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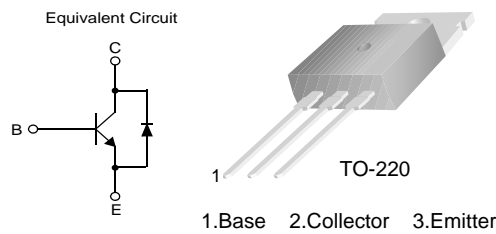
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# FJP5304D

## NPN Silicon Transistor

### High Voltage High Speed Power Switch Application

- Wide Safe Operating Area
- Built-in Free Wheeling diode Suitable for Electronic Ballast Application
- Suitable for Electronic Ballast Application
- Small Variance in Storage Time



### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ 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	12	V
$I_C$	Collector Current (DC)	4	A
$I_{CP}$	* Collector Current (Pulse)	8	A
$I_B$	Base Current (DC)	2	A
$I_{BP}$	* Base Current (Pulse)	4	A
$P_C$	Collector Dissipation ( $T_C=25^\circ\text{C}$ )	70	W
$T_{STG}$	Storage Temperature	- 65 ~ 150	$^\circ\text{C}$

\* Pulse Test Pulse Width = 5ms, Duty Cycle  $\geq 1.0\%$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 1\text{mA}, I_E = 0$	700			V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 5\text{mA}, I_B = 0$	400			V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 1\text{mA}, I_C = 0$	12			V
$I_{CES}$	Collector Cut-off Current	$V_{CE} = 700\text{V}, V_{EB} = 0$			100	mA
$I_{CEO}$	Collector Cut-off Current	$V_{CE} = 400\text{V}, I_B = 0$			250	mA
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 12\text{V}, I_C = 0$			100	mA

$h_{FE}$	DC Current Gain	$V_{CE} = 5V, I_C = 10mA$ $V_{CE} = 5V, I_C = 2A$	10 8		40	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 0.5A, I_B = 0.1A$ $I_C = 1A, I_B = 0.2A$ $I_C = 2.5A, I_B = 0.5A$			0.7 1.0 1.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 0.5A, I_B = 0.1A$ $I_C = 1A, I_B = 0.2A$ $I_C = 2.5A, I_B = 0.5A$			1.1 1.2 1.3	V
$V_f$	Internal Diode Forward Voltage Drop	$I_F = 2A$			2.5	V
<b>Inductive Load Switching (<math>V_{CC} = 200V</math>)</b>						
$t_{stg}$	Storage Time	$I_C = 2A, I_{B1} = 0.4A$ $V_{BE(off)} = -5V, L = 200\mu H$		0.6		$\mu s$
$t_f$	Fall Time			0.1		
<b>Resistive Load Switching (<math>V_{CC} = 250V</math>)</b>						
$t_{stg}$	Storage Time	$I_C = 2A, I_{B1} = I_{B2} = 0.4A$ $T_P = 30\mu s$			2.9	$\mu s$
$t_f$	Fall Time			0.2		

\* Pulse test:  $PW \leq 300\mu s$ , Duty cycle  $\leq 2\%$

### Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.78	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	62.5	$^{\circ}C/W$

# Typical Characteristics

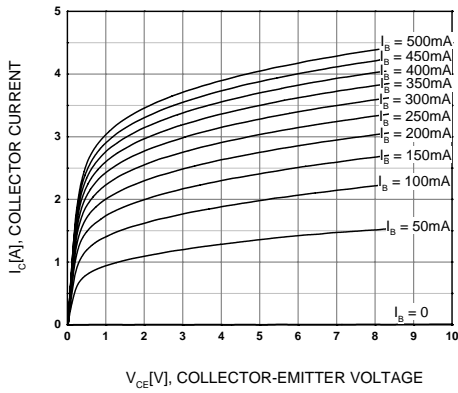


Figure 1. Static Characteristic

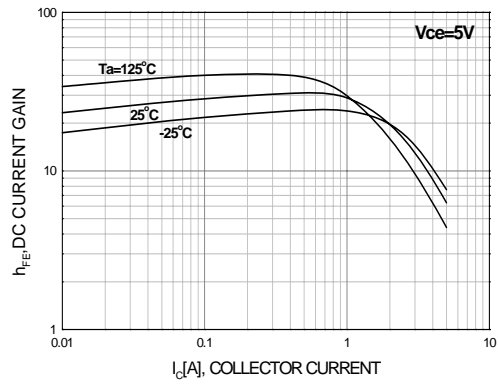


Figure 2. DC Current Gain

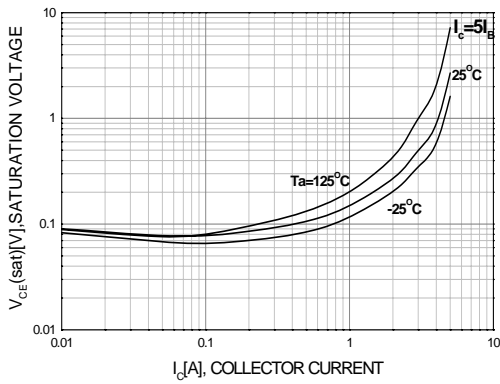


Figure 3. Collector-Emitter Saturation Voltage

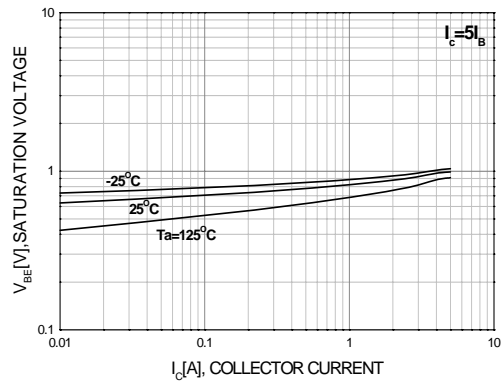


Figure 4. Base-Emitter Saturation Voltage

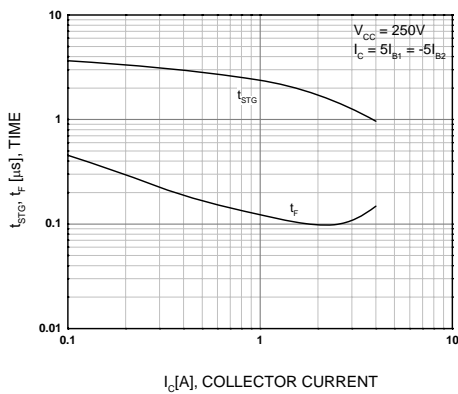


Figure 5. Resistive Load Switching Time

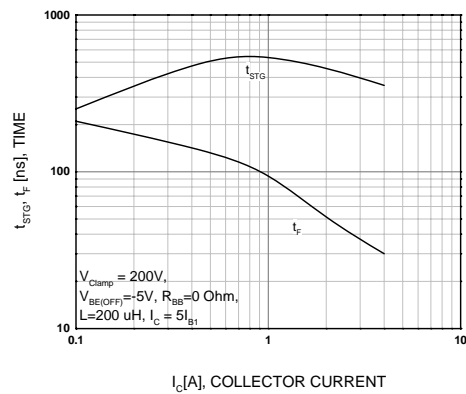


Figure 6. Inductive Load Switching Time

Typical Characteristics (Continued)

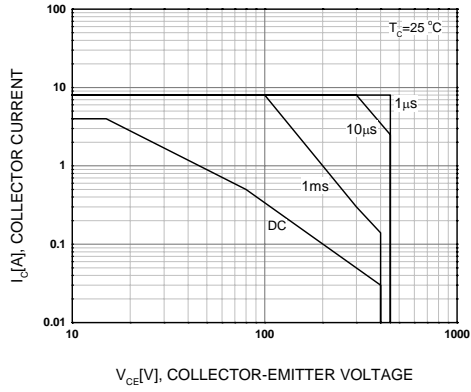


Figure 1. Forward Bias Safe Operating Area

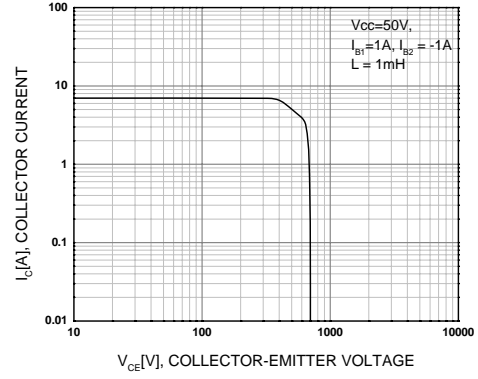


Figure 2. Reverse Bias Safe Operating Area

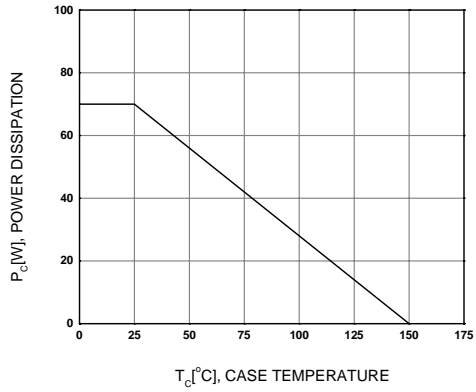


Figure 3. Power Derating



- NOTES:
- A) REFERENCE JEDEC, TO-220, VARIATION AB
  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DIMENSIONS COMMON TO ALL PACKAGE SUPPLIERS EXCEPT WHERE NOTED [ ].
  - D) LOCATION OF MOLDED FEATURE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE)
  - E) DOES NOT COMPLY JEDEC STANDARD VALUE.
  - F) "A1" DIMENSIONS AS BELOW:  
 SINGLE GAUGE = 0.51 - 0.61  
 DUAL GAUGE = 1.10 - 1.45
  - G) DRAWING FILE NAME: TO220B03REV9
  - H) PRESENCE IS SUPPLIER DEPENDENT
  - I) SUPPLIER DEPENDENT MOLD LOCKING HOLES IN HEATSINK.

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