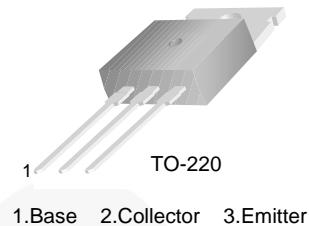


## FJPF13009

### NPN Silicon Transistor

#### Features

- High-Voltage Capability
- High Switching Speed
- Suitable for Electronic Ballast and Switched Mode Power Supply



#### Ordering Information

Part Number <sup>(1)</sup>	Marking	Package	Packing Method
FJPF13009H1TU	J13009-1	TO-220F 3L	Rail
FJPF13009H2TU	J13009-2	TO-220F 3L	Rail

**Note:**

1. The Affix “-H2” means the hFE classification.
- The Suffix “-TU” means the tube packing method.

#### Absolute Maximum Ratings<sup>(2)</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  $T_C = 25^\circ\text{C}$  unless otherwise noted.

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
$P_D$	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  $150^\circ\text{C}$ . These are steady state-limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

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

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

Symbol	Parameter	Conditions	Min.	Typ.	Max	Units
$V_{CEO}(\text{sus})$	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
$h_{FE}$	DC Current Gain	$V_{CE} = 5 \text{ V}, I_C = 5 \text{ A} (h_{FE1})$	8		40	
		$V_{CE} = 5 \text{ V}, I_C = 8 \text{ A}$	6		30	
$V_{CE}(\text{sat})$	Collector-Emitter Saturation Voltage	$I_C = 5 \text{ A}, I_B = 1 \text{ A}$			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	
$V_{BE}(\text{sat})$	Base-Emitter Saturation Voltage	$I_C = 5 \text{ A}, I_B = 1 \text{ A}$			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	$\mu\text{s}$
$t_{STG}$	Storage Time				3.0	
$t_F$	Fall Time				0.7	

**Note:**

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

## Typical Performance Characteristics

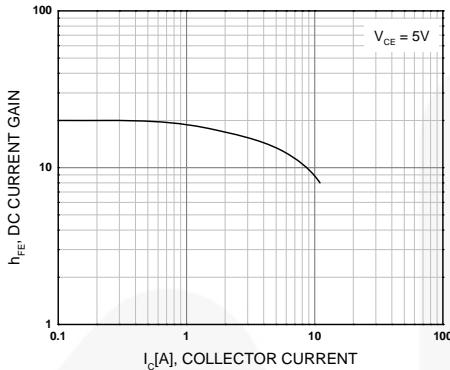


Figure 1. DC current Gain

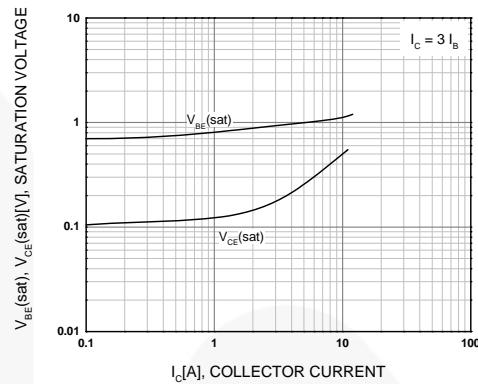


Figure 2. Base-Emitter Saturation Voltage Collector-Emitter Saturation Voltage

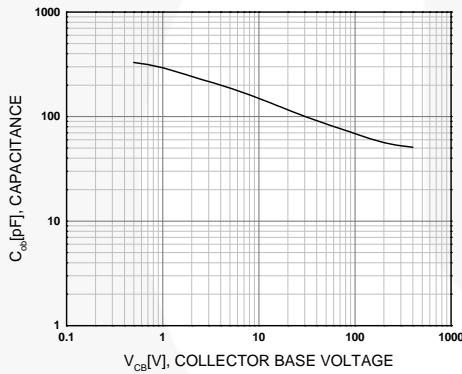


Figure 3. Collector Output Capacitance

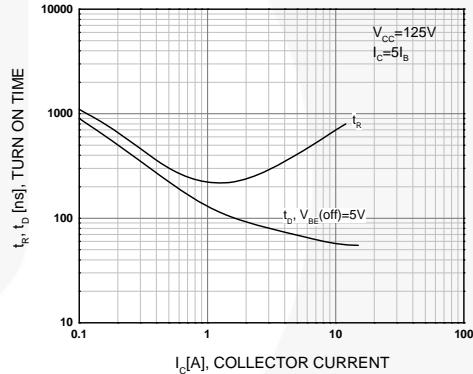


Figure 4. Turn-On Time

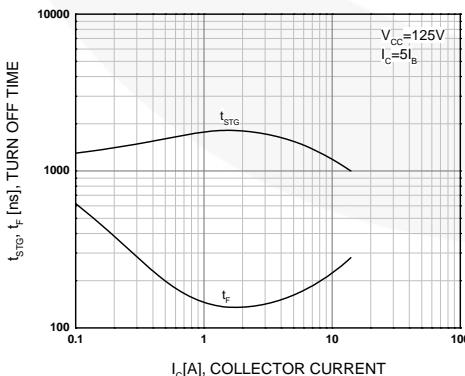


Figure 5. Turn-Off Time

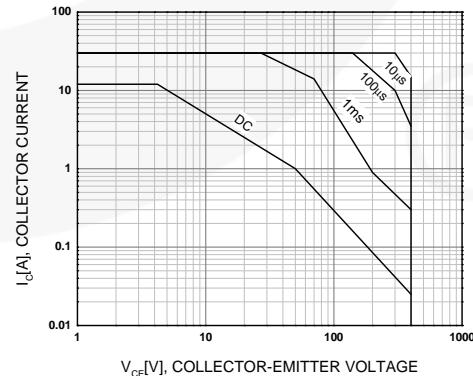
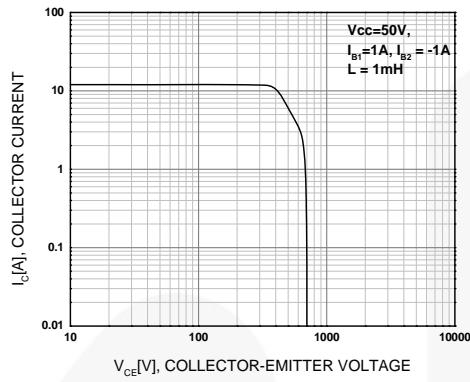
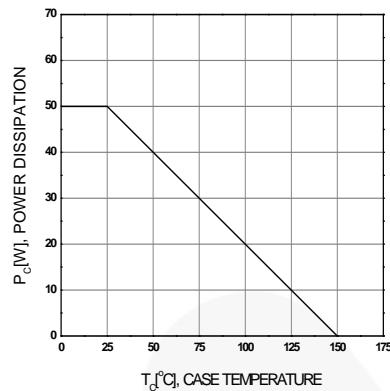


Figure 6. Forward Bias Safe Operating Area

**Typical Performance Characteristics** (continued)



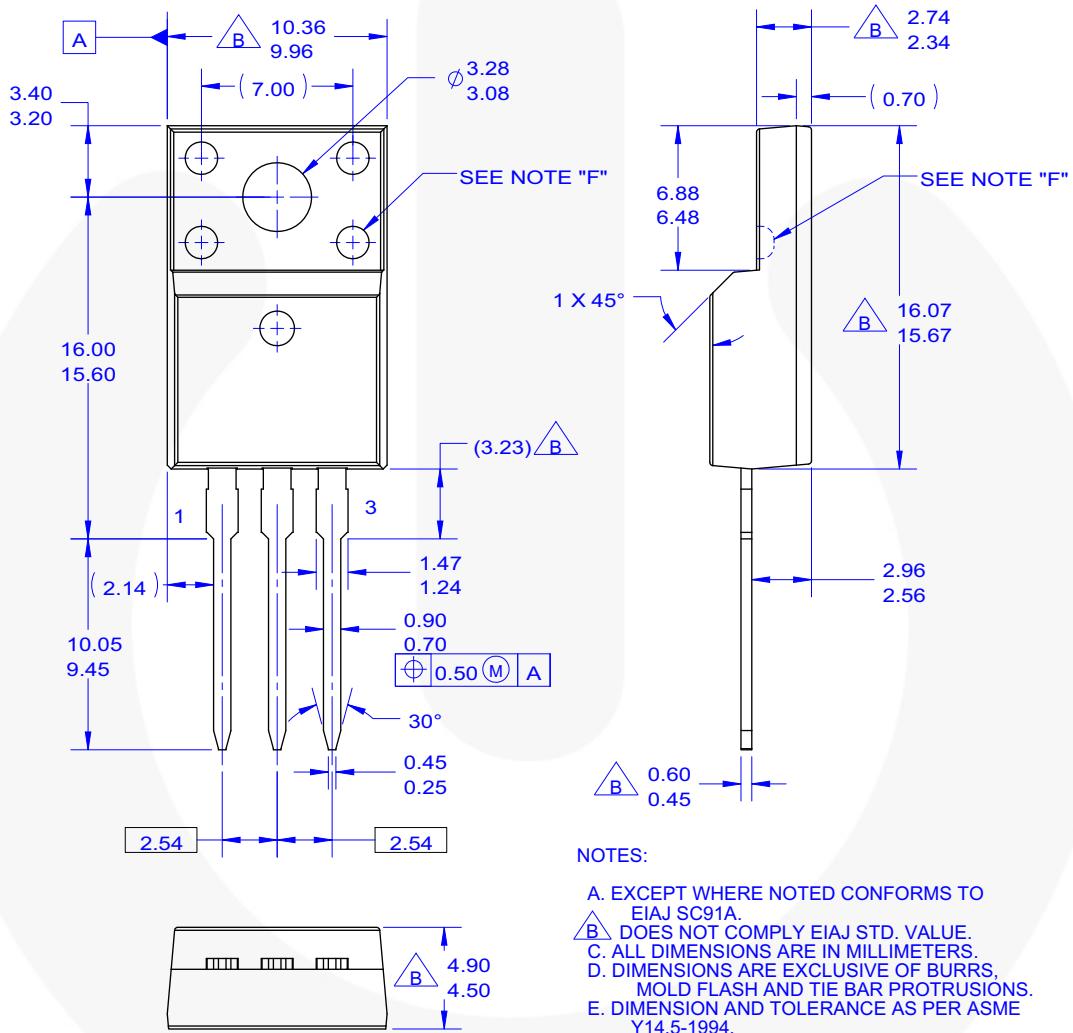
**Figure 7. Reverse Bias Safe Operating Area**



**Figure 8. Power Derating**

## Physical Dimensions

TO-220F 3L



**Figure 9. TO220, MOLDED, 3-LEAD, FULL PACK, EIAJ SC91, STRAIGHT LEAD (ACTIVE)**

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

*Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:*

<http://www.fairchildsemi.com/dwg/T0/T0220M03.pdf>

<http://www.fairchildsemi.com/dwg/101022010505.pdf>  
For current tape and reel specifications, visit Fairchild Semiconductor's online packaging area:

[http://www.fairchildsemi.com/packing\\_dwg/PKG-T0220M03\\_PSTS.pdf](http://www.fairchildsemi.com/packing_dwg/PKG-T0220M03_PSTS.pdf)



## TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

2Cool™  
AccuPower™  
AX-CAP®  
BitSiC™  
Build it Now™  
CorePLUS™  
CorePOWER™  
CROSSVOLT™  
CTL™  
Current Transfer Logic™  
DEUXPEED®  
Dual Cool™  
EcoSPARK®  
EfficientMax™  
ESBC™  
  
Fairchild®  
Fairchild Semiconductor®  
FACT Quiet Series™  
FACT®  
FAST®  
FastvCore™  
FETBench™

FPS™  
F-PFS™  
FRFET®  
Global Power Resource™  
GreenBridge™  
Green FPS™  
Green FPS™ e-Series™  
Gmax™  
GTO™  
IntelliMAX™  
ISOPLANAR™  
Making Small Speakers Sound Louder and Better™  
MegaBuck™  
MICROCOUPLER™  
MicroFET™  
MicroPak™  
MicroPak2™  
MillerDrive™  
MotionMax™  
mWSaver™  
OptoHiT™  
OPTOLOGIC®  
OPTOPLANAR®

PowerTrench®  
PowerXS™  
Programmable Active Droop™  
QFET®  
QST™  
Quiet Series™  
RapidConfigure™  
  
Saving our world, 1mW/W/kW at a time™  
SignalWise™  
SmartMax™  
SMART START™  
Solutions for Your Success™  
SPM®  
STEALTH™  
SuperFET®  
SuperSOT™-3  
SuperSOT™-6  
SuperSOT™-8  
SupreMOS®  
SyncFET™

Sync-Lock™  
  
TinyBoost™  
TinyBuck™  
TinyCalc™  
TinyLogic®  
TINYOPTO™  
TinyPower™  
TinyPWM™  
TinyWire™  
TransiC™  
TriFault Detect™  
TRUECURRENT®  
μSerDes™  
  
UHC®  
Ultra FRFET™  
UnifET™  
VCX™  
VisualMax™  
VoltagePlus™  
XS™

\* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, [www.fairchildsemi.com](http://www.fairchildsemi.com), under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I64