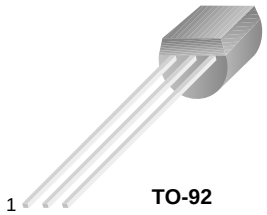
December 2009

# FJN3303F
## High Voltage Fast-Switching NPN Power Transistor

### Features

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




**TO-92**

1. Emitter 2. Collector 3.Base

### Absolute Maximum Ratings $T_A$ = 25°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) | 1.5 | A |
| $I_{CP}$ | Collector Current (Pulse) * | 3 | A |
| $I_B$ | Base Current (DC) | 0.75 | A |
| $I_{BP}$ | Base Current (Pulse) * | 1.5 | A |
| $T_J$ | Junction Temperature | 150 | °C |
| $T_{STG}$ | Storage Temperature range | -65 to +150 | °C |

* Pulse Test: Pulse Width = 5ms, Duty Cycle ≤ 10%

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

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $P_D$ | Total Device Dissipation | $T_C$ = 25°C<br>$T_A$ = 25°C | 1.1<br>650 | W<br>mW |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case | | 48 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | | 190 | °C/W |

### Ordering Information

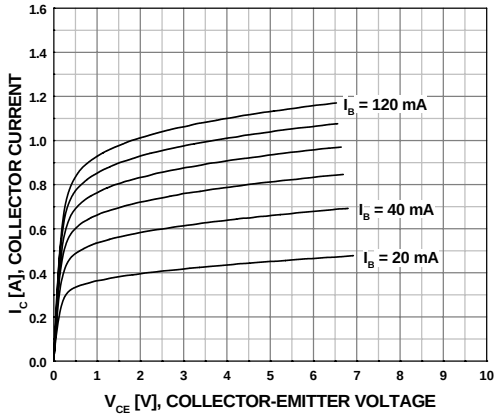
| Part Number | Marking Info. | Package | Packing Method | Remarks |
|---|---|---|---|---|
| FJN3303FBU | J3303F | TO-92 (Straight) | BULK | Green EMC |
| FJN3303FTA | J3303F | TO-92 (Form) | AMMO | Green EMC |

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

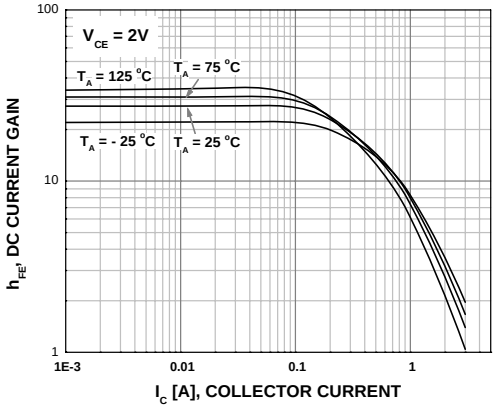
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $BV_{CBO}$ | Collector-Base Breakdown Voltage | $I_C$ = 500μA, $I_E$ = 0 | 700 | | | V |
| $BV_{CEO}$ | Collector-Emitter Breakdown Voltage | $I_C$ = 5mA, $I_B$ = 0 | 400 | | | V |
| $BV_{EBO}$ | Emitter-Base Breakdown Voltage | $I_E$ = 500μA, $I_C$ = 0 | 9 | | | V |
| $I_{CBO}$ | Collector Cut-off Current | $V_{CB}$ = 700V, $I_E$ = 0 | | | 10 | μA |
| $I_{EBO}$ | Emitter Cut-off Current | $V_{EB}$ = 9V, $I_C$ = 0 | | | 10 | μA |
| $h_{FE1}$<br>$h_{FE2}$ | DC Current Gain | $V_{CE}$ = 2V, $I_C$ = 0.5A<br>$V_{CE}$ = 2V, $I_C$ = 1.0A | 14<br>5 | | 23 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C$ = 0.5A, $I_B$ = 0.1A<br>$I_C$ = 1.0A, $I_B$ = 0.25A<br>$I_C$ = 1.5A, $I_B$ = 0.5A | | | 0.5<br>1.0<br>3.0 | V<br>V<br>V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C$ = 0.5A, $I_B$ = 0.1A<br>$I_C$ = 1.0A, $I_B$ = 0.25A | | | 1.0<br>1.2 | V<br>V |
| $f_T$ | Current Gain Bandwidth Product | $V_{CE}$ = 10V, $I_C$ = 0.1A | 4 | | | MHz |
| $t_{ON}$ | Turn On Time | $V_{CC}$ = 125V, $I_C$ = 1A<br>$I_{B1}$ = - $I_{B2}$ = -0.2A<br>$R_L$ = 125Ω | | | 1.1 | μs |
| $t_{STG}$ | Storage Time | | | | 4.0 | μs |
| $t_F$ | Fall Time | | | | 0.7 | μs |

## Typical Performance Characteristics

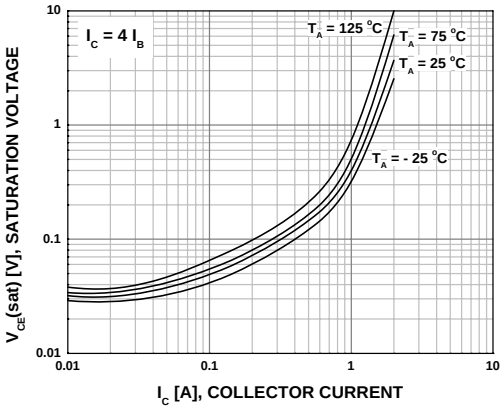
### Figure 1. Static Characteristic



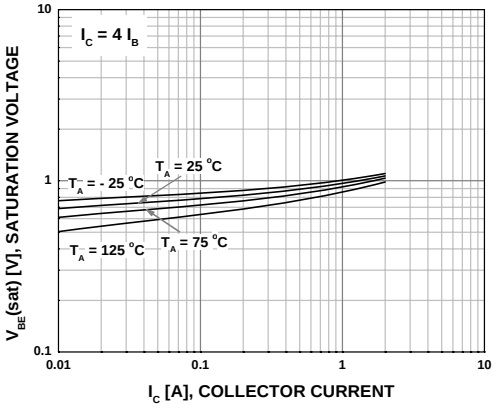

### Figure 2. DC Current Gain



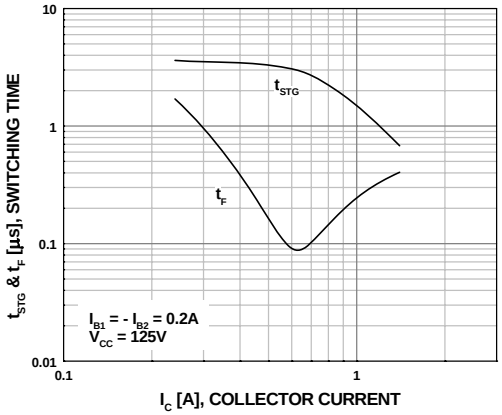

### Figure 3. Collector-Emitter Saturation Voltage



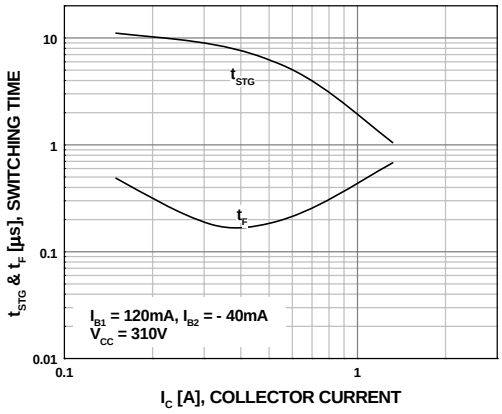

### Figure 4. Base-Emitter Saturation Voltage




### Figure 5. Resistive Load Switching Time




### Figure 6. Resistive Load Switching Time



## Typical Performance Characteristics (Continued)

**Figure 7. Forward Biased Safe Operating Area**

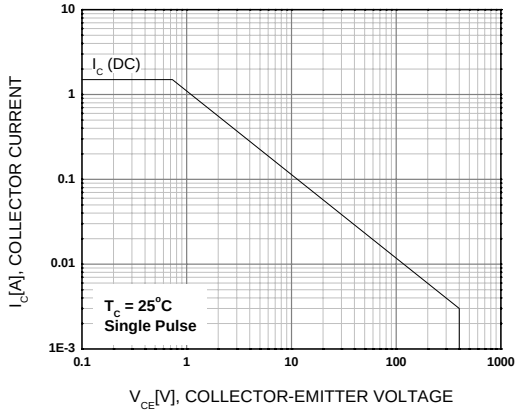



**Figure 8. Reverse Biased Safe Operating Area**

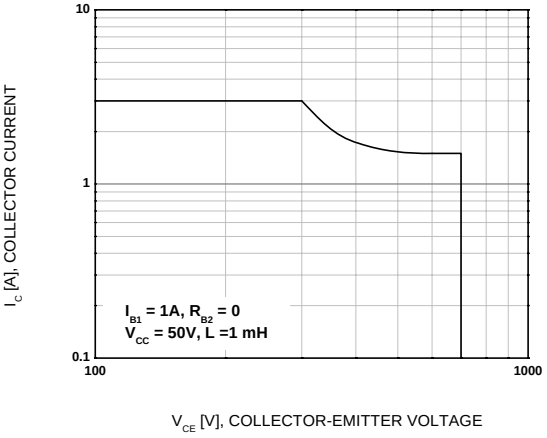
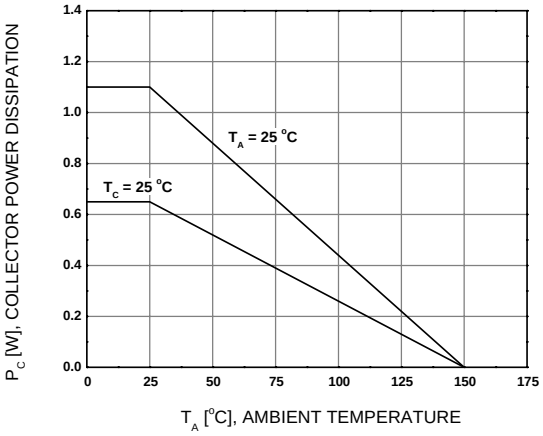
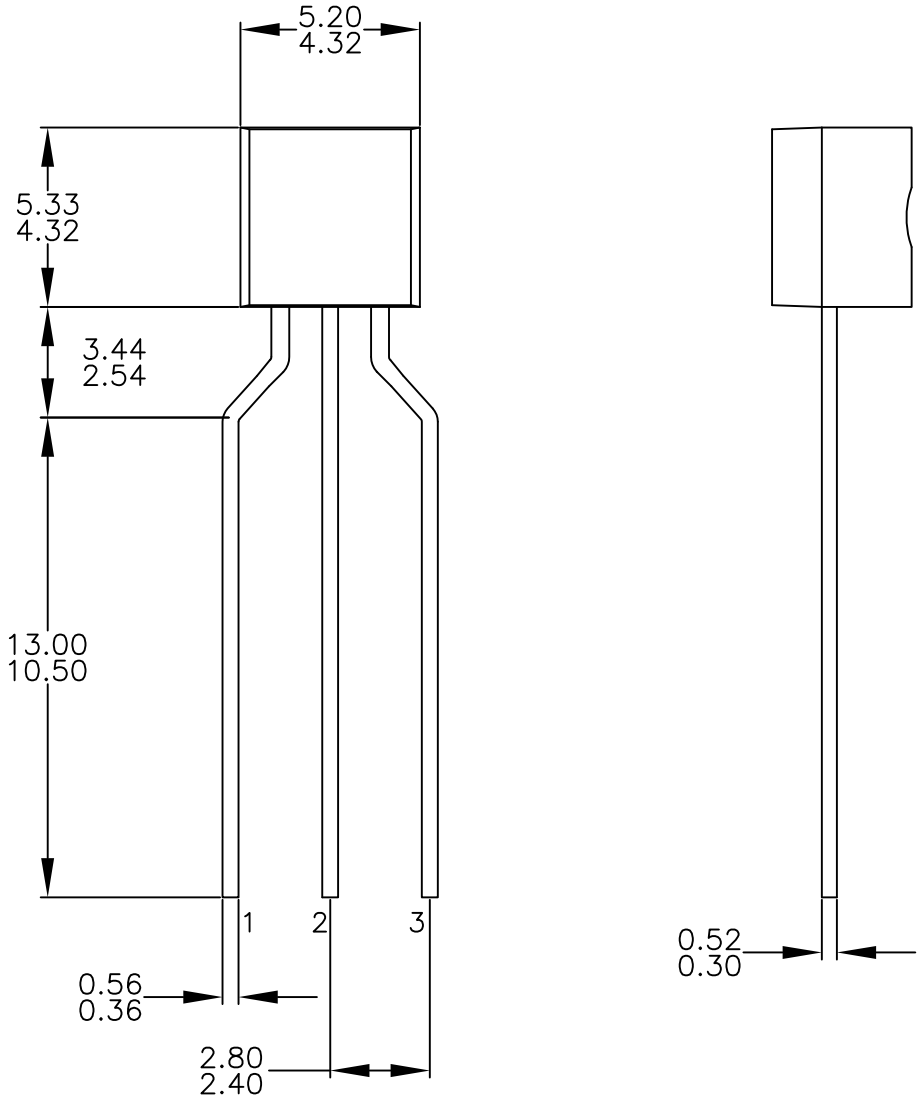
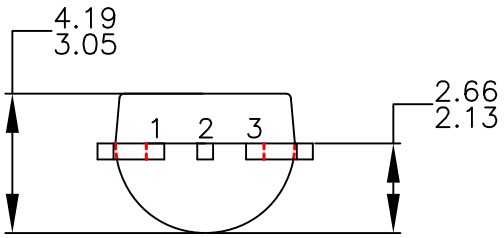



**Figure 9. Power Derating**



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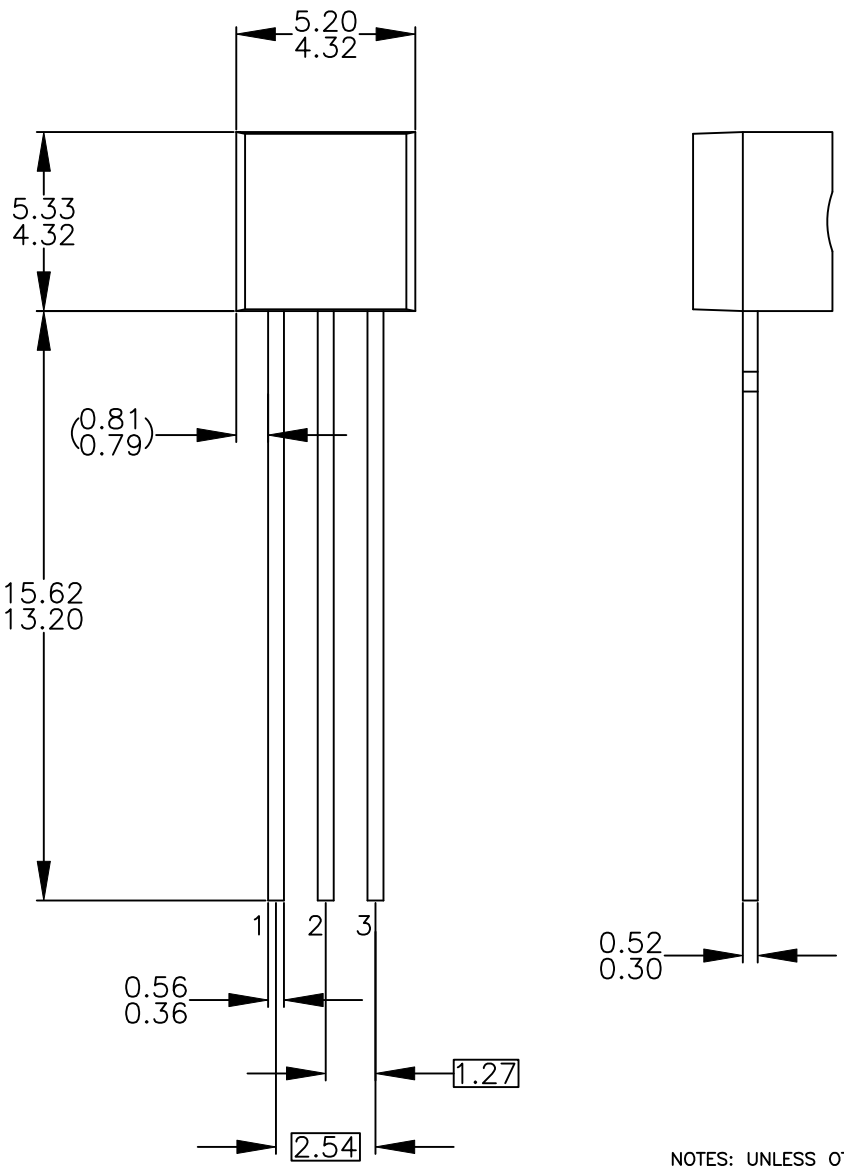


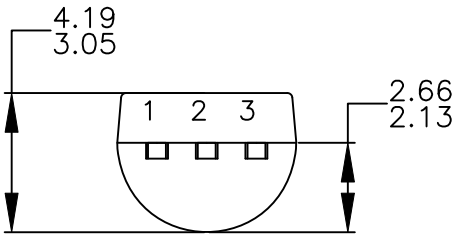


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