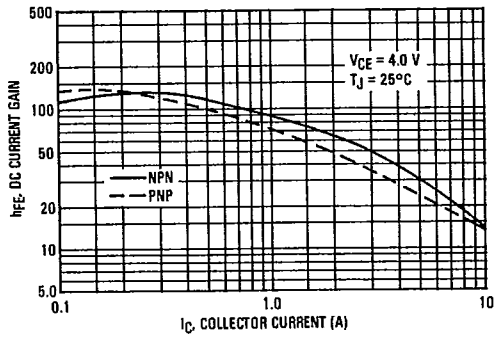


STYLE 1:
1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	20.32	21.08	0.800	0.830
B	15.49	15.90	0.610	0.626
C	4.19	5.08	0.165	0.200
D	1.02	1.65	0.040	0.065
E	1.35	1.65	0.053	0.065
G	5.21	5.72	0.205	0.225
H	2.41	3.20	0.095	0.126
J	0.38	0.64	0.015	0.025
K	12.70	15.49	0.500	0.610
L	15.88	16.51	0.625	0.650
N	12.19	12.70	0.480	0.500
Q	4.04	4.22	0.159	0.166

CASE 340-02
TO-218AC

FIGURE 1 — DC CURRENT GAIN



3

TIP33, TIP33A, TIP33B, TIP33C, TIP34, TIP34A, TIP34B, TIP34C

T-33-13
T-33-21

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage (1) (I_C = 30 mA, I_B = 0)	TIP33, TIP34	$V_{CEO(sus)}$	40	—	Vdc
	TIP33A, TIP34A		60	—	
	TIP33B, TIP34B		80	—	
	TIP33C, TIP34C		100	—	
Collector-Emitter Cutoff Current		I_{CEO}			mA
(V_{CE} = 30 V, I_B = 0)	TIP33, TIP33A, TIP34, TIP34A		—	0.7	
(V_{CE} = 60 V, I_B = 0)	TIP33B, TIP33C, TIP34B, TIP34C		—	0.7	
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 (1)					
DC Current Gain		h_{FE}			—
(I_C = 1.0 A, V_{CE} = 4.0 V)			40	—	
(I_C = 3.0 A, V_{CE} = 4.0 V)			20	100	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 3.0 A, I_B = 0.3 A)			—	1.0	
(I_C = 10 A, I_B = 2.5 A)			—	4.0	
Base-Emitter On Voltage		$V_{BE(on)}$			Vdc
(I_C = 3.0 A, V_{CE} = 4.0 V)			—	1.6	
(I_C = 10 A, V_{CE} = 4.0 V)			—	3.0	
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 (2) (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%.
(2) $f_T = |h_{fe}| \cdot f_{test}$

FIGURE 2 — MAXIMUM RATED FORWARD BIAS SAFE OPERATING AREA

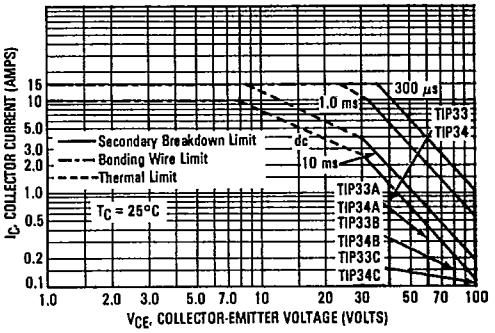
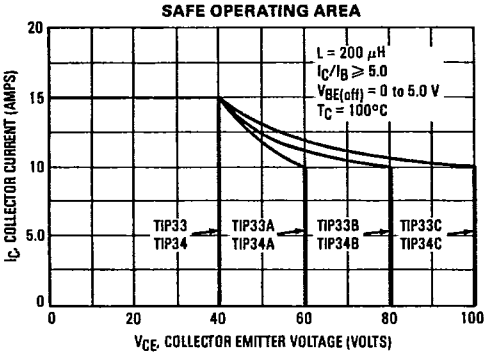


FIGURE 3 — MAXIMUM RATED REVERSE BIAS SAFE OPERATING AREA



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°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 $T_C > 25°C$.

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.