

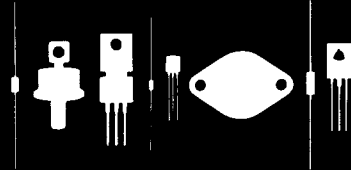
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145 Adams Avenue
Hauppauge, New York 11788



2N1303
2N1305
2N1307
2N1309

PNP GERMANIUM TRANSISTOR

JEDEC TO-5 CASE

DESCRIPTION

The CENTRAL SEMICONDUCTOR 2N1303, 2N1305, 2N1307 and 2N1309 are Germanium PNP Transistors designed for computer and switching applications.

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

| | | |
|--------------------------------|-----------|-----------------------------|
| Collector Base Voltage | V_{CB0} | 30V |
| Emitter Base Voltage | V_{EB0} | 25V |
| Collector Current | I_C | 300 mA |
| Power Dissipation | P_T | 150 mW |
| Operating Junction Temperature | T_J | 85°C |
| Storage Temperature | T_{stg} | - 65 to 100°C |

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

| Symbol | Test Conditions | Type | Min | Max | Unit |
|-------------|--|--------|------|------|---------------|
| I_{CBO} | $V_{CB} = 25\text{V}$ | All | | 10 | μA |
| I_{EBO} | $V_{EB} = 25\text{V}$ | All | | 10 | μA |
| V_{CB0} | $I_C = 100 \mu\text{A}$ | All | 30 | | v |
| V_{EB0} | $I_E = 100 \mu\text{A}$ | All | 25 | | v |
| H_{FE} | $V_{CE} = 1\text{V}, I_C = 10 \text{mA}$ | 2N1303 | 20 | | - |
| | | 2N1305 | 40 | 200 | - |
| | | 2N1307 | 60 | 300 | - |
| | | 2N1309 | 80 | | - |
| H_{FE} | $V_{CE} = 0.35\text{V}, I_C = 200 \text{mA}$ | 2N1303 | 10 | | - |
| | | 2N1305 | 15 | | - |
| | | 2N1307 | 20 | | - |
| | | 2N1309 | 20 | | - |
| $V_{CE}(s)$ | $I_C = 10 \text{mA}, I_B = 0.5 \text{mA}$ | 2N1303 | | 0.2 | v |
| | $I_C = 10 \text{mA}, I_B = 0.25 \text{mA}$ | 2N1305 | | 0.2 | v |
| | $I_C = 10 \text{mA}, I_B = 0.17 \text{mA}$ | 2N1307 | | 0.2 | V |
| | $I_C = 10 \text{mA}, I_B = 0.13 \text{mA}$ | 2N1309 | | 0.2 | v |
| $V_{BE}(s)$ | $I_C = 10 \text{mA}, I_B = 0.5 \text{mA}$ | 2N1303 | 0.15 | 0.40 | v |
| | | 2N1305 | 0.15 | 0.35 | v |
| | | 2N1307 | 0.15 | 0.35 | v |
| | | 2N1309 | 0.15 | 0.35 | v |

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

| <u>Symbol</u> | <u>Test Conditions</u> | <u>Type</u> | <u>Min</u> | <u>Max</u> | <u>Unit</u> |
|---------------|--|-------------|------------|------------|-------------|
| h_{ib} | $V_{CB} = 5V$ $I_E = 1 \text{ mA}$ $f = 1 \text{ KHZ}$ | All | 29 typ. | | ohm |
| h_{rb} | | All | 7 typ. | | X10-4 |
| h_{ob} | | All | 0.40 typ. | | u mho |
| h_{fe} | | All | 140 typ. | | - |
| NF | | All | 3 typ. | | db |
| C_{ob} | $V_{CB} = 5V, f = 1 \text{ MHz}$ | All | 20 max. | | pf |
| C_{ib} | $V_{EB} = 5V f = 1 \text{ MHz}$ | All | 9 typ. | | pf |
| t_d | $I_c = 10 \text{ mA}, I_{B1} = 1.3 \text{ mA}$ | All | 0.06 typ. | | u sec |
| t_r | $I_{Bz} = 0.7 \text{ mA}$ | All | 0.16 typ. | | u sec |
| t_s | $V_{BE} (\text{off}) = 0.8V$ | All | 0.75 typ. | | u sec |
| t_f | $R_L = 1K \text{ ohm}$ | All | 0.35 typ. | | u sec |
| f_{hfb} | $V_{CB} = 5V, I_E = 1 \text{ mA}$ | 2N1303 | 3 | | MHz |
| | | 2N1305 | 5 | | MHz |
| | | 2N1307 | 10 | | MHz |
| | | 2N1309 | 15 | | MHz |

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