MOSPEC

COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

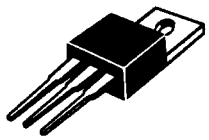
General Purpose-Amplifier and Switching Application..

FEATURES:

* Collector-Emitter Sustaining Voltage -
  $V_{CEO(sus)}$=120V (Min)- TIP41D,TIP42D
  140V (Min)- TIP41E,TIP42E
  160V (Min)- TIP41F,TIP42F
* Current Gain-Bandwidth Product-
  f_T= 3.0MHz(Min)@I_C= 0.5A

NPN	PNP
TIP41D	TIP42D
TIP41E	TIP42E
TIP41F	TIP42F

6 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
120-160 VOLTS
65 WATTS



TO-220

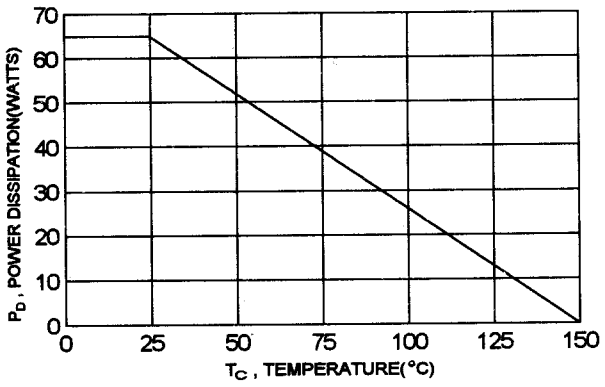
MAXIMUM RATINGS

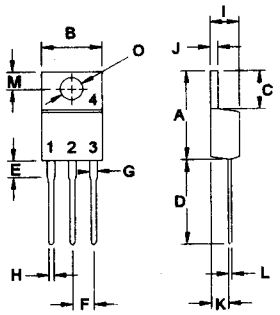
Characteristic	Symbol	TIP41D TIP42D	TIP41E TIP42E	TIP41F TIP42F	Unit
Collector-Emitter Voltage	V_{CEO}	120	140	160	V
Collector-Base Voltage	V_{CBO}	160	180	200	V
Emitter-Base Voltage	V_{EBO}	5			V
Collector Current - Continuous - Peak	I_C	6 10			A
Base Current	I_B	3			A
Total Power Dissipation@T_C = 25°C Derate above 25°C	P_D	65 0.52			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	1.92	°C/W

FIGURE -1 POWER DERATING





PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR

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

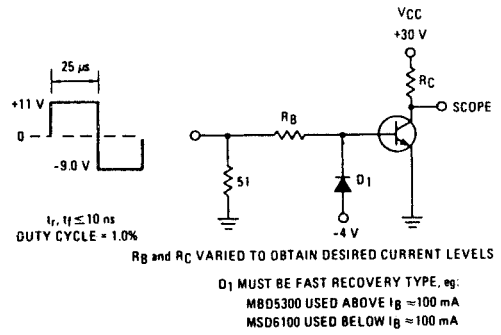
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector -Emitter Sustaining Voltage (1) (I_C =30 mA, I_B= 0)	TIP41D,TIP42D TIP41E,TIP42E TIP41F,TIP42F	V_{CEO}	 120 140 160		V
Collector Cutoff Current (V_{CE}= 90 V, I_B= 0)		I_{CEO}		0.7	mA
Collector Cutoff Current (V_{CE}= 160 V, V_{BE}= 0) (V_{CE}= 180 V, V_{BE}= 0) (V_{CE}= 200 V, V_{BE}= 0)	 TIP41D,TIP42D TIP41E,TIP42E TIP41F,TIP42F	I_{CES}		 0.4 0.4 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 (I_C= 0.3 A,V_{CE}= 4.0 V) (I_C= 3.0 A, V_{CE}= 4.0 V)		h_{FE}	 30 15		
Collector-Emitter Saturation Voltage (I_C =6.0 A, I_B =1.5 A)		$V_{CE(sat)}$		1.5	V
Base-Emitter On Voltage (I_C= 6.0 A, V_{CE}= 4.0 V)		$V_{BE(on)}$		2.0	V
DYNAMIC CHARACTERISTICS					
Current-Gain-Bandwidth Product (I_C = 0.5 A, V_{CE} = 10 V, f = 1.0 MHz)		f_T	3.0		MHz
Small-Signal Current Gain (I_C = 0.5 A, V_{CE} = 10 V, f = 1.0 KHz)		h_{fe}	15		
SWITCHING CHARACTERISTICS					
Turn On Time	I_C= 6.0A , I_{B1}= -I_{B2}= 0.6 A $V_{BE(off)}$= 4.0V, R_L= 5Ω	t_{on}		0.6	us
Off Time		t_{off}		1.0	us

(1) Pulse Test: Pulse width ≦ 300 us , Duty Cycle ≦ 2.0 %

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

FIGURE 2 – SWITCHING TIME TEST CIRCUIT



R_B and R_C VARIED TO OBTAIN DESIRED CURRENT LEVELS

D_1 MUST BE FAST RECOVERY TYPE, eg:
MBD5300 USED ABOVE $I_B \approx 100$ mA
MSD6100 USED BELOW $I_B \approx 100$ mA

FIG-3 TURN-ON TIME

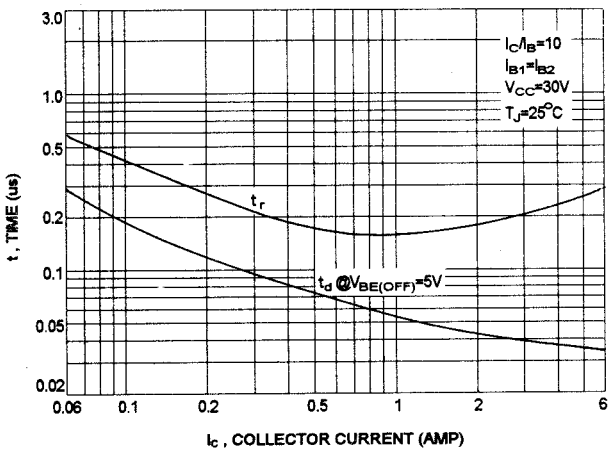


FIG-4 DC CURRENT GAIN

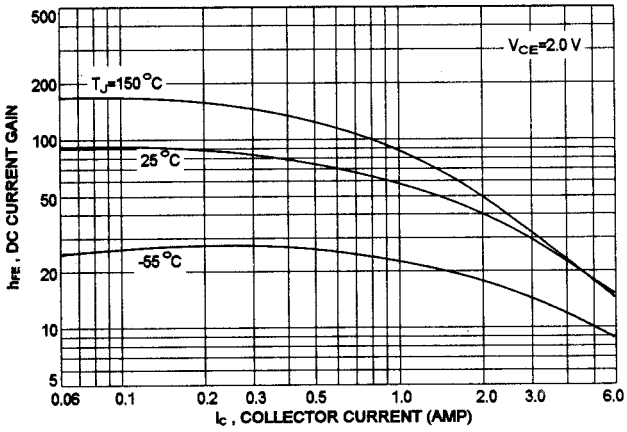


FIG-5 TURN-OFF TIME

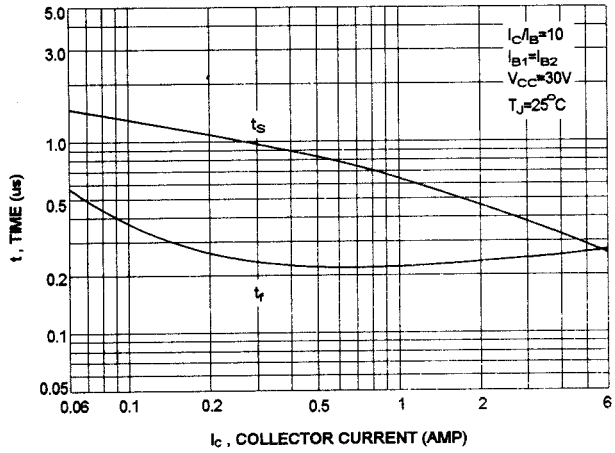
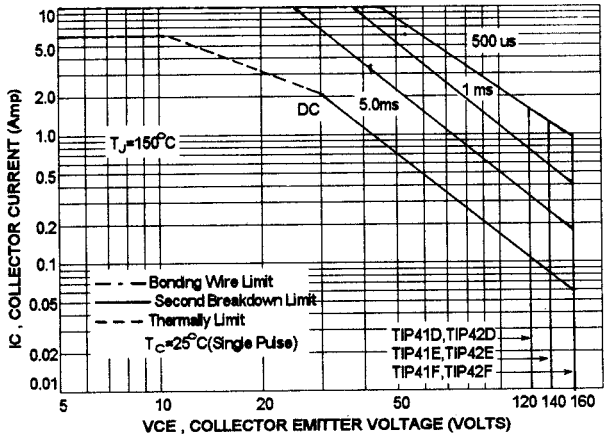


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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

FIG-7 COLLECTOR SATURATION REGION

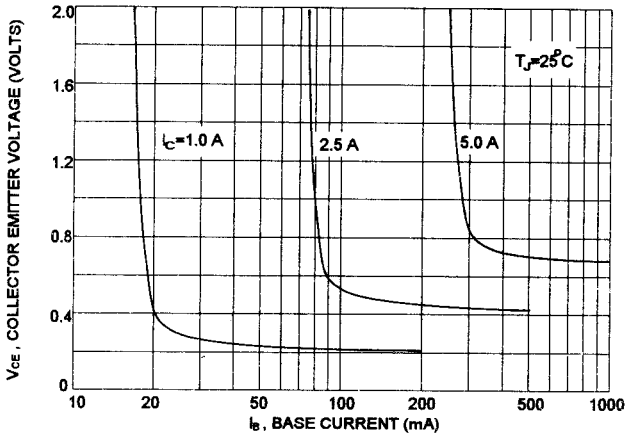


FIG-8 CAPACITANCES

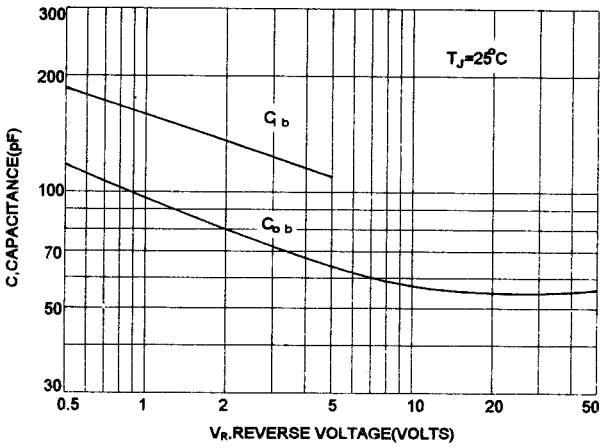


FIG-9 "ON" VOLTAGE

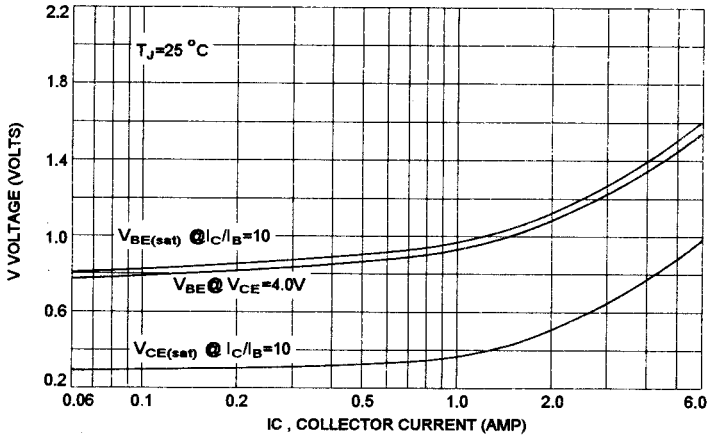


FIG-10 COLLECTOR CUT-OFF REGION