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September 2014

FJPF13009 NPN Silicon Transistor

Features

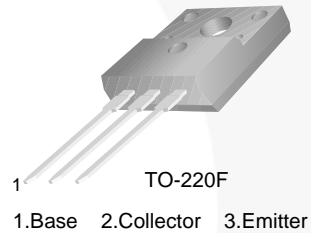
- High-Voltage Capability
- High Switching Speed

Applications

- Electronic Ballast
- Switching Regulator
- Motor Control
- Switched Mode Power Supply

Description

The FJPF13009 is a 700 V, 12 A NPN silicon epitaxial planar transistor. The FJPF13009 is available with multiple h_{FE} bin classes for ease of design use. The FJPF13009 is designed for high speed switching applications which utilizes the industry standard TO-220F package offering flexibility in design and excellent power dissipation.



Ordering Information

| Part Number ⁽¹⁾ | Top Mark | Package | Packing Method |
|----------------------------|----------|------------|----------------|
| FJPF13009H1TU | J13009-1 | TO-220F 3L | Rail |
| FJPF13009H2TU | J13009-2 | TO-220F 3L | Rail |

Notes:

1. The affix "-H1, H2" means the h_{FE} classification. The suffix "-TU" means the tube packing method.

Absolute Maximum Ratings⁽²⁾

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

| Symbol | Parameter | Value | Unit |
|-----------|---|-------------|------------------|
| V_{CBO} | Collector-Base Voltage | 700 | V |
| V_{CEO} | Collector-Emitter Voltage | 400 | V |
| V_{EBO} | Emitter-Base Voltage | 9 | V |
| I_C | Collector Current (DC) | 12 | A |
| I_{CP} | Collector Current (Pulse) | 24 | A |
| I_B | Base Current | 6 | A |
| P_D | Total Device Dissipation ($T_C = 25^\circ\text{C}$) | 50 | W |
| T_J | Junction Temperature | 150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature Range | -65 to +150 | $^\circ\text{C}$ |

Note:

2. These ratings are based on a maximum junction temperature of 150°C . These are steady-state limits. Fairchild Semiconductor should be consulted on application involving pulsed or low-duty-cycle operations.

Electrical Characteristics

Values are at $T_C = 25^\circ\text{C}$ unless otherwise noted.

| Symbol | Parameter | Conditions | Min. | Typ. | Max | Unit |
|----------------|---|--|------|------|-----|---------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage | $I_C = 10\text{ mA}, I_B = 0$ | 400 | | | V |
| I_{EBO} | Emitter Cut-Off Current | $V_{EB} = 9\text{ V}, I_C = 0$ | | | 1 | mA |
| h_{FE1} | DC Current Gain ⁽³⁾ | $V_{CE} = 5\text{ V}, I_C = 5\text{ A}$ | 8 | | 40 | |
| h_{FE2} | | $V_{CE} = 5\text{ V}, I_C = 8\text{ A}$ | 6 | | 30 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage ⁽³⁾ | $I_C = 5\text{ A}, I_B = 1\text{ A}$ | | | 1.0 | V |
| | | $I_C = 8\text{ A}, I_B = 1.6\text{ A}$ | | | 1.5 | |
| | | $I_C = 12\text{ A}, I_B = 3\text{ A}$ | | | 3.0 | |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage ⁽³⁾ | $I_C = 5\text{ A}, I_B = 1\text{ A}$ | | | 1.2 | V |
| | | $I_C = 8\text{ A}, I_B = 1.6\text{ A}$ | | | 1.6 | |
| C_{ob} | Output Capacitance | $V_{CB} = 10\text{ V}, f = 0.1\text{ MHz}$ | | 180 | | pF |
| f_T | Current Gain Bandwidth Product | $V_{CE} = 10\text{ V}, I_C = 0.5\text{ A}$ | 4 | | | MHz |
| t_{ON} | Turn-On Time | $V_{CC} = 125\text{ V}, I_C = 8\text{ A},$ $I_{B1} = -I_{B2} = 1.6\text{ A},$ $R_L = 15.6\ \Omega$ | | | 1.1 | μs |
| t_{STG} | Storage Time | | | | 3.0 | |
| t_F | Fall Time | | | | 0.7 | |

Note:

3. Pulse test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$

h_{FE} Classification

| Classification | H1 | H2 |
|----------------|--------|---------|
| h_{FE1} | 8 ~ 17 | 15 ~ 28 |

Typical Performance Characteristics

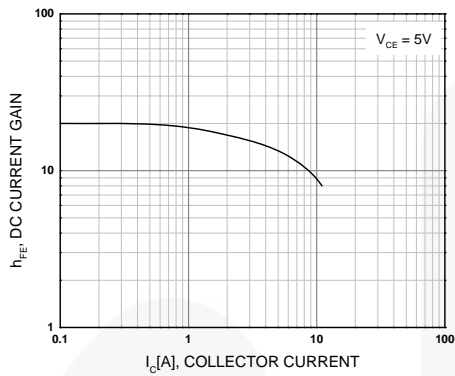


Figure 1. DC Current Gain

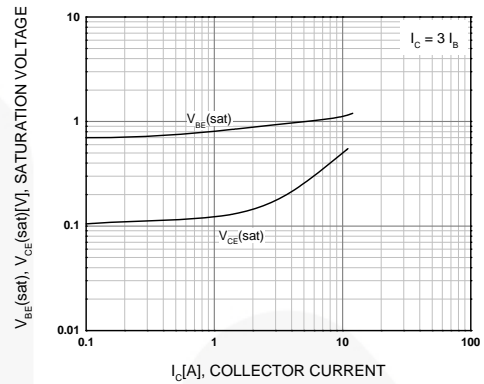


Figure 2. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

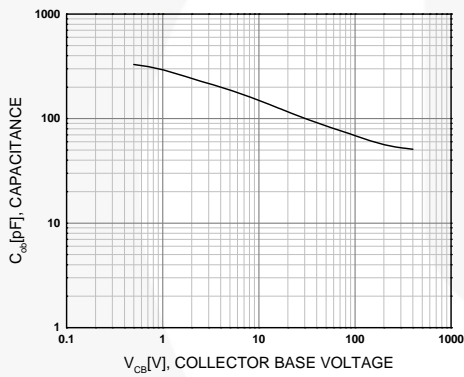


Figure 3. Collector Output Capacitance

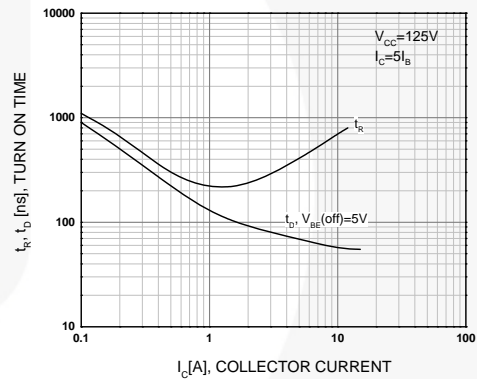


Figure 4. Turn-On Time

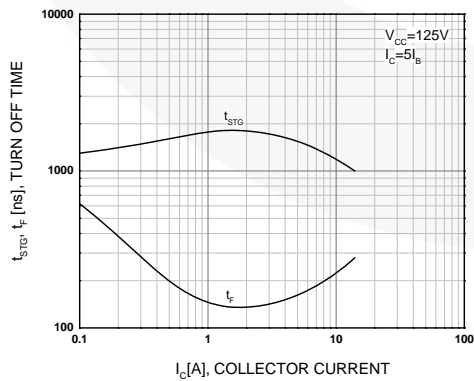


Figure 5. Turn-Off Time

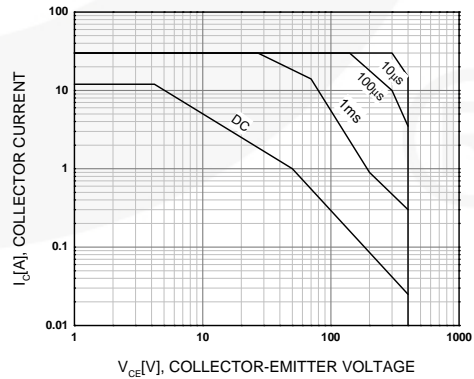


Figure 6. Forward Bias Safe Operating Area

Typical Performance Characteristics (Continued)

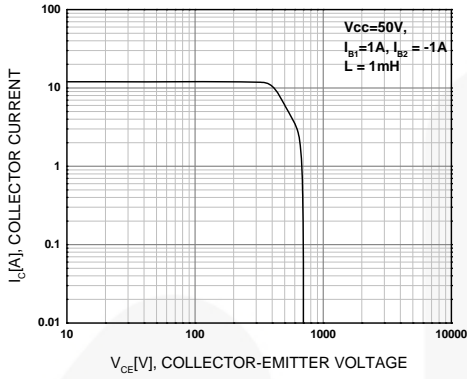


Figure 7. Reverse Bias Safe Operating Area

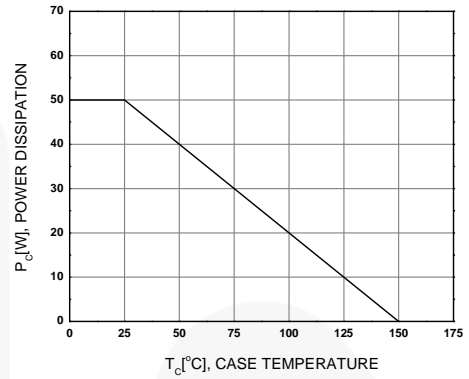


Figure 8. Power Derating

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