

COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

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

FEATURES:

* Collector-Emitter Sustaining Voltage -

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

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

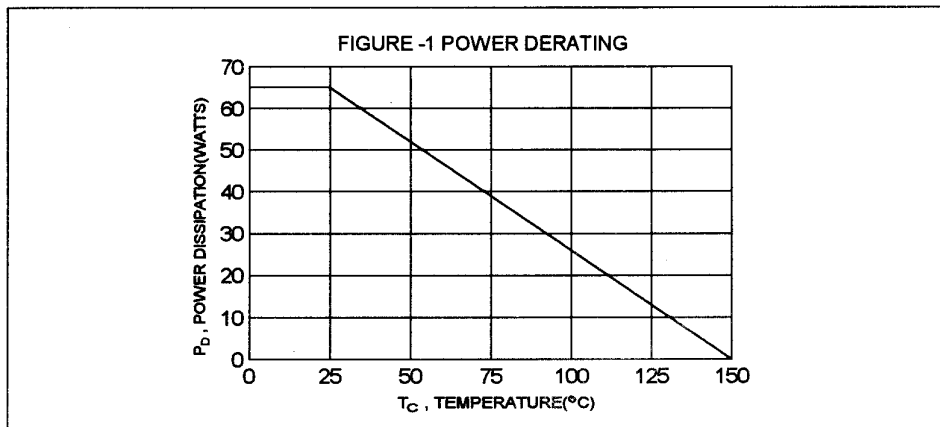
* Current Gain-Bandwidth Product $f_T = 3.0 \text{ MHz} (\text{Min}) @ I_C = 500\text{mA}$

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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	65 0.52				W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150				$^\circ\text{C}$

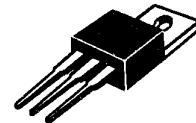
THERMAL CHARACTERISTICS

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

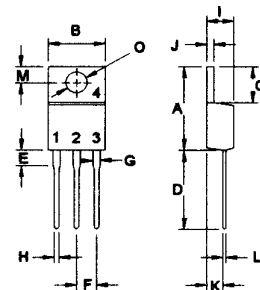


NPN	PNP
TIP41	TIP42
TIP41A	TIP42A
TIP41B	TIP42B
TIP41C	TIP42C

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	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

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 $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$

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

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

FIGURE 2 - SWITCHING TIME TEST CIRCUIT

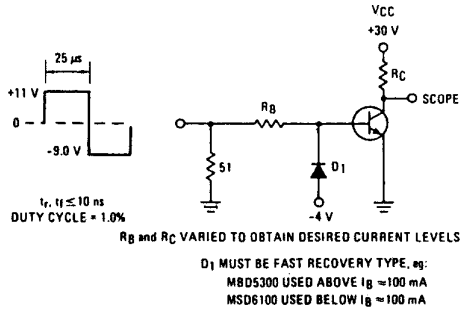


FIG-3 TURN-ON TIME

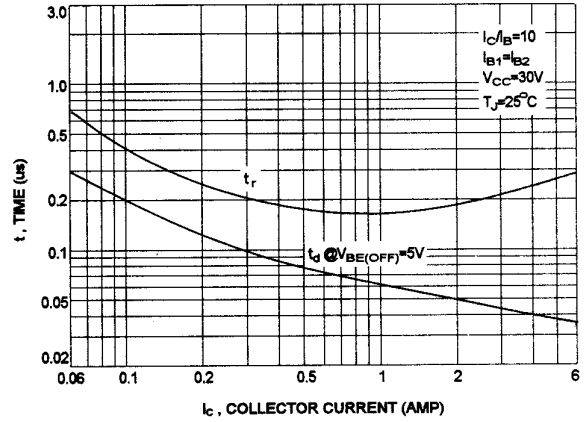


FIG-4 DC CURRENT GAIN

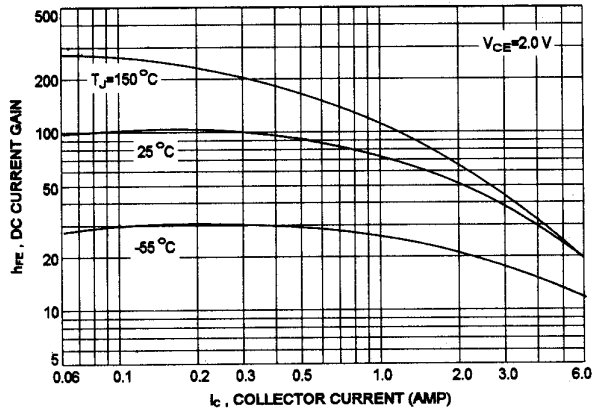


FIG-5 TURN-OFF TIME

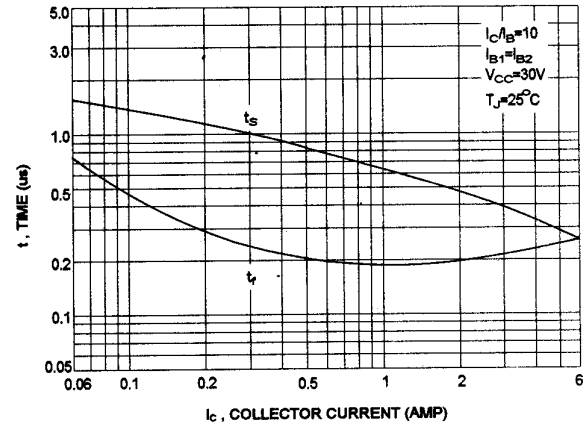
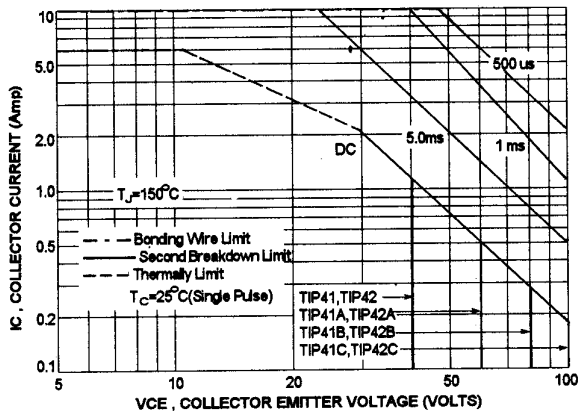


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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

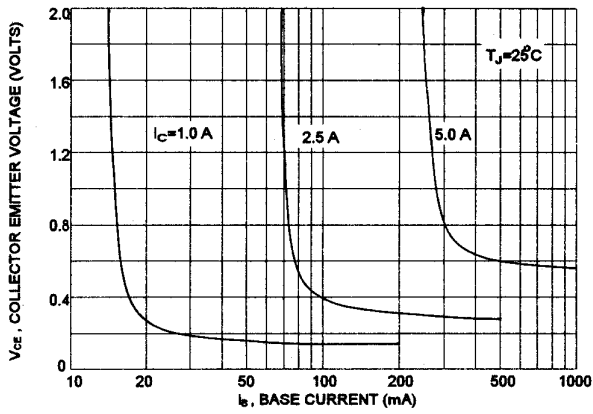


FIG-8 CAPACITANCES

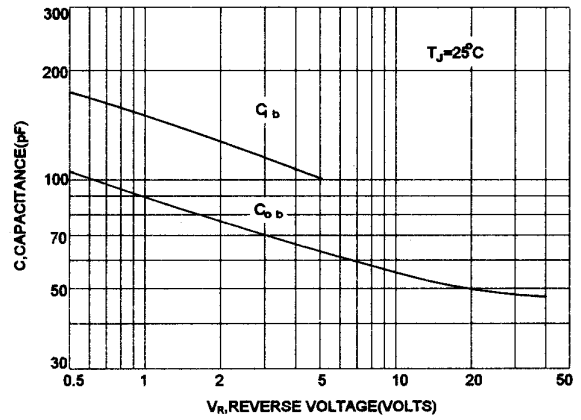


FIG-9 "ON" VOLTAGE

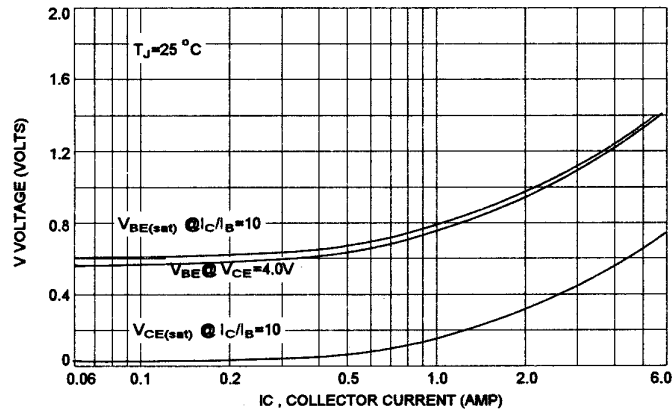


FIG-10 COLLECTOR CUT-OFF REGION

