

# Complementary Silicon Power Transistor

... for general purpose driver or medium power output stages in CW or switching applications.

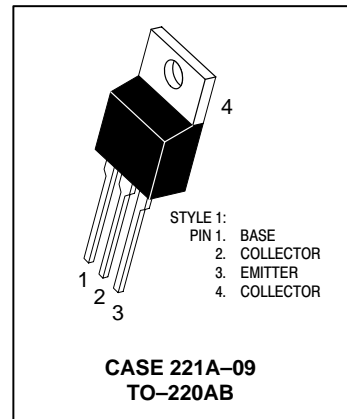
- Low Collector–Emitter Saturation Voltage — 0.5 V (Max)
- High  $f_t$  for Good Frequency Response
- Low Leakage Current

**PNP  
D45C  
NPN  
D44C**

**4.0 AMPERE  
COMPLEMENTARY  
SILICON  
POWER TRANSISTORS  
80 VOLTS**

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	80	Vdc
Collector–Emitter Voltage	$V_{CES}$	90	Vdc
Emitter Base Voltage	$V_{EB}$	5.0	Vdc
Collector Current — Continuous Peak (1)	$I_C$	4.0 6.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ @ $T_A = 25^\circ\text{C}$	$P_D$	30 1.67	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$



## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.2	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	75	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	275	$^\circ\text{C}$

(1) Pulse Width  $\leq$  6.0 ms, Duty Cycle  $\leq$  50%.

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
DC Current Gain ( $V_{CE} = 1.0 \text{ Vdc}, I_C = 0.2 \text{ Adc}$ ) ( $V_{CE} = 1.0 \text{ Vdc}, I_C = 1.0 \text{ Adc}$ ) ( $V_{CE} = 1.0 \text{ Vdc}, I_C = 2.0 \text{ Adc}$ )	$h_{FE}$	40 20 20	120 — —	—

# NPN

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CES}, V_{BE} = 0$ )	$I_{CES}$	—	—	0.1	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 5.0 \text{ Vdc}$ )	$I_{EBO}$	—	—	10	$\mu\text{A}$

### ON CHARACTERISTICS

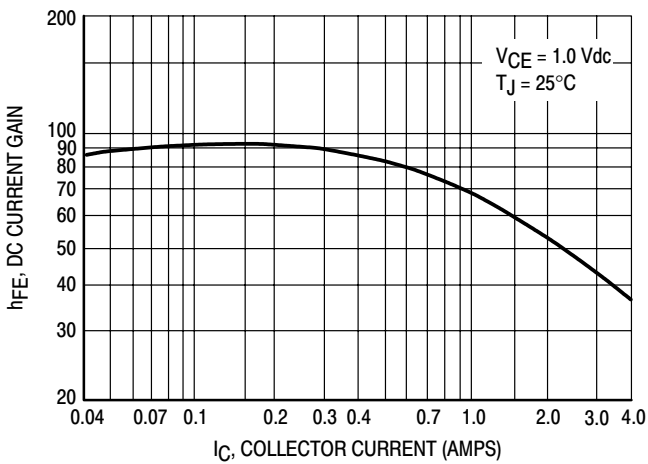
Collector–Emitter Saturation Voltage ( $I_C = 1.0 \text{ Adc}, I_B = 50 \text{ mAdc}$ )	$V_{CE(\text{sat})}$	—	0.135	0.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = 1.0 \text{ Adc}, I_B = 100 \text{ mAdc}$ )	$V_{BE(\text{sat})}$	—	0.85	1.3	Vdc

### DYNAMIC CHARACTERISTICS

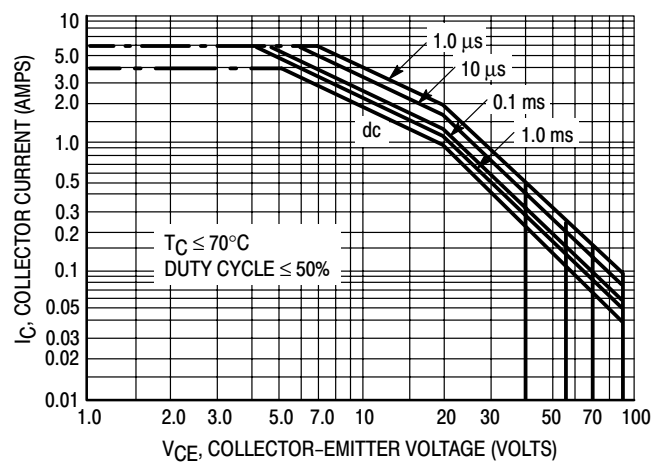
Collector Capacitance ( $V_{CB} = 10 \text{ Vdc}, f = 1.0 \text{ MHz}$ )	$C_{cb}$	—	125	—	$\text{pF}$
Gain Bandwidth Product ( $I_C = 20 \text{ mA}, V_{CE} = 4.0 \text{ Vdc}, f = 20 \text{ MHz}$ )	$f_T$	—	40	—	MHz

### SWITCHING TIMES

Delay and Rise Times ( $I_C = 1.0 \text{ Adc}, I_{B1} = 0.1 \text{ Adc}$ )	$t_d + t_r$	—	50	75	ns
Storage Time ( $I_C = 1.0 \text{ Adc}, I_{B1} = I_{B2} = 0.1 \text{ Adc}$ )	$t_s$	—	350	550	ns
Fall Time ( $I_C = 1.0 \text{ Adc}, I_{B1} = I_{B2} = 0.1 \text{ Adc}$ )	$t_f$	—	50	75	ns



**Figure 1. Typical DC Current Gain**

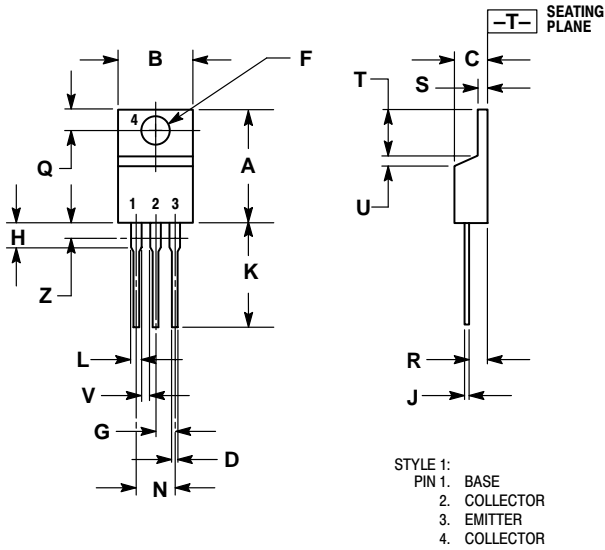


**Figure 2. Maximum Rated Forward Bias Safe Operating Area**

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## PACKAGE DIMENSIONS


### TO-220AB CASE 221A-09 ISSUE AA



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.

DIM	INCHES		MILLIMETERS	
	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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