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FAIRCHILD SEMICONDUCTOR®

November 2013

# FJV3110R
# NPN Epitaxial Silicon Transistor with Bias Resistor

## Features

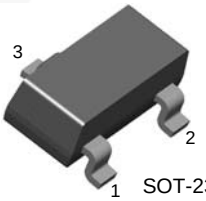
- 100 mA Output Current Capability
- Built-in Bias Resistor (R = 10 kΩ)

## Application

- Switching, Interface, and Driver Circuits
- Inverters
- Digital Applications in Industrial Segments

## Description

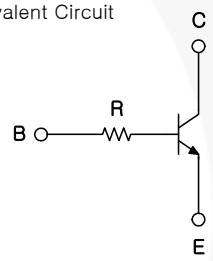
Transistors with built-in resistors can be excellent space- and cost-saving solutions by reducing component count and simplifying circuit design.




SOT-23

1. Base 2. Emitter 3. Collector

Equivalent Circuit




## Ordering Information

| Part Number | Top Mark | Package | Packing Method |
|---|---|---|---|
| FJV3110RMTF | R30 | SOT-23 3L | Tape and Reel |

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 40 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 5 | V |
| $I_C$ | Collector Current | 100 | mA |
| $T_J$ | Junction Temperature | 150 | °C |
| $T_{STG}$ | Storage Temperature | -55 to 150 | °C |

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## Thermal Characteristics[1]

Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_D$ | Power Dissipation | 200 | mW |
| | Derate Above $T_A$ = 25°C | 1.60 | mW/°C |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 625 | °C/W |

**Note:**

1. FR-4 76 x 114 x 0.6T $mm^3$ (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## Electrical Characteristics

Values are at $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | Collector-Base Breakdown Voltage | $I_C$ = 100 μA, $I_E$ = 0 | 40 | | | V |
| $BV_{CEO}$ | Collector-Emitter Breakdown Voltage | $I_E$ = 1 mA, $I_B$ = 0 | 40 | | | V |
| $I_{CBO}$ | Collector Cut-Off Current | $V_{CB}$ = 30 V, $I_E$ = 0 | | | 0.1 | μA |
| $h_{FE}$ | DC Current Gain | $V_{CE}$ = 5 V, $I_C$ = 1 mA | 100 | | 600 | |
| $V_{CE}$(sat) | Collector-Emitter Saturation Voltage | $I_C$ = 10 mA, $I_B$ = 1 mA | | | 0.3 | V |
| $C_{ob}$ | Output Capacitance | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz | | 3.7 | | pF |
| $f_T$ | Current Gain Bandwidth Product | $V_{CE}$ = 10 V, $I_C$ = 5 mA | | 250 | | MHz |
| R | Input Resistor | | 7 | 10 | 13 | kΩ |

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## Typical Performance Characteristics

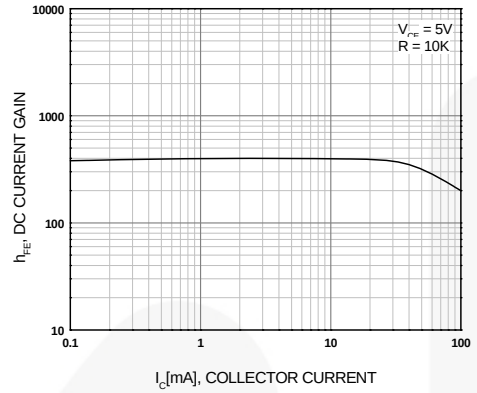



**Figure 1. DC Current Gain**

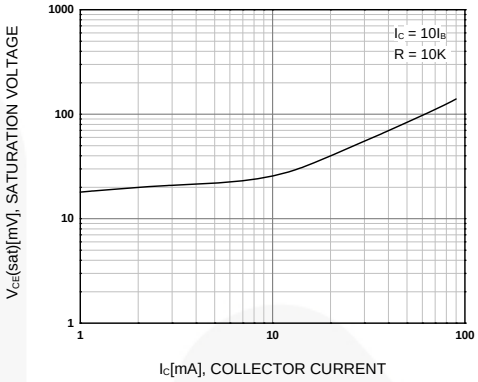



**Figure 2. Collector-Emitter Saturation Voltage**

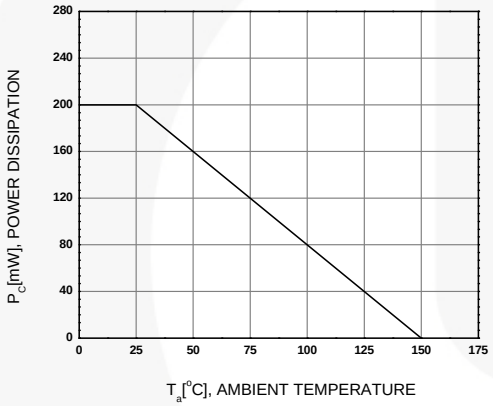



**Figure 3. Power Derating**

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## Physical Dimensions

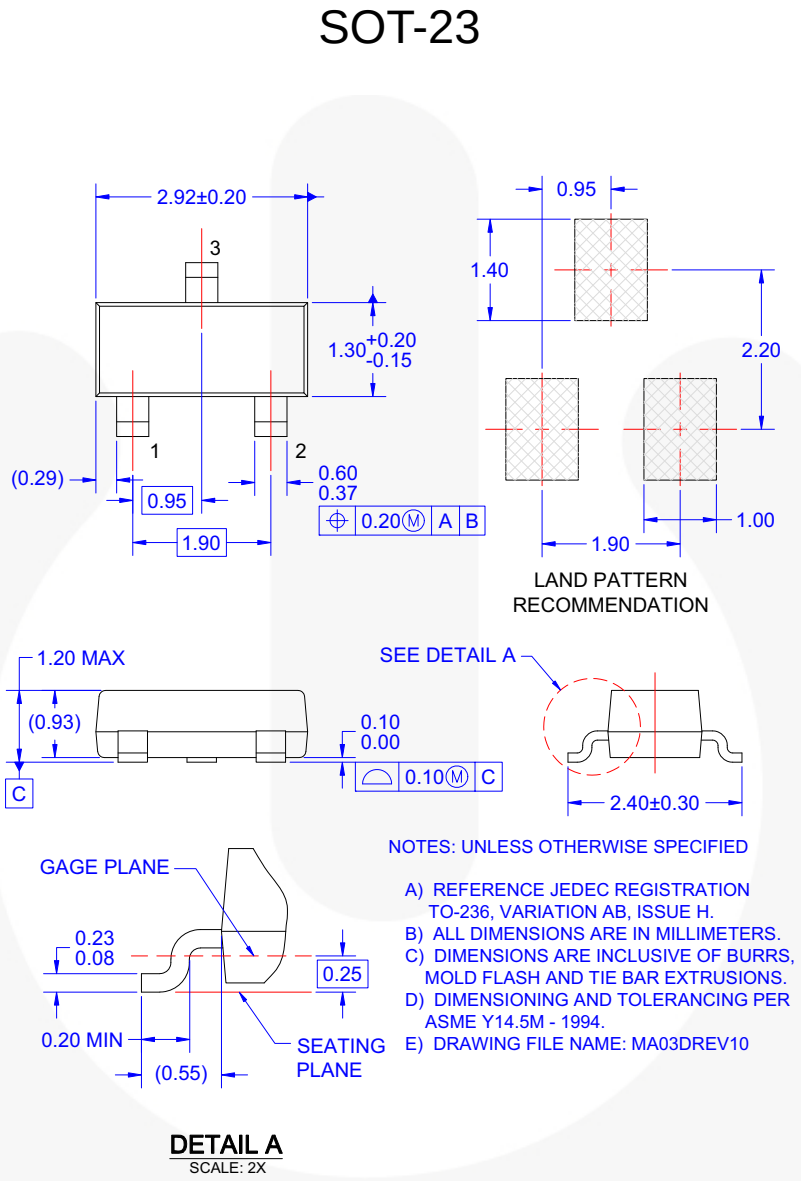



**Figure 4. 3-LEAD, SOT-23, JEDEC TO-236, LOW PROFILE (ACTIVE)**

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| No Identification Needed | Full Production | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design. |
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