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April 2015

# D45H8 / NZT45H8 PNP Power Amplifier

## Description

This device is designed for power amplifier, regulator, and switching circuits where speed is important. Sourced from process 5Q.

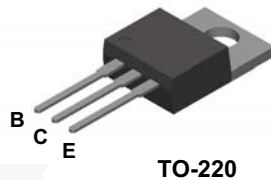


Figure 1. D45H8 Device Package

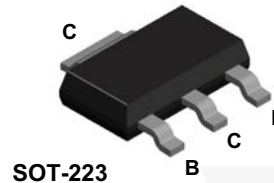


Figure 2. NZT45H8 Device Package

## Ordering Information

| Part Number | Marking | Package    | Packing Method |
|-------------|---------|------------|----------------|
| D45H8       | D45H8   | TO-220 3L  | Rail           |
| NZT45H8     | 45H8    | SOT-223 4L | Tape and Reel  |

## Absolute Maximum Ratings<sup>(1),(2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol         | Parameter  | Value       | Unit             |
|----------------|--|-------------|------------------|
| $V_{CEO}$      | Collector-Emitter Voltage                        | -60         | V                |
| $I_C$          | Collector Current - Continuous                   | -8          | A                |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ\text{C}$ |

### Notes:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

**Thermal Characteristics<sup>(3)</sup>**

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol          | Parameter                               | Max.  |         | Unit                      |
|-----------------|---|-------|---------|---------------------------|
|                 |   | D45H8 | NZT45H8 |                           |
| $P_D$           | Total Device Dissipation                | 60.0  | 1.5     | W                         |
|                 | Derate Above $25^\circ\text{C}$         | 480   | 12      | mW/ $^\circ\text{C}$      |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case    | 2.1   |         | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 62.5  | 83.3    | $^\circ\text{C}/\text{W}$ |

**Notes:**

3. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

**Electrical Characteristics**

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol        | Parameter                            | Conditions                                       | Min.  | Max.  | Unit          |
|---------------|--------------------------------------|--|-------|-------|---------------|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage  | $I_C = -100\text{ mA}$ , $I_B = 0$               | -60   |       | V             |
| $I_{CBO}$     | Collector Cut-Off Current            | $V_{CB} = -60\text{ V}$ , $I_E = 0$              |       | -10   | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter Cut-Off Current              | $V_{EB} = -5.0\text{ V}$ , $I_C = 0$             |       | -100  | $\mu\text{A}$ |
| $h_{FE}$      | DC Current Gain                      | $I_C = -2.0\text{ A}$ , $V_{CE} = -1.0\text{ V}$ | 60    |       |               |
|               |                                      | $I_C = -4.0\text{ A}$ , $V_{CE} = -1.0\text{ V}$ | 40    |       |               |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = -8.0\text{ A}$ , $I_B = -0.4\text{ A}$    |       | -1.0  | V             |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage      | $I_C = -8.0\text{ A}$ , $I_B = -0.8\text{ A}$    |       | -1.5  | V             |
| $V_{BE(on)}$  | Base-Emitter On Voltage              | $I_C = -10\text{ mA}$ , $V_{CE} = -2.0\text{ V}$ | -0.54 | -0.65 | V             |
| $f_T$         | Current Gain - Bandwidth Product     | $I_C = -500\text{ mA}$ , $V_{CE} = -10\text{ V}$ | 40    |       | MHz           |

### Typical Performance Characteristics

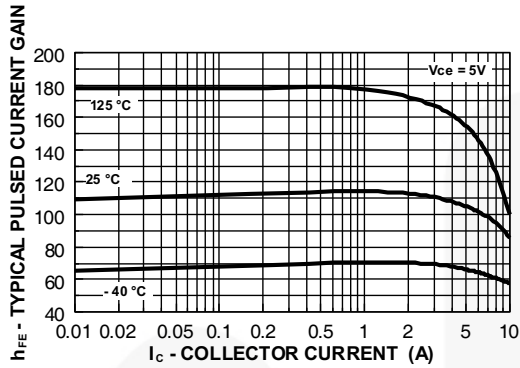


Figure 3. Typical Pulsed Current Gain vs. Collector Current

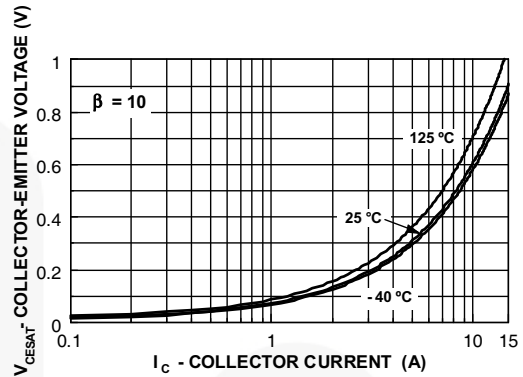


Figure 4. Collector-Emitter Saturation Voltage vs. Collector Current

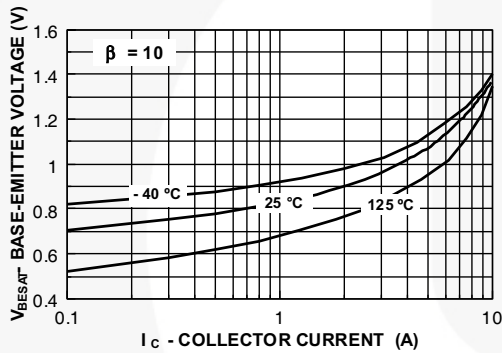


Figure 5. Base-Emitter Saturation Voltage vs. Collector Current

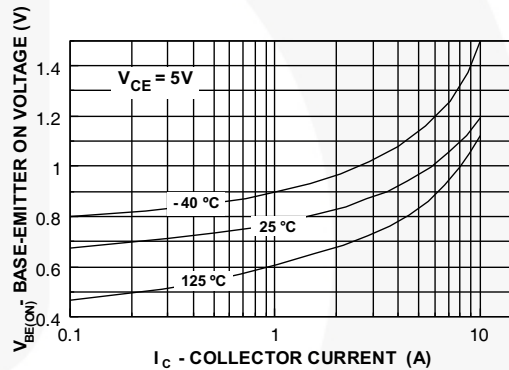


Figure 6. Base-Emitter On Voltage vs. Collector Current

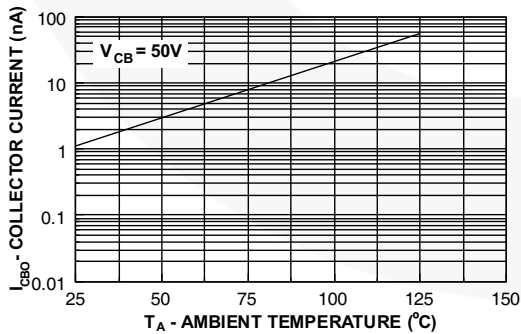


Figure 7. Collector Cut-Off Current vs. Ambient Temperature

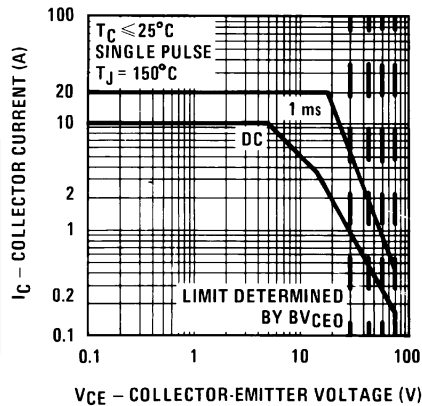


Figure 8. Safe Operating Area TO-220

Typical Performance Characteristics (Continued)

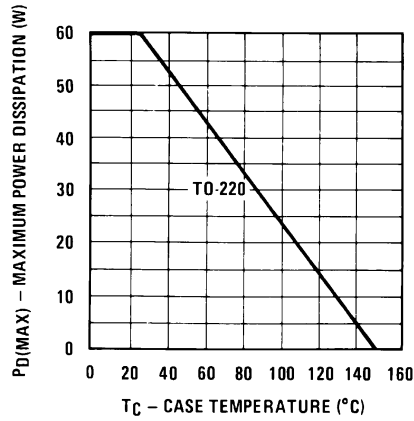


Figure 9. Maximum Power Dissipation vs. Case Temperature

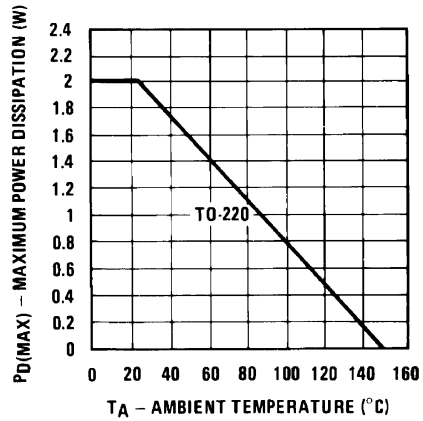


Figure 10. Maximum Power Dissipation vs. Ambient Temperature

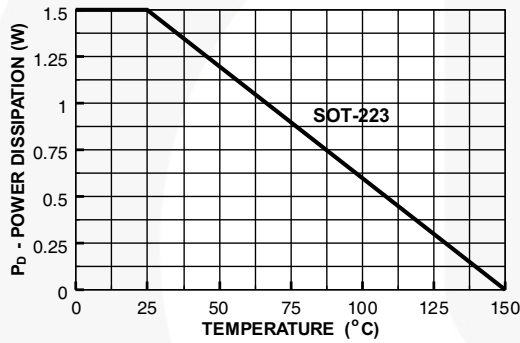


Figure 11. Power Dissipation vs. Ambient Temperature

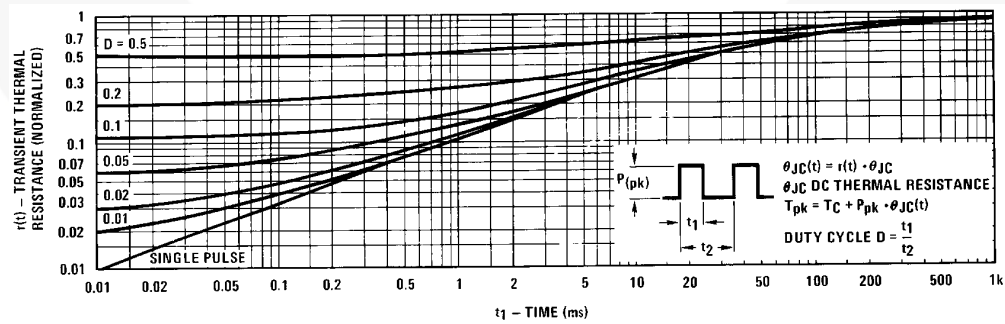


Figure 12. Thermal Response in TO-220 Package

Physical Dimensions

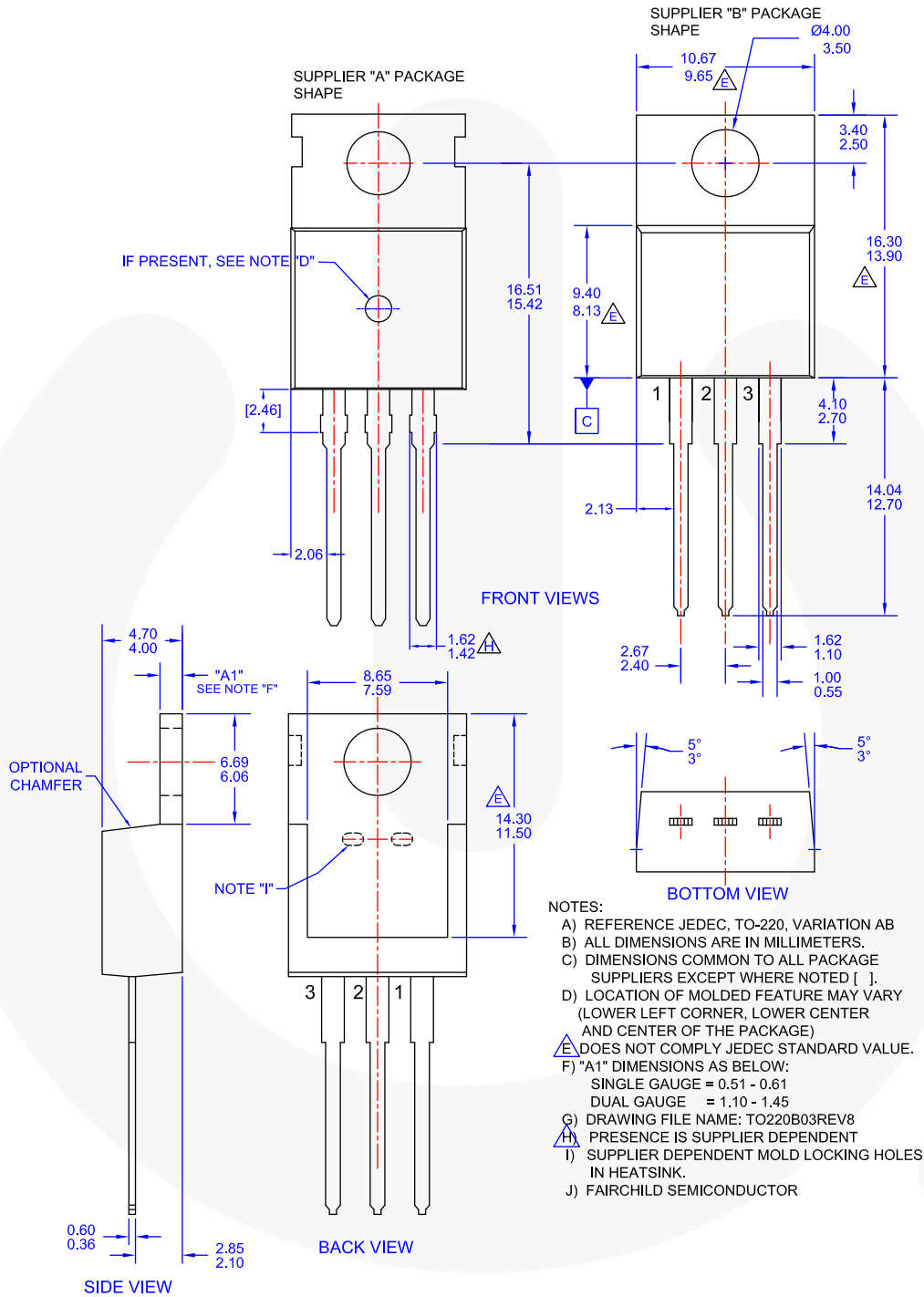


Figure 13. TO-220, MOLDED, 3-LEAD, JEDEC VARIATION AB

Physical Dimensions (Continued)

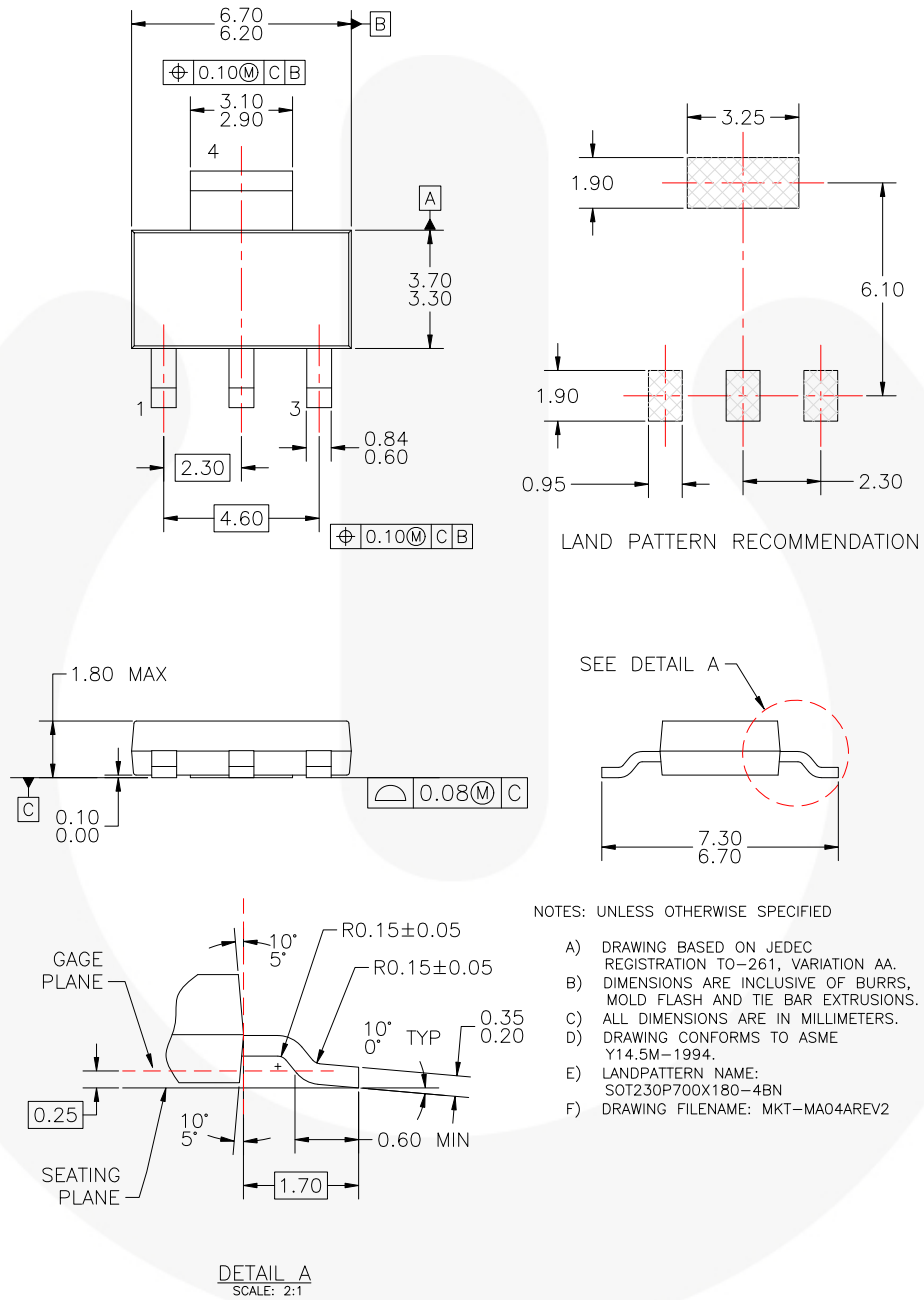



Figure 14. MOLDED PACKAGE, SOT-223, 4-LEAD





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