

COMPLEMENTARY SILICON HIGH-POWER TRANSISTORS

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

FEATURES:

* Collector-Emitter Sustaining Voltage -

$V_{CEO(sus)} = 40V(\text{Min})$ - TIP35, TIP36
 $60V(\text{Min})$ - TIP35A, TIP36A
 $80V(\text{Min})$ - TIP35B, TIP36B
 $100V(\text{Min})$ - TIP35C, TIP36C

* DC Current Gain $hFE=25(\text{Min})@I_C = 1.5A$

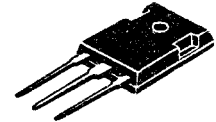
* Current Gain-Bandwidth Product $f_T=3.0 \text{ MHz}(\text{Min})@I_C=1.0A$

NPN	PNP
TIP35	TIP36
TIP35A	TIP36A
TIP35B	TIP36B
TIP35C	TIP36C

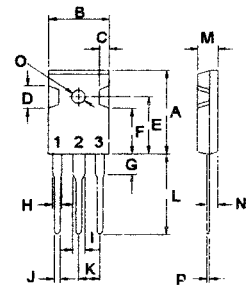
25 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
40 -100 VOLTS
125 WATTS

MAXIMUM RATINGS

Characteristic	Symbol	TIP35 TIP36	TIP35A TIP36A	TIP35B TIP36B	TIP35C TIP36C	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	25 40				A
Base Current	I_B	5.0				A
Total Power Dissipation@ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	125 1.0				W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150				$^\circ\text{C}$



TO-247(3P)



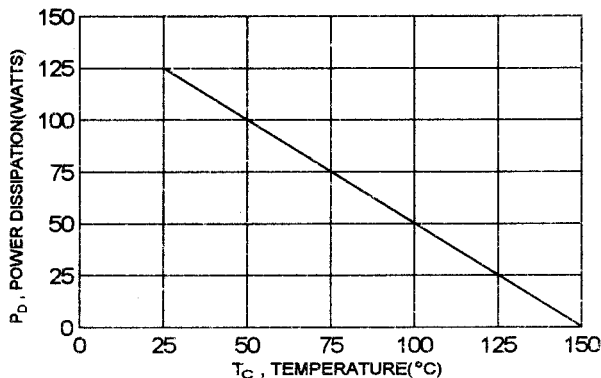
PIN 1.BASE
2.COLLECTOR
3.EMITTER

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.0	$^\circ\text{C/W}$

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

FIGURE -1 POWER DERATING



TIP35, TIP35A, TIP35B, TIP35C NPN / TIP36, TIP36A, TIP36B, TIP36C PNP

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage(1) ($I_C = 30\text{ mA}$, $I_B = 0$)	TIP35,TIP36 TIP35A,TIP36A TIP35B,TIP36B TIP35C,TIP36C	$V_{CEO(sus)}$	40 60 80 100	V
Collector Cutoff Current ($V_{CE} = 30\text{ V}$, $I_B = 0$) ($V_{CE} = 60\text{ V}$, $I_B = 0$)	TIP35,TIP36,TIP35A,TIP36A TIP35B,TIP36B,TIP35C,TIP36C	I_{CEO}	1.0 1.0	mA
Collector Cutoff Current ($V_{CE} = 40\text{ V}$, $V_{EB} = 0$) ($V_{CE} = 60\text{ V}$, $V_{EB} = 0$) ($V_{CE} = 80\text{ V}$, $V_{EB} = 0$) ($V_{CE} = 100\text{ V}$, $V_{EB} = 0$)	TIP35,TIP36 TIP35A,TIP36A TIP35B,TIP36B TIP35C,TIP36C	I_{CES}	0.7 0.7 0.7 0.7	mA
Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}$, $I_C = 0$)		I_{EBO}	1.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 1.5\text{ A}$, $V_{CE} = 4.0\text{ V}$,) ($I_C = 15\text{ A}$, $V_{CE} = 4.0\text{ V}$,)	h_{FE}	25 15	75	
Collector-Emitter Saturation Voltage ($I_C = 15\text{ A}$, $I_B = 1.5\text{ A}$) ($I_C = 25\text{ A}$, $I_B = 5.0\text{ A}$)	$V_{CE(sat)}$		1.8 4.0	V
Base-Emitter On Voltage ($I_C = 15\text{ A}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 25\text{ A}$, $V_{CE} = 4.0\text{ V}$)	$V_{BE(on)}$		2.0 4.0	V

DYNAMIC CHARACTERISTICS

Current Gain - Bandwidth Product (2) ($I_C = 1.0\text{ A}$, $V_{CE} = 10\text{ V}$, $f_{TEST} = 1\text{ MHz}$)	f_T	3.0		MHz
Small Signal Current Gain ($I_C = 1.0\text{ A}$, $V_{CE} = 10\text{ V}$, $f = 1\text{ kHz}$)	h_{fe}	25		

(1) Pulse Test: Pulse width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$

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

TIP35, TIP35A, TIP35B, TIP35C NPN / TIP36, TIP36A, TIP36B, TIP36C PNP

FIG-2 DC CURRENT GAIN

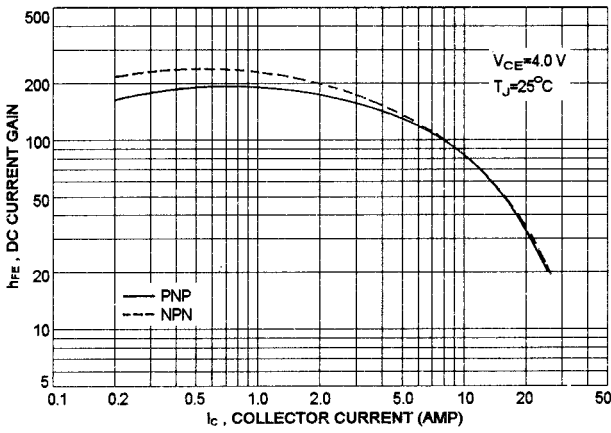


FIG-3 TURN-OFF TIME

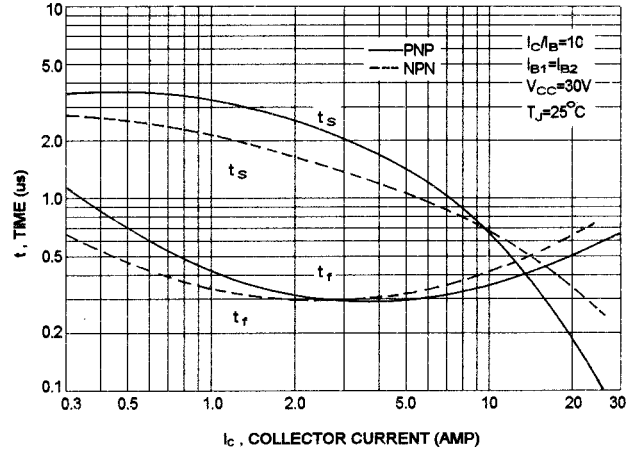


FIG-4 TURN-ON TIME

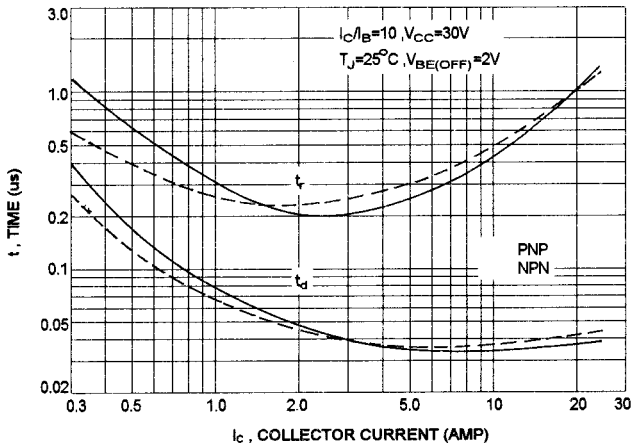


FIG-5 REVERSE BIASE SAFE OPERATING AREA

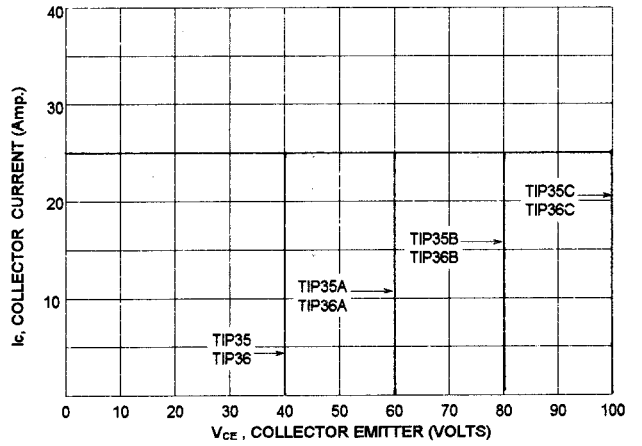
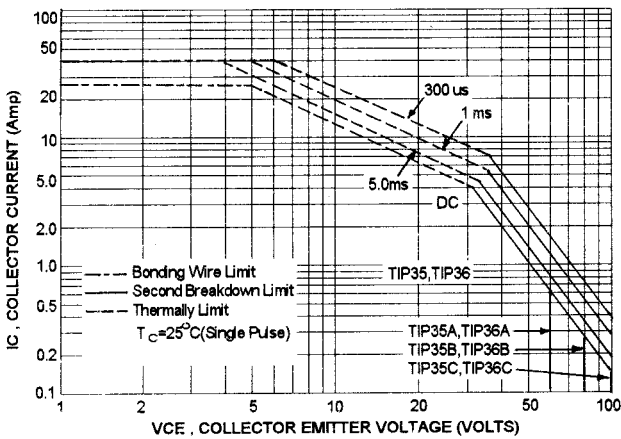


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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-6 is base on $T_C = 25^\circ C$; $T_{J(PK)}$ is variable depending on power level, second breakdown pulse limits are valid for duty cycles to 10% but must be derated when $T_C \geq 25^\circ C$, second breakdown limitations do not derate the same as thermal limitation.