

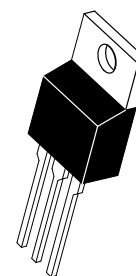
## Complementary Silicon Power Transistors

These complementary silicon power transistors are designed for high-speed switching applications, such as switching regulators and high frequency inverters. The devices are also well-suited for drivers for high power switching circuits.

- Fast Switching —  $t_f = 90$  ns (Max)
- Key Parameters Specified @ 100°C
- Low Collector-Emitter Saturation Voltage —  
 $V_{CE(sat)} = 1.0$  V (Max) @ 8.0 A
- Complementary Pairs Simplify Circuit Designs

**NPN**  
**D44VH**  
**PNP**  
**D45VH**

**15 AMPERE**  
**COMPLEMENTARY**  
**SILICON**  
**POWER TRANSISTORS**  
**80 VOLTS**  
**83 WATTS**



**CASE 221A-06**  
**TO-220AB**

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	80	Vdc
Collector-Emitter Voltage	$V_{CEV}$	100	Vdc
Emitter Base Voltage	$V_{EB}$	7.0	Vdc
Collector Current — Continuous	$I_C$	15	Adc
— Peak (1)	$I_{CM}$	20	
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	$P_D$	83 0.67	Watts W/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to 150	°C

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	275	°C

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

NOTE: All polarities are shown for NPN transistors. For PNP transistors, reverse polarities.

# D44VH D45VH

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Sustaining Voltage (1) (I <sub>C</sub> = 25 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>CEO(sus)</sub>	80	—	—	V <sub>dc</sub>
Collector–Emitter Cutoff Current (V <sub>CE</sub> = Rated V <sub>CEV</sub> , V <sub>BE(off)</sub> = 4.0 V <sub>dc</sub> ) (V <sub>CE</sub> = Rated V <sub>CEV</sub> , V <sub>BE(off)</sub> = 4.0 V <sub>dc</sub> , T <sub>C</sub> = 100°C)	I <sub>CEV</sub>	—	—	10 100	μA <sub>dc</sub>
Emitter Base Cutoff Current (V <sub>EB</sub> = 7.0 V <sub>dc</sub> , I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	—	10	μA <sub>dc</sub>

## ON CHARACTERISTICS (1)

DC Current Gain (I <sub>C</sub> = 2.0 A <sub>dc</sub> , V <sub>CE</sub> = 1.0 V <sub>dc</sub> ) (I <sub>C</sub> = 4.0 A <sub>dc</sub> , V <sub>CE</sub> = 1.0 V <sub>dc</sub> )	h <sub>FE</sub>	35 20	— —	— —	—
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 8.0 A <sub>dc</sub> , I <sub>B</sub> = 0.4 A <sub>dc</sub> ) (I <sub>C</sub> = 8.0 A <sub>dc</sub> , I <sub>B</sub> = 0.8 A <sub>dc</sub> ) (I <sub>C</sub> = 15 A <sub>dc</sub> , I <sub>B</sub> = 3.0 A <sub>dc</sub> , T <sub>C</sub> = 100°C)	V <sub>CE(sat)</sub>	— — — —	— — — —	0.4 1.0 0.8 1.5	V <sub>dc</sub>
Base–Emitter Saturation Voltage (I <sub>C</sub> = 8.0 A <sub>dc</sub> , I <sub>B</sub> = 0.4 A <sub>dc</sub> ) (I <sub>C</sub> = 8.0 A <sub>dc</sub> , I <sub>B</sub> = 0.8 A <sub>dc</sub> ) (I <sub>C</sub> = 8.0 A <sub>dc</sub> , I <sub>B</sub> = 0.4 A <sub>dc</sub> , T <sub>C</sub> = 100°C) (I <sub>C</sub> = 8.0 A <sub>dc</sub> , I <sub>B</sub> = 0.8 A <sub>dc</sub> , T <sub>C</sub> = 100°C)	V <sub>BE(sat)</sub>	— — — —	— — — —	1.2 1.0 1.1 1.5	V <sub>dc</sub>

## DYNAMIC CHARACTERISTICS

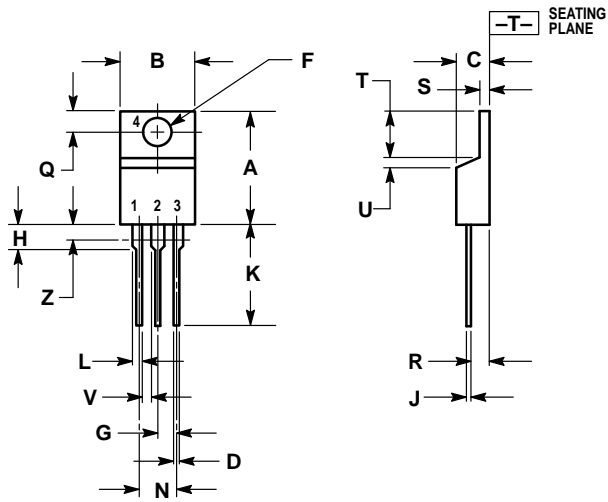
Current Gain Bandwidth Product (I <sub>C</sub> = 0.1 A <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 20 MHz)	f <sub>T</sub>	—	50	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>C</sub> = 0, f <sub>test</sub> = 1.0 MHz)	C <sub>ob</sub>	— —	120 275	— —	pF

## SWITCHING CHARACTERISTICS

Delay Time	(V <sub>CC</sub> = 20 V <sub>dc</sub> , I <sub>C</sub> = 8.0 A <sub>dc</sub> , I <sub>B1</sub> = I <sub>B2</sub> = 0.8 A <sub>dc</sub> )	t <sub>d</sub>	—	—	50	ns
Rise Time		t <sub>r</sub>	—	—	250	
Storage Time		t <sub>s</sub>	—	—	700	
Fall Time		t <sub>f</sub>	—	—	90	

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

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

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