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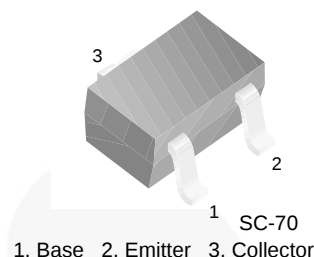
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# FJX3904

## NPN Epitaxial Silicon Transistor

### Feature

- General-Purpose Transistor



### Package Marking and Ordering Information

| Device Item | Device Marking | Package | Packing Method | Qty (pcs)   |
|-------------|----------------|---------|----------------|-------------|
| FJX3904TF   | S1A            | SC-70   | TAPE & REEL    | 3,000 units |

### Absolute Maximum Ratings<sup>(1)</sup>

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  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol          | Parameter                   | Value      | Units            |
|-----------------|-----------------------------|------------|------------------|
| $V_{CBO}$       | Collector-Base Voltage      | 60         | V                |
| $V_{CES}$       | Collector-Emitter Voltage   | 40         | V                |
| $V_{EBO}$       | Emitter-Base Voltage        | 6          | V                |
| $I_C$           | Collector Current           | 200        | mA               |
| $P_C$           | Collector Power Dissipation | 350        | mW               |
| $T_{STG}^{(2)}$ | Storage Temperature         | -55 to 150 | $^\circ\text{C}$ |

#### Notes:

1. These ratings are limiting values above which the serviceability of the diode may be impaired.
2. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .  
These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics<sup>(3)</sup>

| Symbol          | Parameter                           | Value | Unit                      |
|-----------------|-------------------------------------|-------|---------------------------|
| $P_D$           | Derate above $25^\circ\text{C}$     | 2.8   | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Air | 357   | $^\circ\text{C}/\text{W}$ |

#### Note:

3. PCB board size: FR-4 76 x 114 x 0.6 T mm<sup>3</sup> (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

**Electrical Characteristics<sup>(4)</sup>**Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol        | Parameter                            | Test Conditions                                                                                                           | Min. | Max. | Units |
|---------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------|------|-------|
| $BV_{CBO}$    | Collector-Base Breakdown Voltage     | $I_C = 10\ \mu\text{A}, I_E = 0$                                                                                          | 60   |      | V     |
| $BV_{CEO}$    | Collector-Emitter Breakdown Voltage  | $I_C = 1\ \text{mA}, I_B = 0$                                                                                             | 40   |      | V     |
| $BV_{EBO}$    | Emitter-Base Breakdown Voltage       | $I_E = 10\ \mu\text{A}, I_C = 0$                                                                                          | 6    |      | V     |
| $I_{CEX}$     | Collector Cut-Off Current            | $V_{CE} = 30\ \text{V}, V_{EB} = 3\ \text{V}$                                                                             |      | 50   | nA    |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 1\ \text{V}, I_C = 0.1\ \text{mA}$                                                                              | 40   |      |       |
|               |                                      | $V_{CE} = 1\ \text{V}, I_C = 1\ \text{mA}$                                                                                | 70   |      |       |
|               |                                      | $V_{CE} = 1\ \text{V}, I_C = 10\ \text{mA}$                                                                               | 100  | 300  |       |
|               |                                      | $V_{CE} = 1\ \text{V}, I_C = 50\ \text{mA}$                                                                               | 60   |      |       |
|               |                                      | $V_{CE} = 1\ \text{V}, I_C = 100\ \text{mA}$                                                                              | 30   |      |       |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 10\ \text{mA}, I_B = 1\ \text{mA}$                                                                                 |      | 0.2  | V     |
|               |                                      | $I_C = 50\ \text{mA}, I_B = 5\ \text{mA}$                                                                                 |      | 0.3  | V     |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage      | $I_C = 10\ \text{mA}, I_B = 1\ \text{mA}$                                                                                 | 0.65 | 0.85 | V     |
|               |                                      | $I_C = 50\ \text{mA}, I_B = 5\ \text{mA}$                                                                                 |      | 0.95 | V     |
| $C_{ob}$      | Output Capacitance                   | $V_{CB} = 5\ \text{V}, I_E = 0, f = 1\ \text{MHz}$                                                                        |      | 4    | pF    |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = 20\ \text{V}, I_C = 10\ \text{mA}$                                                                              | 300  |      | MHz   |
| NF            | Noise Figure                         | $I_C = 100\ \mu\text{A}, V_{CE} = 5\ \text{V},$<br>$R_S = 1\ \text{k}\Omega,$<br>$f = 10\ \text{Hz to } 15.7\ \text{kHz}$ |      | 5    | dB    |
| $t_{ON}$      | Turn-On Time                         | $V_{CC} = 3\ \text{V}, V_{BE} = 0.5\ \text{V},$<br>$I_C = 10\ \text{mA}, I_{B1} = 1\ \text{mA}$                           |      | 70   | ns    |
| $t_{OFF}$     | Turn-Off Time                        | $V_{CC} = 3\ \text{V}, I_C = 10\ \text{mA},$<br>$I_{B1} = I_{B2} = 1\ \text{mA}$                                          |      | 250  | ns    |

**Note:**4. Pulse test: pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

## Typical Performance Characteristics

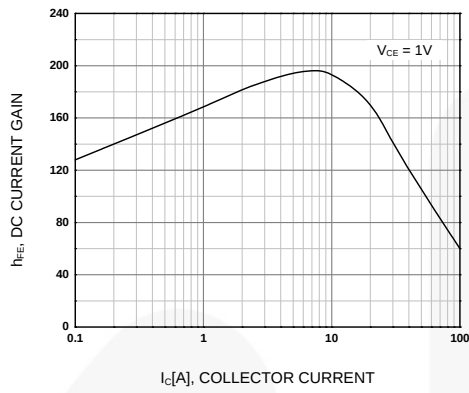


Figure 1. DC Current Gain

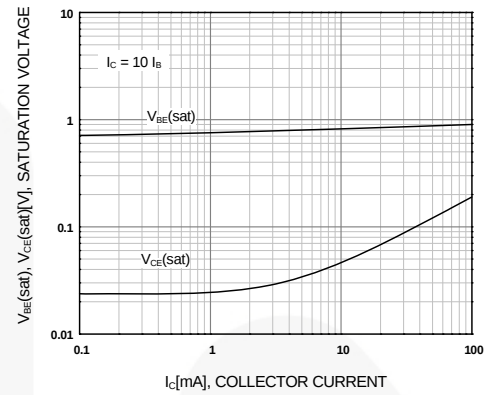


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

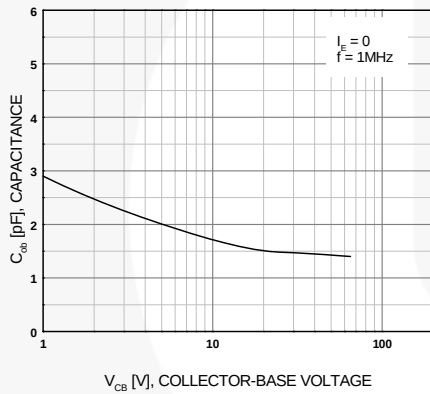


Figure 3. Output Capacitance

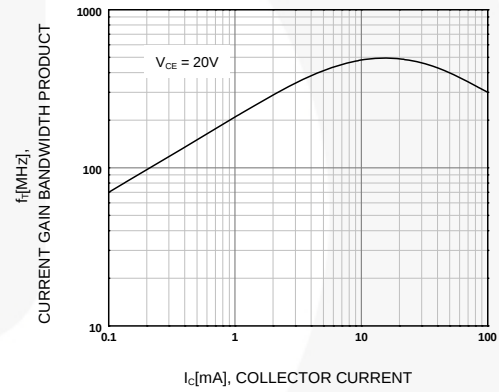


Figure 4. Current Gain Bandwidth Product

## Physical Dimensions

## SC-70 (SOT-323)

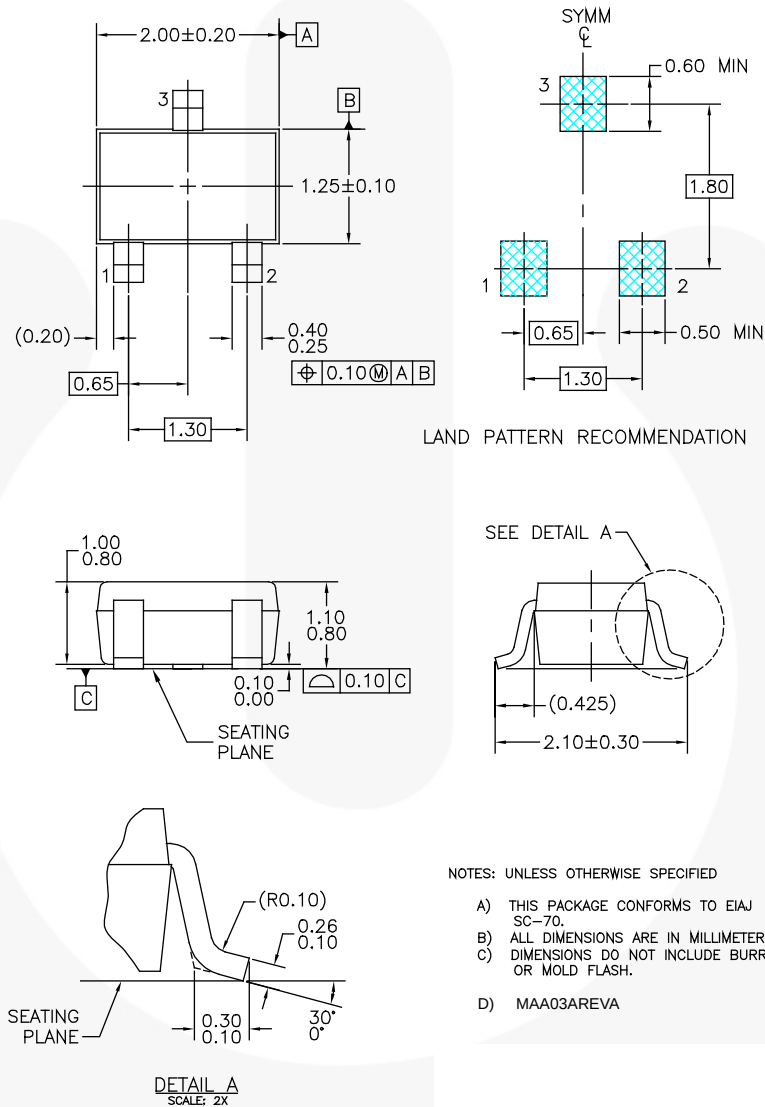


Figure 5. 3 LEAD, SC90, EIAJ SC-70, 1.25 MM WIDE (ACTIVE)

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|  | MicroPak™                                      | STEALTH™                                                                          | UHC®                                                                                |
| Fairchild®                                                                        | MicroPak2™                                     | SuperFET™                                                                         | Ultra FRFET™                                                                        |
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