

# High Voltage Fast Switching Transistor

## FJD5304D

### Features

- Built-in Free Wheeling Diode
- Wide Safe Operating Area
- Small Variance in Storage Time
- Suitable for Electronic Ballast Application
- This is a Pb-Free Device

### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{CBO}$	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) (Note 1)	8	A
$I_B$	Base Current (DC)	2	A
$I_{BP}$	Base Current (Pulse) (Note 1)	4	A
$P_C$	Total Device 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 Junction Temperature Range	-55 to 150	$^\circ\text{C}$

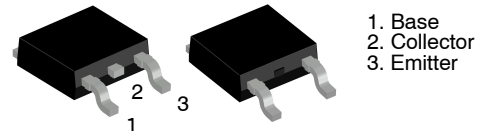
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Pulse test:  $PW = 300\ \mu\text{s}$ , Duty Cycle = 2% Pulsed

### THERMAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

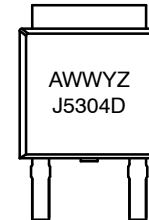
Symbol	Parameter	Value	Unit
$R_{\theta ja}$	Thermal Resistance Junction to Ambient (Note 2)	99	$^\circ\text{C/W}$

2. Device mounted on minimum pad side.



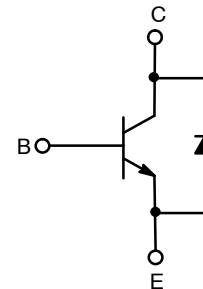
DPAK3 6.10x6.54x2.29, 4.57P  
CASE 369AS

### MARKING DIAGRAM



A = Assembly Location  
 WW = Work Week  
 Y = Year  
 Z = Lot Traceability  
 J5304D = Specific Device Code

### EQUIVALENT CIRCUIT



### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
FJD5304DTF	DPAK3	2000 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

# FJD5304D

## ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
BV <sub>CBO</sub>	Collector-Base Breakdown Voltage	I <sub>C</sub> = 1 mA, 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> = 1 mA, I <sub>C</sub> = 0	12	–	–	V
I <sub>CES</sub>	Collector Cut-off Current	V <sub>CB</sub> = 700 V, I <sub>E</sub> = 0	–	–	100	μA
I <sub>CEO</sub>	Collector Cut-off Current	V <sub>CB</sub> = 400 V, I <sub>B</sub> = 0	–	–	250	μA
I <sub>EBO</sub>	Emitter Cut-off Current	V <sub>EB</sub> = 12 V, I <sub>C</sub> = 0	–	–	1	mA
h <sub>FE</sub>	DC Current Gain	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	10	–	–	
		V <sub>CE</sub> = 5 V, I <sub>C</sub> = 2.0 A	8	–	40	
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 0.5 A, I <sub>B</sub> = 0.1 A	–	–	0.7	V
		I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 0.2 A	–	–	1.0	V
		I <sub>C</sub> = 2.5 A, I <sub>B</sub> = 0.5 A	–	–	1.5	V
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 0.5 A, I <sub>B</sub> = 0.1 A	–	–	1.1	V
		I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 0.2 A	–	–	1.2	V
		I <sub>C</sub> = 2.5 A, I <sub>B</sub> = 0.5 A	–	–	1.3	V
t <sub>STG</sub>	Storage Time	V <sub>CLAMP</sub> = 200 V, I <sub>C</sub> = 2.0 A, I <sub>B1</sub> = 0.4 A, V <sub>BE(off)</sub> = –5 V, L = 200 μH	–	0.6	–	μs
t <sub>F</sub>	Fall Time		–	0.1	–	μs
t <sub>STG</sub>	Storage Time	V <sub>CC</sub> = 250 V, I <sub>C</sub> = 2.0 A, I <sub>B1</sub> = 0.4 A, I <sub>B2</sub> = –0.4 A, T <sub>P</sub> = 30 μs	–	–	2.9	μs
t <sub>F</sub>	Fall Time		–	0.2	–	μs
V <sub>F</sub>	Avalanche Energy	I <sub>F</sub> = 2 A	–	–	2.5	V

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## TYPICAL PERFORMANCE CHARACTERISTICS

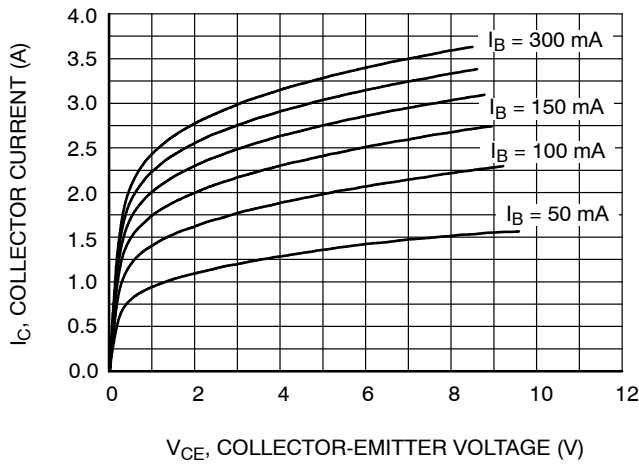


Figure 1. Static Characteristic

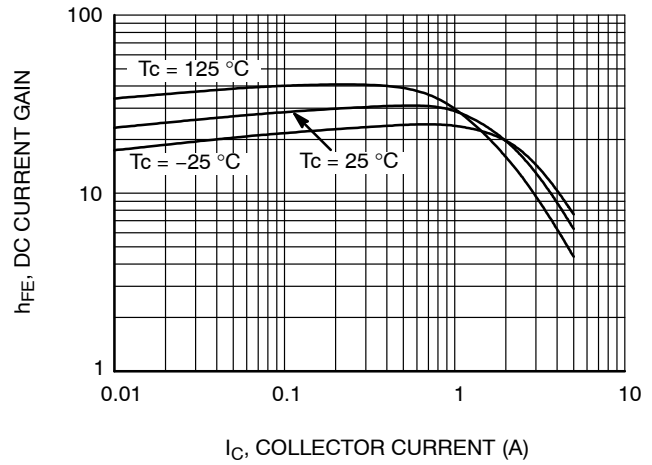


Figure 2. DC Current Gain

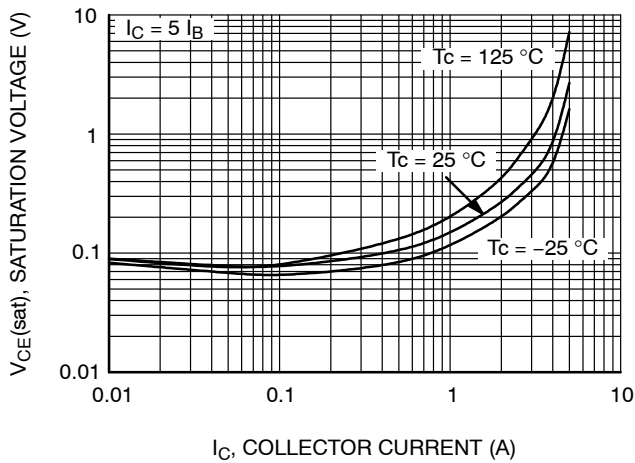


Figure 3. Collector-Emitter Saturation Voltage

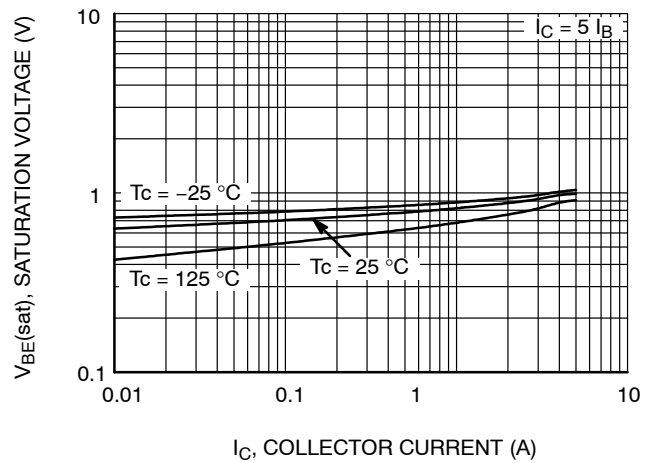


Figure 4. Base-Emitter Saturation Voltage

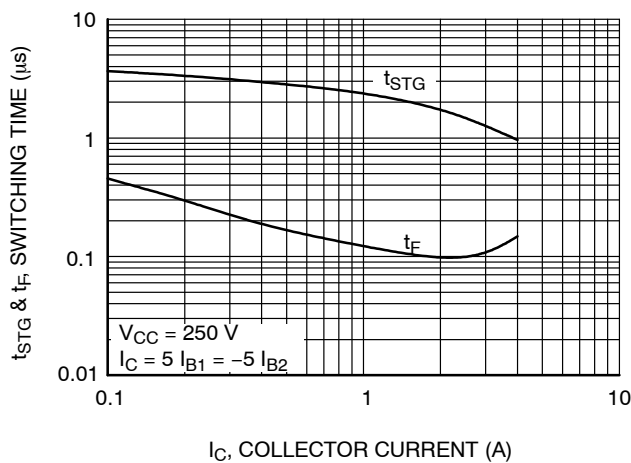


Figure 5. Resistive Load Switching Time

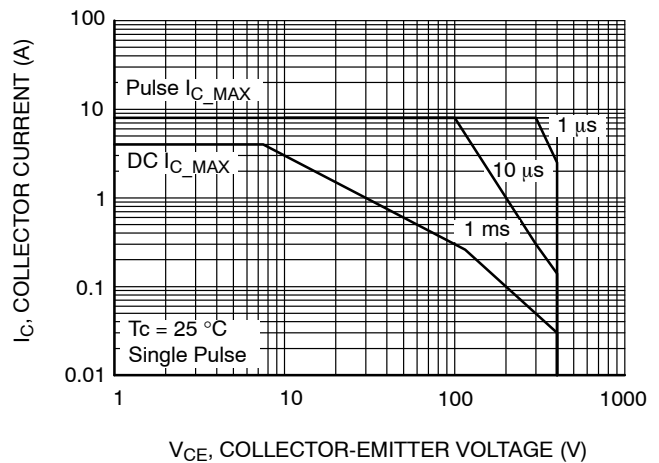


Figure 6. Forward Biased Safe Operating Area

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

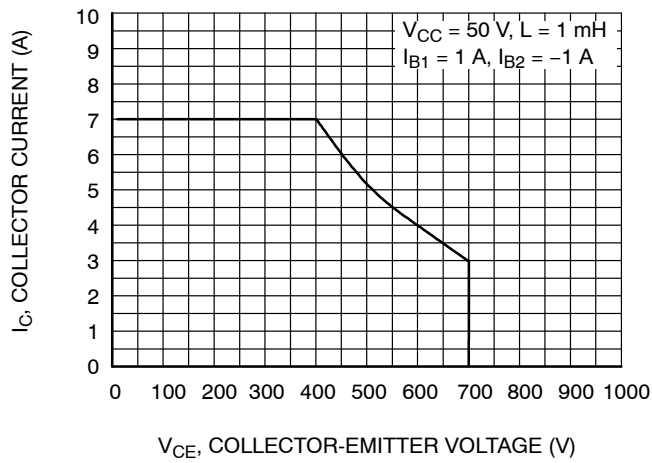


Figure 7. Reverse Biased Safe Operating Area

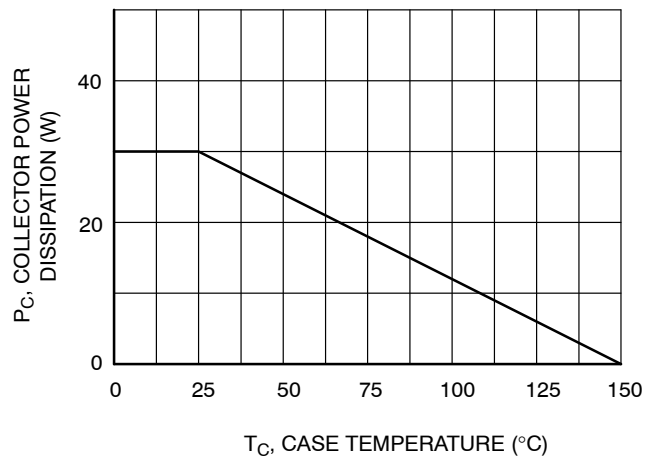
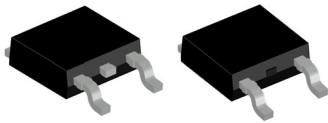
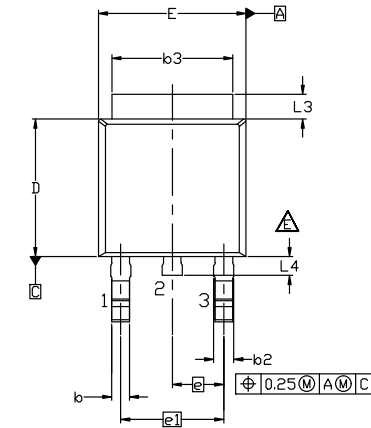


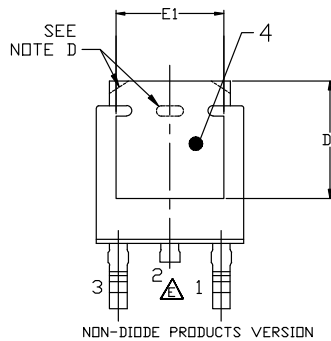
Figure 8. Power Derating Curve


**DPAK3 6.10x6.54x2.29, 4.57P**  
**CASE 369AS**  
**ISSUE B**

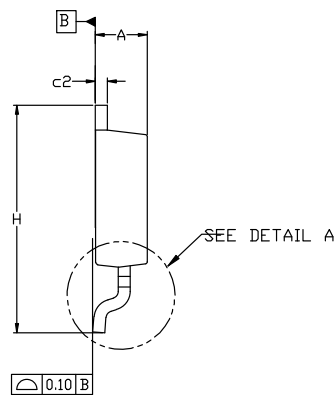
DATE 20 DEC 2023



NON-DIODE PRODUCTS VERSION



NON-DIODE PRODUCTS VERSION



NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO JEDEC, TO-252, ISSUE F, VARIATION AA.

B) ALL DIMENSIONS ARE IN MILLIMETERS.

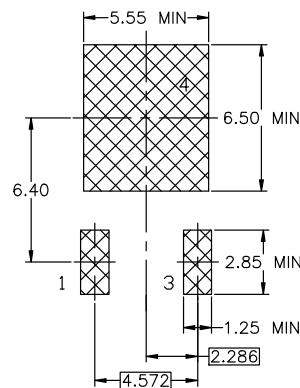
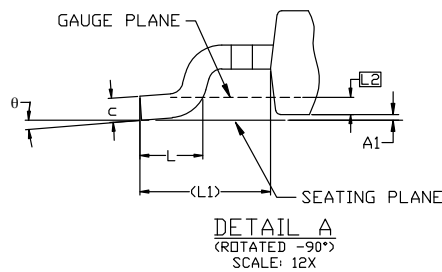
C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2018.

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

E) FOR DIODE PRODUCTS, L4 IS 0.25 MM MAX PLASTIC BODY STUB WITHOUT CENTER LEAD.

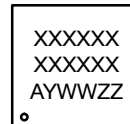
F) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

G) LAND PATTERN RECOMMENDATION IS BASED ON IPC7351A STD TD228P991X239-3N.


**LAND PATTERN RECOMMENDATION**

\*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

DIM	MILLIMETERS		
	MIN.	NDM.	MAX.
A	2.18	2.29	2.39
A1	0.00	-	0.127
b	0.64	0.77	0.89
b2	0.76	0.95	1.14
b3	5.21	5.34	5.46
c	0.45	0.53	0.61
c2	0.45	0.52	0.58
D	5.97	6.10	6.22
D1	5.21	---	---
E	6.35	6.54	6.73
E1	4.32	---	---
e	2.286 BSC		
e1	4.572 BSC		
H	9.40	9.91	10.41
L	1.40	1.59	1.78
L1	2.90 REF		
L2	0.51 BSC		
L3	0.89	1.08	1.27
L4	---	---	1.02
θ	0°	---	10°

**GENERIC MARKING DIAGRAM\***


\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

XXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
ZZ = Assembly Lot Code

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