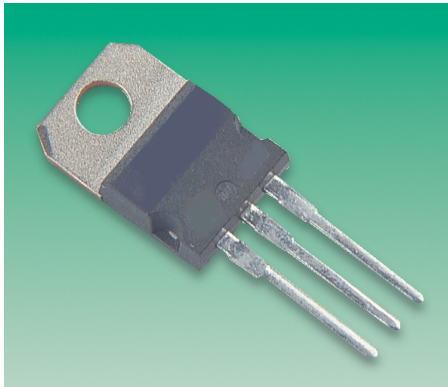


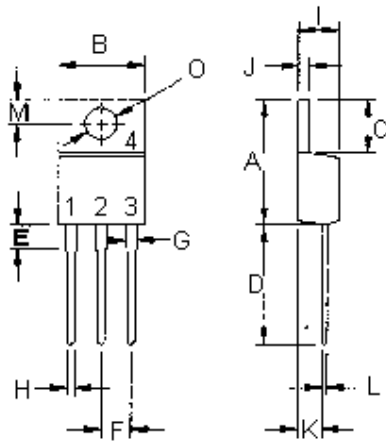
# TIP29, 30

## High Power Bipolar Transistor



### Features:

- Collector-Emitter sustaining voltage-  
 $V_{CE(sus)}$  = 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).

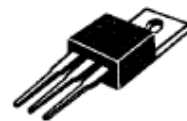
Dimensions	Minimum	Maximum
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

Dimensions : Millimetres

**NPN**  
TIP29A  
TIP29C

**PNP**  
TIP30A  
TIP30C

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



TO-220



# TIP29, 30

## High Power Bipolar Transistor



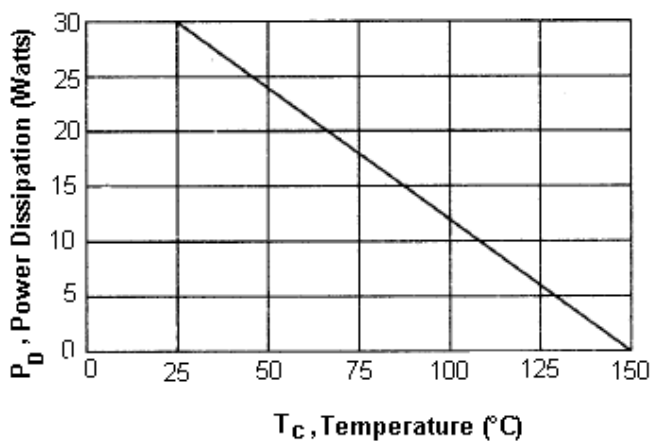
### Maximum Ratings

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 $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	30 0.24		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	Maximum	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	4.167	$^\circ\text{C}/\text{W}$

Figure - 1 Power Derating



# TIP29, 30

## High Power Bipolar Transistor



### Electrical Characteristics ( $T_c = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Minimum	Maximum	Unit
<b>OFF Characteristics</b>				
Collector-Emitter Sustaining Voltage (1) ( $I_C = 30\text{mA}$ , $I_B = 0$ ) TIP29A, TIP30A TIP29C, TIP30C	$V_{CEO(sus)}$	60 100	-	V
Collector Cut off Current ( $V_{CE} = 30\text{V}$ , $I_B = 0$ ) TIP29A, TIP30A ( $V_{CE} = 60\text{V}$ , $I_B = 0$ ) TIP29C, TIP30C	$I_{CEO}$	-	0.3	mA
Collector Cut off Current ( $V_{CE} = 60\text{V}$ , $V_{EB} = 0$ ) TIP29A, TIP30A ( $V_{CE} = 100\text{V}$ , $V_{EB} = 0$ ) TIP29C, TIP30C	$I_{CES}$	-	0.2	
Emitter Cut off Current ( $V_{EB} = 5.0\text{V}$ , $I_C = 0$ )	$I_{EBO}$	-	1.0	

### ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 0.2\text{A}$ , $V_{CE} = 4.0\text{V}$ ) ( $I_C = 1.0\text{A}$ , $V_{CE} = 4.0\text{V}$ )	$h_{FE}$	40 15	- 75	-
Collector-Emitter Saturation Voltage ( $I_C = 1.0\text{A}$ , $I_B = 125\text{mA}$ )	$V_{CE(sat)}$	-	0.7	V
Base-Emitter On Voltage ( $I_C = 1.0\text{A}$ , $V_{CE} = 4.0\text{V}$ )	$V_{BE(on)}$	-	1.3	
<b>DYNAMIC CHARACTERISTICS</b>				
Current Gain-Bandwidth Product (2) ( $I_C = 200\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 1\text{MHz}$ )	$f_T$	3.0	-	MHz
Small Signal Current Gain ( $I_C = 200\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 1\text{kHz}$ )	$h_{fe}$	20	-	-

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

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



# TIP29, 30

## High Power Bipolar Transistor



Figure - 2 Turn-On Time

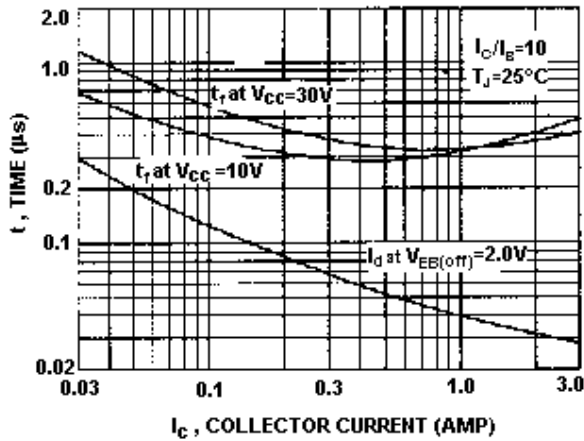


Figure - 3 Switching Time Equivalent Circuit

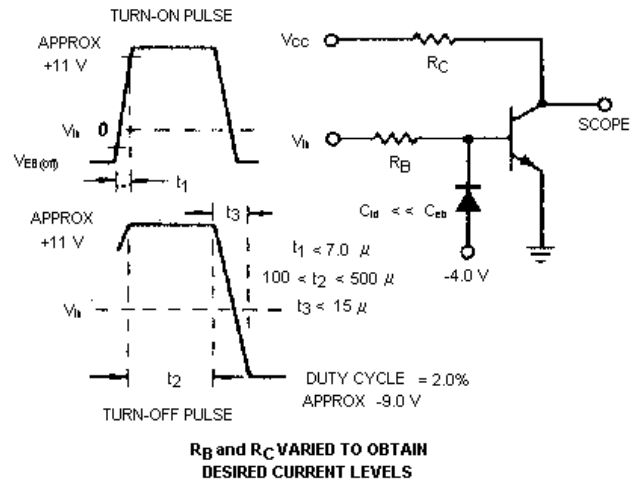


Figure - 4 DC Current Gain

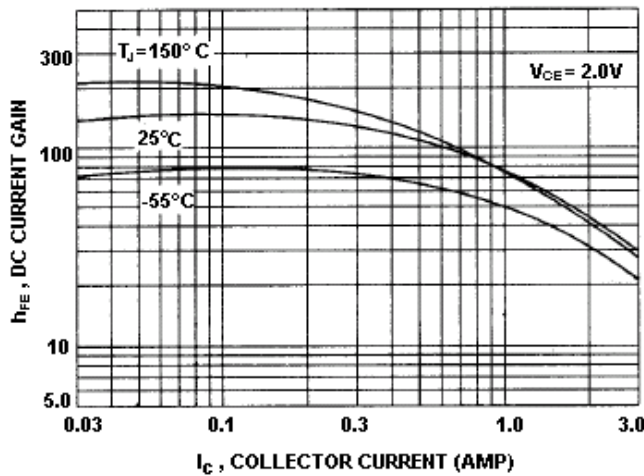


Figure - 5 Turn-Off Time

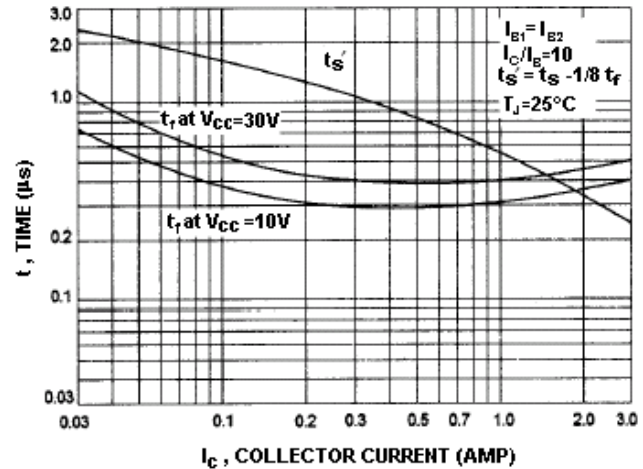
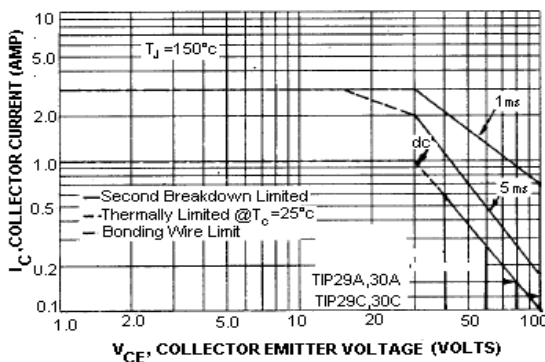


Figure - 6 Active Region Safe Operating Area



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  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_C$  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.



# TIP29, 30

## High Power Bipolar Transistor



### Specifications

TYPE	Part Number
NPN	TIP29A
	TIP29C
PNP	TIP30A
	TIP30C

# TIP29, 30

## High Power Bipolar Transistor



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