Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

January 2016

FJI5603D
NPN Silicon Transistor

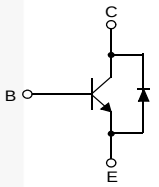
Applications

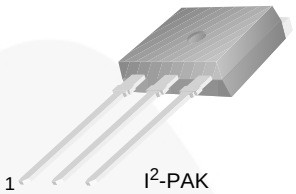
- High Voltage and High Speed Power Switch Application
- Electronic Ballast Application

Features

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

Equivalent Circuit





I^2-PAK

1.Base 2.Collector 3.Emitter

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°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	A
I_{CP}	Collector Current (Pulse)(1)	6	A
I_B	Base Current (DC)	2	A
I_{BP}	Base Current (Pulse)(1)	4	A
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 ≤ 10%

Thermal Characteristics[2]

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

Symbol	Parameter	Rating	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	°C/W
$R_{\theta JA}$	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.	Typ.	Max.	Unit
BV_{CBO}	Collector-Base Breakdown Voltage	I_C = 0.5 mA, I_E = 0		1600	1689		V
BV_{CEO}	Collector-Emitter Breakdown Voltage	I_C = 5 mA, I_B = 0		800	870		V
BV_{EBO}	Emitter-Base Breakdown Voltage	I_E = 0.5 mA, I_C = 0		12.0	14.8		V
I_{CES}	Collector Cut-Off Current	V_{CE} = 1600 V, V_{BE} = 0	T_C = 25°C		0.01	100	µA
			T_C = 125°C			1000	
I_{CEO}	Collector Cut-Off Current	V_{CE} = 800 V, I_B = 0	T_C = 25°C		0.01	100	µA
			T_C = 125°C			1000	
I_{EBO}	Emitter Cut-Off Current	V_{EB} = 12 V, I_C = 0			0.05	500	µA
h_{FE}	DC Current Gain	V_{CE} = 3 V, I_C = 0.4 A	T_C = 25°C	20	29	35	
			T_C = 125°C	6	15		
		V_{CE} = 10 V, I_C = 5 mA	T_C = 25°C	20	43		
			T_C = 125°C	20	46		
V_{CE}(sat)	Collector-Emitter Saturation Voltage	I_C = 250 mA, I_B = 25 mA			0.50	1.25	V
		I_C = 500 mA, I_B = 50 mA			1.50	2.50	
		I_C = 1 A, I_B = 0.2 A			1.20	2.50	
V_{BE}(sat)	Base-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA	T_C = 25°C		0.74	1.20	V
			T_C = 125°C		0.61	1.10	
		I_C = 2 A, I_B = 0.4 A	T_C = 25°C		0.85	1.20	
			T_C = 125°C		0.74	1.10	
C_{ib}	Input Capacitance	V_{EB} = 10 V, I_C = 0, f = 1 MHz			745	1000	pF
C_{ob}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 1 MHz			56	500	pF
f_T	Current Gain Bandwidth Product	I_C = 0.1 A,V_{CE} = 10 V			5		MHz
V_F	Diode Forward Voltage	I_F = 0.4 A			0.76	1.20	V
		I_F = 1 A			0.83	1.50	

Note:

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

Electrical Characteristics (Continued)

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
RESISTIVE LOAD SWITCHING (D.C ≤ 10%, Pulse Width = 20 μs)						
t_{ON}	Turn-On Time	I_C = 0.3 A, I_{B1} = 50 mA, I_{B2} = 150 A, V_{CC} = 125 V, R_L = 416 Ω		400	600	ns
t_{STG}	Storage Time		1.9	2.1	2.3	μs
t_F	Fall Time			310	1000	ns
t_{ON}	Turn-On Time	I_C = 0.5 A, I_{B1} = 50 mA, I_{B2} = 250 mA, V_{CC} = 125 V, R_L = 250 Ω		600	1100	ns
t_{STG}	Storage Time			1.3	1.5	μs
t_F	Fall Time			180	350	ns
INDUCTIVE LOAD SWITCHING (V_{CC} = 15 V)						
t_{STG}	Storage Time	I_C = 0.3 A, I_{B1} = 50 mA, I_{B2} = 150 mA, V_Z = 300 V, L_C = 200 H	0.8		1.2	μs
t_F	Fall Time			170	250	ns
t_C	Cross-Over Time			180	250	ns
t_{STG}	Storage Time	I_C = 0.5 A, I_{B1} = 50 mA, I_{B2} = 250 mA, V_Z = 300 V, L_C = 200 H	0.8		1.2	μs
t_F	Fall Time			140	175	ns
t_C	Cross-Over Time			170	200	ns

Typical Performance Characteristics

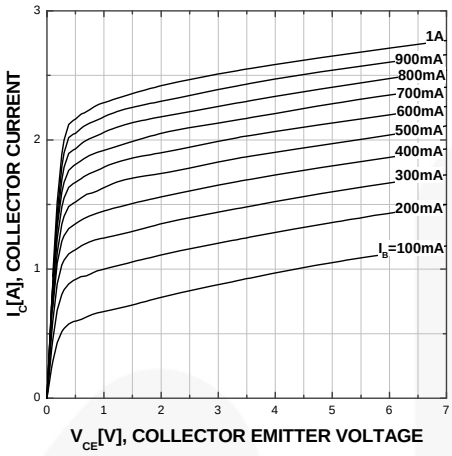


Figure 1. Static Characteristic

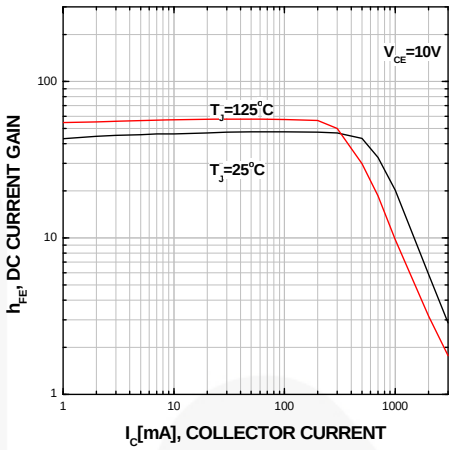


Figure 2. DC Current Gain

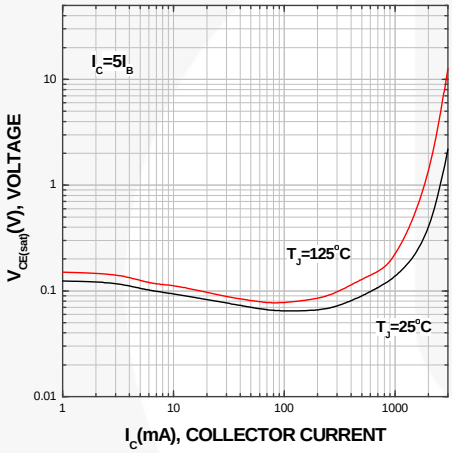


Figure 3. Collector-Emitter Saturation Voltage

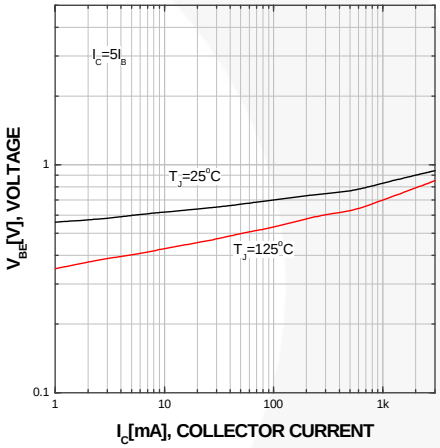


Figure 4. Base-Emitter Saturation Voltage

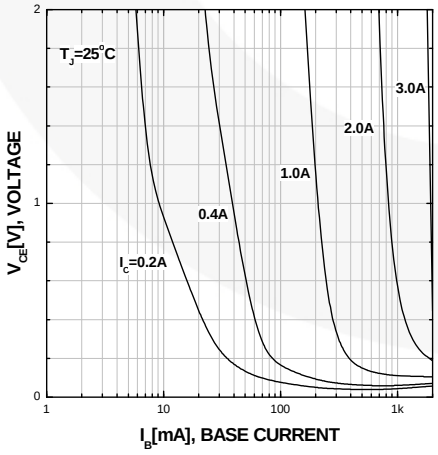


Figure 5. Typical Collector Saturation Voltage

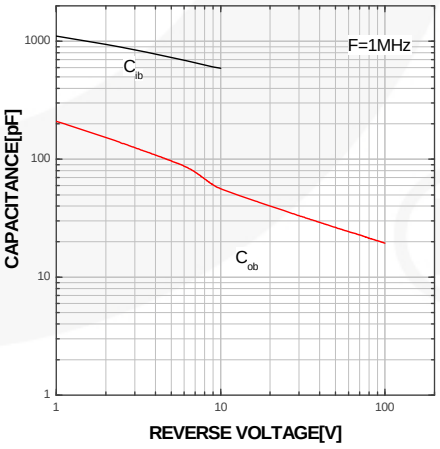


Figure 6. Capacitance

Typical Performance Characteristics (Continued)

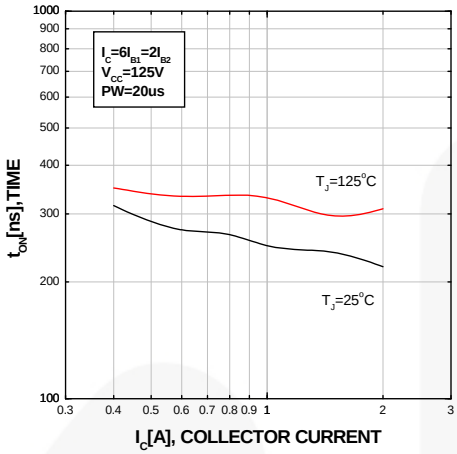


Figure 7. Resistive Switching Time, t_{on}

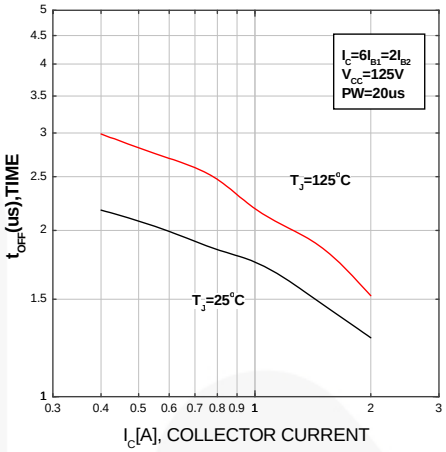


Figure 8. Resistive Switching Time, t_{off}

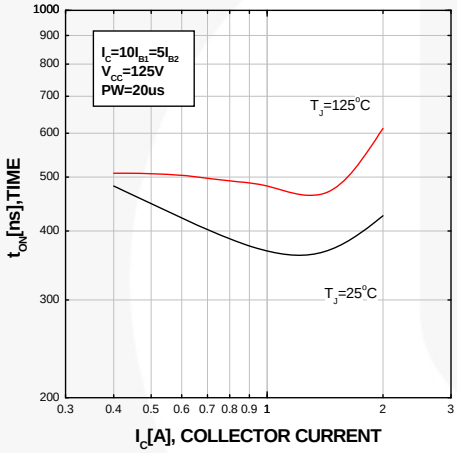


Figure 9. Resistive Switching Time, t_{on}

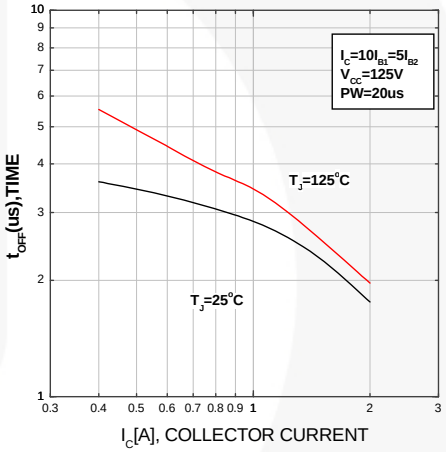


Figure 10. Resistive Switching Time, t_{off}

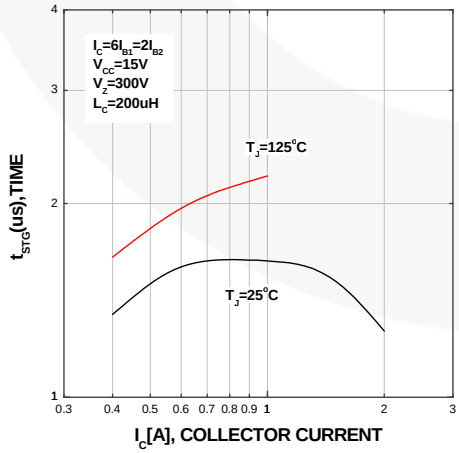


Figure 11. Inductive Switching Time, t_{STG}

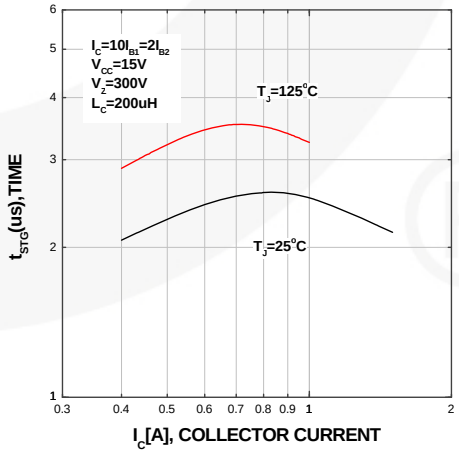


Figure 12. Inductive Switching Time, t_{STG}

Typical Performance Characteristics (Continued)

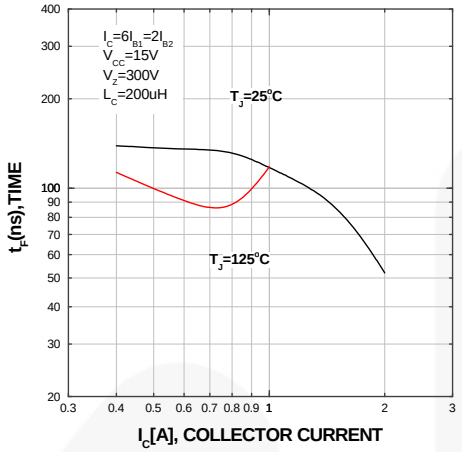


Figure 13. Inductive Switching Time, t_F

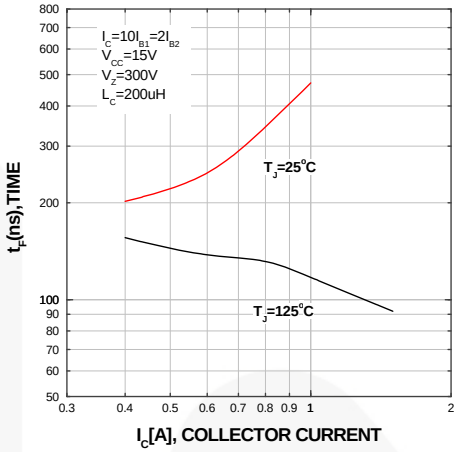


Figure 14. Inductive Switching Time, t_F

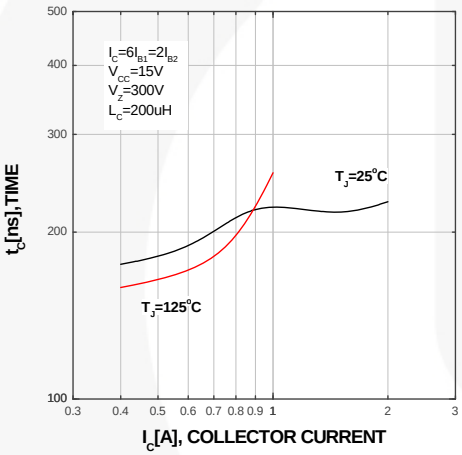


Figure 15. Inductive Switching Time, t_C

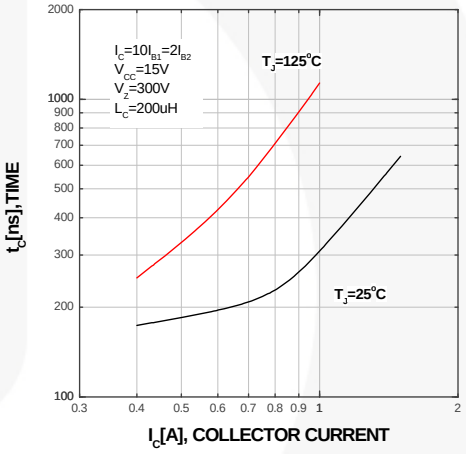


Figure 16. Inductive Switching Time, t_C

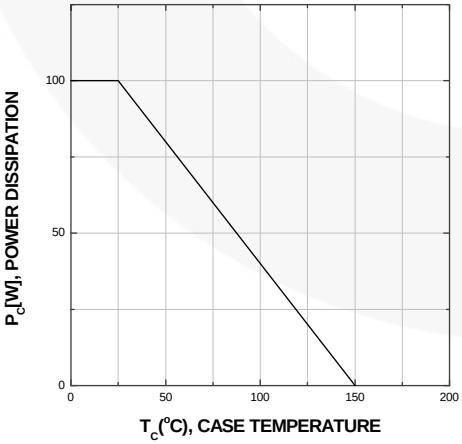
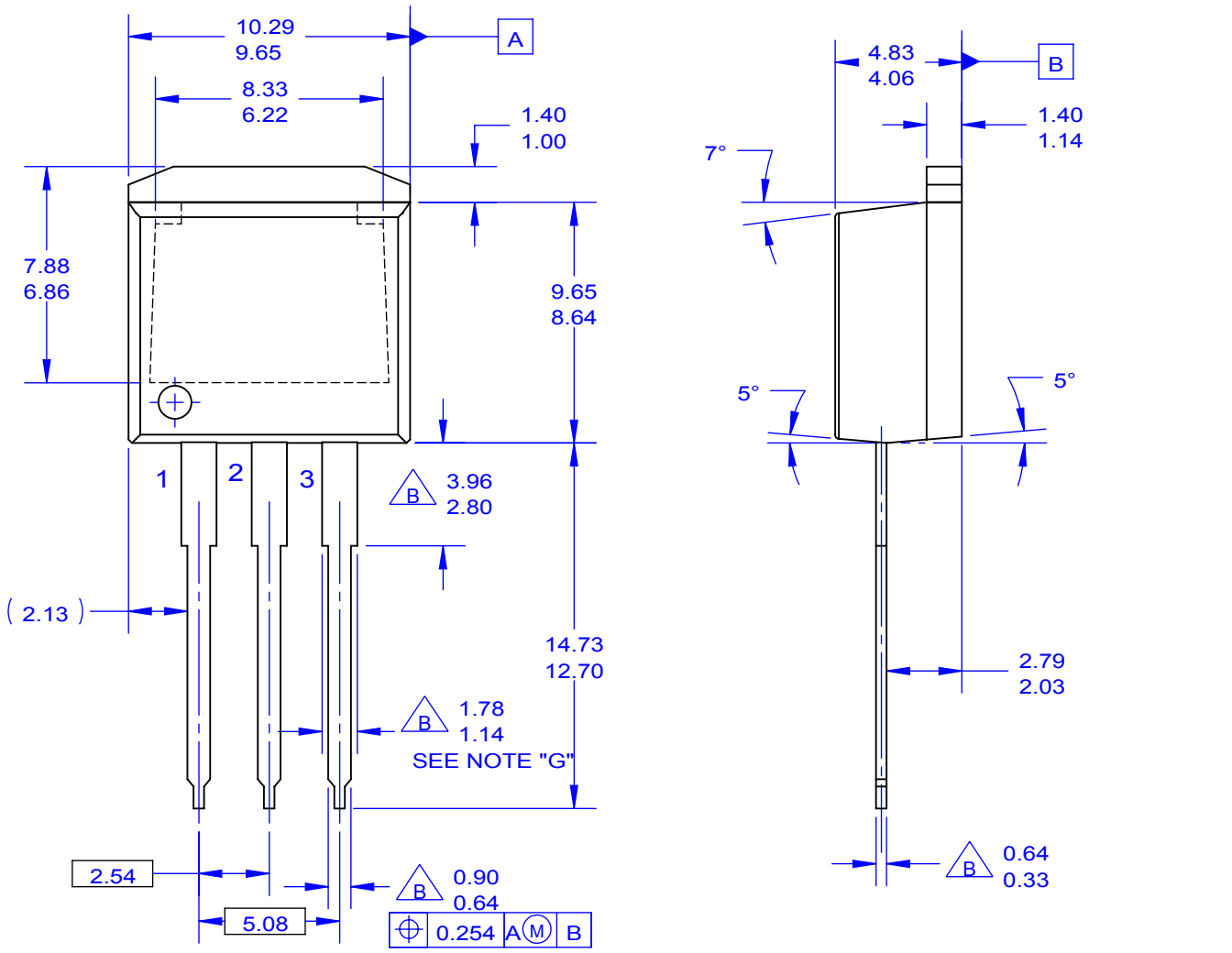


Figure 17. Power Derating



FAIRCHILD ™

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 Y14.5-1994.
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

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

ON Semiconductor:

FJI5603DTU