

2N2904 2N2904A  
2N2905 2N2905A

# PNP SILICON TRANSISTORS



TO-39 CASE



www.centrasemi.com

## DESCRIPTION:

The CENTRAL SEMICONDUCTOR 2N2904, 2N2905 series types are PNP silicon transistors manufactured by the epitaxial planar process, designed for small signal, general purpose and switching applications.

## MARKING: FULL PART NUMBER

### MAXIMUM RATINGS: ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

|                                                | SYMBOL         | 2N2904<br>2N2905 | 2N2904A<br>2N2905A | UNITS              |
|------------------------------------------------|----------------|------------------|--------------------|--------------------|
| Collector-Base Voltage                         | $V_{CBO}$      | 60               | 60                 | V                  |
| Collector-Emitter Voltage                      | $V_{CEO}$      | 40               | 60                 | V                  |
| Emitter-Base Voltage                           | $V_{EBO}$      |                  | 5.0                | V                  |
| Continuous Collector Current                   | $I_C$          |                  | 0.6                | A                  |
| Power Dissipation                              | $P_D$          |                  | 0.8                | W                  |
| Power Dissipation ( $T_C=25^{\circ}\text{C}$ ) | $P_D$          |                  | 3.0                | W                  |
| Operating and Storage Junction Temperature     | $T_J, T_{stg}$ | -65 to +200      |                    | $^{\circ}\text{C}$ |

### ELECTRICAL CHARACTERISTICS: ( $T_A=25^{\circ}\text{C}$ )

| SYMBOL        | TEST CONDITIONS                                            | 2N2904<br>2N2905  |     | 2N2904A<br>2N2905A |     | UNITS |
|---------------|------------------------------------------------------------|-------------------|-----|--------------------|-----|-------|
|               |                                                            | MIN               | MAX | MIN                | MAX |       |
| $I_{CBO}$     | $V_{CB}=50\text{V}$                                        | -                 | 20  | -                  | 10  | nA    |
| $I_{CEV}$     | $V_{CE}=30\text{V}, V_{EB}=0.5\text{V}$                    | -                 | -   | -                  | 50  | nA    |
| $BV_{CBO}$    | $I_C=10\mu\text{A}$                                        | 60                | -   | 60                 | -   | V     |
| $BV_{CEO}$    | $I_C=10\text{mA}$                                          | 40                | -   | 60                 | -   | V     |
| $BV_{EBO}$    | $I_E=10\mu\text{A}$                                        | 5.0               | -   | 5.0                | -   | V     |
| $V_{CE(SAT)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$                        | -                 | 0.4 | -                  | 0.4 | V     |
| $V_{CE(SAT)}$ | $I_C=500\text{mA}, I_B=50\text{mA}$                        | -                 | 1.6 | -                  | 1.6 | V     |
| $V_{BE(SAT)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$                        | -                 | 1.3 | -                  | 1.3 | V     |
| $V_{BE(SAT)}$ | $I_C=500\text{mA}, I_B=50\text{mA}$                        | -                 | 2.6 | -                  | 2.6 | V     |
|               |                                                            | 2N2904<br>2N2904A |     | 2N2905<br>2N2905A  |     |       |
|               |                                                            | MIN               | MAX | MIN                | MAX |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=100\mu\text{A}$ (2N2904, 2N2905)   | 20                | -   | 35                 | -   |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=100\mu\text{A}$ (2N2904A, 2N2905A) | 40                | -   | 75                 | -   |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=1.0\text{mA}$ (2N2904, 2N2905)     | 25                | -   | 50                 | -   |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=1.0\text{mA}$ (2N2904A, 2N2905A)   | 40                | -   | 100                | -   |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=10\text{mA}$ (2N2904, 2N2905)      | 35                | -   | 75                 | -   |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=10\text{mA}$ (2N2904A, 2N2905A)    | 40                | -   | 100                | -   |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=150\text{mA}$                      | 40                | 120 | 100                | 300 |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=500\text{mA}$ (2N2904, 2N2905)     | 20                | -   | 30                 | -   |       |
| $h_{FE}$      | $V_{CE}=10\text{V}, I_C=500\text{mA}$ (2N2904A, 2N2905A)   | 40                | -   | 50                 | -   |       |

R2 (6-April 2015)

2N2904 2N2904A  
2N2905 2N2905A

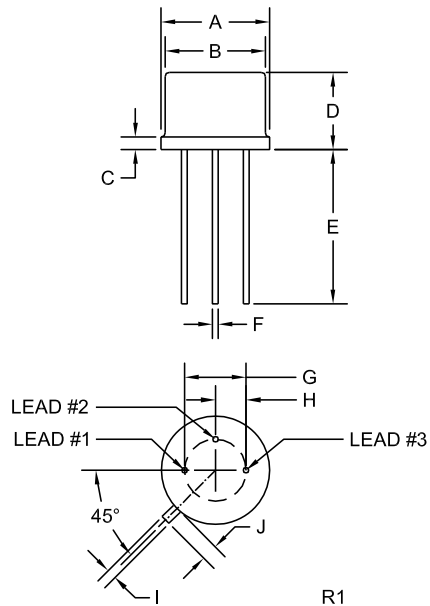
PNP SILICON TRANSISTORS



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

| SYMBOL    | TEST CONDITIONS                                                         | MIN | MAX | UNITS |
|-----------|-------------------------------------------------------------------------|-----|-----|-------|
| $f_T$     | $V_{CE}=20\text{V}$ , $I_C=50\text{mA}$ , $f=100\text{MHz}$             | 200 |     | MHz   |
| $C_{ob}$  | $V_{CB}=10\text{V}$ , $f=100\text{kHz}$                                 |     | 8.0 | pF    |
| $t_{on}$  | $V_{CC}=30\text{V}$ , $I_C=150\text{mA}$ , $I_B=15\text{mA}$            |     | 45  | ns    |
| $t_{off}$ | $V_{CC}=6.0\text{V}$ , $I_C=150\text{mA}$ , $I_{B1}=I_{B2}=15\text{mA}$ |     | 180 | ns    |

TO-39 CASE - MECHANICAL OUTLINE



| DIMENSIONS |        |       |             |      |
|------------|--------|-------|-------------|------|
| SYMBOL     | INCHES |       | MILLIMETERS |      |
|            | MIN    | MAX   | MIN         | MAX  |
| A (DIA)    | 0.335  | 0.370 | 8.51        | 9.40 |
| B (DIA)    | 0.315  | 0.335 | 8.00        | 8.51 |
| C          | -      | 0.040 | -           | 1.02 |
| D          | 0.240  | 0.260 | 6.10        | 6.60 |
| E          | 0.500  | -     | 12.70       | -    |
| F (DIA)    | 0.016  | 0.021 | 0.41        | 0.53 |
| G (DIA)    | 0.200  |       | 5.08        |      |
| H          | 0.100  |       | 2.54        |      |
| I          | 0.028  | 0.034 | 0.71        | 0.86 |
| J          | 0.029  | 0.045 | 0.74        | 1.14 |

TO-39 (REV: R1)

LEAD CODE:

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

MARKING: FULL PART NUMBER

R2 (6-April 2015)

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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.

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- 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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