

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

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 — Peak (1) | I_C I_{CM} | 15 20 | Adc |
| 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

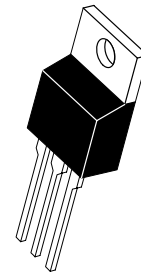
| Characteristic | Symbol | Max | Unit |
|--|-----------------|------|------|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 1.5 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 62.5 | °C/W |
| Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds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

(2) Pulse Width $\leq 6.0 \text{ ms}$, Duty Cycle $\leq 50\%$.

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

**NPN
D44VH
PNP
D45VH**

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



**CASE 221A-09
TO-220AB**

D44VH D45VH

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|--|----------------|----|---|-----------|---------------|
| Collector–Emitter Sustaining Voltage (2) ($I_C = 25\text{ mA}$, $I_B = 0$) | $V_{CEO(sus)}$ | 80 | — | — | Vdc |
| Collector–Emitter Cutoff Current ($V_{CE} = \text{Rated } V_{CEV}$, $V_{BE(off)} = 4.0\text{ Vdc}$) ($V_{CE} = \text{Rated } V_{CEV}$, $V_{BE(off)} = 4.0\text{ Vdc}$, $T_C = 100^\circ\text{C}$) | I_{CEV} | — | — | 10 100 | μA |
| Emitter Base Cutoff Current ($V_{EB} = 7.0\text{ Vdc}$, $I_C = 0$) | I_{EBO} | — | — | 10 | μA |

ON CHARACTERISTICS (2)

| | | | | | |
|--|---------------|------------------|------------------|--------------------------|-----|
| DC Current Gain ($I_C = 2.0\text{ A}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 4.0\text{ A}$, $V_{CE} = 1.0\text{ Vdc}$) | h_{FE} | 35 20 | — — | — — | — |
| Collector–Emitter Saturation Voltage ($I_C = 8.0\text{ A}$, $I_B = 0.4\text{ A}$) D44VH10 ($I_C = 8.0\text{ A}$, $I_B = 0.8\text{ A}$) D45VH10 ($I_C = 15\text{ A}$, $I_B = 3.0\text{ A}$, $T_C = 100^\circ\text{C}$) D44VH10 ($I_C = 15\text{ A}$, $I_B = 3.0\text{ A}$, $T_C = 100^\circ\text{C}$) D45VH10 | $V_{CE(sat)}$ | — — — — | — — — — | 0.4 1.0 0.8 1.5 | Vdc |
| Base–Emitter Saturation Voltage ($I_C = 8.0\text{ A}$, $I_B = 0.4\text{ A}$) D44VH10 ($I_C = 8.0\text{ A}$, $I_B = 0.8\text{ A}$) D45VH10 ($I_C = 8.0\text{ A}$, $I_B = 0.4\text{ A}$, $T_C = 100^\circ\text{C}$) D44VH10 ($I_C = 8.0\text{ A}$, $I_B = 0.8\text{ A}$, $T_C = 100^\circ\text{C}$) D45VH10 | $V_{BE(sat)}$ | — — — — | — — — — | 1.2 1.0 1.1 1.5 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | | |
|---|----------|--------|------------|--------|-----|
| Current Gain Bandwidth Product ($I_C = 0.1\text{ A}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) | f_T | — | 50 | — | MHz |
| Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_C = 0$, $f_{test} = 1.0\text{ MHz}$) D44VH10 D45VH10 | C_{ob} | — — | 120 275 | — — | pF |

SWITCHING CHARACTERISTICS

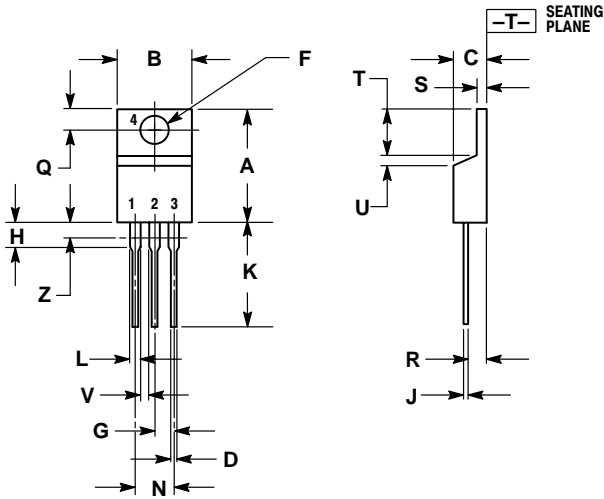
| | | | | | | |
|--------------|--|-------|---|---|-----|----|
| Delay Time | $(V_{CC} = 20\text{ Vdc}$, $I_C = 8.0\text{ A}$, $I_{B1} = I_{B2} = 0.8\text{ A}$) | t_d | — | — | 50 | ns |
| Rise Time | | t_r | — | — | 250 | |
| Storage Time | | t_s | — | — | 700 | |
| Fall Time | | t_f | — | — | 90 | |

(2) Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.

D44VH D45VH


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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