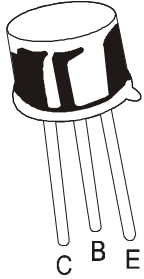


PNP SILICON PLANAR SWITCHING TRANSISTORS

2N2904 2N2905



**TO-39
Metal Can Package**

General Purpose Transistor

ABSOLUTE MAXIMUM RATINGS

| DESCRIPTION | SYMBOL | VALUE | UNIT |
|---|----------------|--------------|----------------------------|
| Collector Emitter Voltage | V_{CEO} | 40 | V |
| Collector Base Voltage | V_{CBO} | 60 | V |
| Emitter Base Voltage | V_{EBO} | 5 | V |
| Collector Current Continuous | I_C | 600 | mA |
| Power Dissipation @ $T_a=25^\circ\text{C}$ Derate Above 25°C | P_D | 600 3.43 | mW mW/ $^\circ\text{C}$ |
| Power Dissipation @ $T_c=25^\circ\text{C}$ Derate Above 25°C | P_D | 3.0 17.2 | W mW/ $^\circ\text{C}$ |
| Operating And Storage Junction Temperature Range | T_j, T_{stg} | - 65 to +200 | $^\circ\text{C}$ |

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ unless specified otherwise)

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---------------------------|------------|--|-----|-----|-----|---------------|
| Collector Emitter Voltage | $*V_{CEO}$ | $I_C=10\text{mA}, I_B=0$ | 40 | | | V |
| Collector Base Voltage | V_{CBO} | $I_C=10\mu\text{A}, I_E=0$ | 60 | | | V |
| Emitter Base Voltage | V_{EBO} | $I_E=10\mu\text{A}, I_C=0$ | 5 | | | V |
| Collector Cut off Current | I_{CEX} | $V_{CE}=30\text{V}, V_{BE}=0.5\text{V}$ | | | 50 | nA |
| Collector Cut off Current | I_{CBO} | $V_{CB}=50\text{V}, I_E=0$ | | | 20 | nA |
| | | $V_{CB}=50\text{V}, I_E=0,$ $T_a=150^\circ\text{C}$ | | | 20 | μA |
| Base Current | I_B | $V_{CE}=30\text{V}, V_{BE}=0.5\text{V}$ | | | 50 | nA |

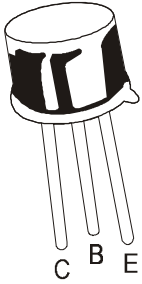
2N2904

2N2905

| DC Current Gain | h_{FE} | $I_C=0.1\text{mA}, V_{CE}=10\text{V}$ | >20 | >35 |
|-----------------|----------|--|----------|-----------|
| | | $I_C=1\text{mA}, V_{CE}=10\text{V}$ | >25 | >50 |
| | | $I_C=10\text{mA}, V_{CE}=10\text{V}$ | >35 | >75 |
| | | $*I_C=150\text{mA}, V_{CE}=10\text{V}$ | 40 - 120 | 100 - 300 |
| | | $*I_C=500\text{mA}, V_{CE}=10\text{V}$ | >20 | >30 |

***Pulse Test: Pulse Width $\leq 300\text{ms}$, Duty Cycle $\leq 2\%$**

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TO-39
Metal Can Package

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ unless specified otherwise)

SMALL SIGNAL CHARACTERISTICS

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|--------------------------------------|----------------|--|-----|-----|-----|------|
| Collector Emitter Saturation Voltage | $*V_{CE(sat)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$ | | | 0.4 | V |
| | | $I_C=500\text{mA}, I_B=50\text{mA}$ | | | 1.6 | V |
| Base Emitter Saturation Voltage | $*V_{BE(sat)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$ | | | 1.3 | V |
| | | $I_C=500\text{mA}, I_B=50\text{mA}$ | | | 2.6 | V |
| Transition Frequency | $**f_T$ | $I_C=50\text{mA}, V_{CE}=20\text{V},$ $f=100\text{MHz}$ | 200 | | | MHz |
| Output Capacitance | C_{obo} | $V_{CB}=10\text{V}, I_E=0,$ $f=100\text{KHz}$ | | | 8.0 | pF |
| Input Capacitance | C_{ibo} | $V_{BE}=2\text{V}, I_C=0,$ $f=100\text{KHz}$ | | | 30 | pF |

SWITCHING TIME

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---------------|-----------|---|-----|-----|-----|------|
| Delay Time | t_d | $I_C=150\text{mA}, I_{B1}=15\text{mA},$ $V_{CC}=30\text{V}$ | | | 10 | ns |
| Rise Time | t_r | | | | 40 | ns |
| Turn on Time | t_{on} | | | | 45 | ns |
| Storage time | t_s | $I_C=150\text{mA}, I_{B1}=$ $I_{B2}=15\text{mA}, V_{CC}=6\text{V}$ | | | 80 | ns |
| Fall Time | t_f | | | | 30 | ns |
| Turn off Time | t_{off} | | | | 100 | ns |

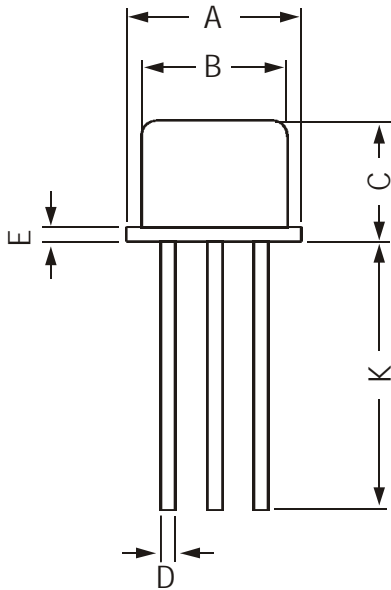
*Pulse Test: Pulse Width $\leq 300\text{ms}$, Duty Cycle $\leq 2\%$

** f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

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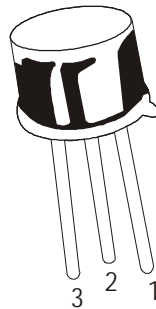
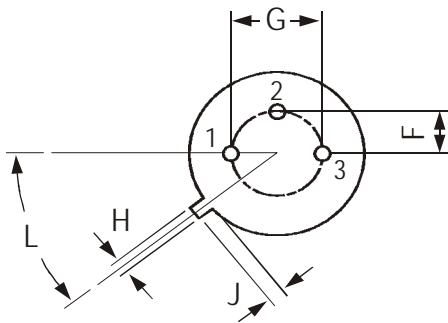
**TO-39
Metal Can Package**

TO-39 Metal Can Package



All dimensions are in mm

| DIM | MIN | MAX |
|-----|--------|--------|
| A | 8.50 | 9.39 |
| B | 7.74 | 8.50 |
| C | 6.09 | 6.60 |
| D | 0.40 | 0.53 |
| E | — | 0.88 |
| F | 2.41 | 2.66 |
| G | 4.82 | 5.33 |
| H | 0.71 | 0.86 |
| J | 0.73 | 1.02 |
| K | 12.70 | — |
| L | 42 DEG | 48 DEG |



PIN CONFIGURATION

- 1. EMITTER
- 2. BASE
- 3. COLLECTOR

Packing Detail

| PACKAGE | STANDARD PACK | | INNER CARTON BOX | | OUTER CARTON BOX | | |
|---------|-----------------|----------------|------------------|-----|-------------------|-----|--------|
| | Details | Net Weight/Qty | Size | Qty | Size | Qty | Gr Wt |
| TO-39 | 500 pcs/polybag | 540 gm/500 pcs | 3" x 7.5" x 7.5" | 20K | 17" x 15" x 13.5" | 32K | 40 kgs |

Disclaimer

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