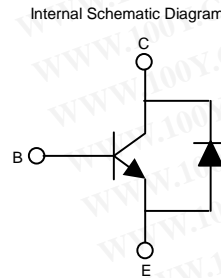
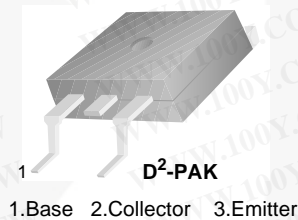


## FJB3307D

# High-Voltage Fast-Switching NPN Power Transistor

### Features

- Built-in Diode between Collector and Emitter
- Suitable for Electronic Ballast and Switch-Mode Power Supplies



### Ordering Information

| Part Number | Marking | Package             | Packing Method |
|-------------|---------|---------------------|----------------|
| FJB3307DTM  | J3307D  | D <sup>2</sup> -PAK | Tape and Reel  |

### Absolute Maximum Ratings

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  $T_A = 25^\circ\text{C}$  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)    | 8          | A                |
| $I_{CP}^{(1)}$ | Collector Current (Pulse) | 16         | A                |
| $I_B$          | Base Current (DC)         | 4          | A                |
| $I_{BP}^{(1)}$ | Base Current (Pulse)      | 8          | A                |
| $T_J$          | Junction Temperature      | 150        | $^\circ\text{C}$ |
| $T_{STG}$      | Storage Temperature       | -55 to 150 | $^\circ\text{C}$ |

#### Note:

1. Pulse test: pulse width = 300 $\mu\text{s}$ , duty cycle = 2% pulsed.

### Thermal Characteristics

| Symbol           | Parameter                               | Value                 | Units |   |
|------------------|---|-----------------------|-------|---|
| P <sub>D</sub>   | Total Device Dissipation                | T <sub>A</sub> = 25°C | 1.72  | W |
|                  |   | T <sub>C</sub> = 25°C | 80    | W |
| R <sub>θja</sub> | Thermal Resistance, Junction to Ambient | 72.5                  | °C/W  |   |
| R <sub>θjc</sub> | Thermal Resistance, Junction to Case    | 1.56                  | °C/W  |   |

### Electrical Characteristics<sup>(2)</sup>

Values are at T<sub>A</sub> = 25°C unless otherwise noted.

| Symbol               | Parameter                            | Conditions  | Min. | Typ. | Max. | Units |
|----------------------|--------------------------------------|---|------|------|------|-------|
| BV <sub>CB0</sub>    | Collector-Base Breakdown Voltage     | I <sub>C</sub> = 500 μA, I <sub>E</sub> = 0   | 700  |      |      | V     |
| BV <sub>CEO</sub>    | Collector-Emitter Breakdown Voltage  | I <sub>C</sub> = 5 mA, I <sub>B</sub> = 0   | 400  |      |      | V     |
| BV <sub>EBO</sub>    | Emitter-Base Breakdown Voltage       | I <sub>E</sub> = 500 μA, I <sub>C</sub> = 0   | 9    |      |      | V     |
| I <sub>EBO</sub>     | Emitter Cut-Off Current              | V <sub>EB</sub> = 9 V, I <sub>C</sub> = 0   |      |      | 1    | mA    |
| h <sub>FE1</sub>     | DC Current Gain                      | V <sub>CE</sub> = 5 V, I <sub>C</sub> = 2 A   | 8    |      | 40   |       |
| h <sub>FE2</sub>     |                                      | V <sub>CE</sub> = 5 V, I <sub>C</sub> = 5 A   | 5    |      | 30   |       |
| V <sub>CE(sat)</sub> | Collector-Emitter Saturation Voltage | I <sub>C</sub> = 2 A, I <sub>B</sub> = 0.4 A  |      |      | 1    | V     |
|                      |                                      | I <sub>C</sub> = 5 A, I <sub>B</sub> = 1 A  |      |      | 2    | V     |
|                      |                                      | I <sub>C</sub> = 5 A, I <sub>B</sub> = 1 A, T <sub>A</sub> = 100°C  |      |      | 3    | V     |
|                      |                                      | I <sub>C</sub> = 8 A, I <sub>B</sub> = 2 A  |      |      | 3    | V     |
| V <sub>BE(sat)</sub> | Base-Emitter Saturation Voltage      | I <sub>C</sub> = 2 A, I <sub>B</sub> = 0.4 A  |      |      | 1.2  | V     |
|                      |                                      | I <sub>C</sub> = 5 A, I <sub>B</sub> = 1 A  |      |      | 1.6  | V     |
|                      |                                      | I <sub>C</sub> = 5 A, I <sub>B</sub> = 1 A, T <sub>A</sub> = 100°C  |      |      | 2.0  | V     |
| V <sub>F</sub>       | Diode Forward Voltage                | I <sub>C</sub> = 3 A  |      |      | 2.5  | V     |
| C <sub>ob</sub>      | Output Capacitance                   | V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz   |      | 60   |      | pF    |
| t <sub>STG</sub>     | Storage Time                         | V <sub>CC</sub> = 125 V, I <sub>C</sub> = 5 A,  |      |      | 3.0  | μs    |
| t <sub>F</sub>       | Fall Time                            | I <sub>B1</sub> = -I <sub>B2</sub> = 1 A, R <sub>L</sub> = 50 Ω   |      |      | 0.7  | μs    |
| t <sub>STG</sub>     | Storage Time                         | V <sub>CC</sub> = 30 V, I <sub>C</sub> = 5 A, L = 200 μH  |      |      | 2.3  | μs    |
| t <sub>F</sub>       | Fall Time                            | I <sub>B1</sub> = 1 A, R <sub>BB</sub> = 0 Ω,<br>V <sub>BE(OFF)</sub> = -5 V,<br>V <sub>CLAMP</sub> = 250 V |      |      | 150  | ns    |

**Note:**

2. Pulse test: pw = 300 μs, duty cycle = 2%.

### h<sub>FE</sub> Classification

| Classification   | H1      | H2      |
|------------------|---------|---------|
| h <sub>FE1</sub> | 15 ~ 28 | 26 ~ 39 |

## Typical Performance Characteristics

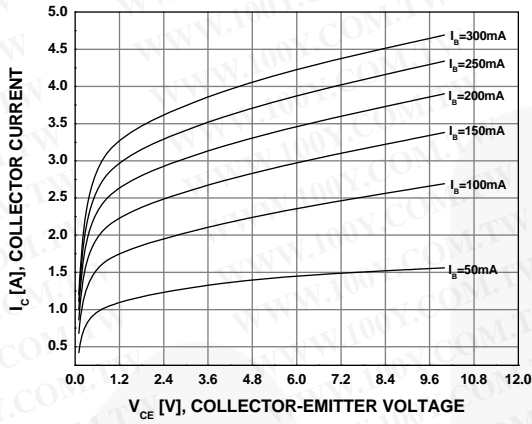


Figure 1. Static Characteristic

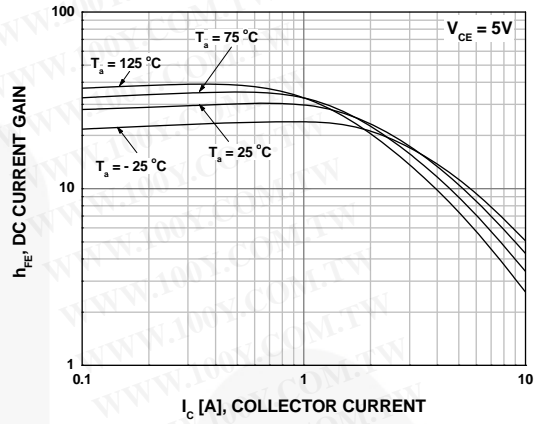


Figure 2. DC Current Gain

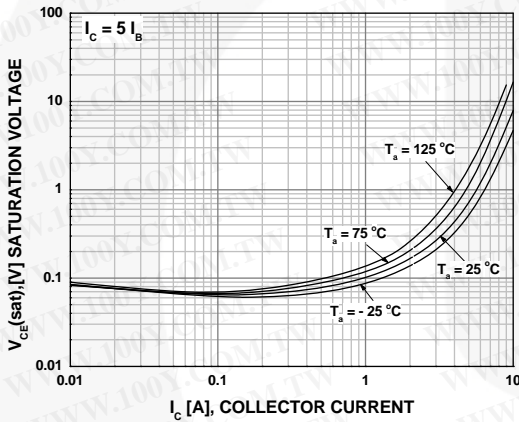


Figure 3. Collector-Emitter Saturation Voltage

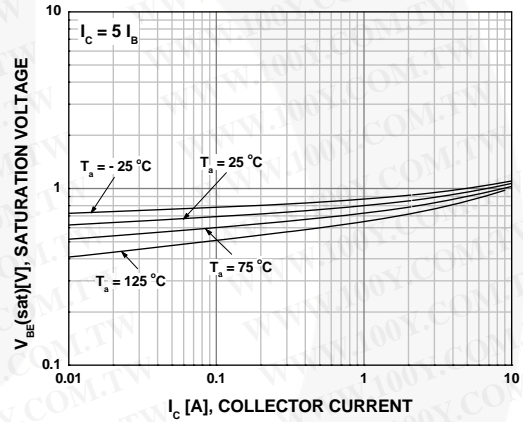


Figure 4. Base-Emitter Saturation Voltage

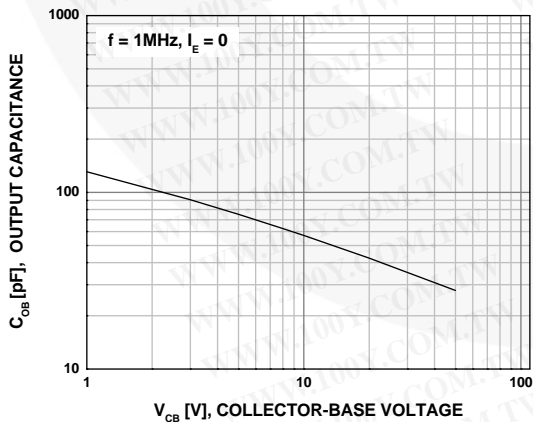


Figure 5. Collector Output Capacitance

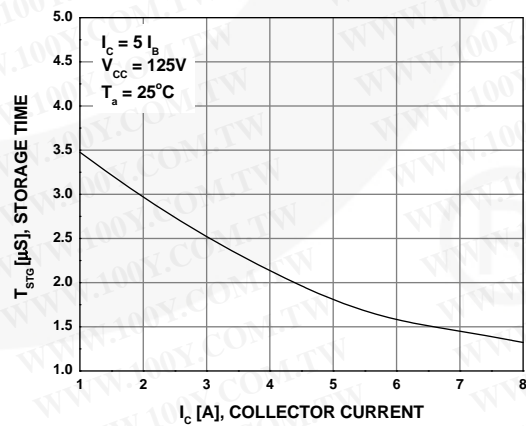


Figure 6. Storage Time (Resistive Load)

Typical Performance Characteristics (Continued)

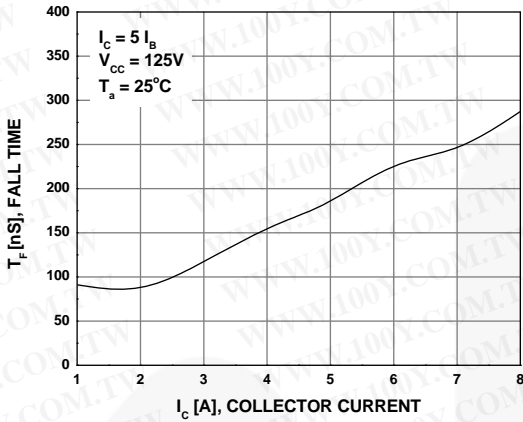


Figure 7. Fall Time (Resistive Load)

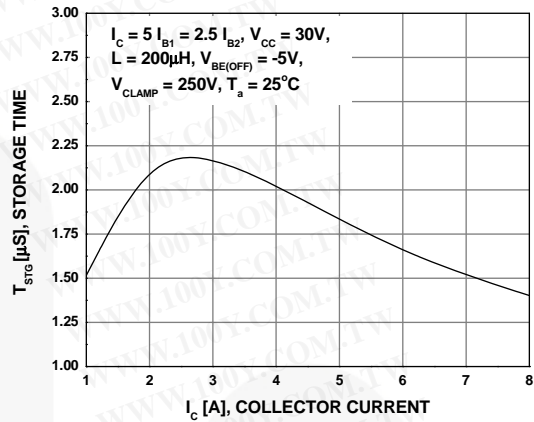


Figure 8. Storage Time (Inductive Load)

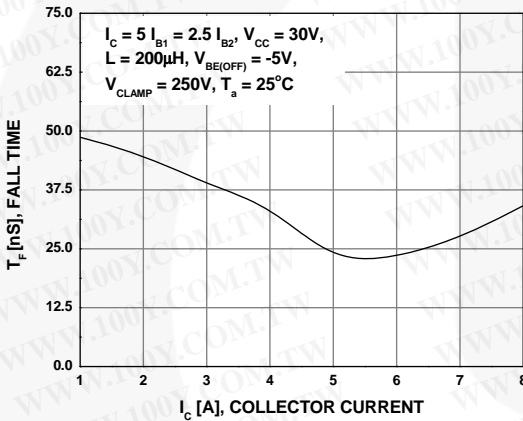


Figure 9. Fall Time (Inductive Load)

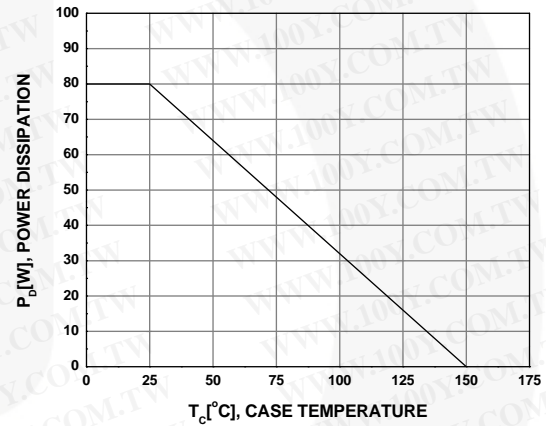


Figure 10. Power Derating

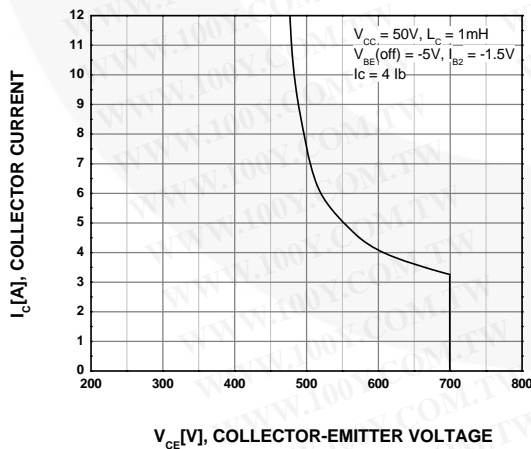


Figure 11. Reverse Bias Safe Operating Area

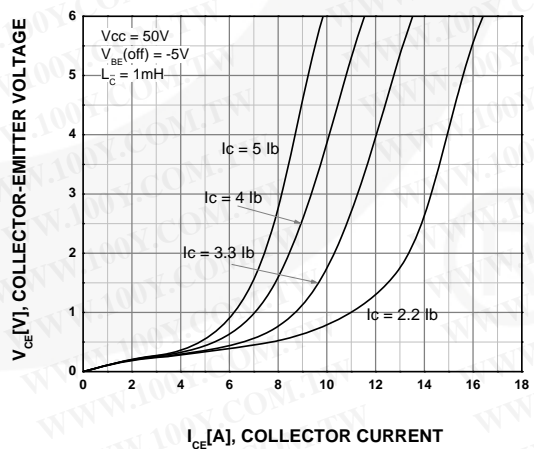


Figure 12. RBSOA Saturation

Typical Performance Characteristics (Continued)

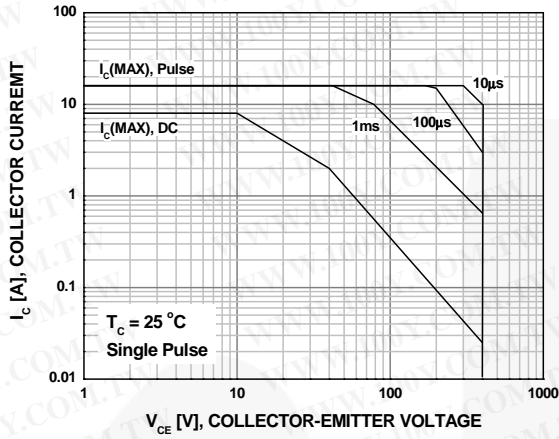
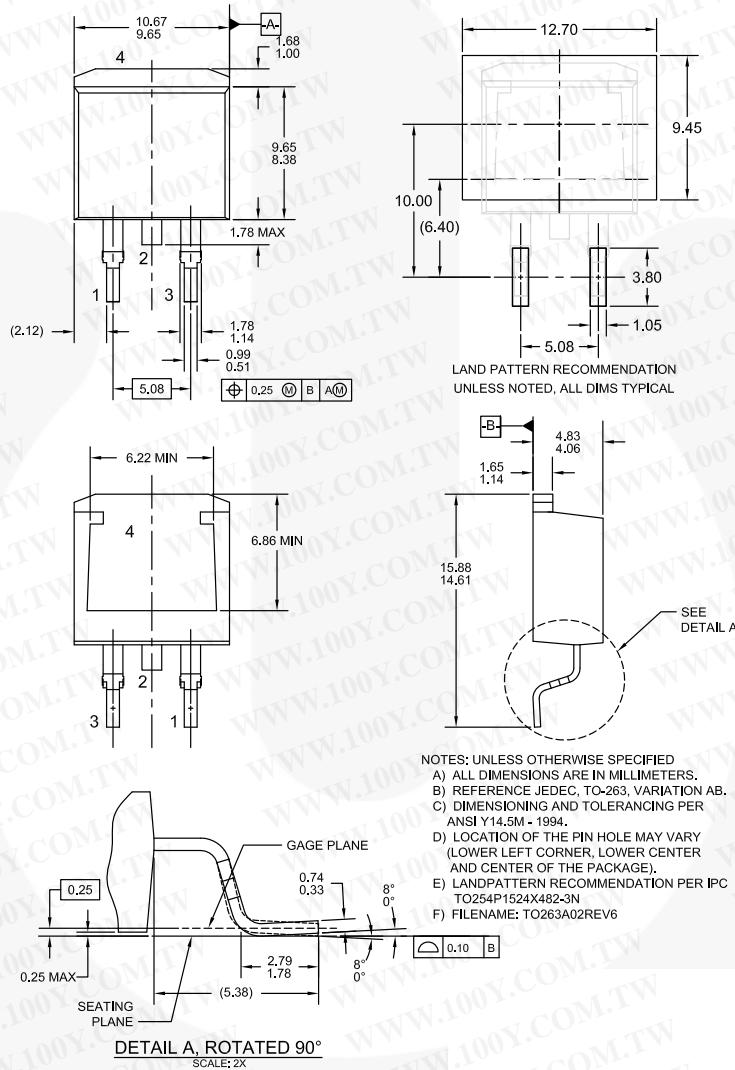


Figure 13. Forward Biased Safe Operating Area

## Physical Dimensions

### D<sup>2</sup>-PAK



**Figure 14. 2-LEAD, JEDEC TO263, VARIATION AB, SURFACE MOUNT (Active)**

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| FETBench™  | OPTOLOGIC®  | XS™   |
|  | OPTOPLANAR®   |   |
|  |  PowerTrench®                          |   |
|  | PowerXS™  |   |
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