MOSPEC

COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

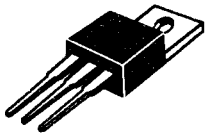
... designed for use in general purpose power amplifier and switching applications.

NPN	PNP
TIP29	TIP30
TIP29A	TIP30A
TIP29B	TIP30B
TIP29C	TIP30C

1.0 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
40-100 VOLTS
30 WATTS

FEATURES:

* Collector-Emitter Sustaining Voltage -
  $V_{CEO(sus)}$= 40V(Min)- TIP29,TIP30
  60V(Min)- TIP29A,TIP30A
  80V(Min)- TIP29B,TIP30B
  100V(Min)-TIP29C,TIP30C
* Collector-Emitter Saturation Voltage- $V_{CE(sat)}$=0.7V(Max)@I_C= 1.0 A
* Current Gain-Bandwidth Product f_T=3.0 MHz (Min)@ I_C=200 mA



TO-220

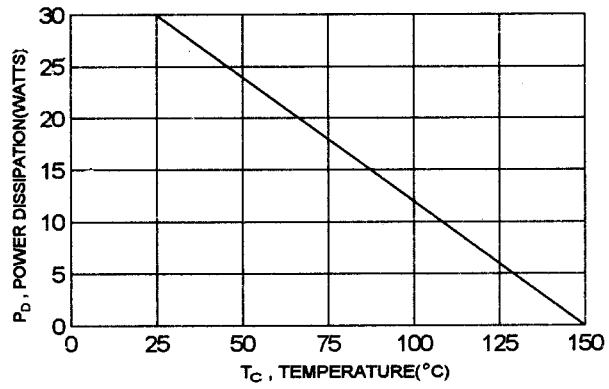
MAXIMUM RATINGS

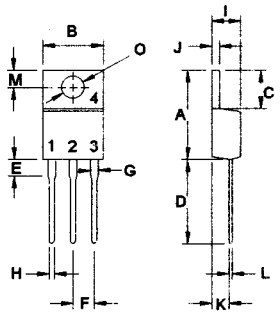
Characteristic	Symbol	TIP29 TIP30	TIP29A TIP30A	TIP29B TIP30B	TIP29C TIP30C	Unit
Collector-Emitter Voltage	V_{CEO}	40	60	80	100	V
Collector-Base Voltage	V_{CBO}	40	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0				V
Collector Current - Continuous - Peak	I_C	1.0 3.0				A
Base Current	I_B	0.4				A
Total Power Dissipation@T_C = 25°C Derate above 25°C	P_D	30 0.24				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	4.167	°C/W

FIGURE -1 POWER DERATING





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

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)	TIP29,TIP30 TIP29A,TIP30A TIP29B,TIP30B TIP29C,TIP30C	$V_{CEO(sus)}$	40 60 80 100		V
Collector Cutoff Current (V_{CE}= 30 V, I_B= 0) (V_{CE}= 60 V, I_B= 0)	TIP29,TIP30,TIP29A,TIP30A TIP29B,TIP30B,TIP29C,TIP30C	I_{CEO}		0.3 0.3	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)	 TIP29,TIP30 TIP29A,TIP30A TIP29B,TIP30B TIP29C,TIP30C	I_{CES}		 0.2 0.2 0.2 0.2	mA
Emitter Cutoff Current (V_{EB}= 5.0 V, I_C= 0)		I_{EBO}		1.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C =0.2 A, V_{CE} = 4.0 V) (I_C =1.0 A, V_{CE} = 4.0 V)		hFE	 40 15	 75	
Collector-Emitter Saturation Voltage (I_C = 1.0 A, I_B =125 mA)		$V_{CE(sat)}$		0.7	V
Base-Emitter On Voltage (I_C =1.0 A, V_{CE}= 4.0 V)		$V_{BE(on)}$		1.3	V
DYNAMIC CHARACTERISTICS					
Current Gain - Bandwidth Product (2) (I_C = 200 mA , V_{CE} = 10 V , f = 1 MHz)		f_T	3.0		MHz
Small Signal Current Gain (I_C = 200 mA , V_{CE} = 10 V , f = 1 kHz)		h_{fe}	20		

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

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

FIG-2 TURN-ON TIME

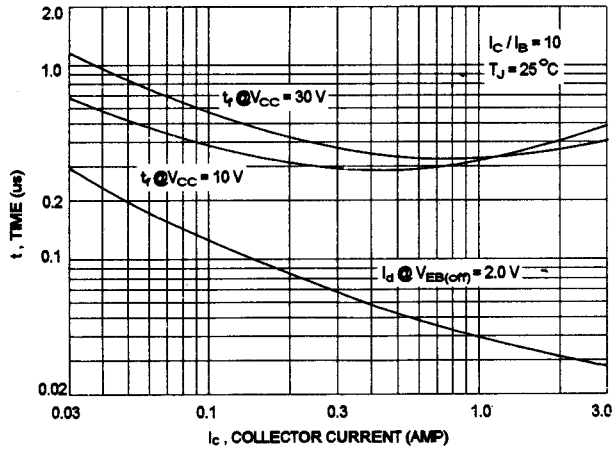
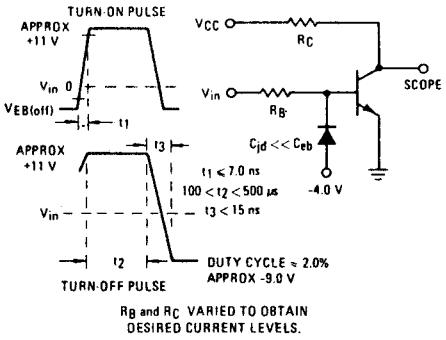


FIGURE 3 – SWITCHING TIME EQUIVALENT CIRCUIT



R_B and R_C VARIED TO OBTAIN DESIRED CURRENT LEVELS.

FIG-4 DC CURRENT GAIN

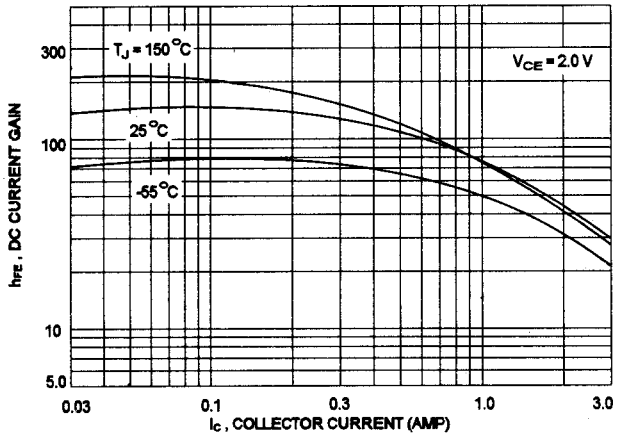


FIG-5 TURN-OFF TIME

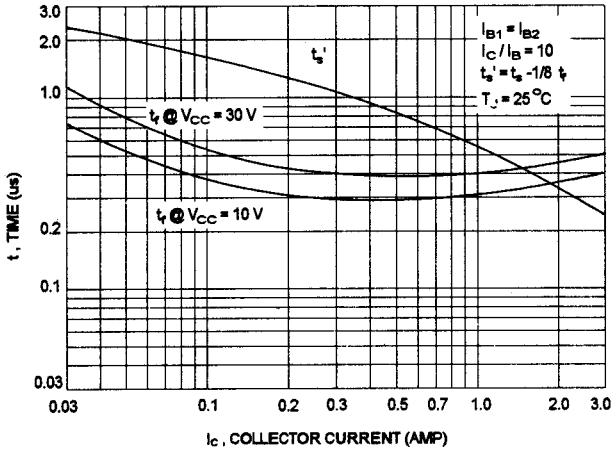
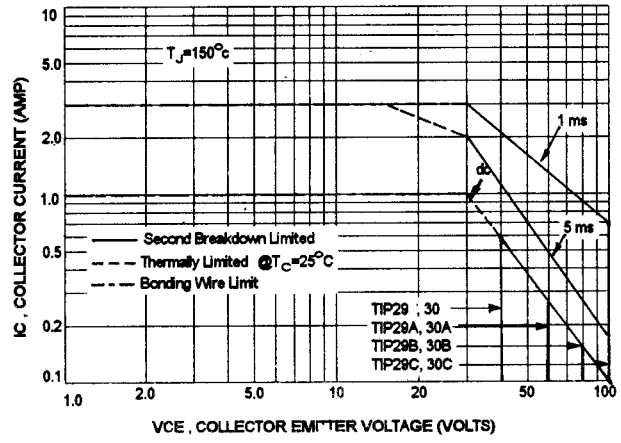


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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.