

COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

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

FEATURES:

- * Collector-Emitter Sustaining Voltage -

$V_{CE(sus)}$ = 40V(Min)- TIP41,TIP42
 60V(Min)- TIP41A,TIP42A
 80V(Min)- TIP41B,TIP42B
 100V(Min)-TIP41C,TIP42C

- * Collector-Emitter Saturation Voltage- $V_{CE(sat)}$ = 1.5V(Max)@ $I_C = 6.0A$

- * Current Gain-Bandwidth Product f_T = 3.0 MHz (Min)@ I_C = 500mA

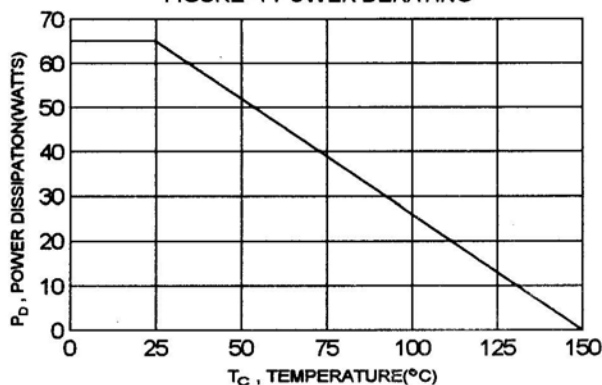
MAXIMUM RATINGS

Characteristic	Symbol	TIP41 TIP42	TIP41A TIP42A	TIP41B TIP42B	TIP41C TIP42C	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				V
Collector Current - Continuous - Peak	I_C	6 10				A
Base Current	I_B	2				A
Total Power Dissipation@ $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	65 0.52				W W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150				$^\circ C$

THERMAL CHARACTERISTICS

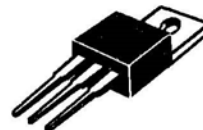
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.92	$^\circ C/W$

FIGURE -1 POWER DERATING

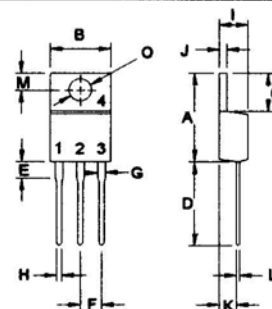


NPN	PNP
TIP41	TIP42
TIP41A	TIP42A
TIP41B	TIP42B
TIP41C	TIP42C

6 AMPERE
 COMPLEMENTARY SILICON
 POWER TRANSISTORS
 40 -100 VOLTS
 65 WATTS



TO-220



PIN 1.BASE
 2.COLLECTOR
 3.EMITTER
 4.COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	16.00
B	9.78	10.42
C	5.02	6.60
D	13.00	14.62
E	3.10	4.19
F	2.41	2.67
G	1.10	1.67
H	0.69	1.01
I	3.21	4.98
J	1.14	1.40
K	2.20	3.30
L	0.28	0.61
M	2.48	3.00
O	3.50	4.00

TIP41, TIP41A, TIP41B, TIP41C NPN / TIP42, TIP42A, TIP42B, TIP42C 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) ($I_C = 30\text{ mA}$, $I_B = 0$)	TIP41, TIP42 TIP41A, TIP42A TIP41B, TIP42B TIP41C, TIP42C	$V_{CEO(sus)}$	40 60 80 100	V
Collector Cutoff Current ($V_{CE} = 30\text{ V}$, $I_B = 0$) ($V_{CE} = 60\text{ V}$, $I_B = 0$)	TIP41, TIP42, TIP41A, TIP42A TIP41B, TIP42B, TIP41C, TIP42C	I_{CEO}	0.7 0.7	mA
Collector Cutoff Current ($V_{CE} = 40\text{ V}$, $V_{EB} = 0$) ($V_{CE} = 60\text{ V}$, $V_{EB} = 0$) ($V_{CE} = 80\text{ V}$, $V_{EB} = 0$) ($V_{CE} = 100\text{ V}$, $V_{EB} = 0$)	TIP41, TIP42 TIP41A, TIP42A TIP41B, TIP42B TIP41C, TIP42C	I_{CES}	0.4 0.4 0.4 0.4	mA
Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}$, $I_C = 0$)		I_{EBO}	1.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 0.3\text{ A}$, $V_{CE} = 4.0\text{ V}$,) ($I_C = 3.0\text{ A}$, $V_{CE} = 4.0\text{ V}$,)	h_{FE}	30 15	75	
Collector-Emitter Saturation Voltage ($I_C = 6.0\text{ A}$, $I_B = 600\text{ mA}$)	$V_{CE(sat)}$		1.5	V
Base-Emitter On Voltage ($I_C = 6.0\text{ A}$, $V_{CE} = 4.0\text{ V}$)	$V_{BE(on)}$		2.0	V

DYNAMIC CHARACTERISTICS

Current Gain - Bandwidth Product (2) ($I_C = 500\text{ mA}$, $V_{CE} = 10\text{ V}$, $f_{TEST} = 1\text{ MHz}$)	f_T	3.0		MHz
Small Signal Current Gain ($I_C = 500\text{ mA}$, $V_{CE} = 10\text{ V}$, $f = 1\text{ kHz}$)	h_{fe}	20		

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

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

FIGURE 2 – SWITCHING TIME TEST CIRCUIT

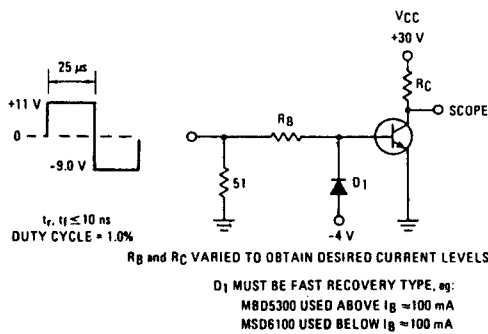


FIG-3 TURN-ON TIME

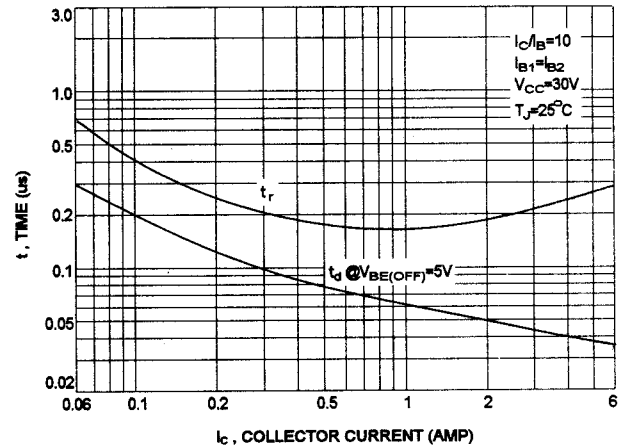


FIG-4 DC CURRENT GAIN

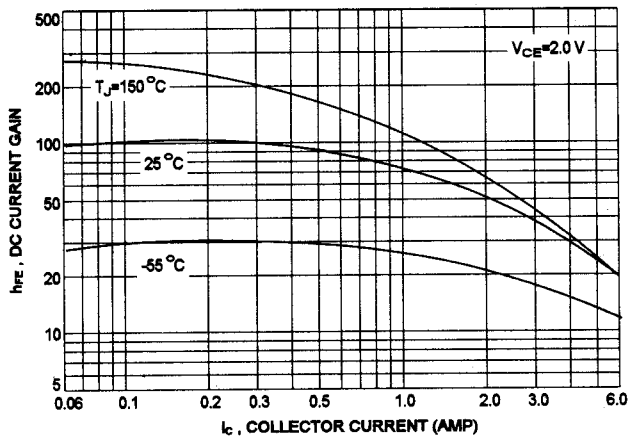


FIG-5 TURN-OFF TIME

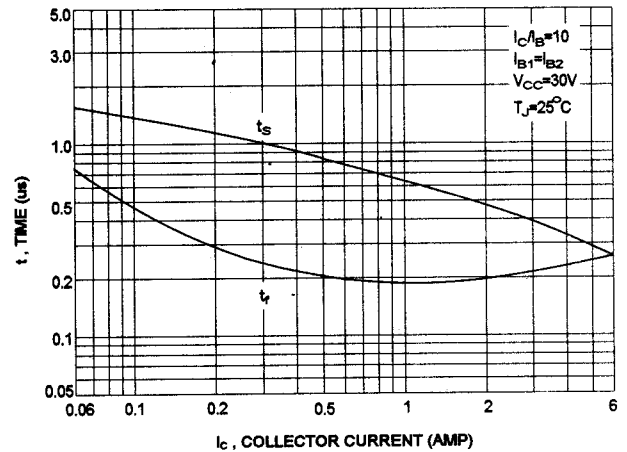
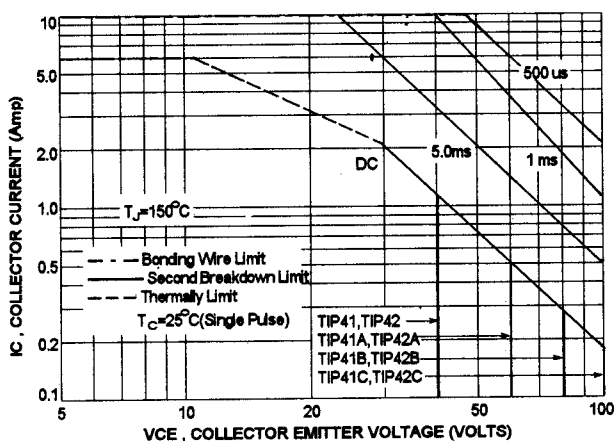


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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 curve is base on $T_{J(PK)} = 150^\circ\text{C}$; T_C is variable depending on power level. second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

TIP41,TIP41A,TIP41B,TIP41C NPN / TIP42,TIP42A,TIP42B,TIP42C PNP

FIG-7 COLLECTOR SATURATION REGION

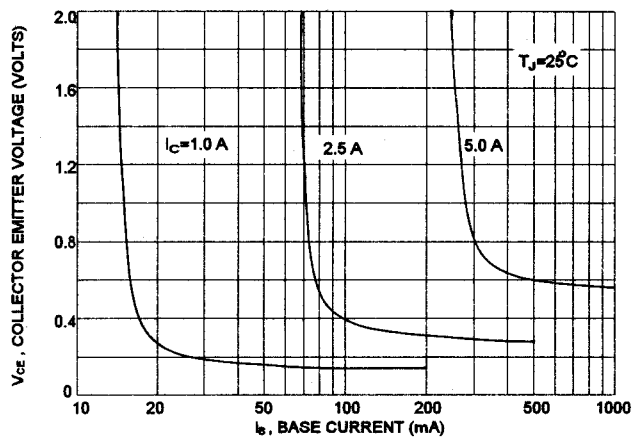


FIG-8 CAPACITANCES

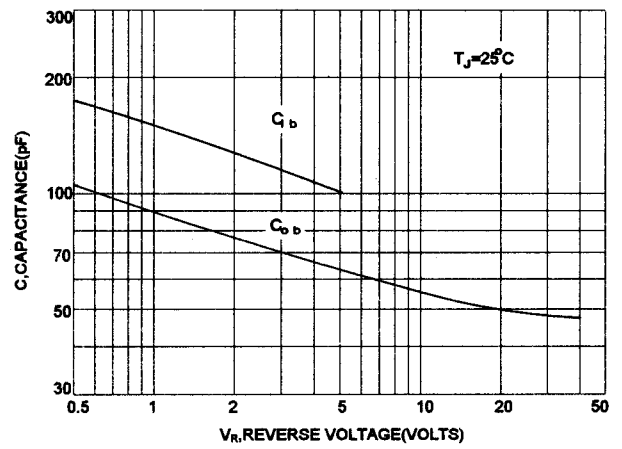


FIG-9 "ON" VOLTAGE

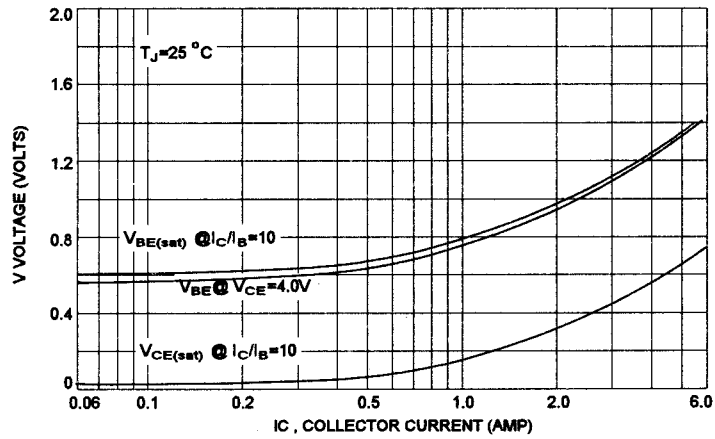
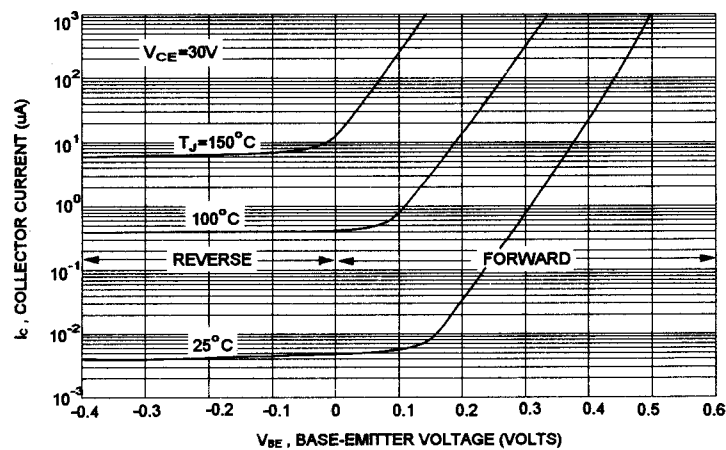


FIG-10 COLLECTOR CUT-OFF REGION



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