

# Complementary Silicon Power Transistors

... for general purpose power amplification and switching such as output or driver stages in applications such as switching regulators, converters and power amplifiers.

- Low Collector–Emitter Saturation Voltage  
 $V_{CE(sat)} = 1.0 \text{ V (Max) @ } 8.0 \text{ A}$
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs

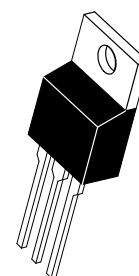
**NPN**  
**D44H Series\***  
**PNP**  
**D45H Series\***

\*Motorola Preferred Device

**10 AMPERE**  
**COMPLEMENTARY**  
**SILICON**  
**POWER TRANSISTORS**  
**60, 80 VOLTS**

## MAXIMUM RATINGS

Rating	Symbol	D44H or D45H		Unit
		8	10, 11	
Collector–Emitter Voltage	$V_{CEO}$	60	80	Vdc
Emitter Base Voltage	$V_{EB}$	5.0		Vdc
Collector Current — Continuous — Peak (1)	$I_C$	10 20		Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ @ $T_A = 25^\circ\text{C}$	$P_D$	50 1.67		Watts
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–55 to 150		$^\circ\text{C}$



**CASE 221A–06**  
**TO–220AB**

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
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  $\leq 6.0 \text{ ms}$ , Duty Cycle  $\leq 50\%$ .

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

Characteristic		Symbol	Min	Max	Unit
DC Current Gain ( $V_{CE} = 1.0 \text{ Vdc}$ , $I_C = 2.0 \text{ Adc}$ )	D44H10 D45H10	$h_{FE}$	35	—	—
	D44H8,11 D44H8,11		60	—	
( $V_{CE} = 1.0 \text{ Vdc}$ , $I_C = 4.0 \text{ Adc}$ )	D44H10 D45H10		20	—	
	D44H8,11 D45H8,11		40	—	

Preferred devices are Motorola recommended choices for future use and best overall value.

# D44H Series D45H Series

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector Cutoff Current (V <sub>CE</sub> = Rated V <sub>CEO</sub> , V <sub>BE</sub> = 0)	I <sub>CES</sub>	—	—	10	μA
Emitter Cutoff Current (V <sub>EB</sub> = 5.0 Vdc)	I <sub>EBO</sub>	—	—	100	μA

### ON CHARACTERISTICS

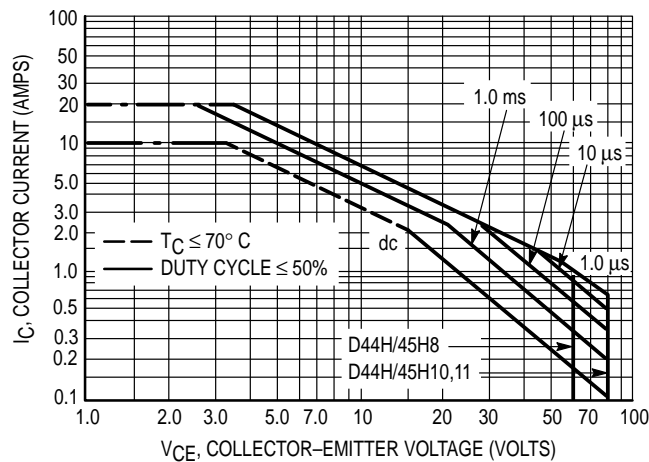
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 8.0 Adc, I <sub>B</sub> = 0.4 Adc) (I <sub>C</sub> = 8.0 Adc, I <sub>B</sub> = 0.8 Adc)	V <sub>CE(sat)</sub>	— —	— —	1.0 1.0	Vdc
Base–Emitter Saturation Voltage (I <sub>C</sub> = 8.0 Adc, I <sub>B</sub> = 0.8 Adc)	V <sub>BE(sat)</sub>	—	—	1.5	Vdc

### DYNAMIC CHARACTERISTICS

Collector Capacitance (V <sub>CB</sub> = 10 Vdc, f <sub>test</sub> = 1.0 MHz)	C <sub>cb</sub>	— —	130 230	— —	pF
Gain Bandwidth Product (I <sub>C</sub> = 0.5 Adc, V <sub>CE</sub> = 10 Vdc, f = 20 MHz)	f <sub>T</sub>	— —	50 40	— —	MHz

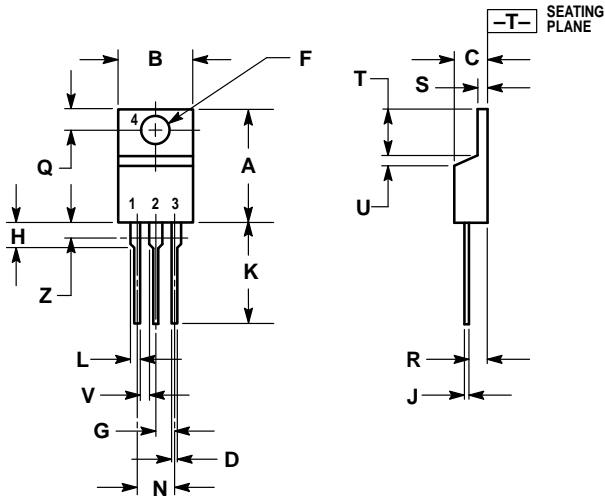
### SWITCHING TIMES

Delay and Rise Times (I <sub>C</sub> = 5.0 Adc, I <sub>B1</sub> = 0.5 Adc)	t <sub>d</sub> + t <sub>r</sub>	— —	300 135	— —	ns
Storage Time (I <sub>C</sub> = 5.0 Adc, I <sub>B1</sub> = I <sub>B2</sub> = 0.5 Adc)	t <sub>s</sub>	— —	500 500	— —	ns
Fall Time (I <sub>C</sub> = 5.0 Adc, I <sub>B1</sub> = 102 = 0.5 Adc)	t <sub>f</sub>	— —	140 100	— —	ns



**Figure 1. Maximum Rated Forward Bias Safe Operating Area**

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.

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

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

CASE 221A-06  
TO-220AB  
ISSUE Y

## D44H Series D45H Series

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D44H/D



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