FAIRCHILD SEMICONDUCTOR®

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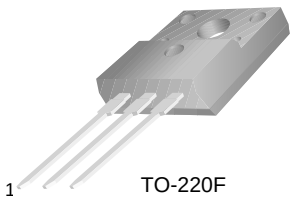
# FJPF13009
# NPN Silicon Transistor

## High Voltage Switch Mode Application

- High Voltage Capability
- High Switching Speed
- Suitable for Motor Control and Switching Mode Power Supply




TO-220F

1.Base 2.Collector 3.Emitter

## Absolute Maximum Ratings* $T_C$ = 25°C unless otherwise noted **(notes_1)**

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CBO}$ | 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 |
| $P_C$ | Collector Dissipation ($T_C$ = 25°C) | 50 | W |
| $T_J$ | Junction Temperature | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | -65 ~ 150 | °C |

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.
NOTES_1:
1) These ratings are based on a maximum junction temperature of 150°C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

## $h_{FE}$ Classification

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

## Electrical Characteristics $T_C$ = 25°C unless otherwise noted

| Symbol | Parameter | Conditions | Min. | Typ. | Max | Units |
|---|---|---|---|---|---|---|
| $V_{CEO}$(sus) | Collector-Emitter Sustaining Voltage | $I_C$ = 10mA, $I_B$ = 0 | 400 | | | V |
| $I_{EBO}$ | Emitter Cut-off Current | $V_{EB}$ = 9V, $I_C$ = 0 | | | 1 | mA |
| $h_{FE}$ | * DC Current Gain | $V_{CE}$ = 5V, $I_C$ = 5A ($h_{FE1}$)<br>$V_{CE}$ = 5V, $I_C$ = 8A | 8<br>6 | | 40<br>30 | |
| $V_{CE}$(sat) | * Collector-Emitter Saturation Voltage | $I_C$ = 5A, $I_B$ = 1A<br>$I_C$ = 8A, $I_B$ = 1.6A<br>$I_C$ = 12A, $I_B$ = 3A | | | 1<br>1.5<br>3 | V<br>V<br>V |
| $V_{BE}$ (sat) | * Base-Emitter Saturation Voltage | $I_C$ = 5A, $I_B$ = 1A<br>$I_C$ = 8A, $I_B$ = 1.6A | | | 1.2<br>1.6 | V<br>V |
| $C_{ob}$ | Output Capacitance | $V_{CB}$ = 10V, f = 0.1MHz | | 180 | | pF |
| $f_T$ | Current Gain Bandwidth Product | $V_{CE}$ = 10V, $I_C$ = 0.5A | 4 | | | MHz |
| $t_{ON}$ | Turn On Time | $V_{CC}$ = 125V, $I_C$ = 8A<br>$I_{B1}$ = - $I_{B2}$ = 1.6A, $R_L$ = 15,6Ω | | | 1.1 | μs |
| $t_{STG}$ | Storage Time | | | | 3 | μs |
| $t_F$ | Fall Time | | | | 0.7 | μs |

* Pulse Test: PW ≤ 300μs, Duty Cycle ≤ 2%

## Package Marking and Ordering Information

| Device Item (notes_2) | Device Marking | Package | Packing Method | Remarks |
|---|---|---|---|---|
| FJPF13009TU | J13009 | TO-220F | TUBE | |
| FJPF13009TTU | J13009 | TO-220F | TUBE | Potting Type |
| FJPF13009H2TU | J130092 | TO-220F | TUBE | |

Notes_2 :

1) The Affix “-H2” means the hFE classification.

2) The Affix “-T” means the TO220F Potting type package option.

3) The Suffix “-TU” means the Tube packing method, which can be on fairchildsemi website at http://www.fairchildsemi.com/packaging.

## Typical Performance Characteristics

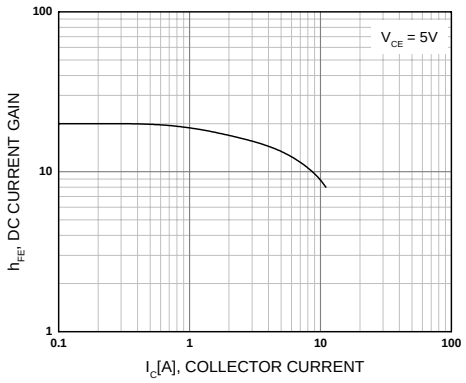



**Figure 1. DC current Gain**

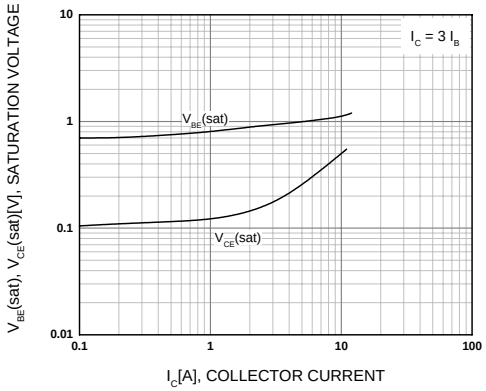



**Figure 2. Base-Emitter Saturation Voltage Collector-Emitter Saturation Voltage**

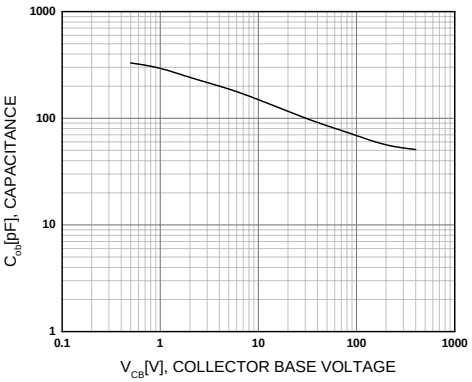



**Figure 3. Collector Output Capacitance**

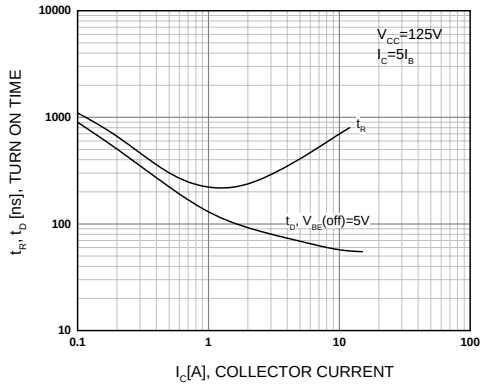



**Figure 4. Turn On Time**

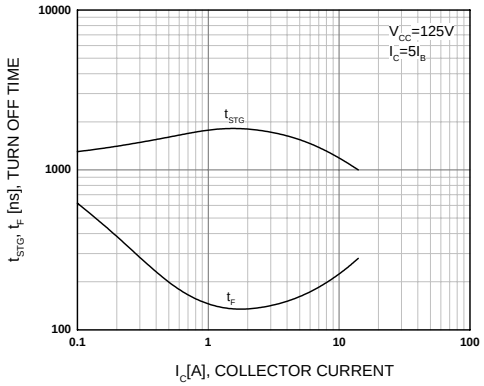



**Figure 5. Turn Off Time**

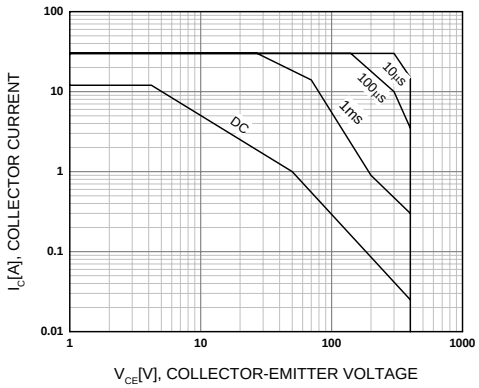



**Figure 6. Forward Bias Safe Operating Area**

## Typical Performance Characteristics (Continued)

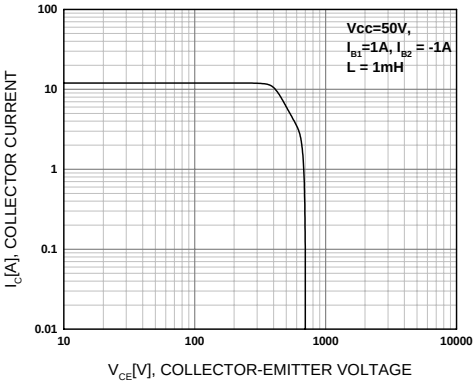



**Figure 7. Reverse Bias Safe Operating Area**

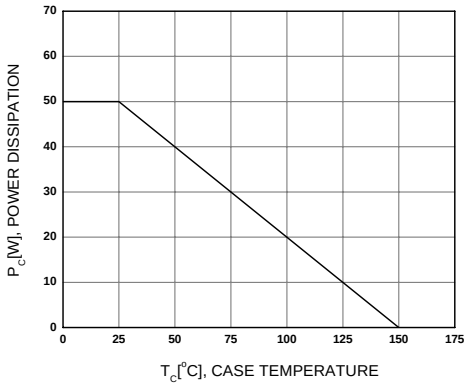



**Figure 8. Power Derating**

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Rev. I31

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