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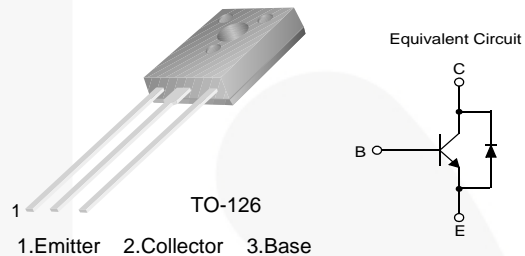


June 2014

FJE5304D NPN Triple Diffused Planar Silicon Transistor

Features

- High-Voltage, High-Speed Power Switch Applications
- Wide Safe Operating Area
- Built-in Free-Wheeling diode
- Suitable for Electronic Ballast Applications
- Small Variance in Storage Time



Ordering Information

Part Number	Top Mark	Package	Packing Method
FJE5304D	J5304D	TO-126 3L	Bulk
FJE5304DTU	J5304D	TO-126 3L	Rail

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 $T_C = 25^\circ\text{C}$ 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) ⁽¹⁾	8	A
I_B	Base Current (DC)	2	A
I_{BP}	Base Current (Pulse) ⁽¹⁾	4	A
T_{STG}	Storage Temperature Range	-65 to 150	$^\circ\text{C}$

Note:

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

Thermal Characteristics

Values are at $T_C = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Max.	Unit
P_C	Collector Dissipation ($T_C = 25^\circ\text{C}$)	30	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4.17	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	83.3	$^\circ\text{C/W}$

Electrical Characteristics⁽²⁾

Values are at $T_C = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
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	μA
I_{CEO}	Collector Cut-Off Current	$V_{CE} = 400\text{ V}, I_B = 0$			250	μA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = 12\text{ V}, I_C = 0$			100	μA
h_{FE}	DC Current Gain	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	10			
		$V_{CE} = 5\text{ V}, I_C = 2\text{ A}$	8		40	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 0.5\text{ A}, I_B = 0.1\text{ A}$			0.7	V
		$I_C = 1\text{ A}, I_B = 0.2\text{ A}$			1.0	
		$I_C = 2.5\text{ A}, I_B = 0.5\text{ A}$			1.5	
$V_{BE(sat)}$	Collector-Base Saturation Voltage	$I_C = 0.5\text{ A}, I_B = 0.1\text{ A}$			1.1	V
		$I_C = 1\text{ A}, I_B = 0.2\text{ A}$			1.2	
		$I_C = 2.5\text{ A}, I_B = 0.5\text{ A}$			1.3	
V_f	Internal Diode Forward Voltage Drop	$I_F = 2\text{ A}$			2.5	V
Inductive Load Switching ($V_{CC} = 200\text{ V}$)						
t_{stg}	Storage Time	$I_C = 2\text{ A}, I_{B1} = 0.4\text{ A},$ $V_{BE(off)} = -5\text{ V},$ $L = 200\text{ }\mu\text{H}$		0.6		μs
t_f	Fall Time			0.1		μs
Resistive Load Switching ($V_{CC} = 250\text{ V}$)						
t_{stg}	Storage Time	$I_C = 2\text{ A},$ $I_{B1} = I_{B2} = 0.4\text{ A},$ $T_P = 30\text{ }\mu\text{s}$			2.9	μs
t_f	Fall Time			0.2		μs

Note:

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

Typical Performance Characteristics

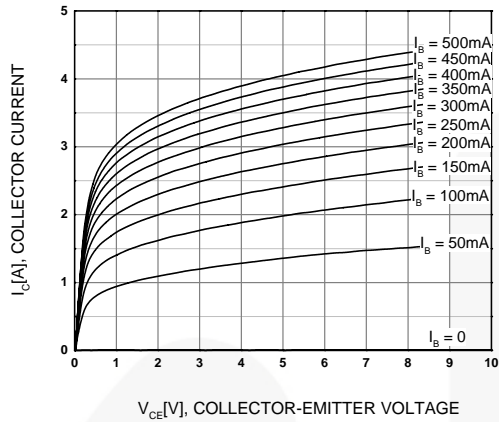


Figure 1. Static Characteristic

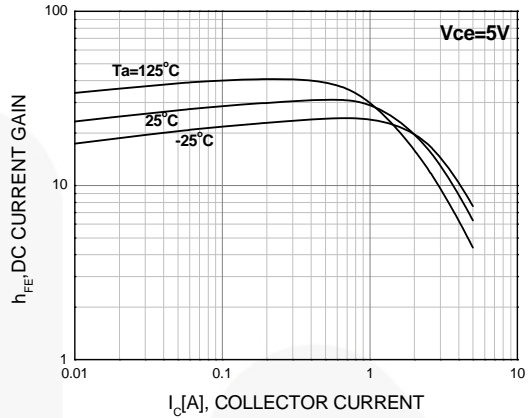


Figure 2. DC Current Gain

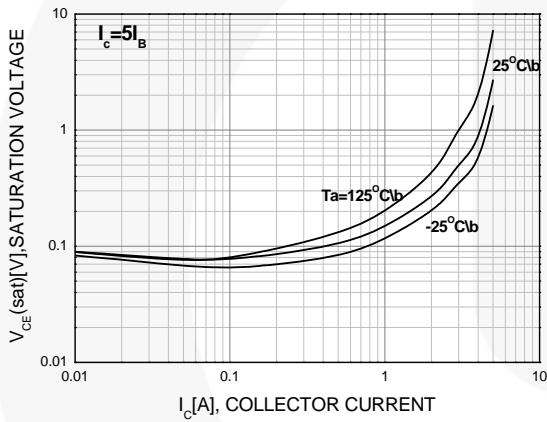


Figure 3. Collector-Emitter Saturation Voltage

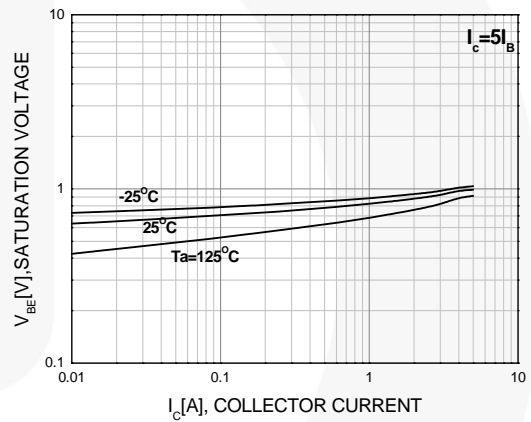


Figure 4. Base-Emitter Saturation Voltage

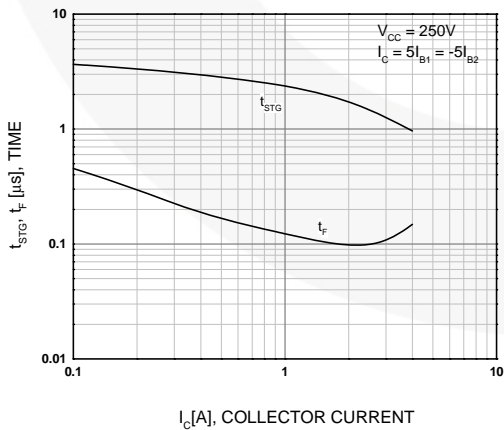


Figure 5. Resistive Load Switching Time

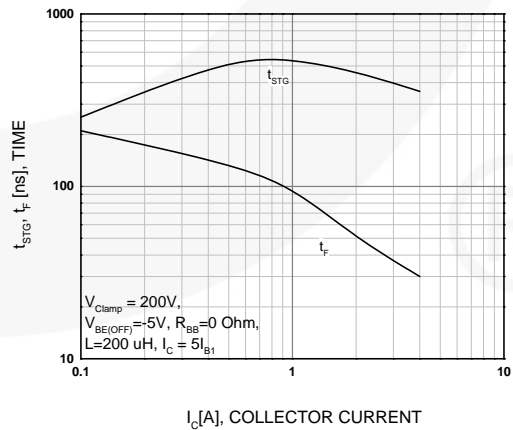


Figure 6. Inductive Load Switching Time

Typical Performance Characteristics (Continued)

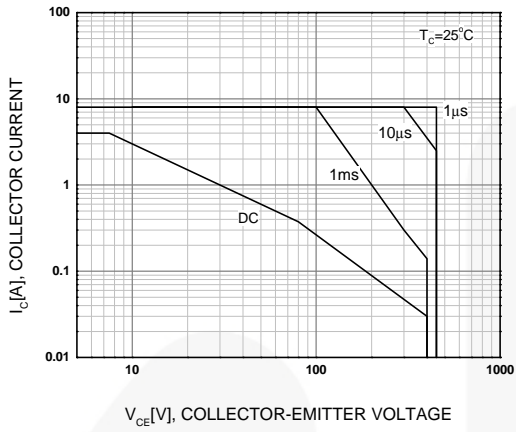


Figure 7. Forward Bias Safe Operating Area

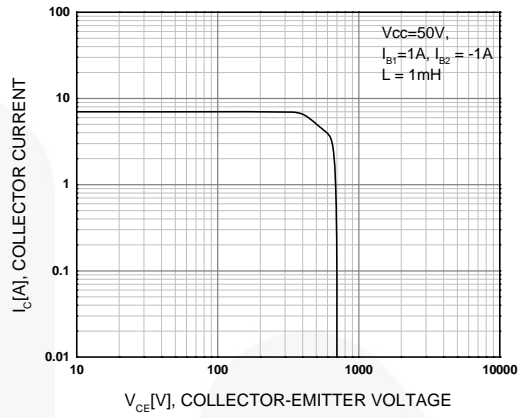


Figure 8. Reverse Bias Safe Operating Area

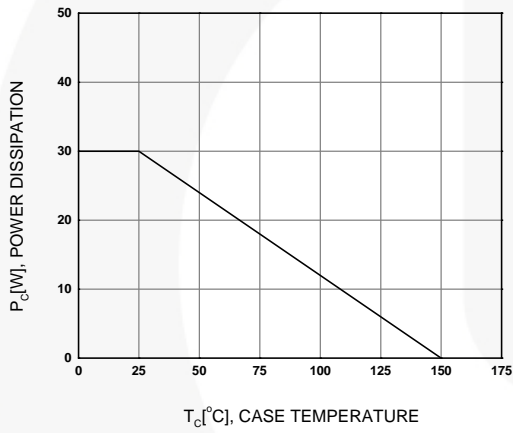


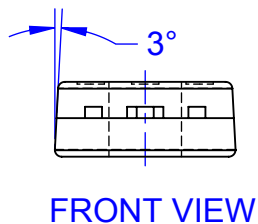
Figure 9. Power Derating



TOP VIEW



SIDE VIEW



FRONT VIEW

PRODUCTION CODE	TERMINAL LENGTH "D"	TERMINAL LENGTH "E"
TSSTU	3.45 - 4.05	6.45-7.45
TSTU	2.36 - 2.96	5.36-6.36
NONE (STD LENGTH)	12.76 - 13.36	15.76-16.76

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- A. NO INDUSTRY STANDARD APPLIES TO THIS PACKAGE
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR PROTRUSIONS

$\triangle D$ FOR TERMINAL LENGTH "D", REFER TO TABLE

$\triangle E$ FOR TERMINAL LENGTH "E", REFER TO TABLE

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