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.

FAIRCHILD SEMICONDUCTOR®

November 2013

FGA50N100BNTD2
1000 V NPT Trench IGBT

Features

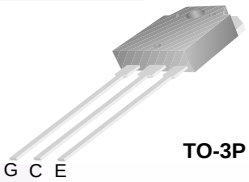
- High Speed Switching
- Low Saturation Voltage : $V_{CE(sat)}$ = 2.5 V @ I_C = 60 A
- High Input Impedance
- Built-in Fast Recovery Diode
- RoHS Compliant

Applications

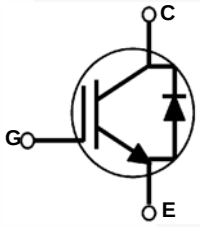
- UPS, Welder

General Description

Using Fairchild's proprietary trench design and advanced NPT technology, the 1000V NPT IGBT offers superior conduction and switching performances, high avalanche ruggedness and easy parallel operation. This device offers the optimum performance for hard switching application such as UPS, welder applications.



TO-3P



Absolute Maximum Ratings

Symbol	Description		Ratings	Unit
V_{CES}	Collector to Emitter Voltage		1000	V
V_{GES}	Gate to Emitter Voltage		± 25	V
I_C	Collector Current	@ T_C = 25°C	50	A
	Collector Current	@ T_C = 100°C	35	A
$I_{CM\ (1)}$	Pulsed Collector Current		200	A
I_F	Diode Continuous Forward Current	@ T_C = 25°C	30	A
	Diode Continuous Forward Current	@ T_C = 100°C	15	A
I_{FM}	Diode Maximum Forward Current		150	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	156	W
	Maximum Power Dissipation	@ T_C = 100°C	63	W
T_J	Operating Junction Temperature		-55 to +150	°C
T_{stg}	Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds		300	°C

Notes:
1: Repetitive rating : Pulse width limited by max. junction temperature

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction to Case	-	0.8	°C/W
$R_{\theta JC}$(DIODE)	Thermal Resistance, Junction to Case	-	1.2	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	40.0	°C/W

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FGA50N100BNTD2	FGA50N100BNTD2	TO-3P	Tube	N/A	N/A	30

Electrical Characteristics of the IGBT T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
BV_{CES}	Collector to Emitter Breakdown Voltage	V_{GE} = 0 V, I_C = 1 mA	1000	-	-	V
I_{CES}	Collector Cut-Off Current	V_{CE} = 1000 V, V_{GE} = 0 V	-	-	1.0	mA
I_{GES}	G-E Leakage Current	V_{GE} = ±25 V, V_{CE} = 0 V	-	-	±500	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 60 mA, V_{CE} = V_{GE}	4.0	5.5	7.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 10 A, V_{GE} = 15 V	-	1.5	1.8	V
		I_C = 60 A, V_{GE} = 15 V		2.5	2.9	V
		I_C = 60 A, V_{GE} = 15 V, T_C = 125°C	-	3.3	-	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 10 V, V_{GE} = 0 V, f = 1 MHz	-	6000	-	pF
C_{oes}	Output Capacitance		-	260	-	pF
C_{res}	Reverse Transfer Capacitance		-	200	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 600 V, I_C = 60 A, R_G = 10 Ω, V_{GE} = 15 V, Inductive Load, T_C = 25°C	-	34	-	ns
t_r	Rise Time		-	68	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	243	-	ns
t_f	Fall Time		-	65	100	ns
Q_g	Total Gate Charge	V_{CE} = 600 V, I_C = 60 A, V_{GE} = 15 V, T_C = 25°C	-	257	350	nC
Q_{ge}	Gate to Emitter Charge		-	45	-	nC
Q_{gc}	Gate to Collector Charge		-	95	-	nC

Electrical Characteristics of the Diode T_C = 25°C unless otherwise noted

V_{FM}	Diode Forward Voltage	I_F = 15 A	-	2.9	3.2	V
		I_F = 60 A	-	4.0	4.7	V
t_{rr}	Diode Reverse Recovery Time	I_F = 60 A, di_F/dt = 100 A/us	-	60	75	ns
I_R	Instantaneous Reverse Current	V_{RRM} = 1000 V	-	-	2	μA

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

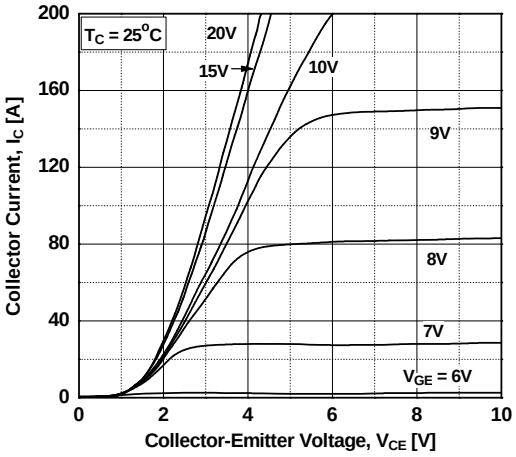


Figure 2. Typical Output Characteristics

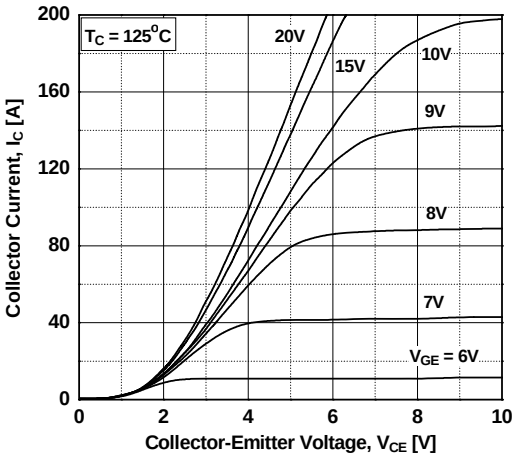


Figure 3. Typical Saturation Voltage Characteristics

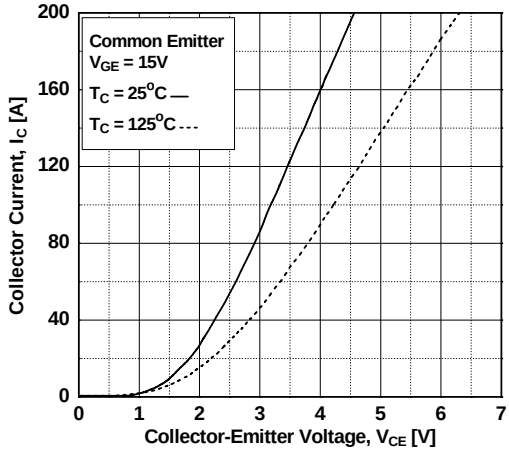


Figure 4. Transfer Characteristics

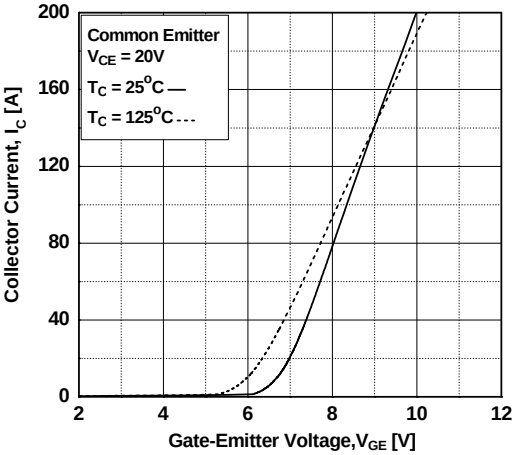


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

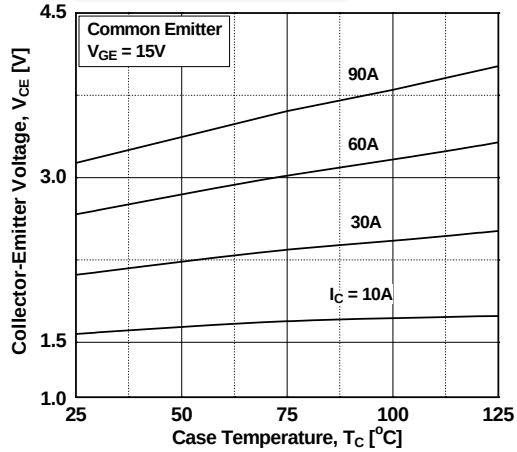
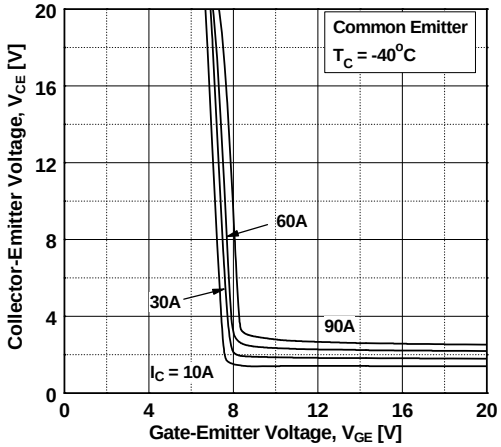


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics

Figure 7. Saturation Voltage vs. V_{GE}

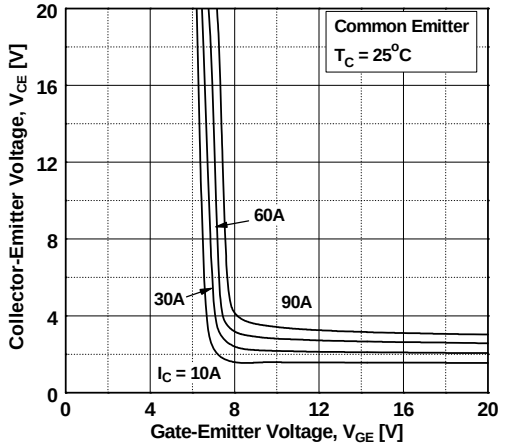


Figure 8. Saturation Voltage vs. V_{GE}

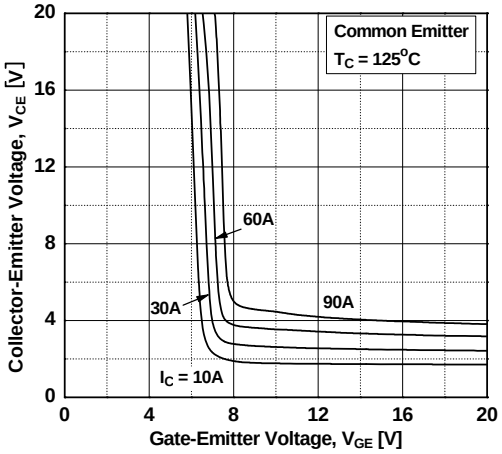


Figure 9. Capacitance Characteristics

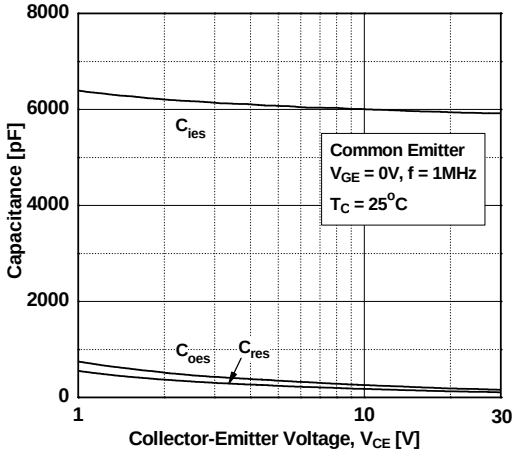


Figure 10. Gate charge Characteristics

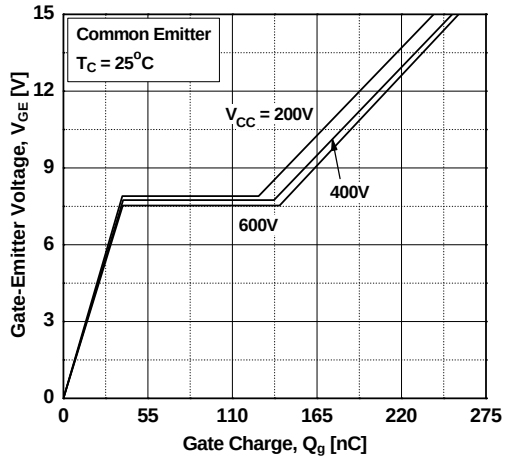


Figure 11. SOA Characteristics

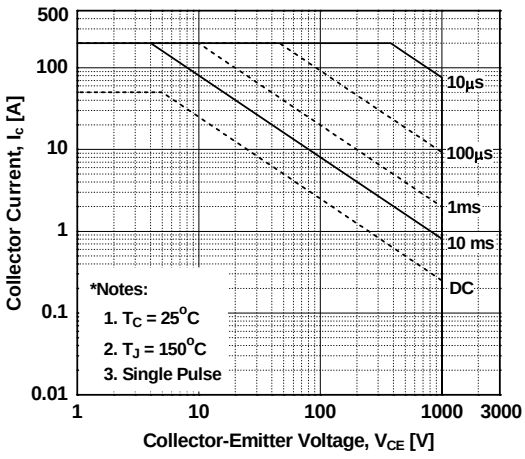
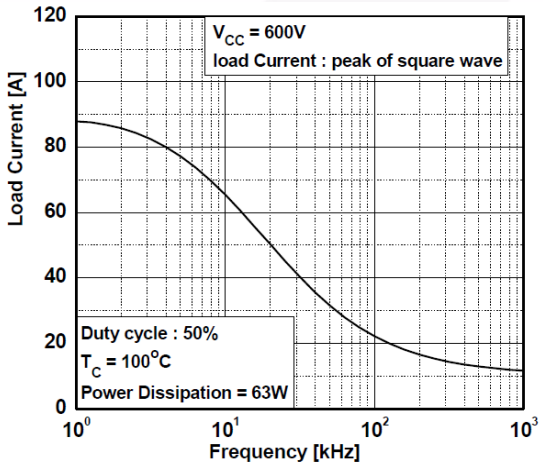


Figure 12. Load Current vs. Frequency



Typical Performance Characteristics

Figure 13. Turn-on Characteristics vs. Gate Resistance

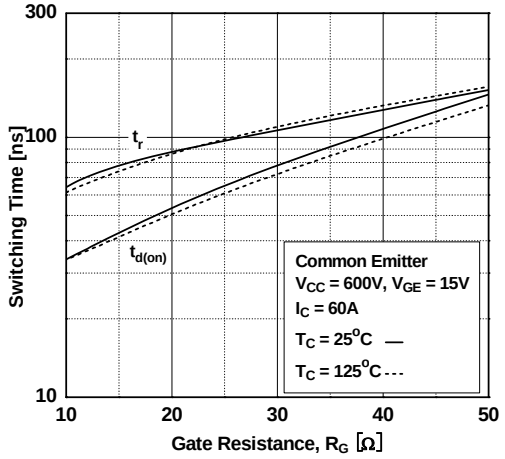


Figure 14. Turn-off Characteristics vs. Gate Resistance

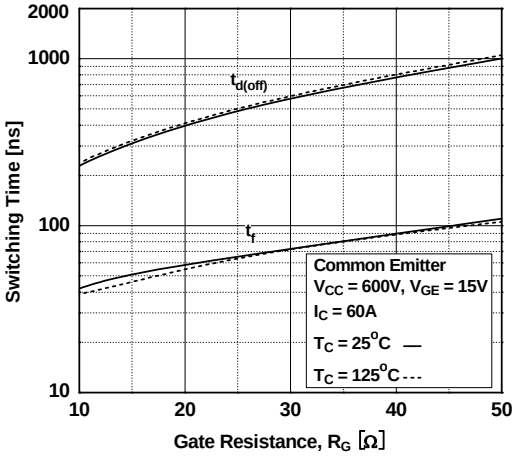


Figure 15. Turn-on Characteristics vs. Collector Current

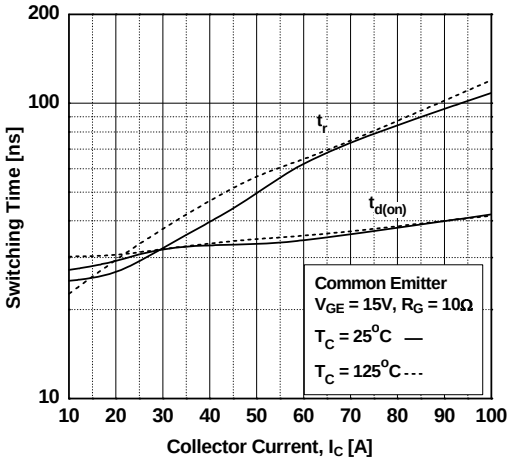


Figure 16. Turn-off Characteristics vs. Collector Current

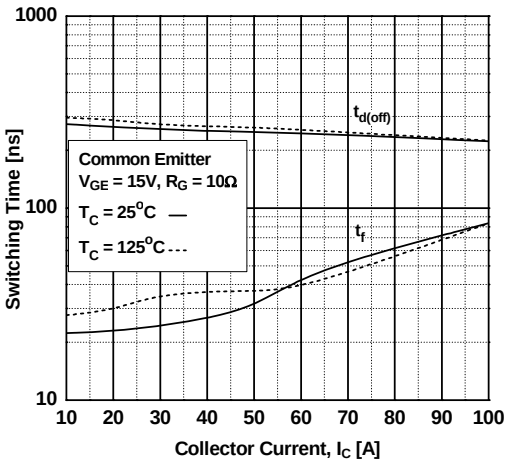


Figure 17. Switching Loss vs. Gate Resistance

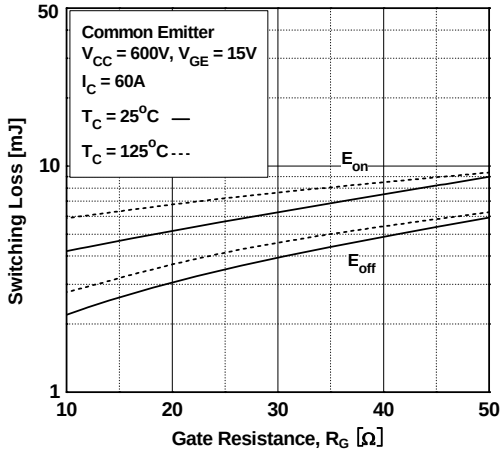
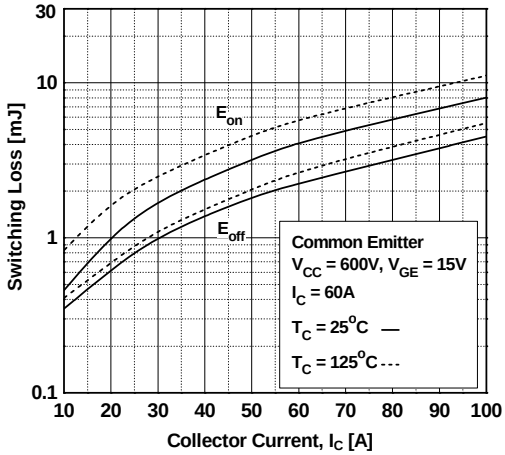


Fig 18. Switching Loss vs. Collector Current



Typical Performance Characteristics

Figure 19. Turn off Switching SOA Characterisics

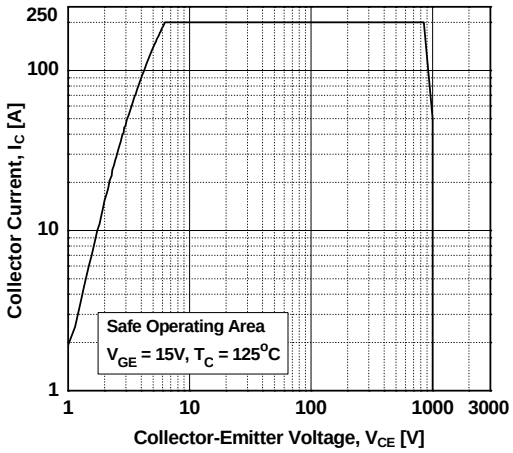


Figure 20. Forward Characteristics

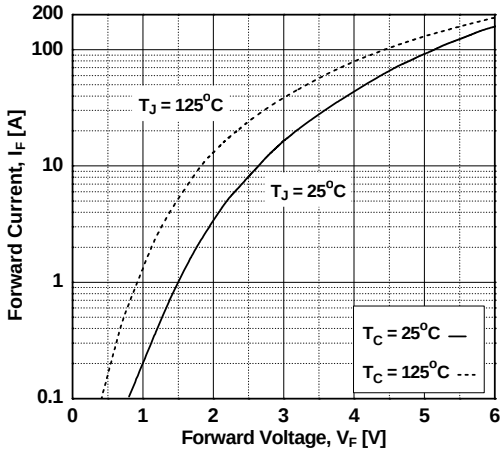


Figure 21. Reverse Current

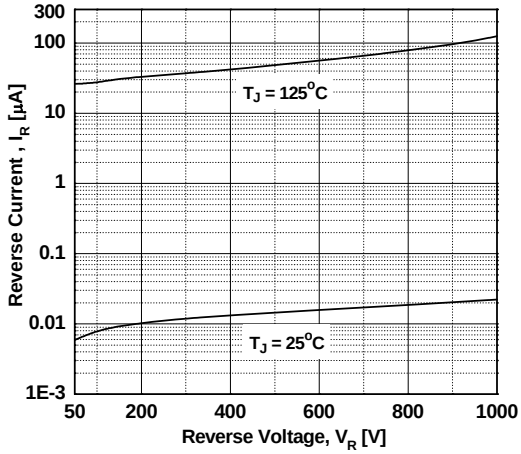


Figure 22. Reverse Recovery Characteristics vs. di_F/dt

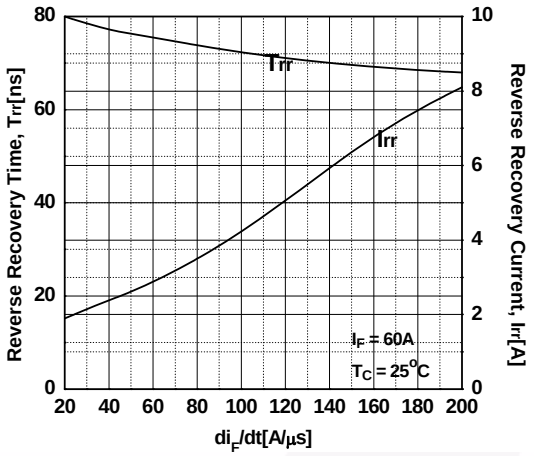
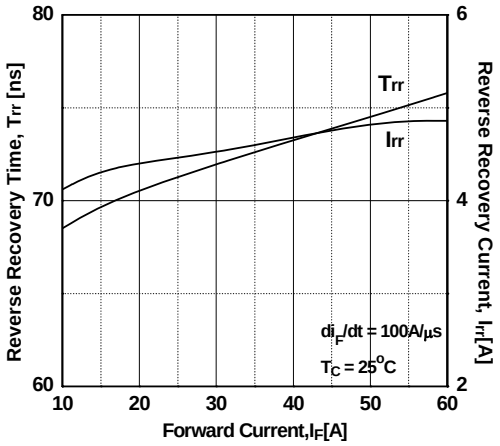
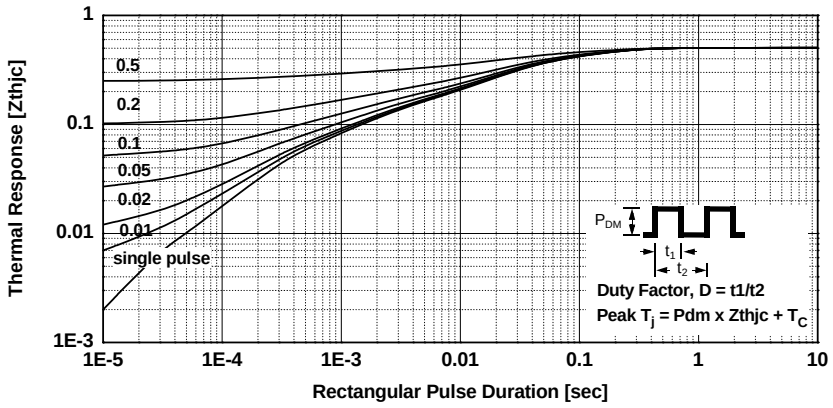


Figure 23. Reverse Recovery Characteristics vs. Forward Current



Typical Performance Characteristics

Figure 24.Transient Thermal Impedance of IGBT



Mechanical Dimensions

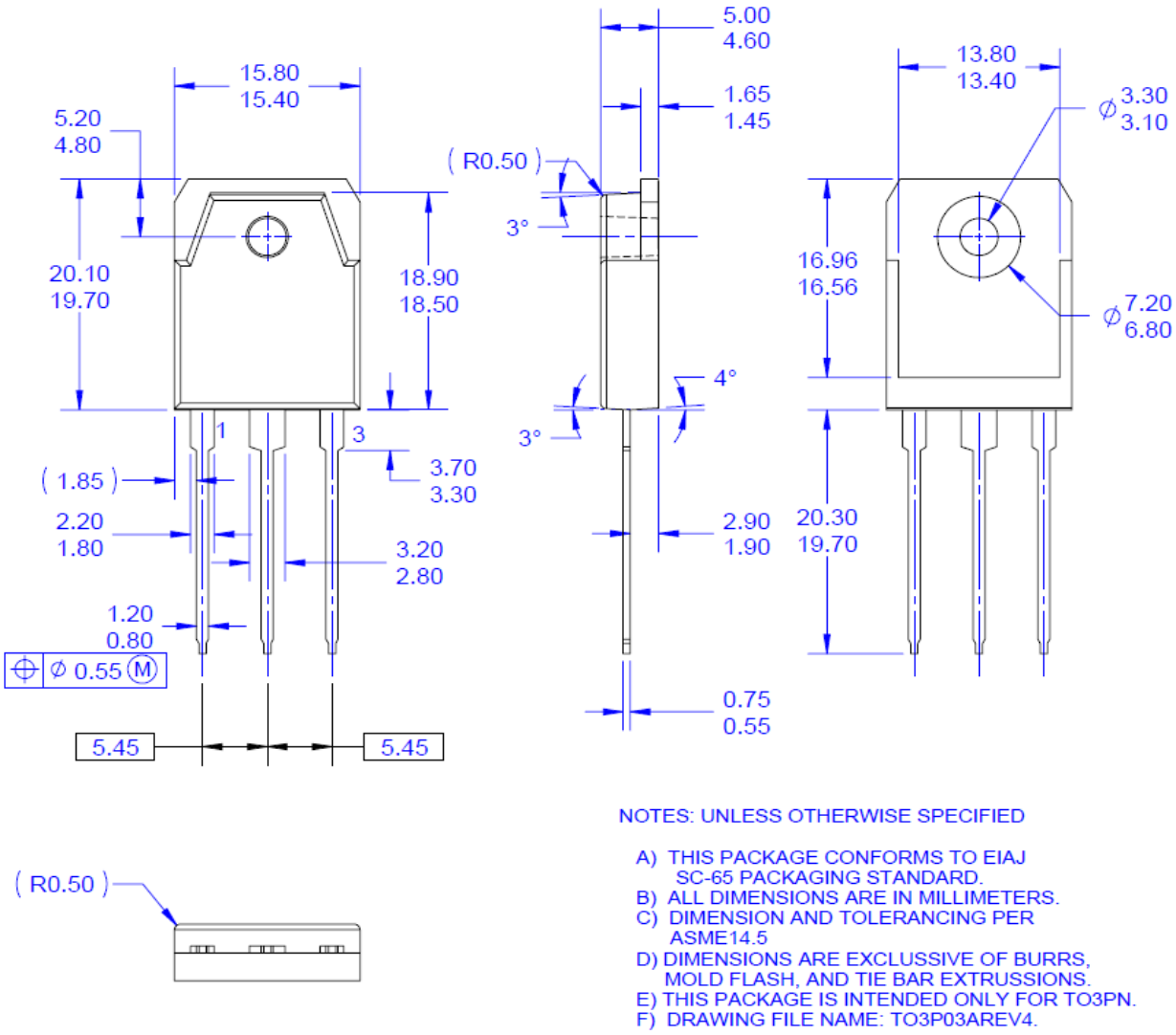


Figure 25. TO-3P 3L - 3LD, T03, PLASTIC, EIAJ SC-65

Package drawings are provided as a service to customers considering Fairchild components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a Fairchild Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of Fairchild's worldwide terms and conditions, specifically the warranty therein, which covers Fairchild products.

Always visit Fairchild Semiconductor's online packaging area for the most recent package drawings:

http://www.fairchildsemi.com/package/packageDetails.html?id=PN_TT3P0-003

FAIRCHILD SEMICONDUCTOR®

TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™
AX-CAP®*
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficentMax™
ESBC™
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FAST®
FastvCore™
FETBench™
FPS™
F-PFS™
FRFET®
Global Power Resource℠
GreenBridge™
Green FPS™
Green FPS™ e-Series™
G*max*™
GTO™
IntelliMAX™
ISOPLANAR™
Marking Small Speakers Sound Louder and Better™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
mWSaver®
OptoHiT™
OPTOLOGIC®
OPTOPLANAR®
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
Solutions for Your Success™
SPM®
STEALTH™
SuperFET®
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SupreMOS®
SyncFET™
Sync-Lock™
SYSTEM GENERAL ®*
TinyBoost®
TinyBuck®
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TranSiC™
TriFault Detect™
TRUECURRENT®*
μSerDes™
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
VoltagePlus™
XS™

*Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used here in:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.Fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufactures of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed application, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handing and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address and warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I66

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

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for IGBT Transistors ***category:***

Click to view products by ON Semiconductor ***manufacturer:***

Other Similar products are found below :

748152A APT20GT60BRDQ1G APT50GT60BRG NGTB10N60FG STGFW20V60DF APT30GP60BG APT45GR65B2DU30 GT50JR22(STA1ES) TIG058E8-TL-H VS-CPV364M4KPBF NGTB25N120FL2WAG NGTG40N120FL2WG RJH60F3DPQ-A0#T0 APT40GR120B2SCD10 APT15GT120BRG APT20GT60BRG NGTB75N65FL2WAG NGTG15N120FL2WG IXA30RG1200DHGLB IXA40RG1200DHGLB APT70GR65B2DU40 NTE3320 IHFW40N65R5SXKSA1 APT70GR120J APT35GP120JDQ2 IKZA40N65RH5XKSA1 IKFW75N65ES5XKSA1 IKFW50N65ES5XKSA1 IKFW50N65EH5XKSA1 IKFW40N65ES5XKSA1 IKFW60N65ES5XKSA1 IMBG120R090M1HXTMA1 IMBG120R220M1HXTMA1 XD15H120CX1 XD25H120CX0 XP15PJS120CL1B1 IGW30N60H3FKSA1 STGWA8M120DF3 IGW08T120FKSA1 IGW75N60H3FKSA1 HGTG40N60B3 FGH60N60SMD_F085 FGH75T65UPD STGWA15H120F2 IKA10N60TXKSA1 IHW20N120R5XKSA1 RJH60D2DPP-M0#T2 IKP20N60TXKSA1 IHW20N65R5XKSA1 IDW40E65D2FKSA1