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January 2016

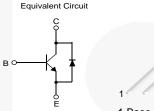
FJI5603D NPN Silicon Transistor

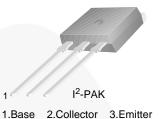
Applications

- High Voltage and High Speed Power Switch Application
- · Electronic Ballast Application

Features

- · Wide Safe Operating Area
- · Small Variance in Storage Time
- Built-in Free Wheeling Diode





Ordering Information

Part Number	Marking	Package	Packing Method	
FJI5603DTU	J5603D	TO-262 3L (I2PAK)	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 $T_A = 25^{\circ}$ C unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	1600	V
V _{CEO}	Collector-Emitter Voltage	800	V
V _{EBO}	Emitter-Base Voltage	12	V
I _C	Collector Current (DC)	3	А
I _{CP}	Collector Current (Pulse) ⁽¹⁾	6	А
I _B	Base Current (DC)	2	А
I _{BP}	Base Current (Pulse) ⁽¹⁾	4	А
P _C	Power Dissipation (T _C = 25°C)	100	W
T _J	Junction Temperature	150	°C
T _{STG}	Storage Junction Temperature Range	-65 to +150	°C
EAS	Avalanche Energy (T _J = 25°C, 8 mH)	3.5	mJ

Notes:

1. Pulse test: pulse width = 5 ms, duty cycle \leq 10%

Thermal Characteristics(2)

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

Symbol	Parameter	Rating	Unit
$R_{ heta JC}$	Thermal Resistance, Junction-to-Case	1.25	°C/W
$R_{ heta JA}$	Thermal Resistance, Junction-to-Ambient	80	°C/W

Note:

2. Device mounted on minimum pad size.

Electrical Characteristics(3)

Values are at $T_A = 25$ °C unless otherwise noted.

Symbol	Parameter	Conditions	;	Min.	Тур.	Max.	Unit	
BV _{CBO}	Collector-Base Breakdown Voltage	$I_C = 0.5 \text{ mA}, I_E = 0$	7	1600	1689		V	
BV _{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 5 \text{ mA}, I_B = 0$		800	870		V	
BV _{EBO}	Emitter-Base Breakdown Voltage	$I_E = 0.5 \text{ mA}, I_C = 0$		12.0	14.8		>	
I _{CES}	Collector Cut-Off Current	V _{CE} = 1600 V, V _{BE} = 0	$T_{\rm C} = 25^{\circ}{\rm C}$ $T_{\rm C} = 125^{\circ}{\rm C}$		0.01	100 1000	μΑ	
I _{CEO}	Collector Cut-Off Current	V _{CE} = 800 V, I _B = 0	$T_{C} = 25^{\circ}C$ $T_{C} = 125^{\circ}C$		0.01	100 1000	μΑ	
I _{EBO}	Emitter Cut-Off Current	V _{EB} = 12 V, I _C = 0			0.05	500	μΑ	
			T _C = 25°C	20	29	35		
	DC Current Gain	$V_{CE} = 3 \text{ V, } I_{C} = 0.4 \text{ A}$	T _C = 125°C	6	15			
h _{FE}		$V_{CC} = 10 \text{ V. } I_{C} = 5 \text{ mA}$	T _C = 25°C	20	43			
			T _C = 125°C	20	46			
	0 11 1 5 11 0 1 11	$I_C = 250 \text{ mA}, I_B = 25 \text{ mA}$			0.50	1.25		
V _{CE} (sat)	Collector-Emitter Saturation Voltage	$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$			1.50	2.50	V	
		$I_C = 1 A, I_B = 0.2 A$			1.20	2.50		
		I _C = 500 mA, I _B = 50 mA	$T_C = 25^{\circ}C$		0.74	1.20		
V _{BE} (sat)	Base-Emitter Saturation Voltage	IC = 300 IIIA, IB = 30 IIIA	$T_{\rm C} = 125^{\circ}{\rm C}$		0.61	1.10	V	
v BE(oat)		$I_C = 2 \text{ A}, I_B = 0.4 \text{ A}$ $T_C = 25^{\circ}\text{C}$ $T_C = 125^{\circ}\text{C}$	$T_C = 25^{\circ}C$		0.85	1.20		
			$T_{\rm C} = 125^{\circ}{\rm C}$		0.74	1.10		
C_{ib}	Input Capacitance	$V_{EB} = 10 \text{ V}, I_{C} = 0, f = 1 \text{ MHz}$			745	1000	pF	
C _{ob}	Output Capacitance	$V_{CB} = 10 \text{ V}, I_{E} = 0, f = 1 \text{ MHz}$ $I_{C} = 0.1 \text{ A}, V_{CE} = 10 \text{ V}$			56	500	pF	
f _T	Current Gain Bandwidth Product				5	V	MHz	
V _F	Diode Forward Voltage	I _F = 0.4 A			0.76	1.20	V	
v F	Diodo i orward voltage	I _F = 1 A			0.83	1.50	V	

Note:

3. Pulse test: pulse width = 20 μs , duty cycle \leq 10%.

Electrical Characteristics (Continued)

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

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
RESISTIVE LOAD SWITCHING (D.C ≤ 10%, Pulse Width = 20 μs)						
t _{ON}	Turn-On Time	$I_C = 0.3 \text{ A}, I_{B1} = 50 \text{ mA},$		400	600	ns
t _{STG}	Storage Time	$I_{B2} = 150 \text{ A}, V_{CC} = 125 \text{ V},$	1.9	2.1	2.3	μs
t _F	Fall Time	$R_L = 416 \Omega$		310	1000	ns
t _{ON}	Turn-On Time	I _C = 0.5 A, I _{B1} = 50 mA,		600	1100	ns
t _{STG}	Storage Time	$I_{B2} = 250 \text{ mA}, V_{CC} = 125 \text{ V},$		1.3	1.5	μs
t _F	Fall Time	$R_L = 250 \Omega$		180	350	ns
INDUCTIV	$^{\prime}$ E LOAD SWITCHING (V_{CC} = 15 V)				
t _{STG}	Storage Time	$I_C = 0.3 \text{ A}, I_{B1} = 50 \text{ mA},$	0.8		1.2	μs
t _F	Fall Time	$I_{B2} = 150 \text{ mA}, V_Z = 300 \text{ V},$		170	250	ns
t _C	Cross-Over Time	$L_C = 200 \text{ H}$		180	250	ns
t _{STG}	Storage Time	I _C = 0.5 A, I _{B1} = 50 mA,	0.8		1.2	μs
t _F	Fall Time	$I_{B2} = 250 \text{ mA}, V_Z = 300 \text{ V},$ $L_C = 200 \text{ H}$		140	175	ns
t _C	Cross-Over Time			170	200	ns

Typical Performance Characteristics

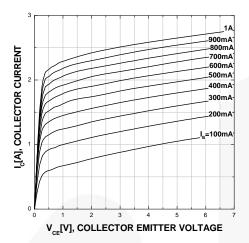


Figure 1. Static Characteristic

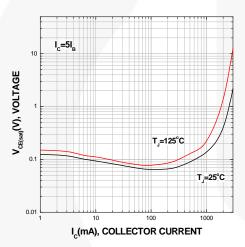


Figure 3. Collector-Emitter Saturation Voltage

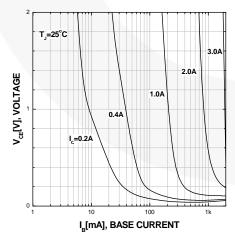


Figure 5. Typical Collector Saturation Voltage

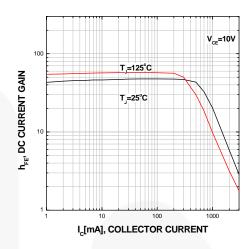


Figure 2. DC Current Gain

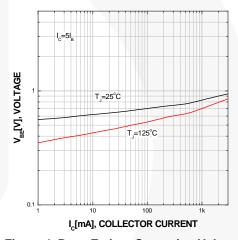


Figure 4. Base-Emitter Saturation Voltage

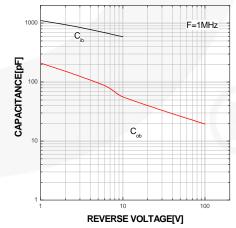


Figure 6. Capacitance

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Typical Performance Characteristics (Continued)

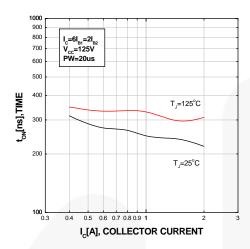


Figure 7. Resistive Switching Time, ton

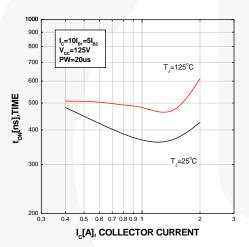


Figure 9. Resistive Switching Time, ton

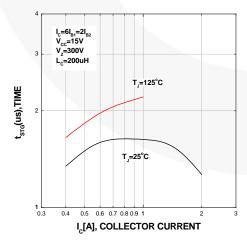


Figure 11. Inductive Switching Time, t_{STG}

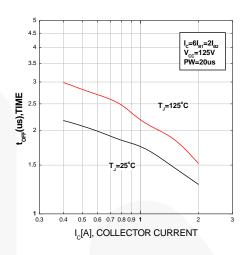


Figure 8. Resistive Switching Time, toff

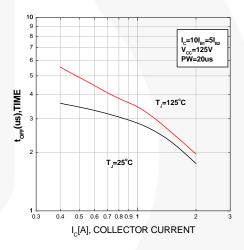


Figure 10. Resistive Switching Time, toff

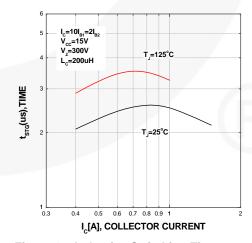


Figure 12. Inductive Switching Time, t_{STG}

Typical Performance Characteristics (Continued)

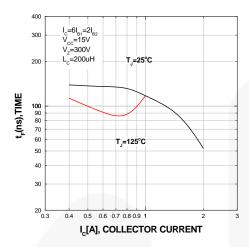


Figure 13. Inductive Switching Time, t_F

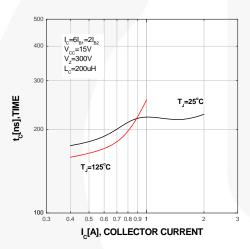


Figure 15. Inductive Switching Time, t_c

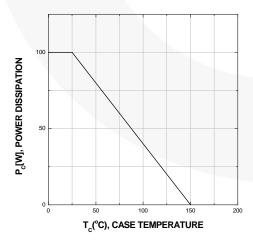


Figure 17. Power Derating

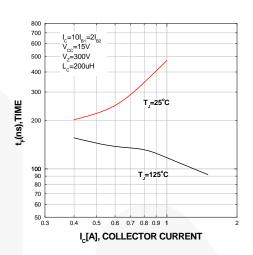


Figure 14. Inductive Switching Time, t_F

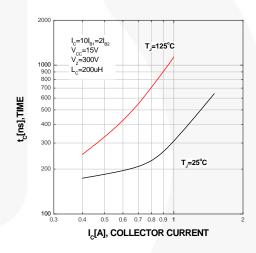
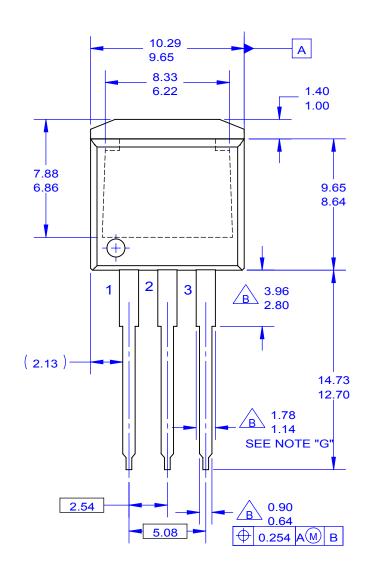
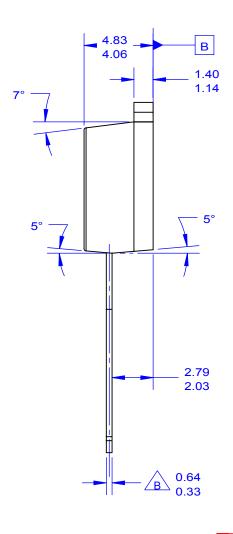


Figure 16. Inductive Switching Time, t_c





NOTES:

A. EXCEPT WHERE NOTED CONFORMS TO
TO262 JEDEC VARIATION AA.
B DOES NOT COMPLY JEDEC STD. VALUE.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DIMENSIONS ARE EXCLUSIVE OF BURRS,
MOLD FLASH AND TIE BAR PROTRUSIONS.
E. DIMENSION AND TOLERANCE AS PER ANSI
Y14 5-1904

Y14.5-1994

F. LOCATION OF PIN HOLE MAY VARY
(LOWER LEFT CORNER, LOWER CENTER
AND CENTER OF PACKAGE)
G. MAXIMUM WIDTH FOR F102 DEVICE = 1.35 MAX.
H. DRAWING FILE NAME: TO262A03REV6



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