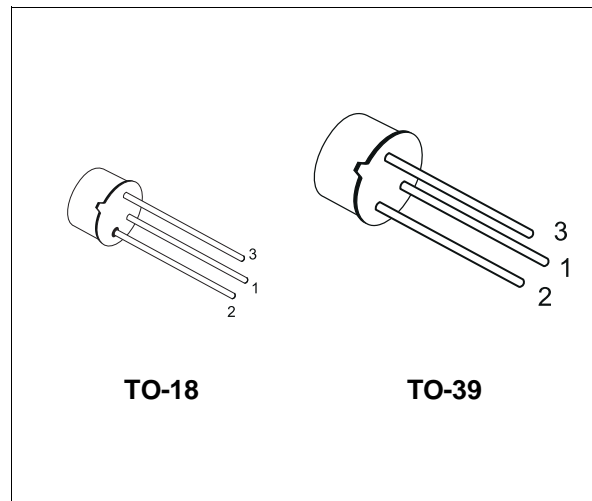


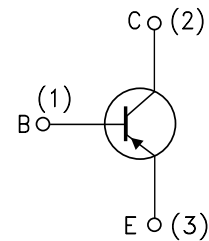
## SMALL SIGNAL PNP TRANSISTORS

### DESCRIPTION

The 2N2905A and 2N2907A are silicon Planar Epitaxial PNP transistors in Jedec TO-39 (for 2N2905A) and in Jedec TO-18 (for 2N2907A) metal case. They are designed for high speed saturated switching and general purpose applications.



### INTERNAL SCHEMATIC DIAGRAM



SC08810

### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter  | Value      | Unit |
|-----------|--|------------|------|
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )   | -60        | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )  | -60        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )   | -5         | V    |
| $I_C$     | Collector Current  | -0.6       | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)   | -0.8       | A    |
| $P_{tot}$ | Total Dissipation at $T_{amb} \leq 25$ °C<br>for <b>2N2905A</b><br>for <b>2N2907A</b><br>at $T_C \leq 25$ °C<br>for <b>2N2905A</b><br>for <b>2N2907A</b> | 0.6        | W    |
|           |  | 0.4        | W    |
|           |  | 3          | W    |
|           |  | 1.8        | W    |
| $T_{stg}$ | Storage Temperature  | -65 to 175 | °C   |
| $T_j$     | Max. Operating Junction Temperature  | 175        | °C   |

**THERMAL DATA**

|                       |                                     |     | TO-39 | TO-18 |      |
|-----------------------|-------------------------------------|-----|-------|-------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-Case    | Max | 50    | 83.3  | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-Ambient | Max | 250   | 375   | °C/W |

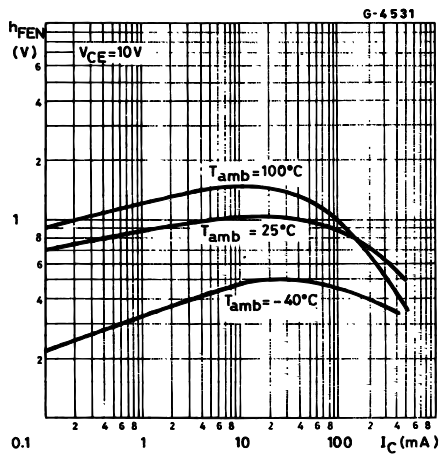
**ELECTRICAL CHARACTERISTICS** (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                | Parameter  | Test Conditions   | Min.                          | Typ. | Max.         | Unit     |
|-----------------------|--|---|-------------------------------|------|--------------|----------|
| I <sub>CBO</sub>      | Collector Cut-off Current (I <sub>E</sub> = 0)           | V <sub>CB</sub> = -50 V<br>V <sub>CB</sub> = -50 V T <sub>J</sub> = 150 °C  |                               |      | -10<br>-10   | nA<br>μA |
| I <sub>CEX</sub>      | Collector Cut-off Current (V <sub>BE</sub> = 0.5V)       | V <sub>CE</sub> = -30 V   |                               |      | -50          | nA       |
| I <sub>BEX</sub>      | Base Cut-off Current (V <sub>BE</sub> = 0.5V)            | V <sub>CE</sub> = -30 V   |                               |      | -50          | nA       |
| V <sub>(BR)CBO</sub>  | Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)    | I <sub>C</sub> = -10 μA   | -60                           |      |              | V        |
| V <sub>(BR)CEO*</sub> | Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = -10 mA   | -60                           |      |              | V        |
| V <sub>(BR)EBO</sub>  | Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)      | I <sub>E</sub> = -10 μA   | -5                            |      |              | V        |
| V <sub>CE(sat)*</sub> | Collector-Emitter Saturation Voltage                     | I <sub>C</sub> = -150 mA I <sub>B</sub> = -15 mA<br>I <sub>C</sub> = -500 mA I <sub>B</sub> = -50 mA  |                               |      | -0.4<br>-1.6 | V<br>V   |
| V <sub>BE(sat)*</sub> | Base-Emitter Saturation Voltage                          | I <sub>C</sub> = -150 mA I <sub>B</sub> = -15 mA<br>I <sub>C</sub> = -500 mA I <sub>B</sub> = -50 mA  |                               |      | -1.3<br>-2.6 | V<br>V   |
| h <sub>FE*</sub>      | DC Current Gain  | I <sub>C</sub> = -0.1 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -1 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -10 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -150 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -500 mA V <sub>CE</sub> = -10 V | 75<br>100<br>100<br>100<br>50 |      | 300          |          |
| f <sub>T</sub>        | Transition Frequency                                     | V <sub>CE</sub> = -20 V f = 100 MHz<br>I <sub>C</sub> = -50 mA  | 200                           |      |              | MHz      |
| C <sub>EBO</sub>      | Emitter-Base Capacitance                                 | I <sub>C</sub> = 0 V <sub>EB</sub> = -2 V f = 1MHz  |                               |      | 30           | pF       |
| C <sub>CBO</sub>      | Collector-Base Capacitance                               | I <sub>E</sub> = 0 V <sub>CB</sub> = -10 V f = 1MHz   |                               |      | 8            | pF       |
| t <sub>d**</sub>      | Delay Time   | V <sub>CC</sub> = -30 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -15 mA  |                               |      | 10           | ns       |
| t <sub>r**</sub>      | Rise Time  | V <sub>CC</sub> = -30 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -15 mA  |                               |      | 40           | ns       |
| t <sub>s**</sub>      | Storage Time   | V <sub>CC</sub> = -6 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -I <sub>B2</sub> = -15 mA  |                               |      | 80           | ns       |
| t <sub>f**</sub>      | Fall Time  | V <sub>CC</sub> = -6 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -I <sub>B2</sub> = -15 mA  |                               |      | 30           | ns       |
| t <sub>on**</sub>     | Turn-on Time   | V <sub>CC</sub> = -30 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -15 mA  |                               |      | 45           | ns       |
| t <sub>off**</sub>    | Turn-off Time  | V <sub>CC</sub> = -6 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -I <sub>B2</sub> = -15 mA  |                               |      | 100          | ns       |

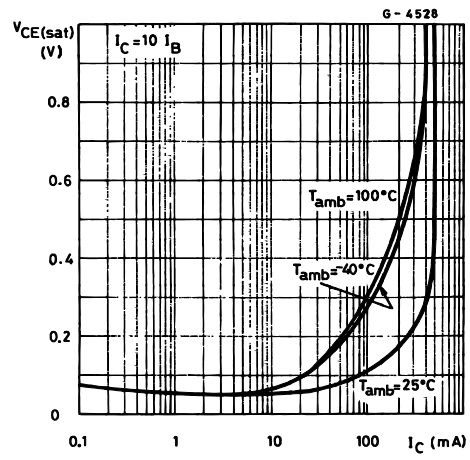
\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1 %

\*\* See test circuit

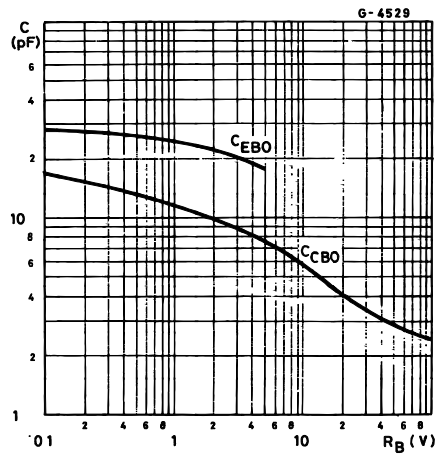
Normalized DC Current Gain.



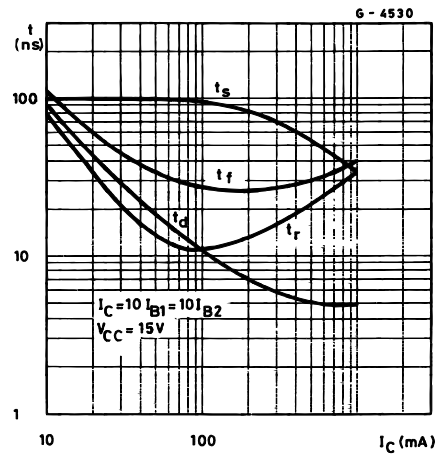
Collector Emitter Saturation Voltage.



Collector Base and Emitter-base capacitances.



Switching Characteristics.



2N2905A/2N2907A

Test Circuit for  $t_{on}$ ,  $t_r$ ,  $t_d$ .



Test Circuit for  $t_{off}$ ,  $t_o$ ,  $t_f$ .



## TO-18 MECHANICAL DATA

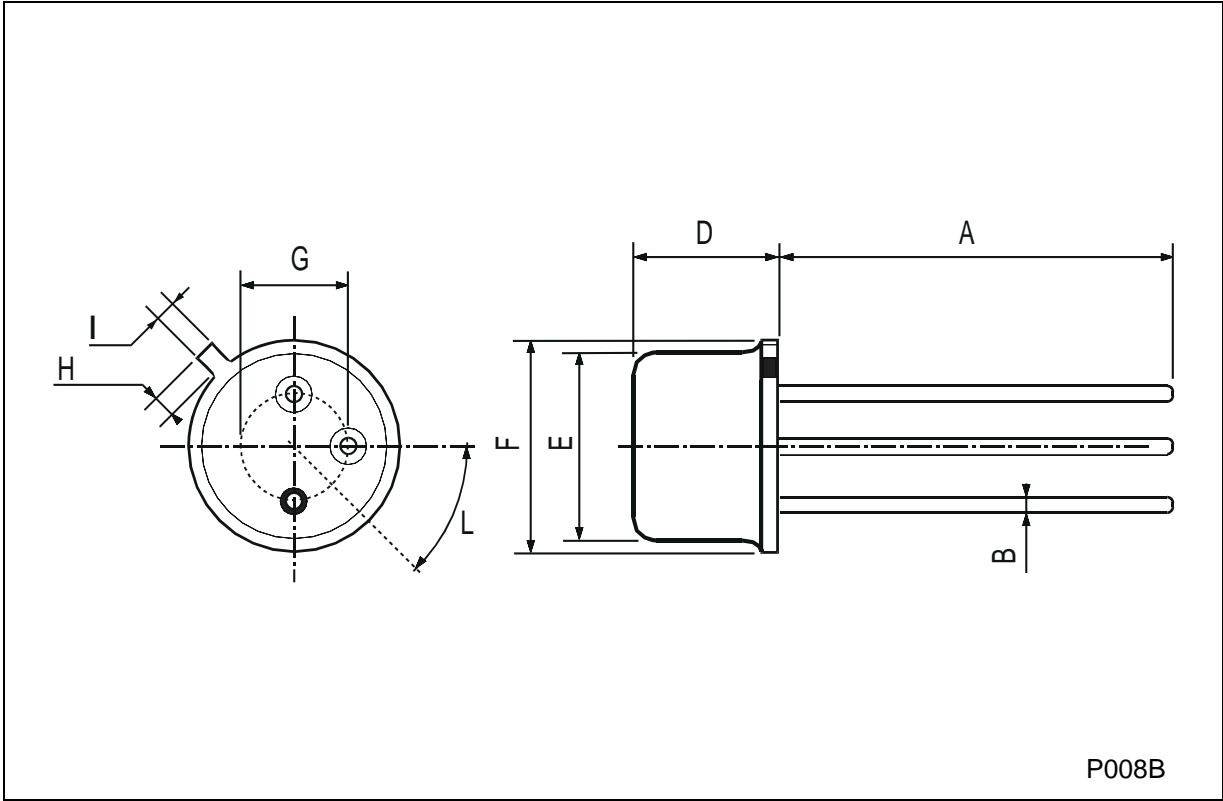
| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |      | 12.7 |      |       | 0.500 |       |
| B    |      |      | 0.49 |       |       | 0.019 |
| D    |      |      | 5.3  |       |       | 0.208 |
| E    |      |      | 4.9  |       |       | 0.193 |
| F    |      |      | 5.8  |       |       | 0.228 |
| G    | 2.54 |      |      | 0.100 |       |       |
| H    |      |      | 1.2  |       |       | 0.047 |
| I    |      |      | 1.16 |       |       | 0.045 |
| L    | 45°  |      |      | 45°   |       |       |



0016043

**TO-39 MECHANICAL DATA**

| DIM. | mm         |      |      | inch  |      |       |
|------|------------|------|------|-------|------|-------|
|      | MIN.       | TYP. | MAX. | MIN.  | TYP. | MAX.  |
| A    | 12.7       |      |      | 0.500 |      |       |
| B    |            |      | 0.49 |       |      | 0.019 |
| D    |            |      | 6.6  |       |      | 0.260 |
| E    |            |      | 8.5  |       |      | 0.334 |
| F    |            |      | 9.4  |       |      | 0.370 |
| G    | 5.08       |      |      | 0.200 |      |       |
| H    |            |      | 1.2  |       |      | 0.047 |
| I    |            |      | 0.9  |       |      | 0.035 |
| L    | 45° (typ.) |      |      |       |      |       |



P008B

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