

# **BSR13**

## **NPN General Purpose Amplifier**

• Sourced from process 10.



# **Absolute Maximum Ratings\*** $T_a$ =25°C unless otherwise noted

| Symbol                            | Parameter  | Ratings   | Units |
|-----------------------------------|--|-----------|-------|
| $V_{CEO}$                         | Collector-Emitter Voltage                        | 30        | V     |
| V <sub>CBO</sub>                  | Collector-Base Voltage                           | 60        | V     |
| V <sub>EBO</sub>                  | Emitter-Base Voltage                             | 5.0       | V     |
| I <sub>C</sub>                    | Collector Current - Continuous                   | 0.5       | Α     |
| T <sub>J</sub> , T <sub>STG</sub> | Operating and Storage Junction Temperature Range | -55 ~ 150 | °C    |

<sup>\*</sup> This ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

These rating are based on a maximum junction temperature of 150 degrees C.
 These are steady limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### **Electrical Characteristics** T<sub>a</sub>=25°C unless otherwise noted

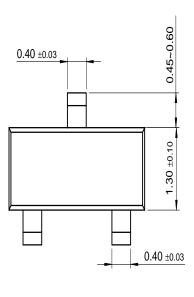
| Symbol               | Parameter                              | Test Condition   | Min. | Max. | Units |
|----------------------|--|--|------|------|-------|
| Off Charac           | cteristics                             | •  | •    |      |       |
| V <sub>(BR)CEO</sub> | Collector-Emitter Breakdown Voltage *  | $I_{C} = 10 \text{mA}, I_{B} = 0$                        | 30   |      | V     |
| V <sub>(BR)CBO</sub> | Collector-Base Breakdown Voltage       | $I_{C} = 10\mu A, I_{E} = 0$                             | 60   |      | V     |
| V <sub>(BR)EBO</sub> | Emitter-Base Breakdown Voltage         | $I_E = 10\mu A, I_C = 0$                                 | 5.0  |      | V     |
| I <sub>CBO</sub>     | Collector Cutoff Current               | $V_{CB} = 50V, I_{E} = 0$                                |      | 30   | nA    |
|                      |  | $V_{CB} = 50V, I_{E} = 0, T_{a} = 150^{\circ}C$          |      | 10   | μΑ    |
| I <sub>EBO</sub>     | Emitter Cutoff Current                 | $V_{EB} = 3.0V, I_{C} = 0$                               |      | 15   | nA    |
| On Charac            | cteristics                             |  | •    |      |       |
| h <sub>FE</sub>      | DC Current Gain                        | $I_C = 0.1 \text{mA}, V_{CE} = 10 \text{V}$              | 35   |      |       |
|                      |  | $I_C = 1.0 \text{mA}, V_{CE} = 10 \text{V}$              | 50   |      |       |
|                      |  | $I_C = 10 \text{mA}, V_{CE} = 10 \text{V}$               | 75   |      |       |
|                      |  | $I_C = 150 \text{mA}, V_{CE} = 10 \text{V}^*$            | 100  | 300  |       |
|                      |  | $I_C = 150 \text{mA}, V_{CE} = 1.0 \text{V}^*$           | 50   |      |       |
|                      |  | $I_C = 500 \text{mA}, V_{CE} = 10 \text{V} *$            | 30   |      |       |
| V <sub>CE(sat)</sub> | Collector-Emitter Saturation Voltage * | I <sub>C</sub> = 150mA, I <sub>B</sub> = 15V             |      | 0.4  | V     |
| -()                  |  | $I_C = 500 \text{mA}, I_B = 50 \text{V}$                 |      | 1.6  |       |
| V <sub>BE(sat)</sub> | Base-Emitter Saturation Voltage        | I <sub>C</sub> = 150mA, I <sub>B</sub> = 15V             |      | 1.3  | V     |
| (-,-,-,-             |  | $I_C = 500 \text{mA}, I_B = 50 \text{V}$                 |      | 2.6  |       |
| Small Sigr           | nal Characteristics                    |  | -    |      |       |
| f <sub>T</sub>       | Curent Gain Bandwidth Product          | I <sub>C</sub> = 20mA, V <sub>CE</sub> = 20V, f = 100MHz | 250  |      |       |
| Pulse Test: Pu       | lse Width ≤ 300μs, Duty Cycle ≤ 2.0%   | •  |      |      |       |

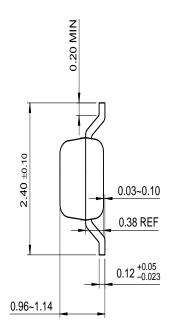
| Thermal Characteristics T <sub>a</sub> =25°C unless otherwise noted |  |            |             |
|---|--|------------|-------------|
| Symbol  | Parameter                                  | Max.       | Units       |
| P <sub>D</sub>  | Total Device Dissipation Derate above 25°C | 350<br>2.8 | mW<br>mW/°C |
| $R_{\theta JA}$   | Thermal Resistance, Junction to Ambient    | 357        | °C/W        |

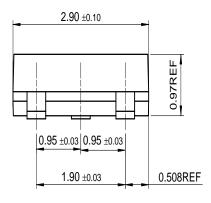
<sup>\*</sup> Device mounted on FR-4PCB 1.6" × 1.6" × 0.06".

# **Package Dimensions**

# SOT-23







Dimensions in Millimeters

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|--------------------------|---------------------------|---|
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