TIP29, A, B, C (NPN), TIP30, A, B, C (PNP)

Complementary Silicon Plastic Power Transistors

. . . designed for use in general purpose amplifier and switching applications. Compact TO–220 AB package.

MAXIMUM RATINGS

Rating	Symbol	TIP29 TIP30	TIP29A TIP30A	TIP29B TIP30B	TIP29C TIP30C	Unit
Collector–Emitter Voltage	V_{CEO}	40	60	80	100	Vdc
Collector–Base Voltage	V_{CB}	40	60	80	100	Vdc
Emitter–Base Voltage	V_{EB}	5.0				Vdc
Collector Current Continuous Peak	I_C	1.0 3.0				Adc
Base Current	I_B	0.4				Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	30 0.24				Watts W/°C
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	2.0 0.016				Watts W/°C
Unclamped Inductive Load Energy (Note 1)	E	32				mJ
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150				°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	4.167	°C/W

1. This rating based on testing with L_C = 20 mH, R_{BE} = 100 Ω, V_{CC} = 10 V, I_C = 1.8 A, P.R.F = 10 Hz.

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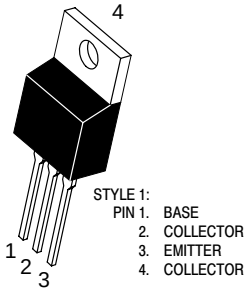
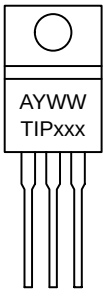
1 AMPERE POWER TRANSISTORS COMPLEMENTARY SILICON 40, 60, 80–100 VOLTS 30 WATTS



TO–220AB
CASE 221A–09
STYLE 1

MARKING DIAGRAM



xxx = Specific Device Code:
29, 29A, 29B, 29C,
30, 30A, 30B, 30C
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (I_C = 30 mAdc, I_B = 0) (Note 2)	$V_{CEO(sus)}$			Vdc
TIP29, TIP30		40	–	
TIP29A, TIP30A		60	–	
TIP29B, TIP30B		80	–	
TIP29C, TIP30C		100	–	
Collector Cutoff Current	I_{CEO}			mAdc
(V_{CE} = 30 Vdc, I_B = 0) TIP29, TIP29A, TIP30, TIP30A		–	0.3	
(V_{CE} = 60 Vdc, I_B = 0) TIP29B, TIP29C, TIP30B, TIP30C		–	0.3	
Collector Cutoff Current	I_{CES}			μAdc
(V_{CE} = 40 Vdc, V_{EB} = 0) TIP29, TIP30		–	200	
(V_{CE} = 60 Vdc, V_{EB} = 0) TIP29A, TIP30A		–	200	
(V_{CE} = 80 Vdc, V_{EB} = 0) TIP29B, TIP30B		–	200	
(V_{CE} = 100 Vdc, V_{EB} = 0) TIP29C, TIP30C		–	200	
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)	I_{EBO}	–	1.0	mAdc
ON CHARACTERISTICS (Note 2)				
DC Current Gain (I_C = 0.2 Adc, V_{CE} = 4.0 Vdc)	h_{FE}	40	–	–
(I_C = 1.0 Adc, V_{CE} = 4.0 Vdc)		15	75	
Collector–Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 125 mAdc)	$V_{CE(sat)}$	–	0.7	Vdc
Base–Emitter On Voltage (I_C = 1.0 Adc, V_{CE} = 4.0 Vdc)	$V_{BE(on)}$	–	1.3	Vdc
DYNAMIC CHARACTERISTICS				
Current–Gain — Bandwidth Product (Note 3) (I_C = 200 mAdc, V_{CE} = 10 Vdc, f_{test} = 1.0 MHz)	f_T	3.0	–	MHz
Small–Signal Current Gain (I_C = 0.2 Adc, V_{CE} = 10 Vdc, f = 1.0 kHz)	h_{fe}	20	–	–

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
3. $f_T = |h_{fe}| \bullet f_{test}$.

ORDERING INFORMATION

Device	Package	Shipping
TIP29	TO–220AB	50 Units/Rail
TIP29A		
TIP29B		
TIP29C		
TIP30		
TIP30A		
TIP30B		
TIP30C		

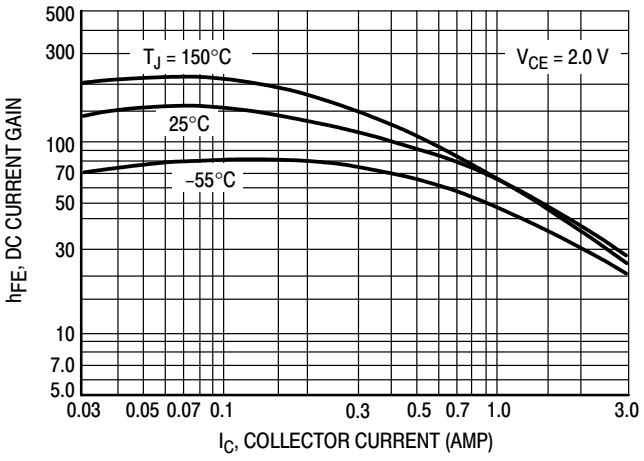


Figure 1. DC Current Gain

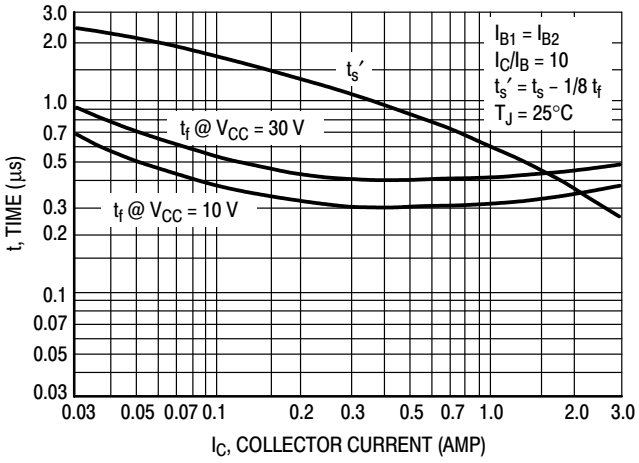


Figure 2. Turn−Off Time

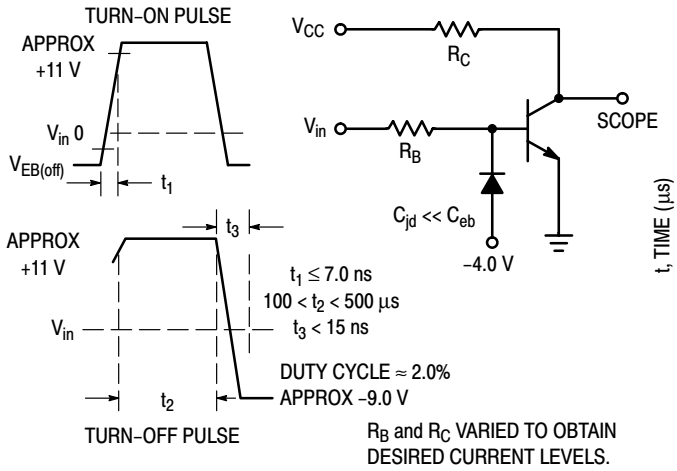


Figure 3. Switching Time Equivalent Circuit

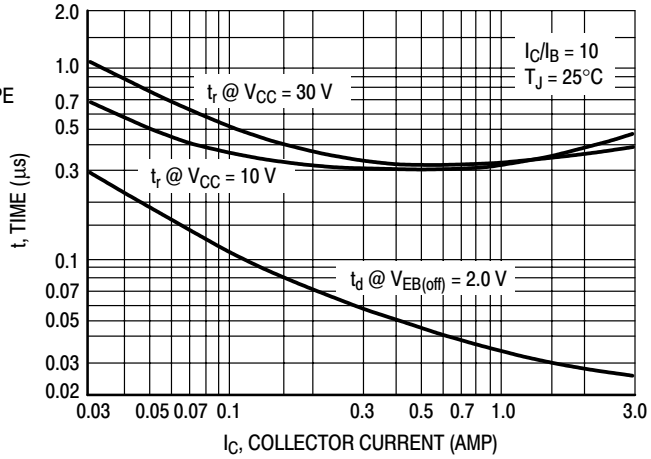


Figure 4. Turn−On Time

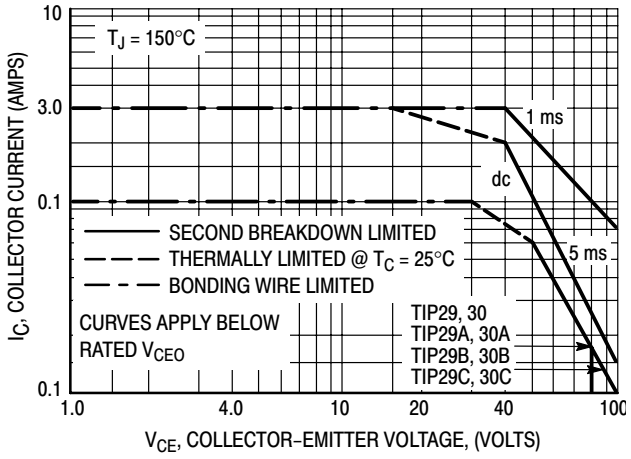


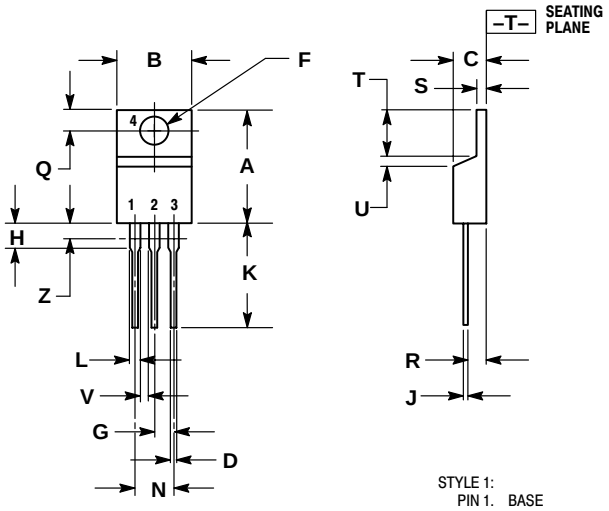
Figure 5. Active Region Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on $T_{J(pk)}$ = 150°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \le 150°C$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

PACKAGE DIMENSIONS

TO–220AB
CASE 221A–09
ISSUE AA



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

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

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