# Complementary Silicon Power Transistors

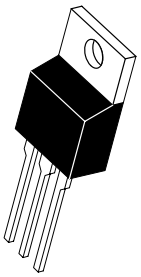
. . . for general purpose power amplification and switching such as output or driver stages in applications such as switching regulators, converters and power amplifiers.

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

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

***ON Semiconductor Preferred Device**

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



**CASE 221A–06**
**TO–220AB**

**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<br>— Peak (1) | $I_C$ | 10<br>20 | | Adc |
| Total Power Dissipation<br>@ $T_C$ = 25°C<br>@ $T_A$ = 25°C | $P_D$ | 50<br>1.67 | | Watts |
| 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 | $R_{\theta JC}$ | 2.5 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 75 | °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%.

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

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

**Preferred** devices are ON Semiconductor recommended choices for future use and best overall value.

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

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Collector Cutoff Current ($V_{CE}$ = Rated $V_{CEO}$, $V_{BE}$ = 0) | | $I_{CES}$ | — | — | 10 | μA |
| Emitter Cutoff Current ($V_{EB}$ = 5.0 Vdc) | | $I_{EBO}$ | — | — | 100 | μA |
| **ON CHARACTERISTICS** | | | | | | |
| Collector–Emitter Saturation Voltage | | $V_{CE(sat)}$ | | | | Vdc |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.4 Adc) | D44H/D45H8,11 | | — | — | 1.0 | |
| ($I_C$ = 8.0 Adc, $I_B$ = 0.8 Adc) | D44H/D45H10 | | — | — | 1.0 | |
| Base–Emitter Saturation Voltage ($I_C$ = 8.0 Adc, $I_B$ = 0.8 Adc) | | $V_{BE(sat)}$ | — | — | 1.5 | Vdc |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Collector Capacitance | | $C_{cb}$ | | | | pF |
| ($V_{CB}$ = 10 Vdc, $f_{test}$ = 1.0 MHz) | D44H Series | | — | 130 | — | |
| | D45H Series | | — | 230 | — | |
| Gain Bandwidth Product | | $f_T$ | | | | MHz |
| ($I_C$ = 0.5 Adc, $V_{CE}$ = 10 Vdc, f = 20 MHz) | D44H Series | | — | 50 | — | |
| | D45H Series | | — | 40 | — | |
| **SWITCHING TIMES** | | | | | | |
| Delay and Rise Times | | $t_d + t_r$ | | | | ns |
| ($I_C$ = 5.0 Adc, $I_{B1}$ = 0.5 Adc) | D44H Series | | — | 300 | — | |
| | D45H Series | | — | 135 | — | |
| Storage Time | | $t_s$ | | | | ns |
| ($I_C$ = 5.0 Adc, $I_{B1}$ = $I_{B2}$ = 0.5 Adc) | D44H Series | | — | 500 | — | |
| | D45H Series | | — | 500 | — | |
| Fall Time | | $t_f$ | | | | ns |
| ($I_C$ = 5.0 Adc, $I_{B1}$ = 102 = 0.5 Adc) | D44H Series | | — | 140 | — | |
| | D45H Series | | — | 100 | — | |

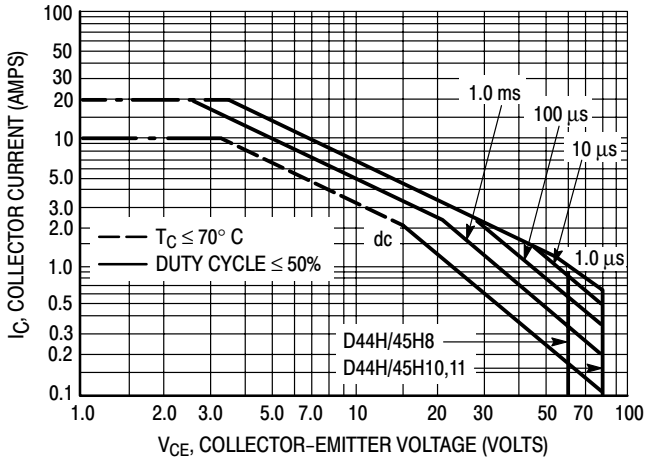
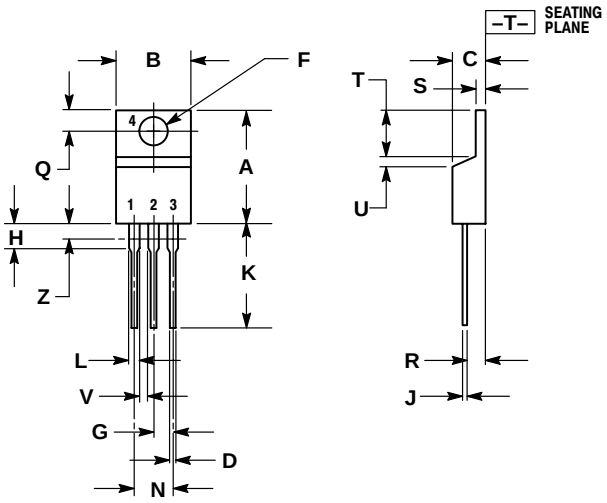



**Figure 1. Maximum Rated Forward Bias Safe Operating Area**

## PACKAGE DIMENSIONS

**TO−220**
**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.

| | 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 |

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