

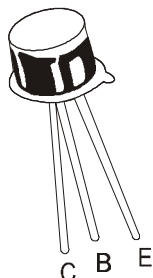
## NPN SILICON PLANAR TRANSISTORS

2N930

2N930A

TO-18

Metal Can Package



### Low Noise Transistors

#### ABSOLUTE MAXIMUM RATINGS

| DESCRIPTION                                                                   | SYMBOL         | 2N930        | 2N930A | UNIT                       |
|-------------------------------------------------------------------------------|----------------|--------------|--------|----------------------------|
| Collector Emitter Voltage                                                     | $V_{CEO}$      | 45           | 60     | V                          |
| Collector Base Voltage                                                        | $V_{CBO}$      | 45           | 60     | V                          |
| Emitter Base Voltage                                                          | $V_{EBO}$      | 5            | 6      | V                          |
| Collector Current Continuous                                                  | $I_C$          | 30           |        | mA                         |
| Power Dissipation @ $T_a=25^\circ\text{C}$<br>Derate Above $25^\circ\text{C}$ | $P_D$          | 300<br>1.72  |        | mW<br>mW/ $^\circ\text{C}$ |
| Power Dissipation @ $T_c=25^\circ\text{C}$<br>Derate Above $25^\circ\text{C}$ | $P_D$          | 600<br>3.42  |        | mW<br>mW/ $^\circ\text{C}$ |
| Operating And Storage Junction Temperature Range                              | $T_j, T_{stg}$ | - 65 to +200 |        | $^\circ\text{C}$           |

#### THERMAL CHARACTERISTICS

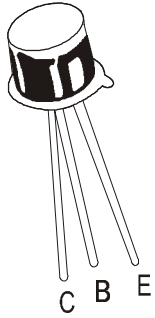
|                                 |               |     |                    |
|---------------------------------|---------------|-----|--------------------|
| Junction to Ambient in free air | $R_{th(j-a)}$ | 583 | $^\circ\text{C/W}$ |
| Junction to Case                | $R_{th(j-c)}$ | 292 | $^\circ\text{C/W}$ |

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

| DESCRIPTION                          | SYMBOL         | TEST CONDITION                                                                                                                                                                                                                  | 2N930                          | 2N930A                        | UNIT          |
|--------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------|---------------|
| Collector Emitter Voltage            | $*V_{CEO}$     | $I_C=10\text{mA}, I_B=0$                                                                                                                                                                                                        | >45                            | >60                           | V             |
| Collector Base Voltage               | $V_{CBO}$      | $I_C=10\mu\text{A}, I_E=0$                                                                                                                                                                                                      | >45                            | >60                           | V             |
| Emitter Base Voltage                 | $V_{EBO}$      | $I_E=10\mu\text{A}, I_C=0$                                                                                                                                                                                                      | >5                             | >6                            | V             |
| Collector Cut Off Current            | $I_{CBO}$      | $V_{CB}=45\text{V}, I_E=0$                                                                                                                                                                                                      | <10                            | <2                            | nA            |
| Collector Cut Off Current            | $I_{CEO}$      | $V_{CE}=5\text{V}, I_B=0$                                                                                                                                                                                                       | <2                             | <2                            | nA            |
| Emitter Cut Off Current              | $I_{EBO}$      | $V_{EB}=5\text{V}, I_C=0$                                                                                                                                                                                                       | <10                            | <2                            | nA            |
| Collector Cut Off Current            | $I_{CES}$      | $V_{CE}=45\text{V}, V_{BE}=0$                                                                                                                                                                                                   | <10                            | <2                            | nA            |
|                                      |                | $V_{CE}=45\text{V}, V_{BE}=0, T_a=170^\circ\text{C}$                                                                                                                                                                            | <10                            | <2                            | $\mu\text{A}$ |
| Collector Emitter Saturation Voltage | $*V_{CE(sat)}$ | $I_C=10\text{mA}, I_B=0.5\text{mA}$                                                                                                                                                                                             | <1.0                           | <0.5                          | V             |
| Base Emitter Saturation Voltage      | $*V_{BE(sat)}$ | $I_C=10\text{mA}, I_B=0.5\text{mA}$                                                                                                                                                                                             | 0.7 - 0.9                      | 0.7 - 0.9                     | V             |
| DC Current Gain                      | $h_{FE}$       | $I_C=1\mu\text{A}, V_{CE}=5\text{V}$<br>$I_C=10\mu\text{A}, V_{CE}=5\text{V}$<br>$I_C=10\mu\text{A}, V_{CE}=5\text{V}, T_a=-55^\circ\text{C}$<br>$I_C=500\mu\text{A}, V_{CE}=5\text{V}$<br>$*I_C=10\text{mA}, V_{CE}=5\text{V}$ | 100-300<br>>20<br>>150<br><600 | >60<br>100-300<br>>30<br><600 |               |

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

## NPN SILICON PLANAR TRANSISTORS



**2N930**  
**2N930A**

**TO-18**  
**Metal Can Package**

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

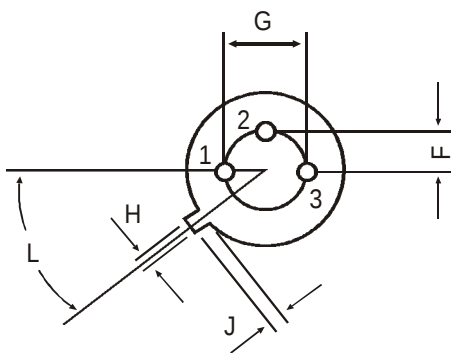
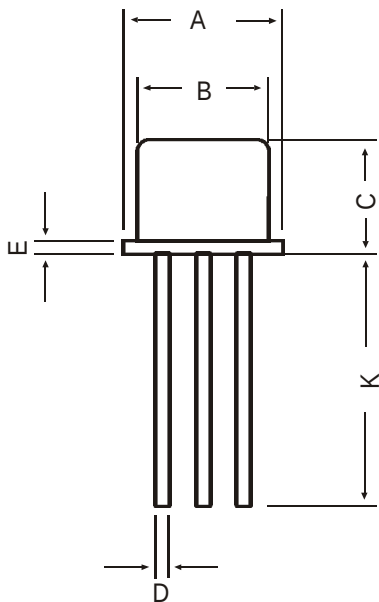
### DYNAMIC CHARACTERISTICS

| DESCRIPTION               | SYMBOL   | TEST CONDITION                                                                                             | MIN      | TYP | MAX    | UNIT             |
|---------------------------|----------|------------------------------------------------------------------------------------------------------------|----------|-----|--------|------------------|
| Transition frequency      | $f_T$    | $I_C=500\mu\text{A}$ , $V_{CE}=5\text{V}$ , $f=30\text{MHz}$<br><b>2N930</b><br><b>2N930A</b>              | 30<br>45 |     |        | MHz<br>MHz       |
| Output Capacitance        | $C_{ob}$ | $V_{CB}=5\text{V}$ , $I_E=0$ , $f=1\text{MHz}$<br><b>2N930</b><br><b>2N930A</b>                            |          |     | 8<br>6 | pF<br>pF         |
| Input Impedance           | $h_{ib}$ | $I_C=1\text{mA}$ , $V_{CB}=5\text{V}$ , $f=1\text{kHz}$                                                    | 25       |     | 32     | $\Omega$         |
| Voltage Feedback Ratio    | $h_{rb}$ | $I_C=1\text{mA}$ , $V_{CB}=5\text{V}$ , $f=1\text{kHz}$                                                    |          |     | 600    | $\times 10^{-6}$ |
| Small Signal Current Gain | $h_{fe}$ | $I_C=1\text{mA}$ , $V_{CE}=5\text{V}$ , $f=1\text{kHz}$                                                    | 150      |     | 600    |                  |
| Output Admittance         | $h_{ob}$ | $I_C=1\text{mA}$ , $V_{CB}=5\text{V}$ , $f=1\text{kHz}$                                                    |          |     | 1      | $\mu\text{S}$    |
| Noise Figure              | NF       | $I_C=10\mu\text{A}$ , $V_{CE}=5\text{V}$ , $R_g=10\text{k}\Omega$ ,<br>$f=10\text{Hz}$ to $15.7\text{kHz}$ |          |     | 3      | dB               |

2N930  
2N930A

TO-18  
Metal Can Package

TO-18 Metal Can Package



All dimensions in mm.

| DIM | MIN    | MAX  |
|-----|--------|------|
| A   | 5.24   | 5.84 |
| B   | 4.52   | 4.97 |
| C   | 4.31   | 5.33 |
| D   | 0.40   | 0.53 |
| E   | —      | 0.76 |
| F   | —      | 1.27 |
| G   | —      | 2.97 |
| H   | 0.91   | 1.17 |
| J   | 0.71   | 1.21 |
| K   | 12.70  | —    |
| L   | 45 DEG |      |



3 2 1

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-18   | 1K/polybag    | 350 gm/1K pcs  | 3" x 7.5" x 7.5" | 5K  | 17" x 15" x 13.5" | 80K | 34 kgs |

### **Disclaimer**

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