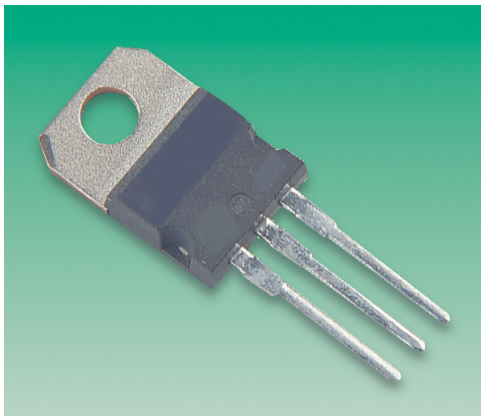
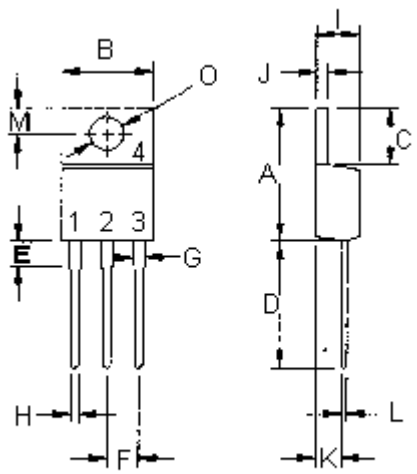
TIP29, 30

High Power Bipolar Transistor



Features:

- Collector-Emitter sustaining voltage-
  $V_{CEO(sus)}$ = 60V (Minimum) - TIP29A, TIP30A
  = 100V (Minimum) - TIP29C, TIP30C.
- Collector-Emitter saturation voltage-
  $V_{CE(sat)}$ = 0.7V (Maximum) at I_C = 1.0A.
- Current gain-bandwidth product f_T = 3.0MHz (Minimum) at I_C = 200mA.



Pin 1. Base
2. Collector
3. Emitter
4. Collector(Case).

Dimensions	Minimum	Maximum
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

Dimensions : Millimetres

NPN TIP29A TIP29C
PNP TIP30A TIP30C

1.0 Ampere
Complementary Silicon
Power Transistors
40 - 100 Volts
30 Watts

TO-220

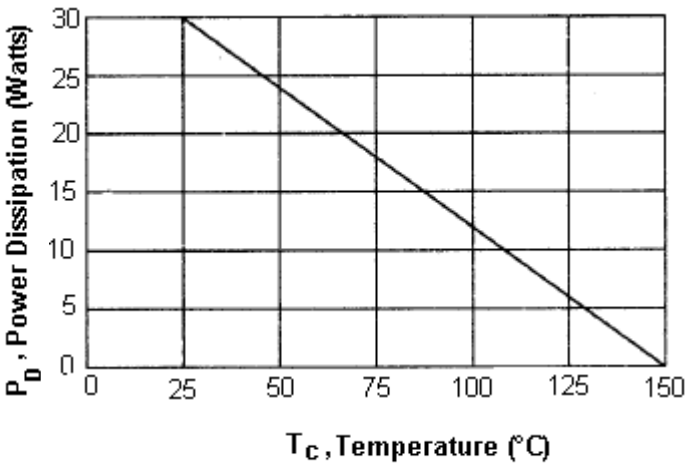
Maximum Ratings

Characteristic	Symbol	TIP29A TIP30A	TIP29C TIP30C	Unit
Collector-Emitter Voltage	V_{CEO}	60	100	V
Collector-Base Voltage	V_{CBO}			
Emitter-Base Voltage	V_{EBO}	5.0		
Collector Current-Continuous -Peak	I_C	1.0 3.0		A
Base Current	I_B	0.4		
Total Power Dissipation at 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	Maximum	Unit
Thermal Resistance Junction to Case	Rθjc	4.167	°C/W

Figure - 1 Power Derating



Electrical Characteristics (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Minimum	Maximum	Unit
OFF Characteristics				
Collector-Emitter Sustaining Voltage (1) (I_C = 30mA, I_B = 0) TIP29A, TIP30A TIP29C, TIP30C	$V_{CEO(sus)}$	60 100	-	V
Collector Cut off Current (V_{CE} = 30V, I_B = 0) TIP29A, TIP30A (V_{CE} = 60V, I_B = 0) TIP29C, TIP30C	I_{CEO}	-	0.3	mA
Collector Cut off Current (V_{CE} = 60V, V_{EB} = 0) TIP29A, TIP30A (V_{CE} = 100V, V_{EB} = 0) TIP29C, TIP30C	I_{CES}	-	0.2	
Emitter Cut off Current (V_{EB} = 5.0V, I_C = 0)	I_{EBO}	-	1.0	
ON CHARACTERISTICS (1)				
DC Current Gain (I_C = 0.2A, V_{CE} = 4.0V) (I_C = 1.0A, V_{CE} = 4.0V)	h_{FE}	40 15	- 75	-
Collector-Emitter Saturation Voltage (I_C = 1.0A, I_B = 125mA)	$V_{CE(sat)}$	-	0.7	V
Base-Emitter On Voltage (I_C = 1.0A, V_{CE} = 4.0V)	$V_{BE(on)}$	-	1.3	
DYNAMIC CHARACTERISTICS				
Current Gain-Bandwidth Product (2) (I_C = 200mA, V_{CE} = 10V, f = 1MHz)	f_T	3.0	-	MHz
Small Signal Current Gain (I_C = 200mA, V_{CE} = 10V, f = 1kHz)	h_{fe}	20	-	-

(1) Pulse Test: Pulse Width ≤300µs, Duty Cycle ≤2.0%.

(2) $f_T = |h_{FE}| \bullet f_{TEST.}$

Figure - 2 Turn-On Time

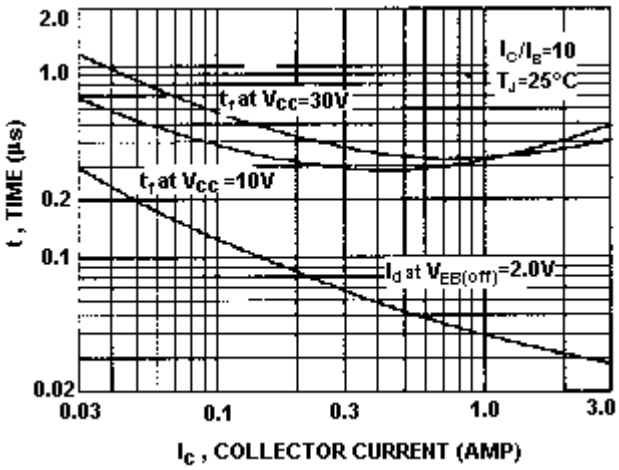
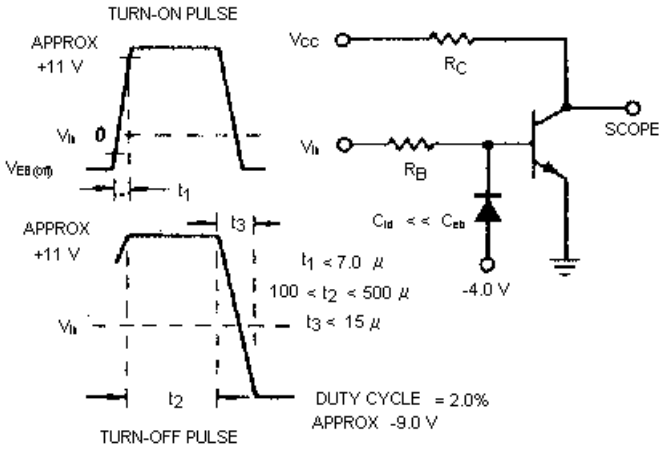


Figure - 3 Switching Time Equivalent Circuit



R_B and R_C VARIED TO OBTAIN DESIRED CURRENT LEVELS

Figure - 4 DC Current Gain

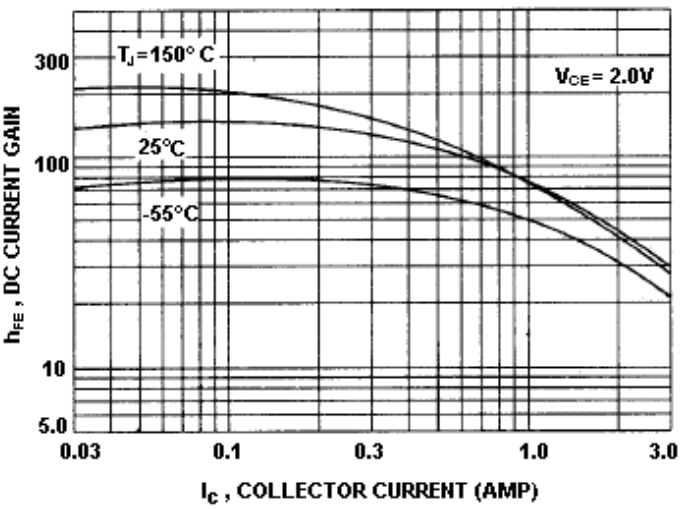


Figure - 5 Turn-Off Time

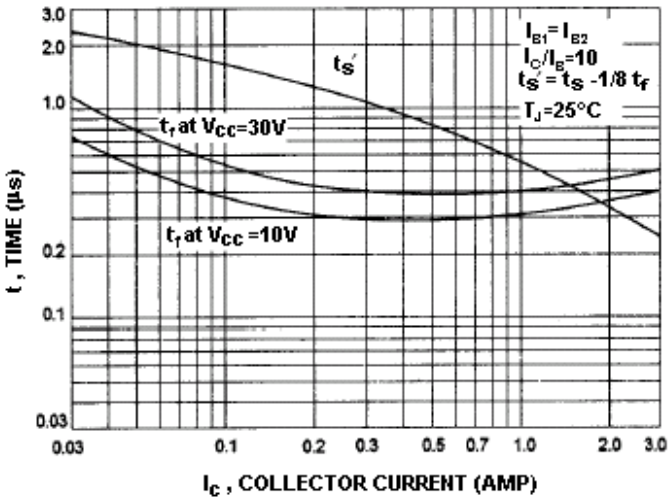
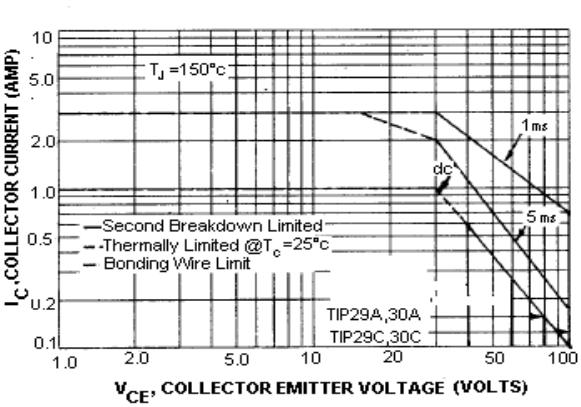


Figure - 6 Active Region Safe Operating Area



There are two limitations 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 the curves indicate.

The data of Figure - 6 curve is based 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 $T_{J(PK)}$ ≤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.

Specifications

TYPE	Part Number
NPN	TIP29A
	TIP29C
PNP	TIP30A
	TIP30C