

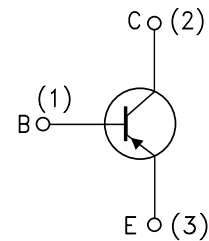
SMALL SIGNAL PNP TRANSISTORS

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 | | |
| | for 2N2905A | 0.6 | W |
| | for 2N2907A | 0.4 | W |
| | at $T_C \leq 25$ °C | | |
| | for 2N2905A | 3 | W |
| | for 2N2907A | 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 _{thj-case} | Thermal Resistance Junction-Case | Max | 50 | 83.3 | °C/W |
| R _{thj-amb} | Thermal Resistance Junction-Ambient | Max | 250 | 375 | °C/W |

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

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



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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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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.