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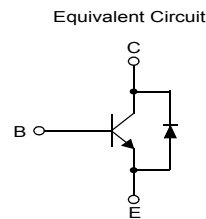
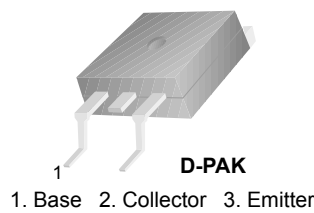
July 2010

# FJD5304D

## High Voltage Fast Switching Transistor

### Features

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



### Absolute Maximum Ratings $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units	
$V_{CB0}$	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	$T_c = 25^\circ\text{C}$	30	W
		$T_a = 25^\circ\text{C}$	1.25	W
$T_J$	Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature	-55 to 150	$^\circ\text{C}$	

\* Pulse Test:  $PW = 300\mu\text{s}$ , Duty Cycle = 2% Pulsed

### Thermal Characteristics $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$R_{\theta ja}$	Thermal Resistance Junction-Ambient **	99	$^\circ\text{C/W}$

\*\* Device mounted on minimum pad size.

## Package Marking and Ordering Information

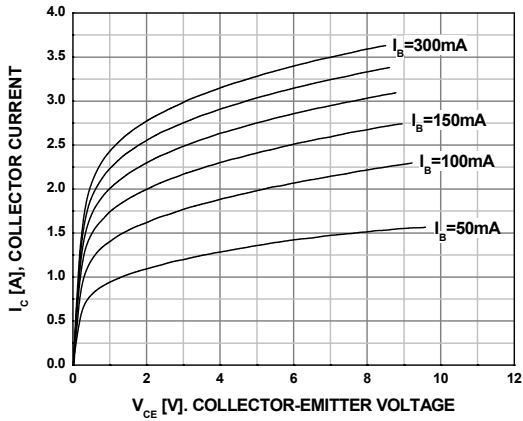
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
J5304D	FJD5304DTM	D-PAK	13" Dia	-	2500
J5304D	FJD5304DTF	D-PAK	13" Dia	-	2000

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

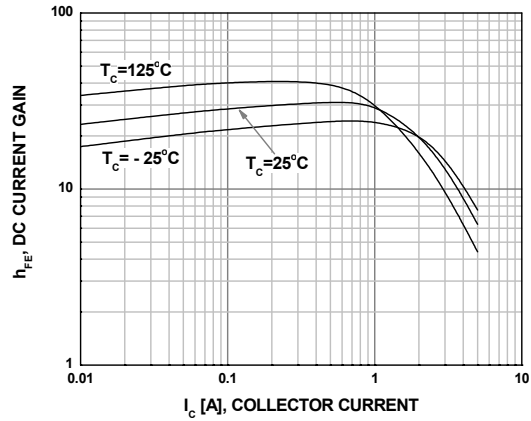
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 1\text{mA}, I_E = 0$	700			V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 5\text{mA}, I_B = 0$	400			V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 1\text{mA}, I_C = 0$	12			V
$I_{CES}$	Collector Cut-off Current	$V_{CB} = 700\text{V}, I_E = 0$			100	$\mu\text{A}$
$I_{CEO}$	Collector Cut-off Current	$V_{CB} = 400\text{V}, I_B = 0$			250	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-off Current	$V_{EB} = 12\text{V}, I_C = 0$			1	mA
$h_{FE}$	DC Current Gain	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$ $V_{CE} = 5\text{V}, I_C = 2.0\text{A}$	10 8		40	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$			0.7	V
		$I_C = 1.0\text{A}, I_B = 0.2\text{A}$			1.0	V
		$I_C = 2.5\text{A}, I_B = 0.5\text{A}$			1.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$			1.1	V
		$I_C = 1.0\text{A}, I_B = 0.2\text{A}$			1.2	V
		$I_C = 2.5\text{A}, I_B = 0.5\text{A}$			1.3	V
$t_{STG}$	Storage Time	$V_{CLAMP}=200\text{V}, I_C=2.0\text{A},$ $I_{B1}=0.4\text{A}, V_{BE(off)}=-5\text{V}, L=200\mu\text{H}$		0.6		$\mu\text{s}$
$t_F$	Fall Time			0.1		$\mu\text{s}$
$t_{STG}$	Storage Time	$V_{CC}=250\text{V}, I_C=2.0\text{A},$ $I_{B1}=0.4\text{A}, I_{B2}=-0.4\text{A}, T_P=30\mu\text{s}$			2.9	$\mu\text{s}$
$t_F$	Fall Time			0.2		$\mu\text{s}$
$V_F$	Diode Forward Voltage	$I_F = 2\text{A}$			2.5	V

## Typical Performance Characteristics

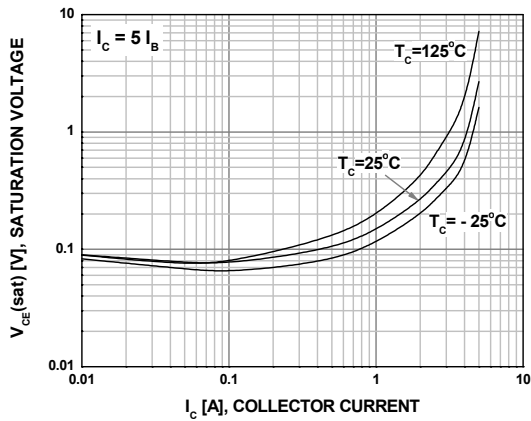
**Figure 1. Static Characteristic**



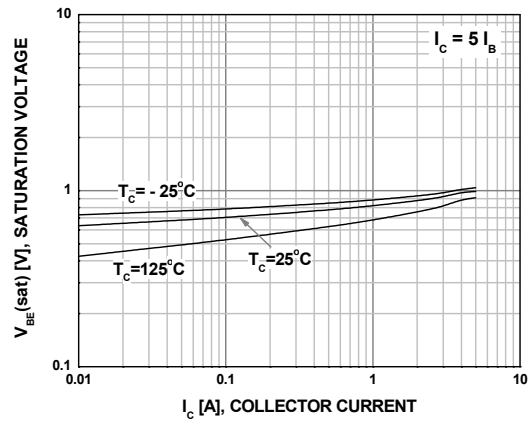
**Figure 2. DC Current Gain**



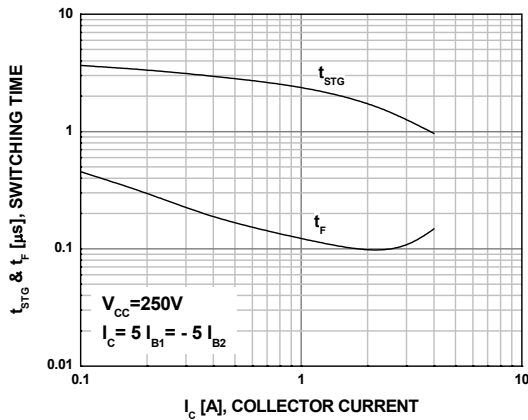
**Figure 3. Collector-Emitter Saturation Voltage**



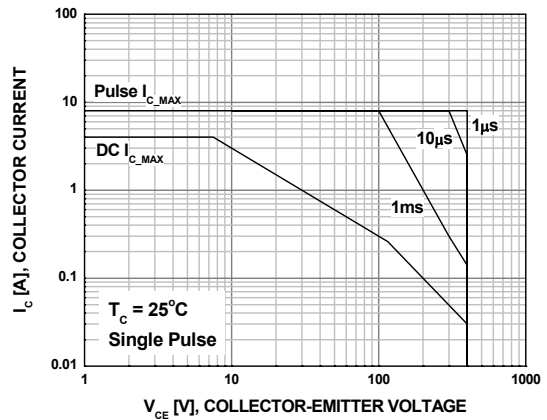
**Figure 4. Base-Emitter Saturation Voltage**



**Figure 5. Resistive Load Switching Time**

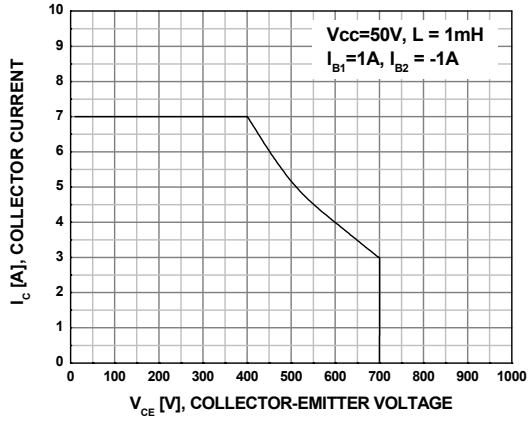


**Figure 6. Forward Biased Safe Operating Area**

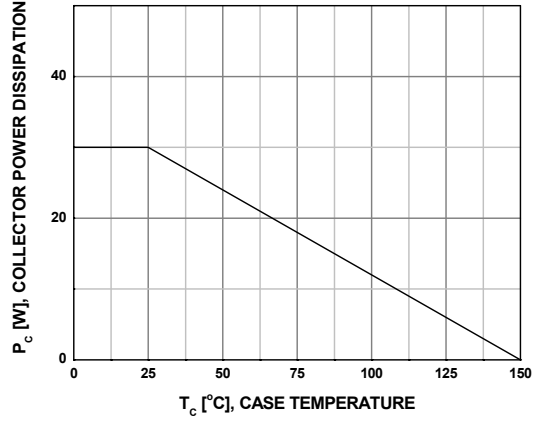


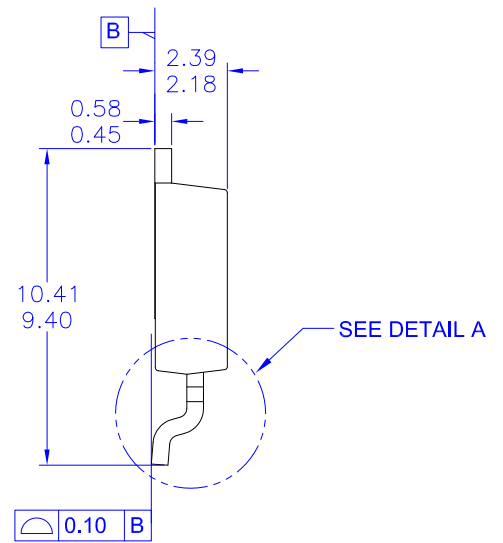
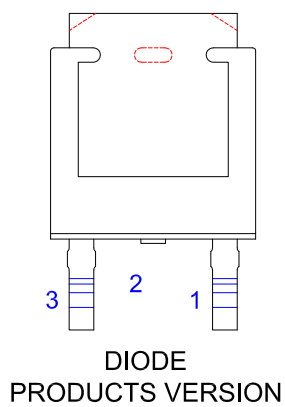
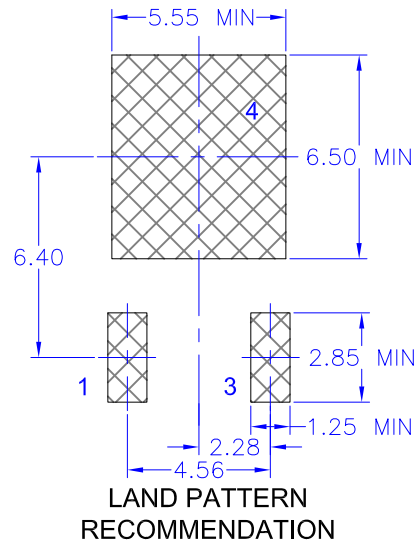
**Typical Performance Characteristics (Continued)**

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



**Figure 8. Power Derating Curve**





NOTES: UNLESS OTHERWISE SPECIFIED  
A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE C, VARIATION AA.

B) ALL DIMENSIONS ARE IN MILLIMETERS.

C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.

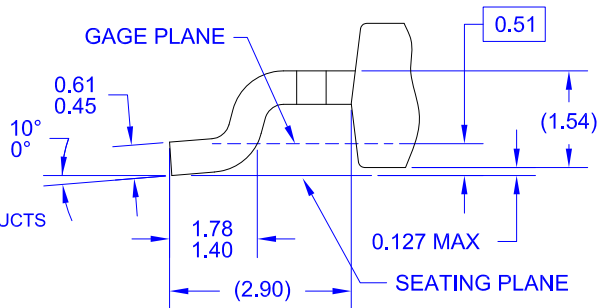
D) SUPPLIER DEPENDENT MOLD LOCKING HOLES OR CHAMFERED CORNERS OR EDGE PROTRUSION.

E) TRIMMED METAL CENTER LEAD IS PRESENT ON FOR NON-DIODE PRODUCTS

F) DIMENSIONS ARE EXCLUSIVE OF BURS, MOLD FLASH AND TIE BAR EXTRUSIONS.

G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TO228P991X239-3N.

H) DRAWING NUMBER AND REVISION: MKT-TO252A03REV11



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