MOSPEC

COMPLEMENTARY SILICON
HIGH-POWER TRANSISTORS

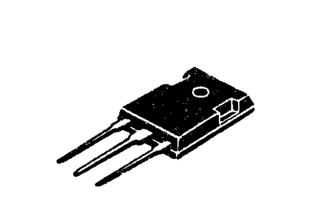
... designed for use in general purpose power amplifier and switching applications.

FEATURES:

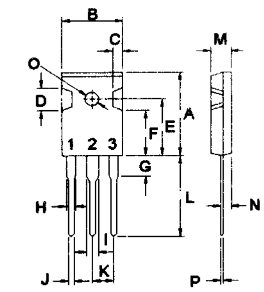
* Collector-Emitter Sustaining Voltage -
  $V_{CEO(sus)}$= 40V(Min)- TIP33,TIP34
  60V(Min)- TIP33A,TIP34A
  80V(Min)- TIP33B,TIP34B
  100V(Min)- TIP33C,TIP34C
* DC Current Gain hFE=40(Min)@I_C= 1.0A
* Current Gain-Bandwidth Product f_T=3.0 MHz (Min)@ I_C=0.5A

NPN	PNP
TIP33	TIP34
TIP33A	TIP34A
TIP33B	TIP34B
TIP33C	TIP34C

10 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
40 -100 VOLTS
80 WATTS



TO-247(3P)



PIN 1.BASE
2.COLLECTOR
3.EMITTER

DIM	MILLIMETERS	
	MIN	MAX
A	20.63	22.38
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.81	15.22
F	11.72	12.84
G	4.20	4.50
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.50	21.50
M	4.68	5.36
N	2.40	2.80
O	3.25	3.65
P	0.55	0.70

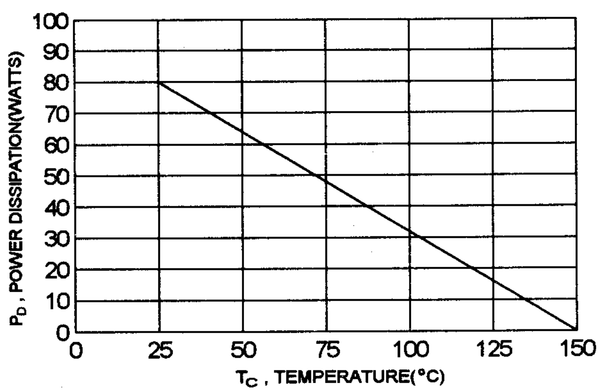
MAXIMUM RATINGS

Characteristic	Symbol	TIP33 TIP34	TIP33A TIP34A	TIP33B TIP34B	TIP33C TIP34C	Unit
Collector-Emitter Voltage	V_{CEO}	40	60	80	100	V
Collector-Base Voltage	V_{CBO}	40	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0				V
Collector Current - Continuous - Peak	I_C	10 15				A
Base Current	I_B	3.0				A
Total Power Dissipation@T_C = 25°C Derate above 25°C	P_D	80 0.64				W 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	Rθjc	1.56	°C/W

FIGURE -1 POWER DERATING



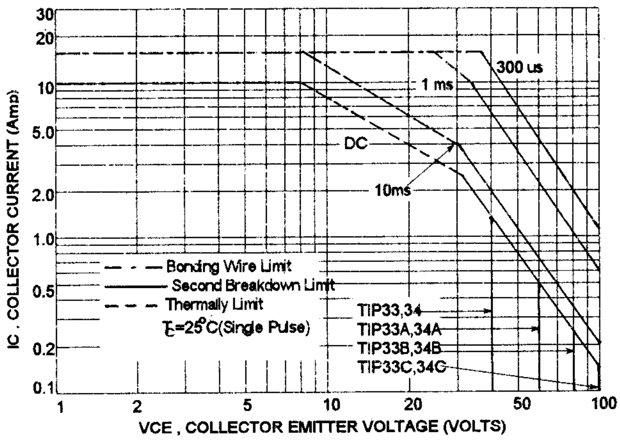
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage(1) (I_C= 30 mA, I_B= 0)	TIP33,TIP34 TIP33A,TIP34A TIP33B,TIP34B TIP33C,TIP34C	$V_{CEO(sus)}$	40 60 80 100		V
Collector Cutoff Current (V_{CE}= 30 V, I_B= 0) (V_{CE}= 60 V, I_B= 0)	 TIP33,TIP34,TIP33A,TIP34A TIP33B,TIP34B,TIP33C,TIP34C	I_{CEO}		 0.7 0.7	mA
Collector Cutoff Current (V_{CE}= 40 V, V_{EB}= 0) (V_{CE}= 60 V, V_{EB}= 0) (V_{CE}= 80 V, V_{EB}= 0) (V_{CE}= 100 V, V_{EB}= 0)	 TIP33,TIP34 TIP33A,TIP34A TIP33B,TIP34B TIP33C,TIP34C	I_{CES}		 0.4 0.4 0.4 0.4	mA
Emitter Cutoff Current (V_{EB}= 5.0 V, I_C= 0)		I_{EBO}		 1.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain (V_{CE} = 4.0 V, I_C = 1.0 A) (V_{CE} = 4.0 V, I_C = 3.0 A)		hFE	 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	V
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	V
DYNAMIC CHARACTERISTICS					
Current Gain - Bandwidth Product (2) (I_C = 0.5 A , V_{CE} = 10 V , f_{TEST} = 1 MHz)		f_T	 3.0		MHz
Small Signal Current Gain (I_C = 0.5 A , V_{CE} = 10 V , f = 1 kHz)		h_{fe}	 20		

(1) Pulse Test: Pulse width $\leqq$ 300 μs , Duty Cycle $\leqq$ 2.0 %

(2) $f_T = |h_{fe}| \cdot f_{TEST}$

FIG-2 ACTIVE- REGION SAFE OPERATING AREA

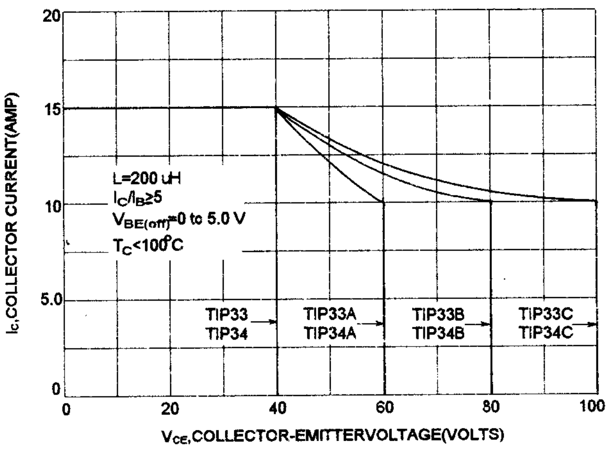


FORWARD BIAS

There are two limitation on the power handling ability of a transistor:average junction temperature and second breakdown safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of FIG-2 is base on T_C=25 °C;$T_{J(PK)}$ is variable depending on power level.Second breakdown pulse limi -ts are valid for duty cycles to 10% but must be derated when $T_C \geq 25°C$, second breakdown limitations do not derate the same as thermal limitations.

FIG-3 REVERSE BIAS SAFE OPERATING AREA



REVERSE BIAS

For inductive loads,high voltage and high current must be sustained simultaneously during turn-off,in most cases with the base-to-emitter junction reverse biased under these conditions the collector voltage must be held to a safe level at or below a specfic value of collector current.This can be accomplished by several mean such as active clamping, RC snubbing, load line shaping, etc. the safe level for these devices is specified as Reverse Bias Safe Operating Area and represents the voltage-current condition allowable during reverse biased turn-off. This rating is verified under clamped conditions so that the device is never subjected to an avalanche mode. FIG-3 gives the RBSOA characteristics.

FIG-4 DC CURRENT GAIN