

2N2221  
2N2222

**SILICON  
NPN TRANSISTORS**



**TO-18 CASE**



[www.centrasemi.com](http://www.centrasemi.com)

**DESCRIPTION:**

The CENTRAL SEMICONDUCTOR 2N2221 and 2N2222 are silicon NPN epitaxial planar transistors designed for small signal, general purpose switching applications.

**MARKING: FULL PART NUMBER**

**MAXIMUM RATINGS:** ( $T_A=25^{\circ}\text{C}$ )

Collector-Base Voltage  
Collector-Emitter Voltage  
Emitter-Base Voltage  
Continuous Collector Current  
Power Dissipation  
Power Dissipation ( $T_C=25^{\circ}\text{C}$ )  
Operating and Storage Junction Temperature  
Thermal Resistance  
Thermal Resistance

**SYMBOL**

$V_{CBO}$  60  
 $V_{CEO}$  30  
 $V_{EBO}$  5.0  
 $I_C$  800  
 $P_D$  500  
 $P_D$  1.2  
 $T_J, T_{stg}$  -65 to +200  
 $\Theta_{JA}$  350  
 $\Theta_{JC}$  146

**UNITS**

V  
V  
V  
mA  
mW  
W  
 $^{\circ}\text{C}$   
 $^{\circ}\text{C/W}$   
 $^{\circ}\text{C/W}$

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

| SYMBOL        | TEST CONDITIONS                                       | MIN | MAX | UNITS         |
|---------------|-------------------------------------------------------|-----|-----|---------------|
| $I_{CBO}$     | $V_{CB}=50\text{V}$                                   | -   | 10  | nA            |
| $I_{CBO}$     | $V_{CB}=50\text{V}, T_A=150^{\circ}\text{C}$          | -   | 10  | $\mu\text{A}$ |
| $I_{EBO}$     | $V_{EB}=3.0\text{V}$                                  | -   | 10  | nA            |
| $BV_{CBO}$    | $I_C=10\mu\text{A}$                                   | 60  | -   | V             |
| $BV_{CEO}$    | $I_C=10\text{mA}$                                     | 30  | -   | V             |
| $BV_{EBO}$    | $I_E=10\mu\text{A}$                                   | 5.0 | -   | V             |
| $V_{CE(SAT)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$                   | -   | 0.4 | V             |
| $V_{CE(SAT)}$ | $I_C=500\text{mA}, I_B=50\text{mA}$                   | -   | 1.6 | V             |
| $V_{BE(SAT)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$                   | 0.6 | 1.3 | V             |
| $V_{BE(SAT)}$ | $I_C=500\text{mA}, I_B=50\text{mA}$                   | -   | 2.6 | V             |
| $f_T$         | $V_{CE}=20\text{V}, I_C=20\text{mA}, f=100\text{MHz}$ | 250 | -   | MHz           |
| $C_{ob}$      | $V_{CB}=10\text{V}, I_E=0, f=100\text{kHz}$           | -   | 8.0 | pF            |
| $C_{ib}$      | $V_{EB}=0.5\text{V}, I_C=0, f=100\text{kHz}$          | -   | 30  | pF            |

2N2221  
2N2222

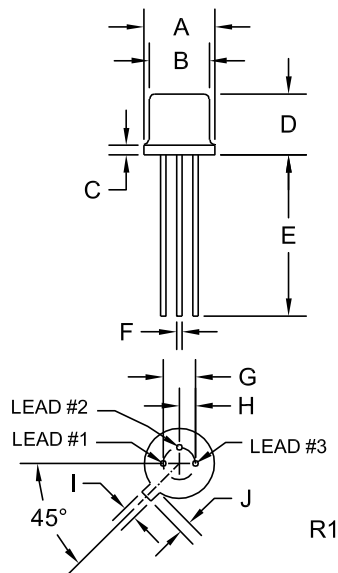
SILICON  
NPN TRANSISTORS



**ELECTRICAL CHARACTERISTICS - Continued:** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

| SYMBOL   | TEST CONDITIONS                                               | 2N2221 |     | 2N2222 |     |
|----------|---------------------------------------------------------------|--------|-----|--------|-----|
|          |                                                               | MIN    | MAX | MIN    | MAX |
| $h_{FE}$ | $V_{CE}=10\text{V}, I_C=0.1\text{mA}$                         | 20     | -   | 35     | -   |
| $h_{FE}$ | $V_{CE}=10\text{V}, I_C=1.0\text{mA}$                         | 25     | -   | 50     | -   |
| $h_{FE}$ | $V_{CE}=10\text{V}, I_C=10\text{mA}$                          | 35     | -   | 75     | -   |
| $h_{FE}$ | $V_{CE}=10\text{V}, I_C=10\text{mA}, T_A=-55^{\circ}\text{C}$ | 15     | -   | 35     | -   |
| $h_{FE}$ | $V_{CE}=10\text{V}, I_C=150\text{mA}$                         | 40     | 120 | 100    | 300 |
| $h_{FE}$ | $V_{CE}=1.0\text{V}, I_C=150\text{mA}$                        | 20     | -   | 50     | -   |
| $h_{FE}$ | $V_{CE}=10\text{V}, I_C=500\text{mA}$                         | 25     | -   | 40     | -   |

**TO-18 CASE - MECHANICAL OUTLINE**



| SYMBOL  | DIMENSIONS |       |             |      |
|---------|------------|-------|-------------|------|
|         | INCHES     |       | MILLIMETERS |      |
|         | MIN        | MAX   | MIN         | MAX  |
| A (DIA) | 0.209      | 0.230 | 5.31        | 5.84 |
| B (DIA) | 0.178      | 0.195 | 4.52        | 4.95 |
| C       | -          | 0.030 | -           | 0.76 |
| D       | 0.170      | 0.210 | 4.32        | 5.33 |
| E       | 0.500      | -     | 12.70       | -    |
| F (DIA) | 0.016      | 0.019 | 0.41        | 0.48 |
| G (DIA) | 0.100      |       | 2.54        |      |
| H       | 0.050      |       | 1.27        |      |
| I       | 0.036      | 0.046 | 0.91        | 1.17 |
| J       | 0.028      | 0.048 | 0.71        | 1.22 |

TO-18 (REV: R1)

**LEAD CODE:**

- 1) Emitter
- 2) Base
- 3) Collector

**MARKING: FULL PART NUMBER**

R2 (24-July 2013)

## OUTSTANDING SUPPORT AND SUPERIOR SERVICES



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### PRODUCT SUPPORT

Central's operations team provides the highest level of support to insure product is delivered on-time.

- Supply management (Customer portals)
- Inventory bonding
- Consolidated shipping options
- Custom bar coding for shipments
- Custom product packing

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### DESIGNER SUPPORT/SERVICES

Central's applications engineering team is ready to discuss your design challenges. Just ask.

- Free quick ship samples (2<sup>nd</sup> day air)
- Online technical data and parametric search
- SPICE models
- Custom electrical curves
- Environmental regulation compliance
- Customer specific screening
- Up-screening capabilities
- Special wafer diffusions
- PbSn plating options
- Package details
- Application notes
- Application and design sample kits
- Custom product and package development

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### REQUESTING PRODUCT PLATING

1. If requesting Tin/Lead plated devices, add the suffix "TIN/LEAD" to the part number when ordering (example: 2N2222A TIN/LEAD).
2. If requesting Lead (Pb) Free plated devices, add the suffix "PBFREE" to the part number when ordering (example: 2N2222A PBFREE).

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### CONTACT US

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