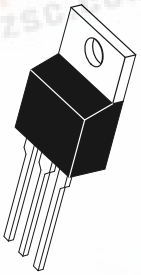
# Complementary Silicon Power Transistors

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

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

**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<br>— Peak (1) | $I_C$<br>$I_{CM}$ | 15<br>20 | Adc |
| Total Power Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 83<br>0.67 | Watts<br>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 ≤ 6.0 ms, Duty Cycle ≤ 50%.

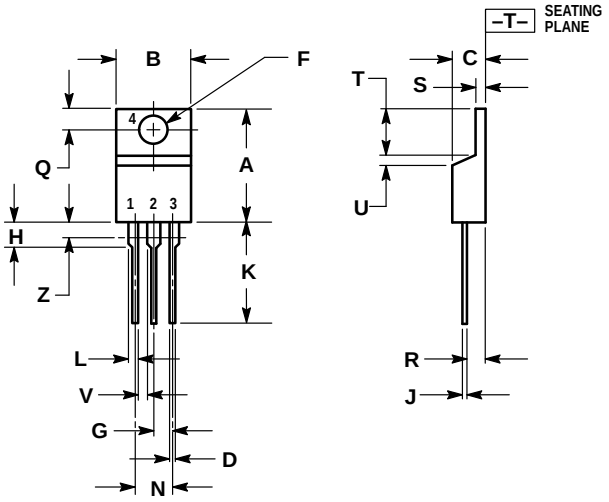
NOTE: All polarities are shown for NPN transistors. For PNP transistors, reverse polarities.

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

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector–Emitter Sustaining Voltage (1) ($I_C$ = 25 mAdc, $I_B$ = 0) | | $V_{CEO(sus)}$ | 80 | — | — | Vdc |
| Collector–Emitter Cutoff Current | | $I_{CEV}$ | | | | μAdc |
| ($V_{CE}$ = Rated $V_{CEV}$, $V_{BE(off)}$ = 4.0 Vdc) | | | — | — | 10 | |
| ($V_{CE}$ = Rated $V_{CEV}$, $V_{BE(off)}$ = 4.0 Vdc, $T_C$ = 100°C) | | | — | — | 100 | |
| Emitter Base Cutoff Current ($V_{EB}$ = 7.0 Vdc, $I_C$ = 0) | | $I_{EBO}$ | — | — | 10 | μAdc |
| **ON CHARACTERISTICS (1)** | | | | | | |
| DC Current Gain | | $h_{FE}$ | | | | — |
| ($I_C$ = 2.0 Adc, $V_{CE}$ = 1.0 Vdc) | | | 35 | — | — | |
| ($I_C$ = 4.0 Adc, $V_{CE}$ = 1.0 Vdc) | | | 20 | — | — | |
| Collector–Emitter Saturation Voltage | | $V_{CE(sat)}$ | | | | Vdc |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.4 Adc) | D44VH10 | | — | — | 0.4 | |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.8 Adc) | D45VH10 | | — | — | 1.0 | |
| ($I_C$ = 15 Adc, $I_B$ = 3.0 Adc, $T_C$ = 100°C) | D44VH10 | | — | — | 0.8 | |
| | D45VH10 | | — | — | 1.5 | |
| Base–Emitter Saturation Voltage | | $V_{BE(sat)}$ | | | | Vdc |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.4 Adc) | D44VH10 | | — | — | 1.2 | |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.8 Adc) | D45VH10 | | — | — | 1.0 | |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.4 Adc, $T_C$ = 100°C) | D44VH10 | | — | — | 1.1 | |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.8 Adc, $T_C$ = 100°C) | D45VH10 | | — | — | 1.5 | |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Current Gain Bandwidth Product ($I_C$ = 0.1 Adc, $V_{CE}$ = 10 Vdc, f = 20 MHz) | | $f_T$ | — | 50 | — | MHz |
| Output Capacitance | | $C_{ob}$ | | | | pF |
| ($V_{CB}$ = 10 Vdc, $I_C$ = 0, $f_{test}$ = 1.0 MHz) | D44VH10 | | — | 120 | — | |
| | D45VH10 | | — | 275 | — | |
| **SWITCHING CHARACTERISTICS** | | | | | | |
| Delay Time | ($V_{CC}$ = 20 Vdc, $I_C$ = 8.0 Adc, $I_{B1}$ = $I_{B2}$ = 0.8 Adc) | $t_d$ | — | — | 50 | ns |
| Rise Time | | $t_r$ | — | — | 250 | |
| Storage Time | | $t_s$ | — | — | 700 | |
| Fall Time | | $t_f$ | — | — | 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.

| | 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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