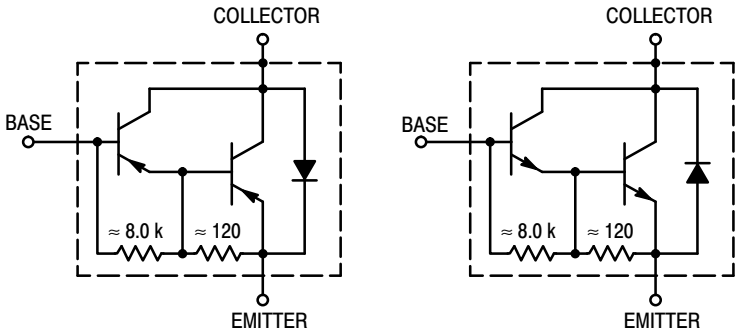

Figure 1. Darlington Circuit Schematic

ORDERING INFORMATION

Device	Package	Shipping
TIP29	TO−220	50 Units / Rail
TIP29G	TO−220 (Pb−Free)	50 Units / Rail
TIP29A	TO−220	50 Units / Rail
TIP29AG	TO−220 (Pb−Free)	50 Units / Rail
TIP29B	TO−220	50 Units / Rail
TIP29BG	TO−220 (Pb−Free)	50 Units / Rail
TIP29C	TO−220	50 Units / Rail
TIP29CG	TO−220 (Pb−Free)	50 Units / Rail
TIP30	TO−220	50 Units / Rail
TIP30G	TO−220 (Pb−Free)	50 Units / Rail
TIP30A	TO−220	50 Units / Rail
TIP30AG	TO−220 (Pb−Free)	50 Units / Rail
TIP30B	TO−220	50 Units / Rail
TIP30BG	TO−220 (Pb−Free)	50 Units / Rail
TIP30C	TO−220	50 Units / Rail
TIP30CG	TO−220 (Pb−Free)	50 Units / Rail

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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. $f_T = |h_{fe}| \bullet f_{test}$

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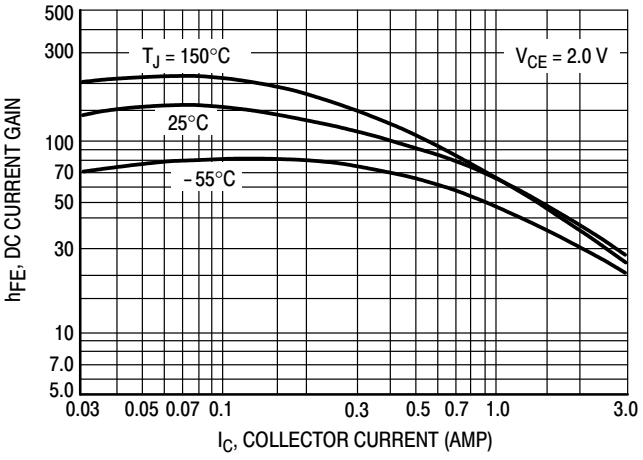

Figure 2. DC Current Gain

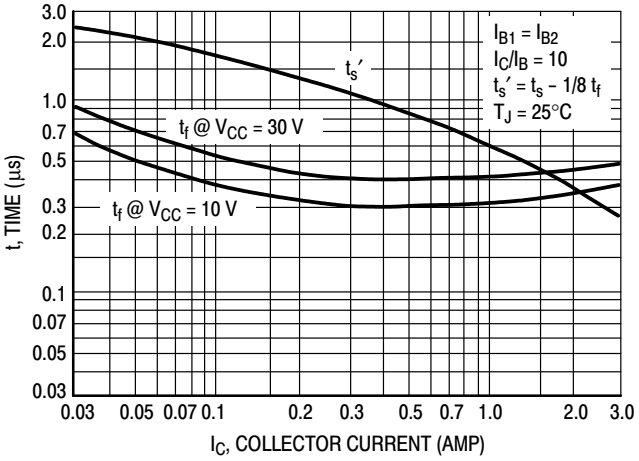

Figure 3. Turn−Off Time

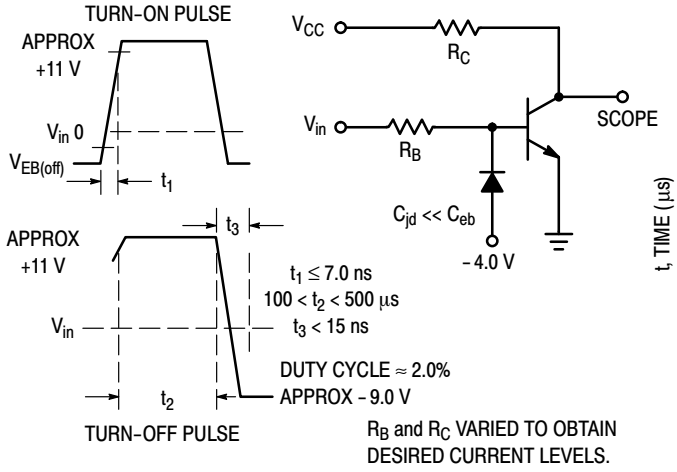

Figure 4. Switching Time Equivalent Circuit

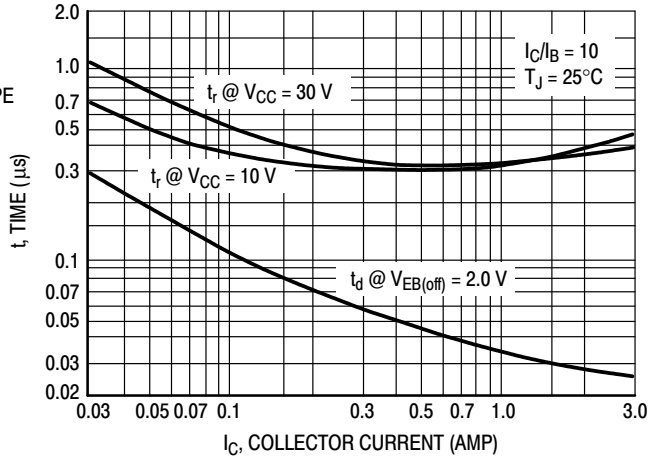

Figure 5. Turn−On Time

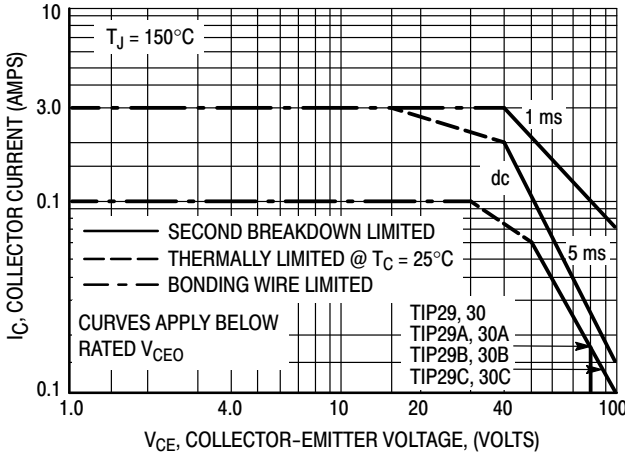

Figure 6. Active Region Safe Operating Area

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

The data of Figure 6 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 $T_{J(pk)} \leq$ 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.

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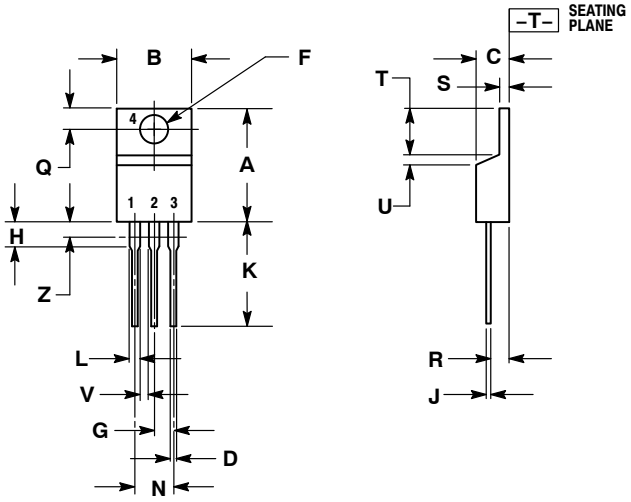
PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AG



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	0.036	0.64	0.91
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.025	0.36	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

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