FJP13007
High Voltage Fast-Switching NPN Power Transistor

High Voltage High Speed Power Switch Application
• High Voltage Capability
• High Switching Speed
• Suitable for Electronic Ballast and Switching Mode Power Supply

Absolute Maximum Ratings \( T_C = 25^\circ C \) unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{CEO} )</td>
<td>Collector-Emitter Voltage</td>
<td>400</td>
<td>V</td>
</tr>
<tr>
<td>( V_{EBO} )</td>
<td>Emitter-Base Voltage</td>
<td>9</td>
<td>V</td>
</tr>
<tr>
<td>( I_C )</td>
<td>Collector Current (DC)</td>
<td>8</td>
<td>A</td>
</tr>
<tr>
<td>( I_{CP} )</td>
<td>Collector Current (Pulse)</td>
<td>16</td>
<td>A</td>
</tr>
<tr>
<td>( I_B )</td>
<td>Base Current</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>( P_C )</td>
<td>Collector Dissipation ( T_C = 25^\circ C )</td>
<td>80</td>
<td>W</td>
</tr>
<tr>
<td>( T_J )</td>
<td>Junction Temperature</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>( T_{STG} )</td>
<td>Storage Temperature</td>
<td>-65 – 150</td>
<td>°C</td>
</tr>
</tbody>
</table>

## Electrical Characteristics

$T_C = 25^\circ C$ unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV_{CEO}</td>
<td>Collector-Emitter Breakdown Voltage</td>
<td>$I_C = 10mA, I_B = 0$</td>
<td>400</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>$I_{EBO}$</td>
<td>Emitter Cut-off Current</td>
<td>$V_{EB} = 9V, I_C = 0$</td>
<td></td>
<td>1</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>$h_{FE1}$</td>
<td>DC Current Gain *</td>
<td>$V_{CE} = 5V, I_C = 2A$</td>
<td>8</td>
<td>60</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>$h_{FE2}$</td>
<td></td>
<td>$V_{CE} = 5V, I_C = 5A$</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$V_{CES(sat)}$</td>
<td>Collector-Emitter Saturation Voltage</td>
<td>$I_C = 2A, I_B = 0.4A$</td>
<td>1.0</td>
<td></td>
<td>3.0</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 5A, I_B = 1A$</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 8A, I_B = 2A$</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$V_{BE(sat)}$</td>
<td>Base-Emitter Saturation Voltage</td>
<td>$I_C = 2A, I_B = 0.4A$</td>
<td>1.2</td>
<td></td>
<td>1.6</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_C = 5A, I_B = 1A$</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>$f_T$</td>
<td>Current Gain Bandwidth Product</td>
<td>$V_{CE} = 10V, I_C = 0.5A$</td>
<td>4</td>
<td></td>
<td></td>
<td>MHz</td>
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<tr>
<td>$C_{ob}$</td>
<td>Output Capacitance</td>
<td>$V_{CB} = 10V, f = 0.1MHz$</td>
<td>110</td>
<td></td>
<td></td>
<td>pF</td>
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<tr>
<td>$t_{ON}$</td>
<td>Turn On Time</td>
<td>$V_{CC} = 125V, I_C = 5A$</td>
<td>1.6</td>
<td></td>
<td></td>
<td>$\mu s$</td>
</tr>
<tr>
<td>$t_{STG}$</td>
<td>Storage Time</td>
<td>$I_{B1} = -I_{B2} = 1A$</td>
<td></td>
<td></td>
<td>3.0</td>
<td>$\mu s$</td>
</tr>
<tr>
<td>$t_f$</td>
<td>Fall Time</td>
<td>$R_L = 25\Omega$</td>
<td></td>
<td></td>
<td>0.7</td>
<td>$\mu s$</td>
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</table>

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

### $h_{FE}$ Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>H1</th>
<th>H2</th>
</tr>
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<tbody>
<tr>
<td>$h_{FE1}$</td>
<td>15 ~ 28</td>
<td>26 ~ 39</td>
</tr>
</tbody>
</table>
Typical Characteristics

Figure 1. DC Current Gain

Figure 2. Saturation Voltage

Figure 3. Collector Output Capacitance

Figure 4. Turn On Time

Figure 5. Turn Off Time

Figure 6. Forward Biased Safe Operating Area
Typical Characteristics (Continued)

Figure 7. Reverse Biased Safe Operating Area

- $V_{CC} = 50V$
- $I_{B1} \leq 1A$, $I_{B2} \leq 1A$
- $L = 1mH$

$V_{CE}$, COLLECTOR-EMITTER VOLTAGE

$IC$, COLLECTOR CURRENT

Figure 8. Power Derating

- $P_{D}$, POWER DISSIPATION
- $T_{C}$, CASE TEMPERATURE

$V_{CE}$, COLLECTOR-EMITTER VOLTAGE

$IC$, COLLECTOR CURRENT
Mechanical Dimensions

TO220

NOTES: UNLESS OTHERWISE SPECIFIED
A) REFERENCE JEDEC, TO-220, ISSUE K,
VARIATION AB, DATED APRIL 2002.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONING AND TOLERANCING PER
ANSI Y14.5-1973
D) LOCATION OF THE PIN HOLE MAY VARY
(LOWER LEFT CORNER, LOWER CENTER
AND CENTER OF THE PACKAGE)
△ DOES NOT COMPLY JEDEC STANDARD VALUE.
F) "A1" DIMENSIONS REPRESENT LIKE BELOW:
SINGLE GAUGE = 0.51 - 0.61
DUAL GAUGE = 1.14 - 1.40
G) DRAWING FILE NAME: TO220B03REV6
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