



November 2014



# D44H8 / NZT44H8 NPN Power Amplifier

## Features

- This device is designed for power amplifier, regulator and switching circuits where speed is important.
- Sourced from process 4Q.

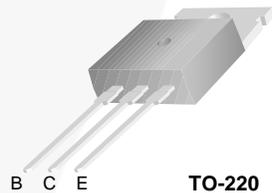


Figure 1. D44H8 Device Package

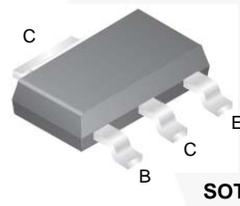


Figure 2. NZT44H8 Device Package

## Ordering Information

| Part Number | Marking | Package    | Packing Method |
|-------------|---------|------------|----------------|
| D44H8       | D44H8   | TO-220 3L  | Rail           |
| NZT44H8     | 44H8    | 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                   | 8.0         | 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                      |
|-----------------|---|-------|---------|---------------------------|
|                 |   | D44H8 | NZT44H8 |                           |
| $P_D$           | Total Device Dissipation                | 60    | 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    | $^\circ\text{C}/\text{W}$ |

**Note:**

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-Base Cut-Off Current       | $V_{CB} = 60\text{ V}, I_E = 0$             |      | 10   | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter-Base Cut-Off Current         | $V_{EB} = 5\text{ V}, I_C = 0$              |      | 100  | $\mu\text{A}$ |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 1\text{ V}, I_C = 2\text{ A}$     | 60   |      |               |
|               |                                      | $V_{CE} = 1\text{ V}, I_C = 4\text{ A}$     | 40   |      |               |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 8\text{ A}, I_B = 0.4\text{ A}$      |      | 1.0  | V             |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage      | $I_C = 8\text{ A}, I_B = 0.8\text{ A}$      |      | 1.5  | V             |
| $V_{BE(on)}$  | Base-Emitter On Voltage              | $V_{CE} = 2\text{ V}, I_C = 10\text{ mA}$   | 0.52 | 0.65 | V             |
| $f_T$         | Current Gain-Bandwidth Product       | $I_C = 500\text{ mA}, V_{CE} = 10\text{ V}$ | 50   |      | MHz           |

Typical Performance Characteristics

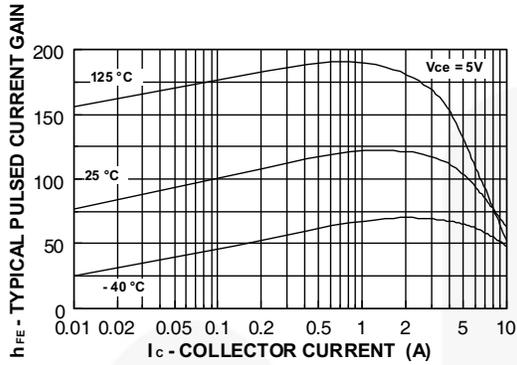


Figure 3. Typical Pulsed Current Gain vs. Collector Current

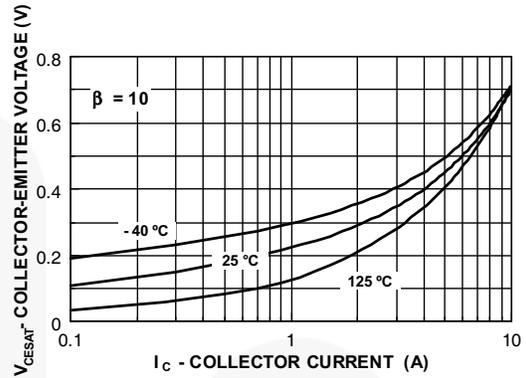


Figure 4. Collector-Emitter Saturation Voltage vs. Collector Current

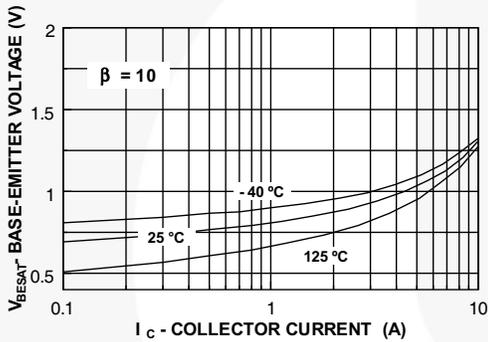


Figure 5. Base-Emitter Saturation Voltage vs. Collector Current

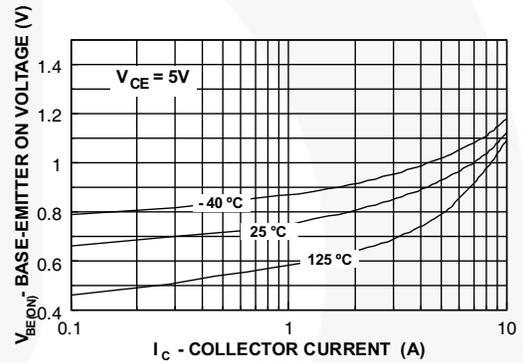


Figure 6. Base-Emitter On Voltage vs. Collector Current

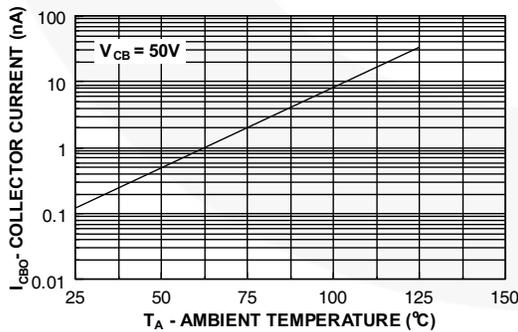


Figure 7. Current Cut-Off Current vs. Ambient Temperature

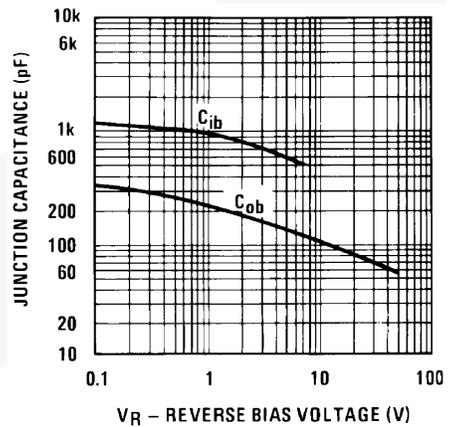


Figure 8. Junction Capacitance vs. Reverse Bias Voltage

Typical Performance Characteristics (Continued)

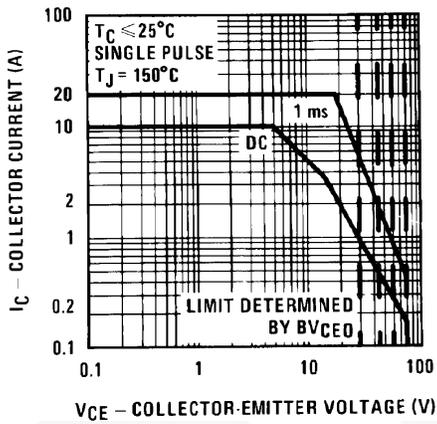


Figure 9. Safe Operating Area TO-220

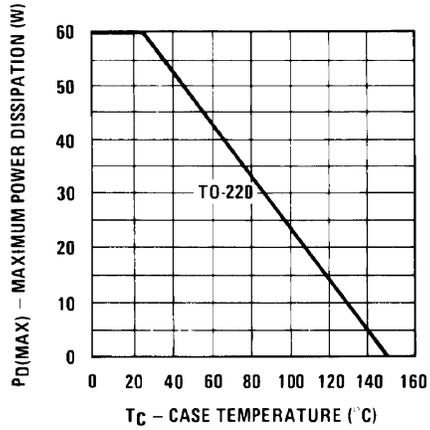


Figure 10. Maximum Power Dissipation vs. Case Temperature

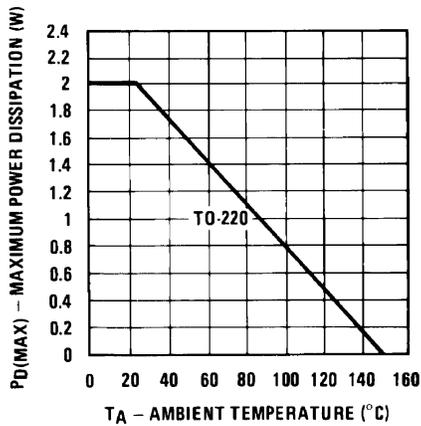


Figure 11. Maximum Power Dissipation vs. Ambient Temperature

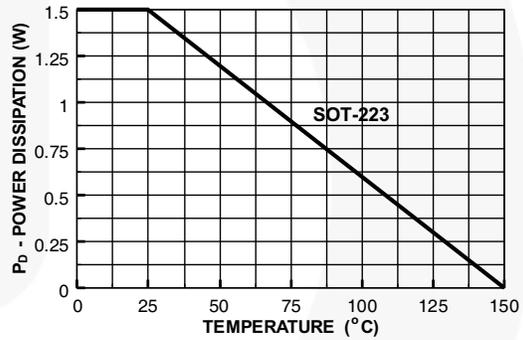


Figure 12. Power Dissipation vs. Ambient Temperature

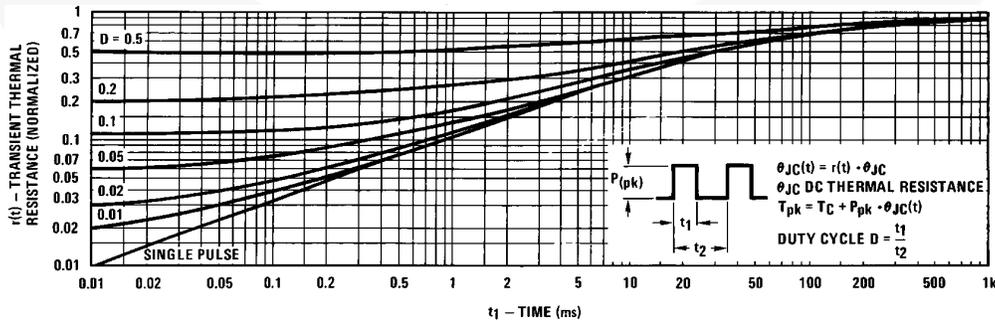
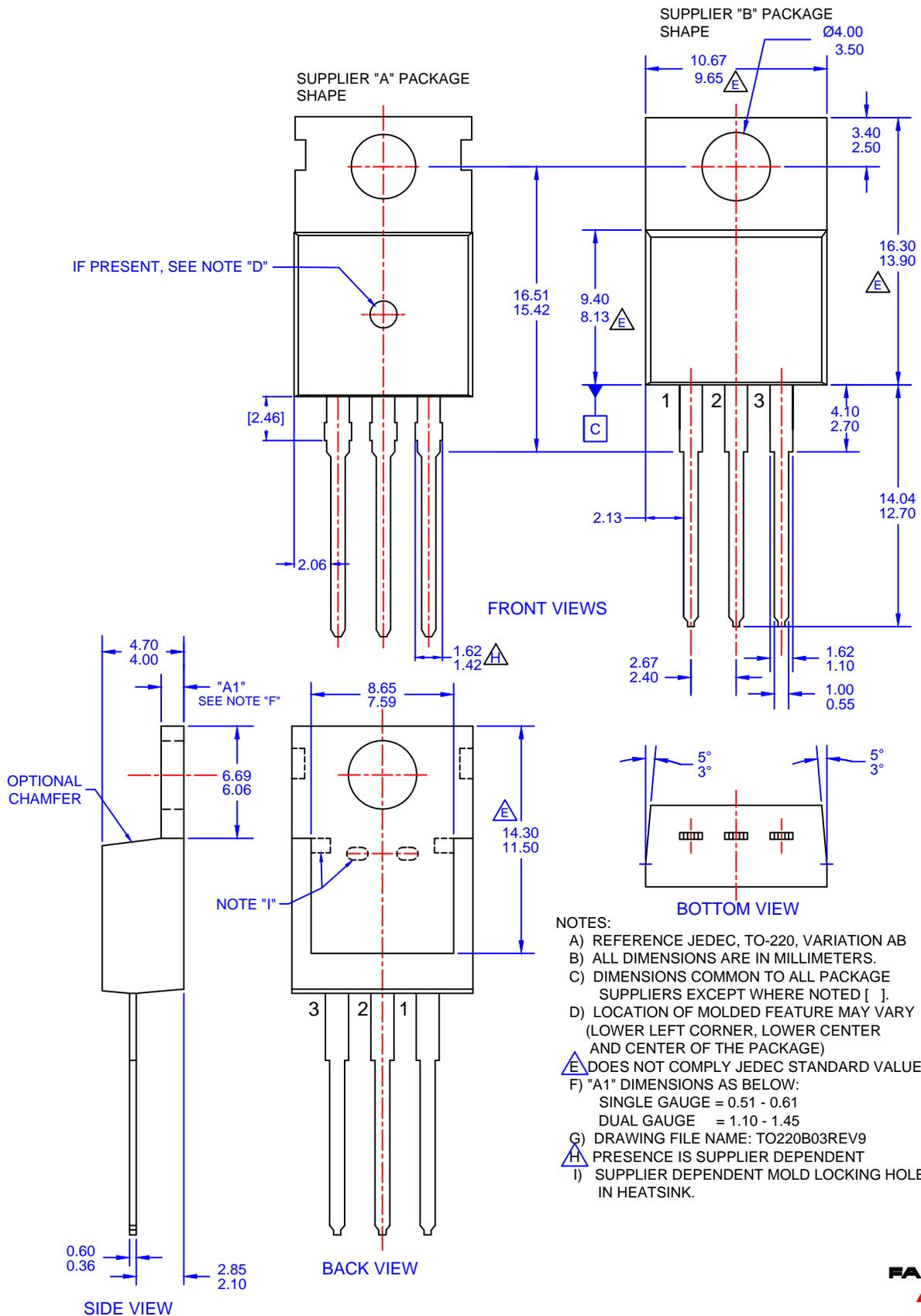


Figure 13. Thermal Response in TO-220 Package

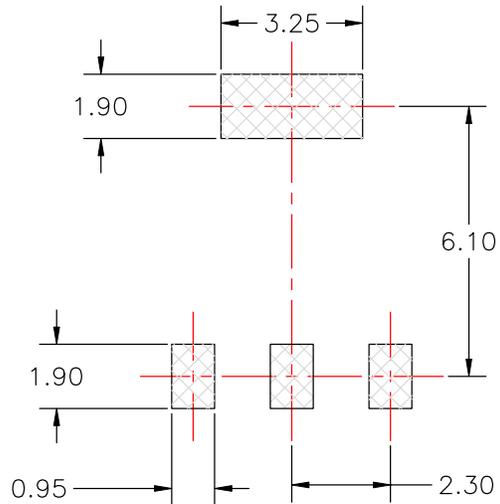
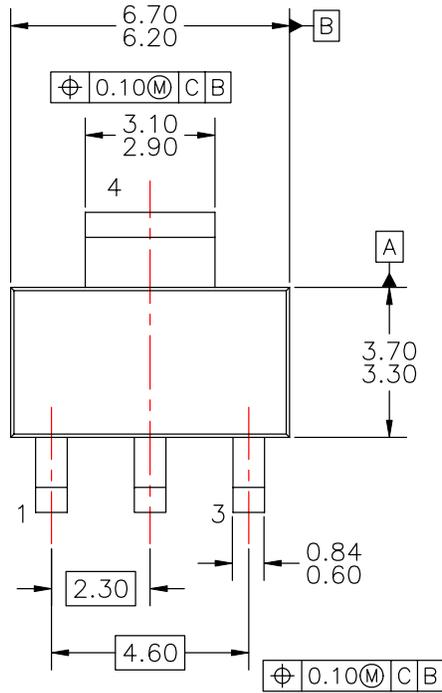


- NOTES:**
- A) REFERENCE JEDEC, TO-220, VARIATION AB
  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DIMENSIONS COMMON TO ALL PACKAGE SUPPLIERS EXCEPT WHERE NOTED [ ].
  - D) LOCATION OF MOLDED FEATURE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
  - E) DOES NOT COMPLY JEDEC STANDARD VALUE.
  - F) "A1" DIMENSIONS AS BELOW:  
 SINGLE GAUGE = 0.51 - 0.61  
 DUAL GAUGE = 1.10 - 1.45
  - G) DRAWING FILE NAME: TO220B03REV9
  - H) PRESENCE IS SUPPLIER DEPENDENT
  - I) SUPPLIER DEPENDENT MOLD LOCKING HOLES IN HEATSINK.

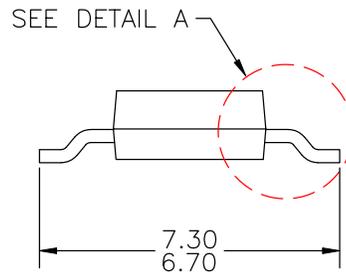
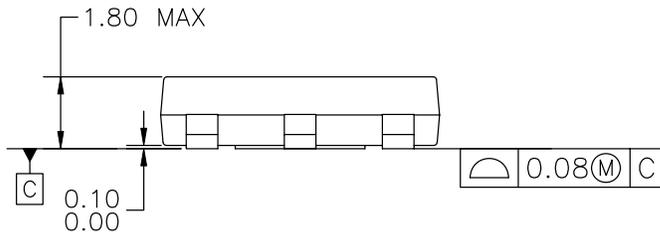
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**APPROVED**  
July-14-2008

| REVISIONS |   |             |           |
|-----------|---|-------------|-----------|
| LTR       | DESCRIPTION   | DATE        | NAME/SITE |
| A         | RELEASE TO DOCUMENT CONTROL   | JAN.25,1996 | TL/FSCP   |
| 2         | CHG DWG TEMPLATE FR NATIONAL TO FAIRCHILD; CHG DIM STYLE FR DUAL INCH[MM] TO SINGLE, MM; CHG LD WID FR 0.74 <del>±0.03</del> TO 0.60-0.84; REMOVE PKG THICK DIM (1.6); CHG TOTAL PKG HT FR 1.8 <del>±0.05</del> TO 1.80 MAX; CHG FOOT LANDING DIM FR 0.91 MIN TO 0.60 MIN; CHG LD THICKNESS FR 0.35 <del>±0.03</del> TO 0.20-0.35; ADD DRAFT ANGLE OF MOLDED BODY TOP & BOT; CHG LD LGTH TO PKG EDGE DIM TO BASIC; CHG LD PITCH FR 2.29 BS TO 2.30 BS; CHG BODY WID FR 3.56 <del>±0.33</del> TO 3.30; CHG BODY LN FR 6.53 <del>±0.33</del> TO 6.30; CHG TOTAL PKG WID FR 6.94 <del>±0.33</del> TO 7.30; CHG PAD SIZE FR 0.99 MAX TO 0.95; CHG PAD PITCH FR 2.286 TO 2.30; CHG THERMAL TAB SIZE FR 3.28 MAX TO 3.25; CHG PAD SIZE FR 1.5 TO 1.90; CHG PAD SPACE FR 6.3 TO 6.10; CHG NOTE '2' TO 'A' W/O DATE; DEL NOTE ON LD FINISH; ADD NOTES B, C, D, E & F. | 12FEB08     | LZSC/FSCP |

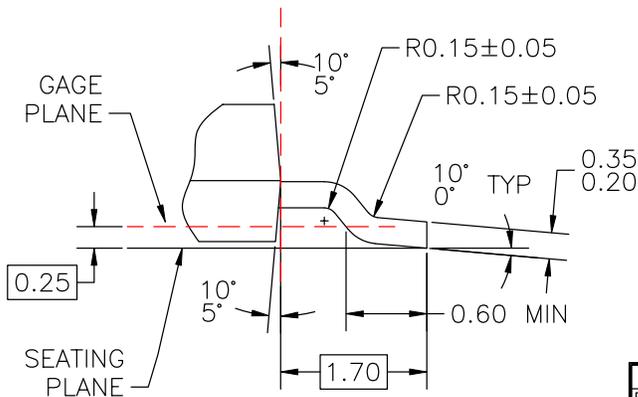


LAND PATTERN RECOMMENDATION



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING BASED ON JEDEC REGISTRATION TO-261, VARIATION AA.
- B) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- C) ALL DIMENSIONS ARE IN MILLIMETERS.
- D) DRAWING CONFORMS TO ASME Y14.5M-1994.
- E) LANDPATTERN NAME: SOT230P700X180-4BN
- F) DRAWING FILENAME: MKT-MA04AREV2



DETAIL A  
SCALE: 2:1

|                               |           |                                    |
|-------------------------------|-----------|------------------------------------|
| APPROVALS                     | DATE      | <b>FAIRCHILD</b><br>SEMICONDUCTOR™ |
| DRWN:<br>J.U. COMPARATIVO JR. | 26FEB2008 |                                    |
| CHEKED:<br>L.Z. STA CRUZ      |           |                                    |
| APPROVED:<br>M.R. GESTOLE     |           |                                    |
| G.S. BAJE                     |           | MOLDED PACKAGE<br>SOT-223, 4 LEAD  |
|                               |           | SCALE: 1:1                         |
|                               |           | SIZE: A3                           |
|                               |           | DRAWING NUMBER: MKT-MA04A          |
|                               |           | REV: 2                             |
|                               |           | FORMERLY: N/A                      |
|                               |           | SHEET: 1 OF 1                      |



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| Awinda®                  | Global Power Resource <sup>SM</sup>            | PowerTrench®                          | TinyBuck®        |
| AX-CAP®*                 | GreenBridge™                                   | PowerXS™                              | TinyCalc™        |
| BitSiC™                  | Green FPS™                                     | Programmable Active Droop™            | TinyLogic®       |
| Build it Now™            | Green FPS™ e-Series™                           | QFET®                                 | TINYOPTO™        |
| CorePLUS™                | Gmax™  | QS™                                   | TinyPower™       |
| CorePOWER™               | GTO™   | Quiet Series™                         | TinyPWM™         |
| CROSSVOL™                | IntelliMAX™                                    | RapidConfigure™                       | TinyWire™        |
| CTL™                     | ISOPLANAR™                                     | Saving our world, 1mW/W/kW at a time™ | TranSiC™         |
| Current Transfer Logic™  | Making Small Speakers Sound Louder and Better™ | SignalWise™                           | TriFault Detect™ |
| DEUXPEED®                | MegaBuck™                                      | SmartMax™                             | TRUECURRENT®*    |
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| EfficientMax™            | MicroPak™                                      | SPM®                                  | Ultra FRFET™     |
| ESBC™                    | MicroPak2™                                     | STEALTH™                              | UniFET™          |
| F <sup>®</sup>           | MillerDrive™                                   | SuperFET®                             | VCX™             |
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| FACT®                    | MTx®   | SupreMOS®                             | Xsens™           |
| FastvCore™               | MVN®   | SyncFET™                              | 仙童™              |
| FETBench™                | mWSaver®                                       | Sync-Lock™                            |                  |
| FPS™                     | OptoHiT™                                       |                                       |                  |
|                          | OPTOLOGIC®                                     |                                       |                  |

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|--------------------------|-----------------------|---|
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| No Identification Needed | Full Production       | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.   |
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