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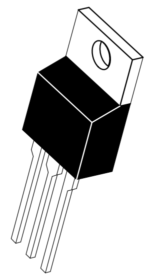
NPN
TIP29B
TIP29C
PNP
TIP30B
TIP30C

Complementary Silicon Plastic Power Transistors

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

**1 AMPERE
POWER TRANSISTORS
COMPLEMENTARY
SILICON
80–100 VOLTS
30 WATTS**



**CASE 221A–06
TO–220AB**

MAXIMUM RATINGS

Rating	Symbol	TIP29B TIP30B	TIP29C TIP30C	Unit
Collector–Emitter Voltage	V_{CEO}	80	100	Vdc
Collector–Base Voltage	V_{CB}	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 (See Note 3)	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

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (1) (I_C = 30 mAdc, I_B = 0)	TIP29B, TIP30B TIP29C, TIP30C	$V_{CEO(sus)}$	80 100	— —	Vdc
Collector Cutoff Current (V_{CE} = 60 Vdc, I_B = 0)		I_{CEO}	—	0.3	mAdc
Collector Cutoff Current (V_{CE} = 80 Vdc, V_{EB} = 0) (V_{CE} = 100 Vdc, V_{EB} = 0)	 TIP29B, TIP30B TIP29C, TIP30C	I_{CES}	 — —	 200 200	μAdc
Emitter Cutoff Current (V_{BE} = 5.0 Vdc, I_C = 0)		I_{EBO}	—	1.0	mAdc
ON CHARACTERISTICS (1)					
DC Current Gain (I_C = 0.2 Adc, V_{CE} = 4.0 Vdc) (I_C = 1.0 Adc, V_{CE} = 4.0 Vdc)		h_{FE}	40 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 (2) (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	—	—

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

REV 1

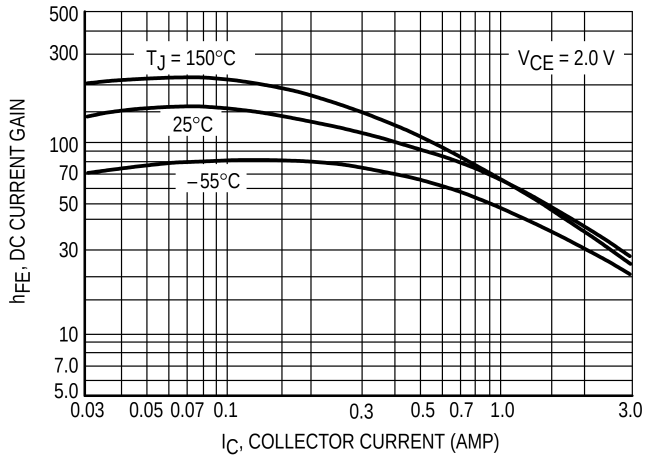


Figure 1. DC Current Gain

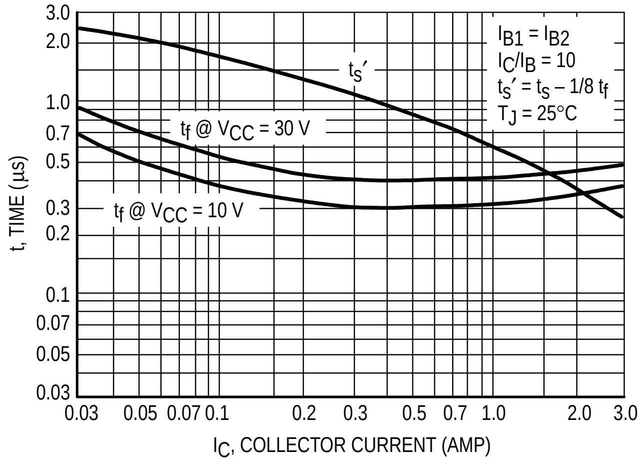


Figure 2. Turn–Off Time

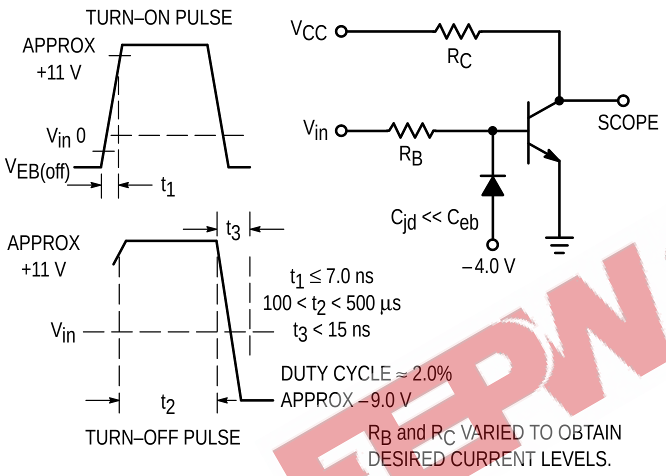


Figure 3. Switching Time Equivalent Circuit

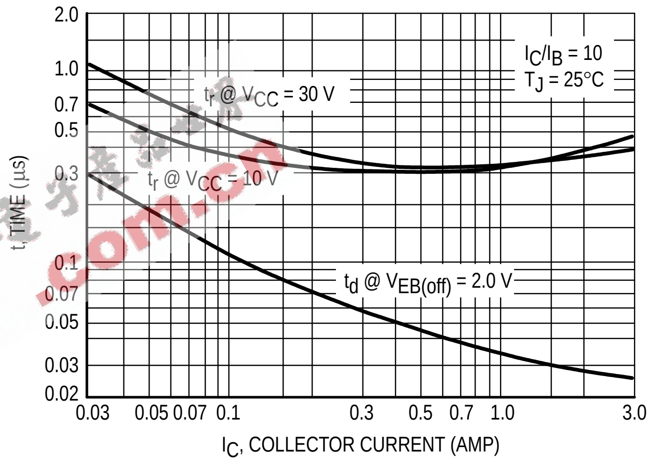


Figure 4. Turn–On Time

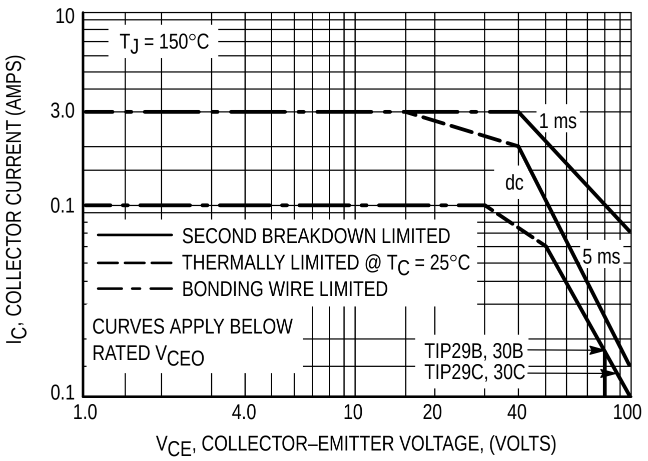
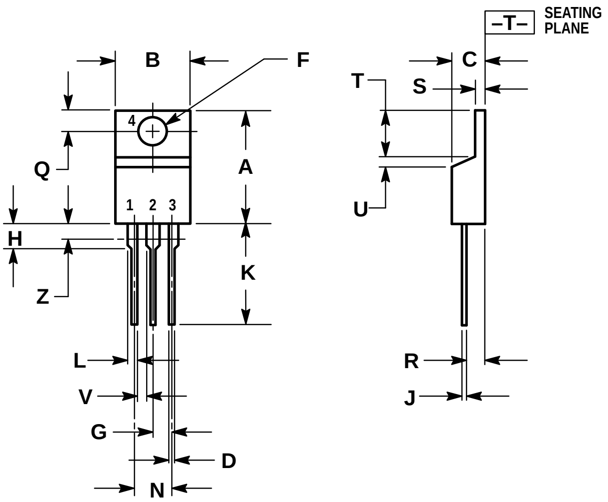


Figure 5. Active Region Safe Operating Area

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 $T_{J(pk)}$ ≤ 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



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

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

CASE 221A–06
TO–220AB
ISSUE Y

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