

# FJP13009

## High Voltage Fast-Switching NPN Power Transistor

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



### Absolute Maximum Ratings\* T<sub>C</sub> = 25°C unless otherwise noted (notes\_1)

Symbol	Parameter	Value	Units
V <sub>CBO</sub>	Collector-Base Voltage	700	V
V <sub>CEO</sub>	Collector-Emitter Voltage	400	V
V <sub>EBO</sub>	Emitter-Base Voltage	9	V
I <sub>C</sub>	Collector Current (DC)	12	A
I <sub>CP</sub>	Collector Current (Pulse)	24	A
I <sub>B</sub>	Base Current	6	A
P <sub>C</sub>	Collector Dissipation (T <sub>C</sub> = 25°C)	100	W
T <sub>J</sub>	Junction Temperature	150	°C
T <sub>STG</sub>	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.

### Package Marking and Ordering Information

Device Item (notes_2)	Device Marking	Package	Packing Method	Qty(pcs)
FJP13009	J13009	TO-220	Bulk	1,200
FJP13009H2TU	J130092	TO-220	TUBE	1,000
FJP13009TU	J13009	TO-220	TUBE	1,000

#### Notes\_2:

- 1) The Affix "-H2" means the hFE classification.
- 2) The Suffix "-TU" means the Tube packing method, which can be on fairchildsemi website at <http://www.fairchildsemi.com/packaging>.

**Electrical Characteristics**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max	Units
$V_{CE0(sus)}$	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	$V_{CE} = 5\text{V}, I_C = 5\text{A} (h_{FE1})$ $V_{CE} = 5\text{V}, I_C = 8\text{A}$	8 6		40 30	
$V_{CE(sat)}$	* Collector-Emitter Saturation Voltage	$I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$ $I_C = 12\text{A}, I_B = 3\text{A}$			1 1.5 3	V V V
$V_{BE(sat)}$	* Base-Emitter Saturation Voltage	$I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$			1.2 1.6	V V
$C_{ob}$	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	$V_{CC} = 125\text{V}, I_C = 8\text{A}$			1.1	$\mu\text{s}$
$t_{STG}$	Storage Time	$I_{B1} = -I_{B2} = 1.6\text{A}, R_L = 15.6\Omega$			3	$\mu\text{s}$
$t_F$	Fall Time				0.7	$\mu\text{s}$

\* Pulse Test:  $PW \leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

**$h_{FE}$  Classification**

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

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

# Typical Performance Characteristics

**勝特力材料 886-3-5753170**  
**勝特力电子(上海) 86-21-34970699**  
**勝特力电子(深圳) 86-755-83298787**  
[Http://www.100y.com.tw](http://www.100y.com.tw)

FJP13009 High Voltage Fast-Switching NPN Power Transistor

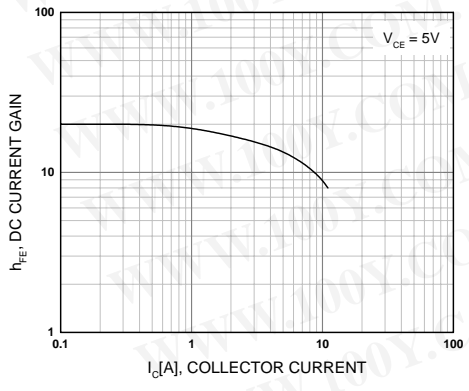


Figure 1. DC current Gain

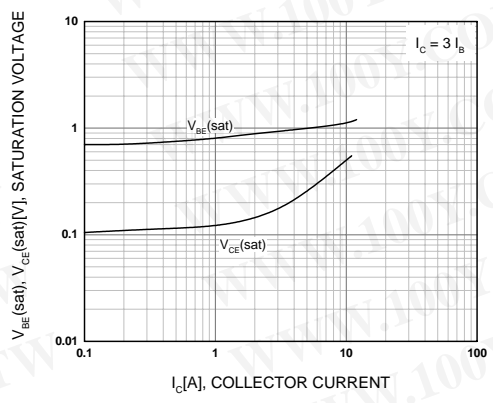


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

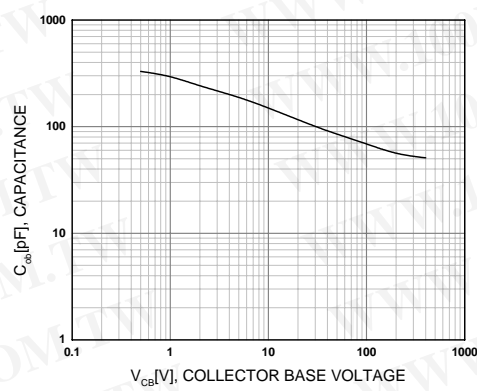


Figure 3. Collector Output Capacitance

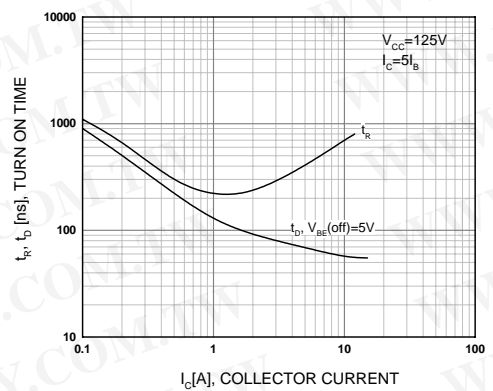


Figure 4. Turn On Time

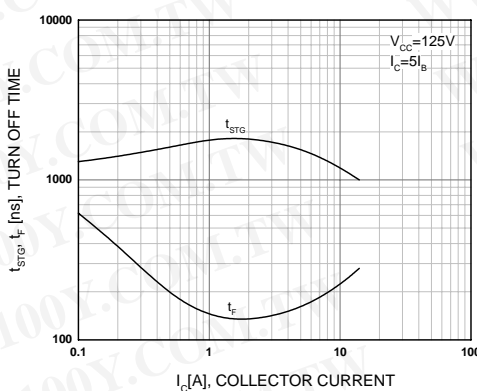


Figure 5. Turn Off Time

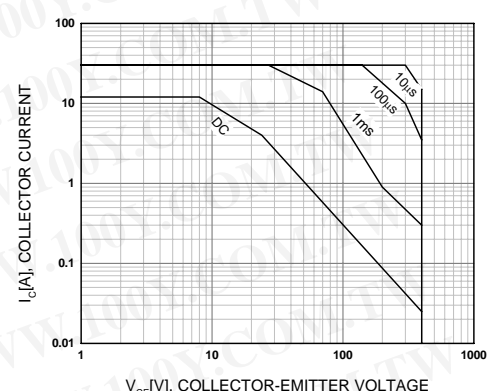
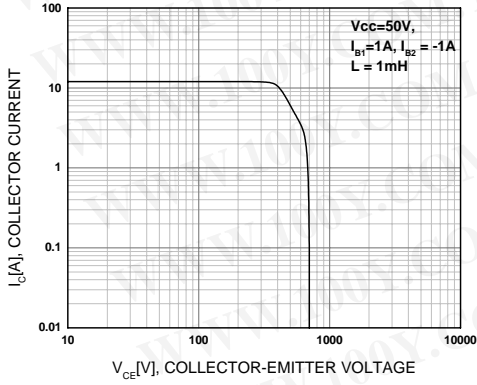
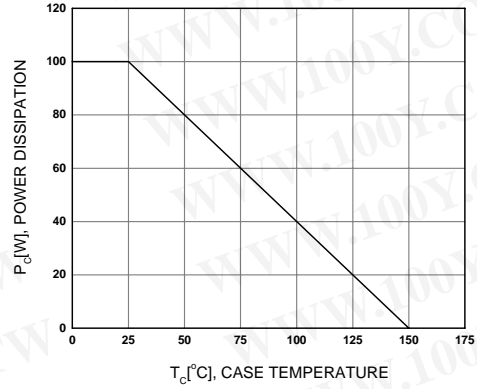


Figure 6. Forward Bias Safe Operating Area

**Typical Performance Characteristics** (Continued)



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

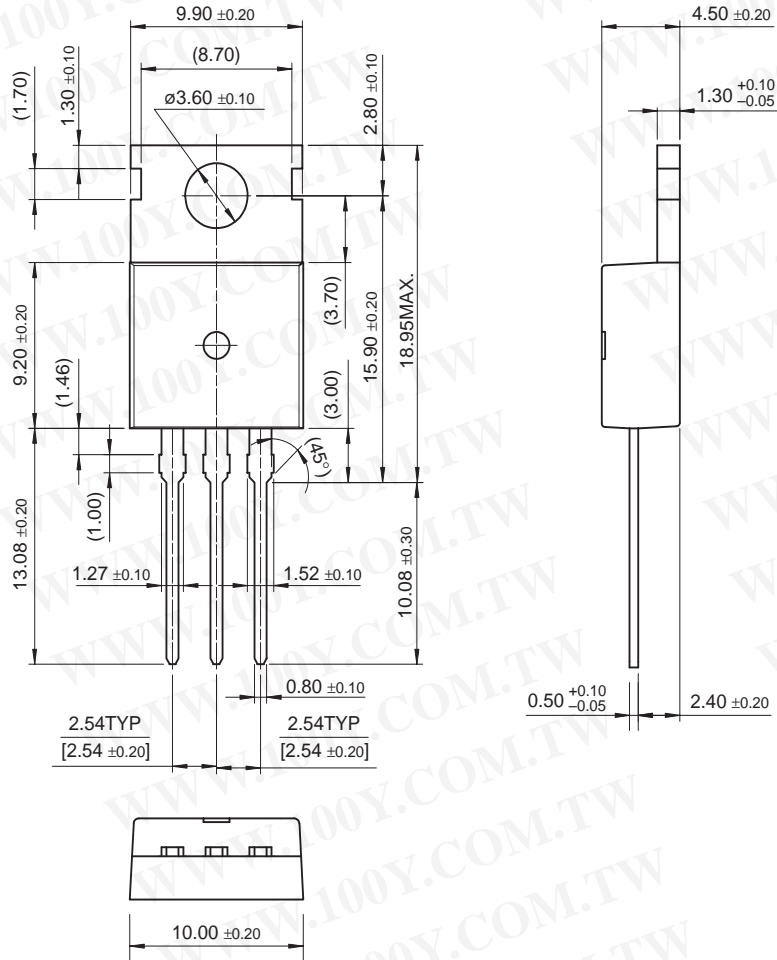


**Figure 8. Power Derating**

**勝特力材料 886-3-5753170**  
**勝特力电子(上海) 86-21-34970699**  
**勝特力电子(深圳) 86-755-83298787**  
[Http://www.100y.com.tw](http://www.100y.com.tw)

Mechanical Dimensions

TO-220



勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

Dimensions in Millimeters



## TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE <sup>®</sup>	HiSeC <sup>™</sup>	Programmable Active Droop <sup>™</sup>	TinyLogic <sup>®</sup>
Across the board. Around the world.™	<i>i-Lo</i> <sup>™</sup>	QFET <sup>®</sup>	TINYOPTO <sup>™</sup>
ActiveArray <sup>™</sup>	ImpliedDisconnect <sup>™</sup>	QS <sup>™</sup>	TinyPower <sup>™</sup>
Bottomless <sup>™</sup>	IntelliMAX <sup>™</sup>	QT Optoelectronics <sup>™</sup>	TinyWire <sup>™</sup>
Build it Now <sup>™</sup>	ISOPLANAR <sup>™</sup>	Quiet Series <sup>™</sup>	TruTranslation <sup>™</sup>
CoolFET <sup>™</sup>	MICROCOUPLER <sup>™</sup>	RapidConfigure <sup>™</sup>	μSerDes <sup>™</sup>
CROSSVOLT <sup>™</sup>	MicroPak <sup>™</sup>	RapidConnect <sup>™</sup>	UHC <sup>®</sup>
CTL <sup>™</sup>	MICROWIRE <sup>™</sup>	ScalarPump <sup>™</sup>	UniFET <sup>™</sup>
Current Transfer Logic <sup>™</sup>	MSX <sup>™</sup>	SMART START <sup>™</sup>	VCX <sup>™</sup>
DOME <sup>™</sup>	MSXPro <sup>™</sup>	SPM <sup>®</sup>	Wire <sup>™</sup>
E <sup>2</sup> CMOS <sup>™</sup>	OCX <sup>™</sup>	STEALTH <sup>™</sup>	
EcoSPARK <sup>®</sup>	OCXPro <sup>™</sup>	SuperFET <sup>™</sup>	
EnSigna <sup>™</sup>	OPTOLOGIC <sup>®</sup>	SuperSOT <sup>™</sup> -3	
FACT Quiet Series <sup>™</sup>	OPTOPLANAR <sup>®</sup>	SuperSOT <sup>™</sup> -6	
FACT <sup>®</sup>	PACMAN <sup>™</sup>	SuperSOT <sup>™</sup> -8	
FAST <sup>®</sup>	POP <sup>™</sup>	SyncFET <sup>™</sup>	
FASTr <sup>™</sup>	Power220 <sup>®</sup>	TCM <sup>™</sup>	
FPS <sup>™</sup>	Power247 <sup>®</sup>	The Power Franchise <sup>®</sup>	
FRFET <sup>®</sup>	PowerEdge <sup>™</sup>		
GlobalOptoisolator <sup>™</sup>	PowerSaver <sup>™</sup>	TinyBoost <sup>™</sup>	
GTO <sup>™</sup>	PowerTrench <sup>®</sup>	TinyBuck <sup>™</sup>	

## 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.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This 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	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild Semiconductor. The datasheet is printed for reference information only.

Rev. I24