

# Central<sup>TM</sup> Semiconductor Corp.

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Manufacturers of World Class Discrete Semiconductors

PN2221  
PN2221A  
PN2222  
PN2222A

NPN Silicon Transistor

JEDEC TO-92 Case

## DESCRIPTION

The CENTRAL SEMICONDUCTOR PN2221,A,PN2222,A are Silicon NPN Planar Epitaxial Transistors designed for small signal general purpose and switching applications.

MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise noted)

|                                               |                                  | PN2221<br>PN2222 | PN2221A<br>PN2222A |                  |
|-----------------------------------------------|----------------------------------|------------------|--------------------|------------------|
| Collector-Base Voltage                        | V <sub>CB0</sub>                 | 60               | 75                 | V <sub>dc</sub>  |
| Emitter-Base Voltage                          | V <sub>EB0</sub>                 | 5.0              | 6.0                | V <sub>dc</sub>  |
| Collector-Emitter Voltage                     | V <sub>CE0</sub>                 | 30               | 40                 | V <sub>dc</sub>  |
| Collector Current-Continuous                  | I <sub>C</sub>                   | 800              |                    | mA <sub>dc</sub> |
| Power Dissipation                             | P <sub>T</sub>                   | 625              |                    | mW               |
| Operating and Storage<br>Junction Temperature | T <sub>J</sub> ,T <sub>stg</sub> | -65 TO +150      |                    | °C               |

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

| Symbol              | Test Conditions                                                                     | PN2221<br>PN2222  |     | PN2221A<br>PN2222A |     | Unit |
|---------------------|-------------------------------------------------------------------------------------|-------------------|-----|--------------------|-----|------|
|                     |                                                                                     | Min               | Max | Min                | Max |      |
| I <sub>CB0</sub>    | V <sub>CB</sub> =50V                                                                |                   | 10  |                    |     | nA   |
| I <sub>CB0</sub>    | V <sub>CB</sub> =60V                                                                |                   |     | 10                 |     | nA   |
| I <sub>CEV</sub>    | V <sub>CE</sub> =60V, V <sub>EB</sub> =3.0V                                         |                   |     | 10                 |     | nA   |
| I <sub>EB0</sub>    | V <sub>EB</sub> =3.0V                                                               |                   | 10  | 10                 |     | nA   |
| BV <sub>CB0</sub>   | I <sub>C</sub> =10uA                                                                | 60                |     | 75                 |     | V    |
| BV <sub>EB0</sub>   | I <sub>E</sub> =10uA                                                                | 5.0               |     | 6.0                |     | V    |
| BV <sub>CE0</sub>   | I <sub>C</sub> =10mA                                                                | 30                |     | 40                 |     | V    |
| V <sub>CE</sub> (s) | I <sub>C</sub> =150mA, I <sub>B</sub> =15mA                                         |                   | 0.4 |                    | 0.3 | V    |
| V <sub>CE</sub> (s) | I <sub>C</sub> =500mA, I <sub>B</sub> =50mA                                         |                   | 1.6 |                    | 1.0 | V    |
| V <sub>BE</sub> (s) | I <sub>C</sub> =150mA, I <sub>B</sub> =15mA                                         |                   | 1.3 |                    | 1.2 | V    |
| V <sub>BE</sub> (s) | I <sub>C</sub> =500mA, I <sub>B</sub> =50mA                                         |                   | 2.6 |                    | 2.0 | V    |
|                     |                                                                                     | PN2221<br>PN2221A |     | PN2222<br>PN2222A  |     | Unit |
|                     |                                                                                     | Min               | Max | Min                | Max |      |
| h <sub>FE</sub>     | V <sub>CE</sub> =10V, I <sub>C</sub> =100uA                                         | 20                |     | 35                 |     | -    |
| h <sub>FE</sub>     | V <sub>CE</sub> =10V, I <sub>C</sub> =1mA                                           | 25                |     | 50                 |     | -    |
| h <sub>FE</sub>     | V <sub>CE</sub> =10V, I <sub>C</sub> =10mA                                          | 35                |     | 75                 |     | -    |
| h <sub>FE</sub>     | V <sub>CE</sub> =10V, I <sub>C</sub> =150mA                                         | 40                | 120 | 100                | 300 | -    |
| h <sub>FE</sub>     | V <sub>CE</sub> =1V, I <sub>C</sub> =150mA                                          | 20                |     | 50                 |     | -    |
| h <sub>FE</sub>     | V <sub>CE</sub> =10V, I <sub>C</sub> =500mA (PN2221, PN2222 Only)                   | 20                |     | 30                 |     | -    |
| h <sub>FE</sub>     | V <sub>CE</sub> =10V, I <sub>C</sub> =500mA (PN2221A, PN2222A Only)                 | 25                |     | 40                 |     | -    |
| f <sub>T</sub>      | V <sub>CE</sub> =20V, I <sub>C</sub> =20mA, f=100MHz (Except PN2222A)               | 250               |     | 250                |     | MHz  |
| f <sub>T</sub>      | V <sub>CE</sub> =20V, I <sub>C</sub> =20mA, f=100MHz (PN2222A only)                 |                   |     | 300                |     | MHz  |
| C <sub>ob</sub>     | V <sub>CB</sub> =10V, f=100kHz                                                      |                   | 8.0 |                    | 8.0 | pF   |
| t <sub>ON</sub>     | V <sub>CC</sub> =30V, I <sub>C</sub> =150mA, I <sub>B</sub> =15mA                   |                   | 35  |                    | 35  | ns   |
| t <sub>OFF</sub>    | V <sub>CC</sub> =30V, I <sub>C</sub> =150mA, I <sub>B1</sub> =I <sub>B2</sub> =15mA |                   | 285 |                    | 285 | ns   |