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December 2009

# FJN3303F High Voltage Fast-Switching NPN Power Transistor

#### **Features**

- · High Voltage Capability
- · High Switching Speed
- · Suitable for Electronic Ballast and Charger
- Green packaging



## **Absolute Maximum Ratings** $T_A = 25$ °C unless otherwise noted

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)	1.5	A	
I <sub>CP</sub>	Collector Current (Pulse) *	3	А	
I <sub>B</sub>	Base Current (DC)	0.75	Α	
I <sub>BP</sub>	Base Current (Pulse) *	1.5	A	
T <sub>J</sub>	Junction Temperature	150	°C	
T <sub>STG</sub>	Storage Temperature range	-65 to +150	°C	

<sup>\*</sup> Pulse Test: Pulse Width = 5ms, Duty Cycle ≤ 10%

### **Thermal Characteristics** $T_A = 25$ °C unless otherwise noted

Symbol	Parameter		Value	Units	
P <sub>D</sub>	Total Device Dissipation	$T_C = 25^{\circ}C$ $T_A = 25^{\circ}C$	1.1 650	W mW	
$R_{\theta JC}$	Thermal Resistance Junction-Case		48	°C/W	
$R_{\theta JA}$	Thermal Resistance Junction-Ar	nbient	190	°C/W	

### **Ordering Information**

Part Number	Marking Info.	Package	Packing Method	Remarks
FJN3303FBU	J3303F	TO-92 (Straight)	BULK	Green EMC
FJN3303FTA	J3303F	TO-92 (Form)	AMMO	Green EMC

# **Electrical Characteristics** $T_A = 25$ °C unless otherwise noted

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Units
BV <sub>CBO</sub>	Collector-Base Breakdown Voltage	$I_C = 500 \mu A, I_E = 0$	700			V
BV <sub>CEO</sub>	Collector-Emitter Breakdown Voltage	$I_C = 5mA, I_B = 0$	400			V
BV <sub>EBO</sub>	Emitter-Base Breakdown Voltage	$I_E = 500 \mu A, I_C = 0$	9			V
I <sub>CBO</sub>	Collector Cut-off Current	V <sub>CB</sub> = 700V, I <sub>E</sub> = 0			10	μΑ
I <sub>EBO</sub>	Emitter Cut-off Current	$V_{EB} = 9V, I_{C} = 0$			10	μΑ
h <sub>FE1</sub>	DC Current Gain	$V_{CE} = 2V, I_{C} = 0.5A$ $V_{CE} = 2V, I_{C} = 1.0A$	14 5		23	
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	$I_C = 0.5A, I_B = 0.1A$ $I_C = 1.0A, I_B = 0.25A$ $I_C = 1.5A, I_B = 0.5A$			0.5 1.0 3.0	V V V
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage	$I_C = 0.5A, I_B = 0.1A$ $I_C = 1.0A, I_B = 0.25A$			1.0 1.2	V V
f <sub>T</sub>	Current Gain Bandwidth Product	$V_{CE} = 10V, I_{C} = 0.1A$	4			MHz
t <sub>ON</sub>	Turn On Time	V <sub>CC</sub> = 125V, I <sub>C</sub> = 1A			1.1	μS
t <sub>STG</sub>	Storage Time	$I_{B1} = -I_{B2} = -0.2A$			4.0	μS
t <sub>F</sub>	Fall Time	$R_L = 125\Omega$			0.7	μS

# **Typical Performance Characteristics**

Figure 1. Static Characteristic

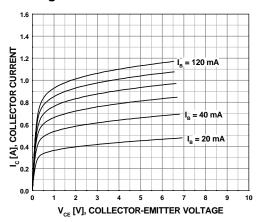


Figure 2. DC Current Gain

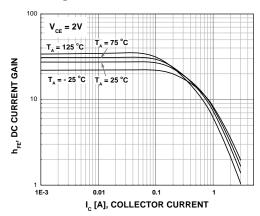


Figure 3. Collector-Emitter Saturation Voltage

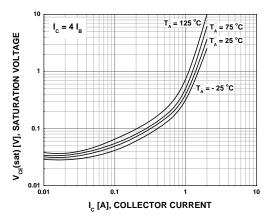


Figure 4. Base-Emitter Saturation Voltage

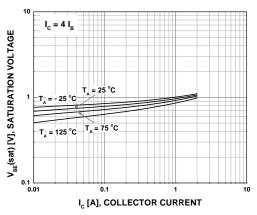


Figure 5. Resistive Load Switching Time

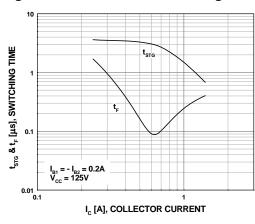
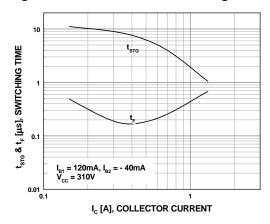


Figure 6. Resistive Load Switching Time



## **Typical Performance Characteristics** (Continued)

Figure 7. Forward Biased Safe Operating Area

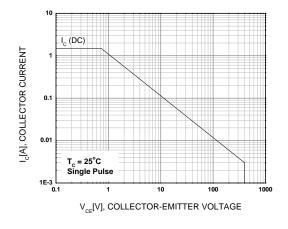
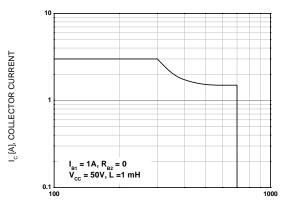
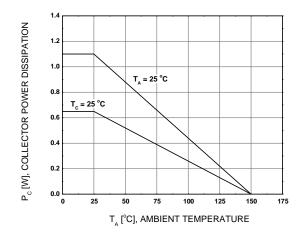


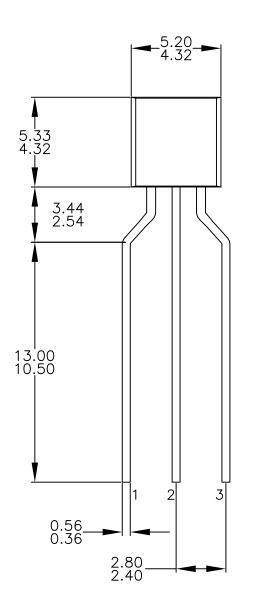
Figure 8. Reverse Biased Safe Operating Area

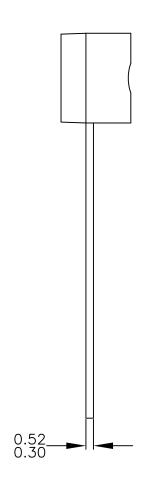


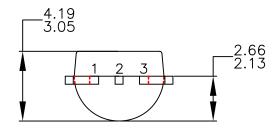
 $V_{\rm CE}$  [V], COLLECTOR-EMITTER VOLTAGE

Figure 9. Power Derating



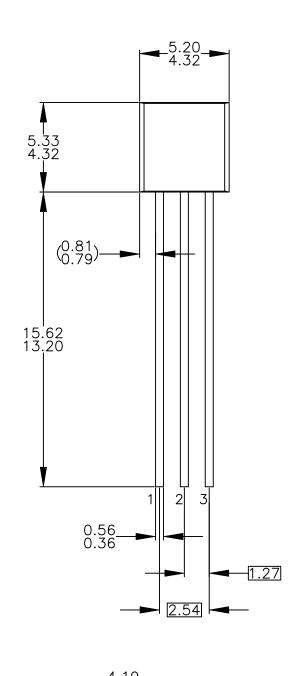


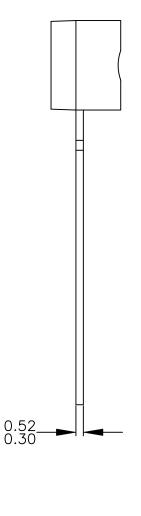




#### NOTES: UNLESS OTHERWISE SPECIFIED

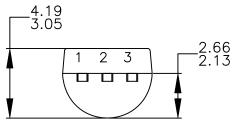
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  ALL DIMENSIONS ARE IN MILLIMETERS.
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  DRAWING FILENAME: MKT-ZAO3FREV3.
  FAIRCHILD SEMICONDUCTOR.
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