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ON Semiconductor®

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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

FGH30T65UPDT
650V, 30A Field Stop Trench IGBT

Features

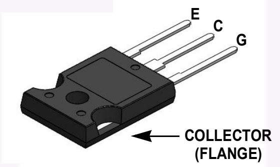
- Maximum Junction Temperature : $T_J = 175^oC$
- Positive Temperaure Co-efficient for Easy Parallel Operating
- High Current Capability
- Low Saturation Voltage: $V_{CE(sat)} = 1.65$ V (Typ.) @ $I_C = 30$ A
- 100% of Parts Tested $I_{LM(2)}$
- High Input Impedance
- Tightened Parameter Distribution
- RoHS Compliant
- Short Circuit Ruggedness > 5 us @ 25^oC

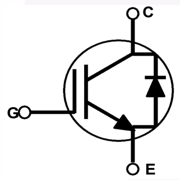
General Description

Using novel field stop trench IGBT technology, Fairchild's new series of field stop trench IGBTs offer the optimum performance for solar inverter , UPS and digital power generator where low conduction and switching losses are essential.

Applications

- Solar Inverter, UPS, Digital Power Generator





Absolute Maximum Ratings

Symbol	Description		Ratings	Unit
V_{CES}	Collector to Emitter Voltage		650	V
V_{GES}	Gate to Emitter Voltage		± 20	V
	Transient Gate to Emitter Voltage		± 25	V
I_C	Collector Current	@ $T_C = 25^oC$	60	A
	Collector Current	@ $T_C = 100^oC$	30	A
$I_{CM(1)}$	Pulsed Collector Current		90	A
$I_{LM(2)}$	Clamped Inductive Load Current		90	A
I_F	Diode Forward Current	@ $T_C = 25^oC$	60	A
	Diode Forward Current	@ $T_C = 100^oC$	30	A
$I_{FM(1)}$	Pulsed Diode Maximum Forward Current		150	A
P_D	Maximum Power Dissipation	@ $T_C = 25^oC$	250	W
	Maximum Power Dissipation	@ $T_C = 100^oC$	125	W
SCWT	Short Circuit Withstand Time	@ $T_C = 25^oC$	5	us
T_J	Operating Junction Temperature		-55 to +175	^oC
T_{stg}	Storage Temperature Range		-55 to +175	^oC
T_L	Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds		300	^oC

Notes:
1: Repetitive rating: Pulse width limited by max. junction temperature
2: $I_C = 90$ A, $V_{CC} = 400$ V, $R_g = 20\ \Omega$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction to Case	-	0.60	$^oC/W$
$R_{\theta JC}$(Diode)	Thermal Resistance, Junction to Case	-	1.2	$^oC/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	40	$^oC/W$

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FGH30T65UPD_F155	FGH30T65UPD	TO-247 G03	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	650	-	-	V
$\frac{\Delta BV_{CES}}{\Delta T_J}$	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0 V, I_C = 250 uA	-	0.65	-	V/^{o}C
I_{CES}	Collector Cut-Off Current	$V_{CE} = V_{CES}$, V_{GE} = 0 V	-	-	250	µA
I_{GES}	G-E Leakage Current	$V_{GE} = V_{GES}$, V_{CE} = 0 V	-	-	±400	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 30 mA, $V_{CE} = V_{GE}$	4.0	6.0	7.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 30 A, V_{GE} = 15 V	-	1.65	2.3	V
		I_C = 30 A, V_{GE} = 15 V, T_C = 175^{o}C	-	2.1	-	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30 V, V_{GE} = 0 V, f = 1 MHz	-	2280	-	pF
C_{oes}	Output Capacitance		-	85	-	pF
C_{res}	Reverse Transfer Capacitance		-	40	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 400 V, I_C = 30 A, R_G = 8 Ω, V_{GE} = 15 V, Inductive Load, T_C = 25^{o}C	-	22	-	ns
t_r	Rise Time		-	26	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	139	-	ns
t_f	Fall Time		-	18	-	ns
E_{on}	Turn-On Switching Loss		-	0.76	-	mJ
E_{off}	Turn-Off Switching Loss		-	0.40	-	mJ
E_{ts}	Total Switching Loss		-	1.16	-	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 400 V, I_C = 30 A, R_G = 8 Ω, V_{GE} = 15V, Inductive Load, T_C = 175^{o}C	-	22	-	ns
t_r	Rise Time		-	30	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	151	-	ns
t_f	Fall Time		-	19	-	ns
E_{on}	Turn-On Switching Loss		-	1.20	-	mJ
E_{off}	Turn-Off Switching Loss		-	0.53	-	mJ
E_{ts}	Total Switching Loss		-	1.73	-	mJ
Tsc	Short Circuit Withstand Time	V_{GE} = 15 V, $V_{CC} \leq$ 400 V, Rg = 10 Ω	5	-	-	us
Q_g	Total Gate Charge	V_{CE} = 400 V, I_C = 30 A, V_{GE} = 15 V	-	155	-	nC
Q_{ge}	Gate to Emitter Charge		-	21	-	nC
Q_{gc}	Gate to Collector Charge		-	91	-	nC

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

Symbol	Parameter	Test Conditions		Min.	Typ.	Max	Unit
V_{FM}	Diode Forward Voltage	I_F = 30 A	T_C = 25^{o}C	-	2.3	3.0	V
			T_C = 175^{o}C	-	1.9	-	
E_{rec}	Reverse Recovery Energy	I_F = 30 A, di_F/dt = 200 A/μs	T_C = 175^{o}C	-	35	-	uJ
t_{rr}	Diode Reverse Recovery Time		T_C = 25^{o}C	-	33	43	ns
			T_C = 175^{o}C	-	148		
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25^{o}C	-	57	80	nC
			T_C = 175^{o}C	-	560		

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

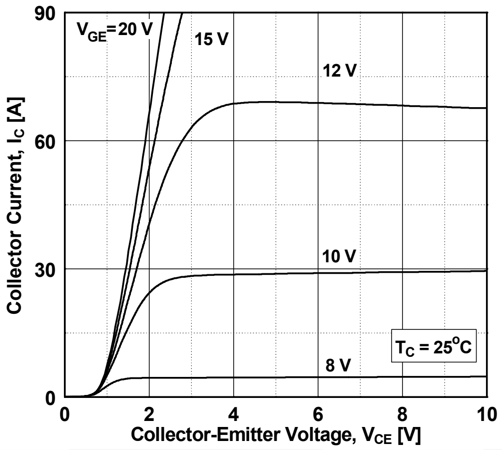


Figure 2. Typical Output Characteristics

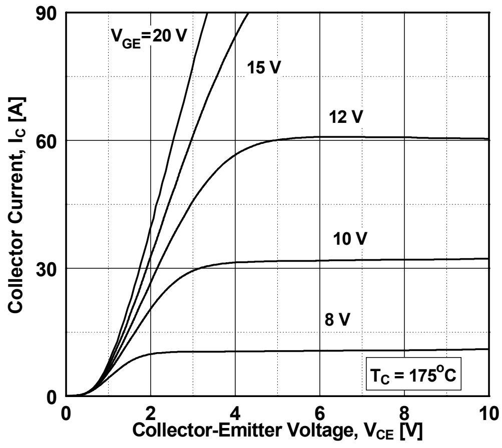


Figure 3. Typical Saturation Voltage Characteristics

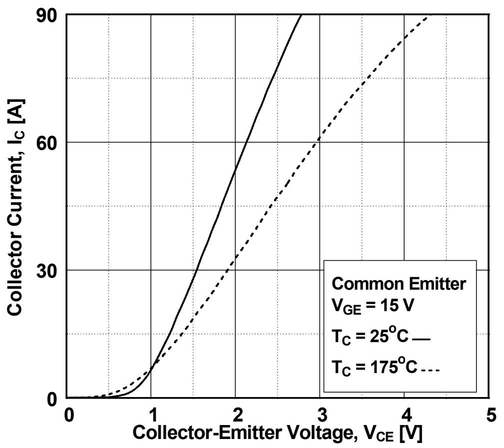


Figure 4. Saturation Voltage vs. Case Temperature at Variant Current Leve

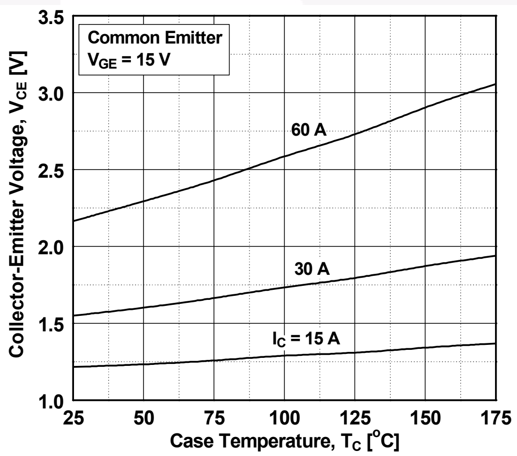


Figure 5. Saturation Voltage vs. V_{GE}

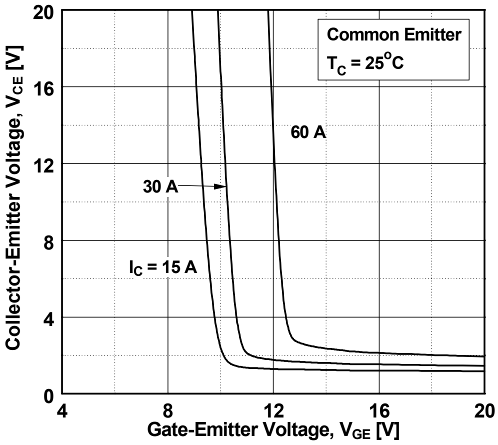
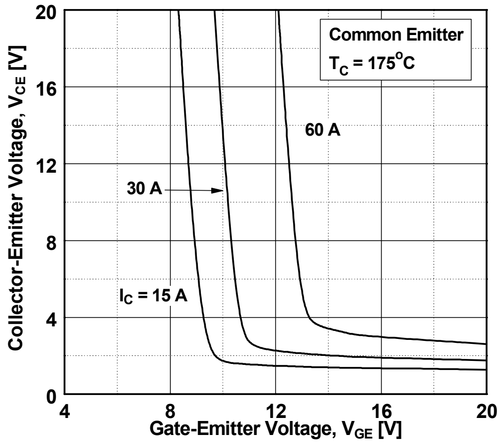


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics

Figure 7. Capacitance Characteristic

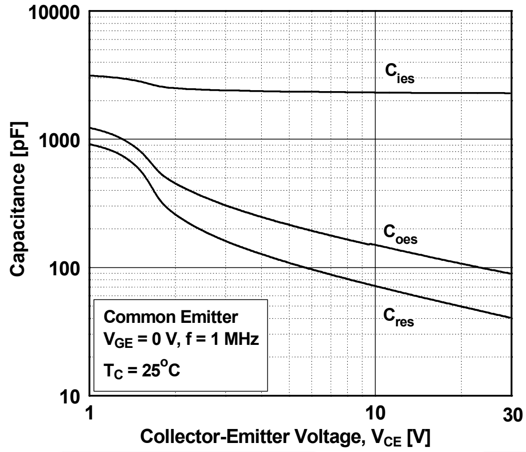


Figure 8. Gate charge Characteristics

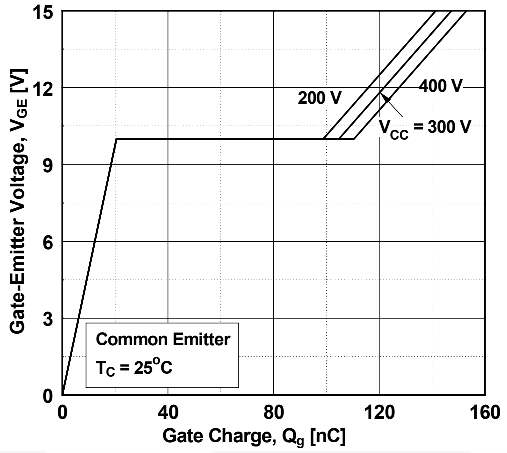


Figure 9. Turn-on Characteristics vs. Gate Resistance

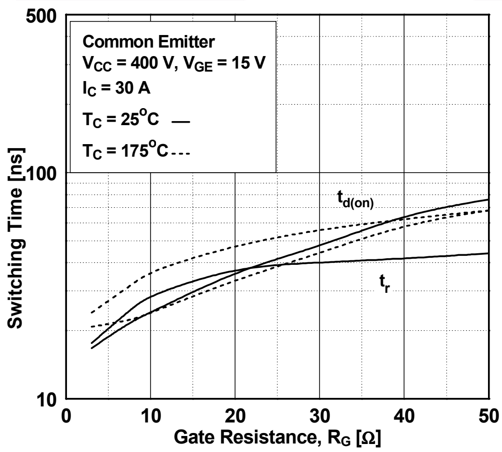


Figure 10. Turn-off Characteristics vs. Gate Resistance

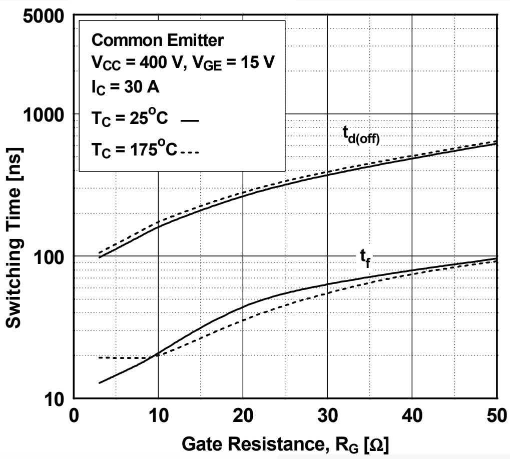


Figure 11. Switching Loss vs. Gate Resistance

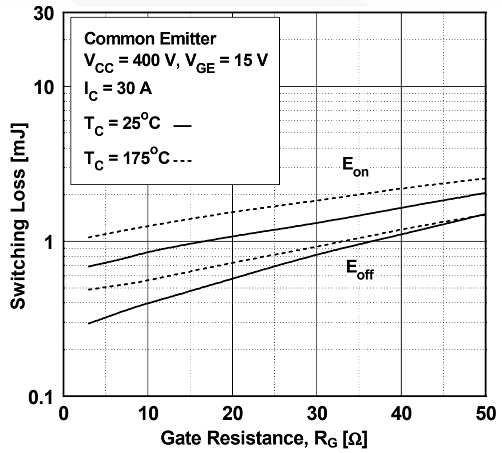
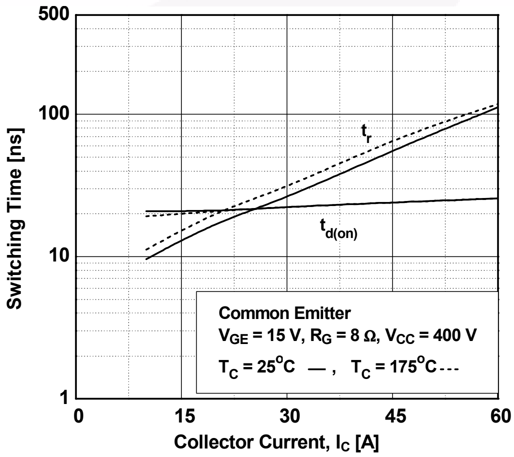


Figure 12. Turn-on Characteristics vs. Collector Current



Typical Performance Characteristics

Figure 13. Turn-off Characteristics vs. Collector Current

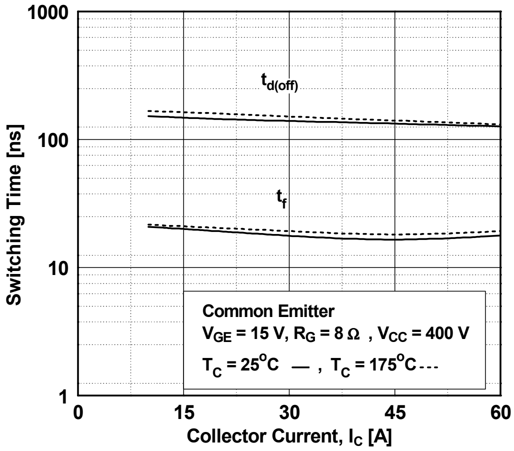


Figure 14. Switching Loss vs. Collector Current

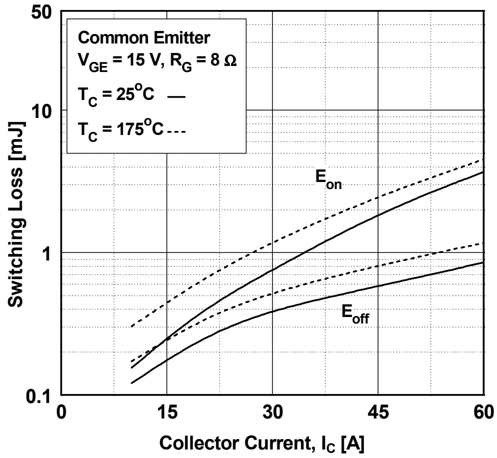


Figure 15. Load Current vs. Frequency

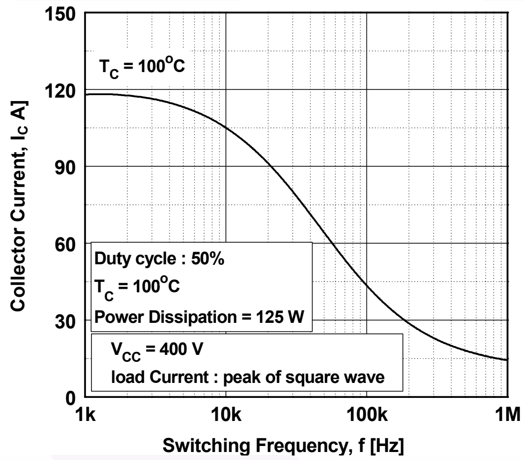


Figure 16. SOA Characteristics

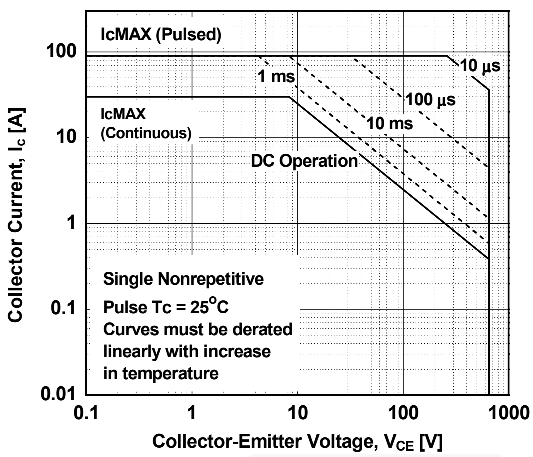


Figure 17. Forward Characteristics

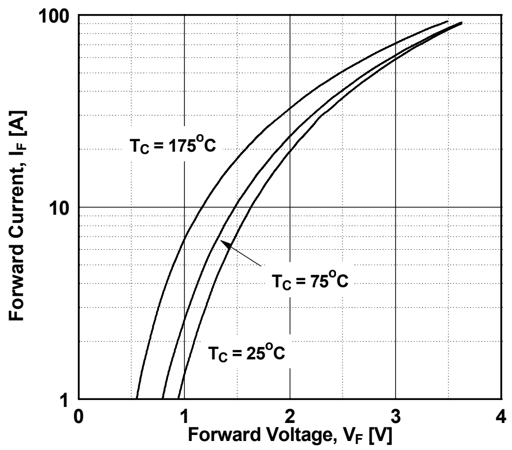
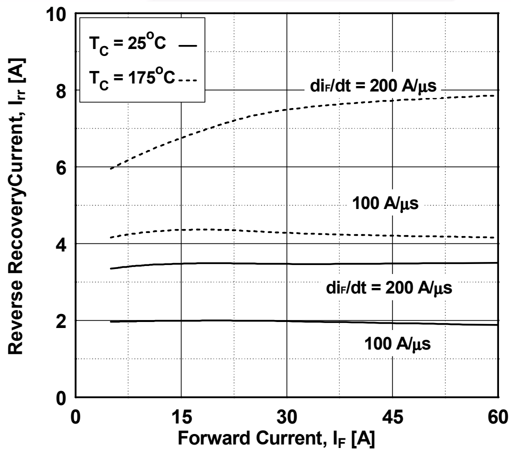


Figure 18. Reverse Revovery Current



Typical Performance Characteristics

Figure 19. Reverse Recovery Time

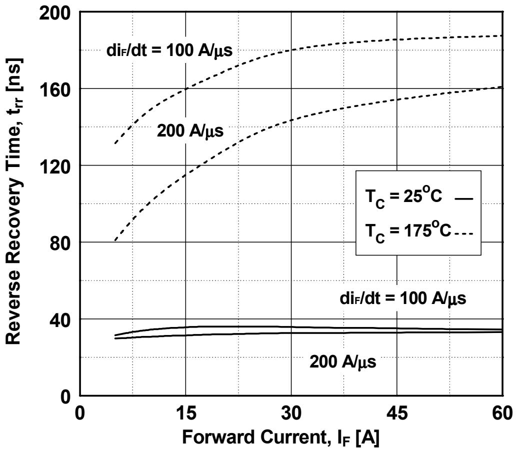


Figure 20. Stored Charge

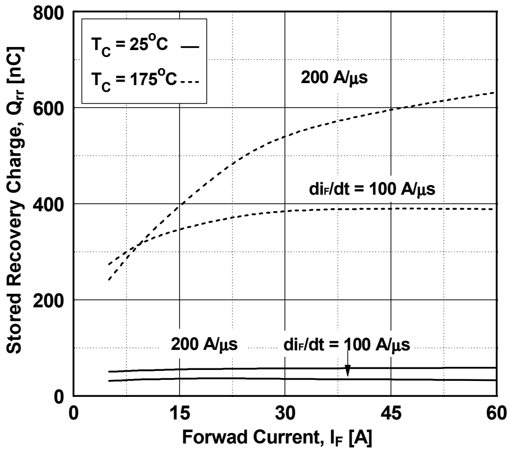


Figure 21. Transient Thermal Impedance of IGBT

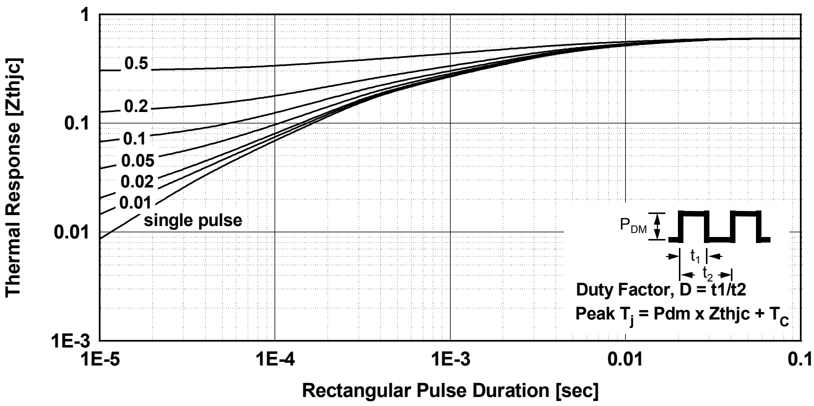
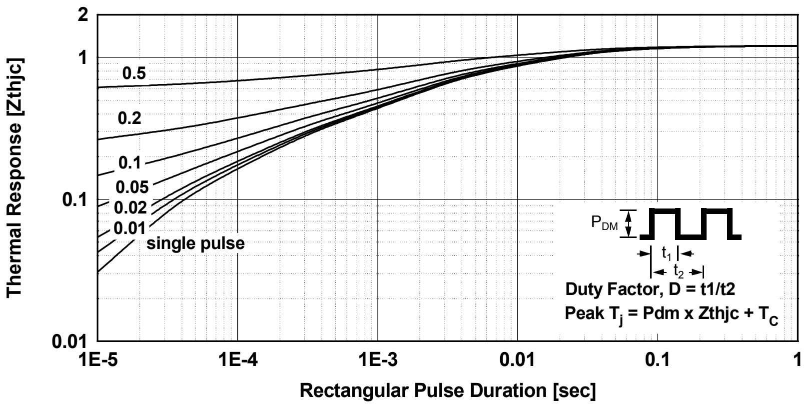
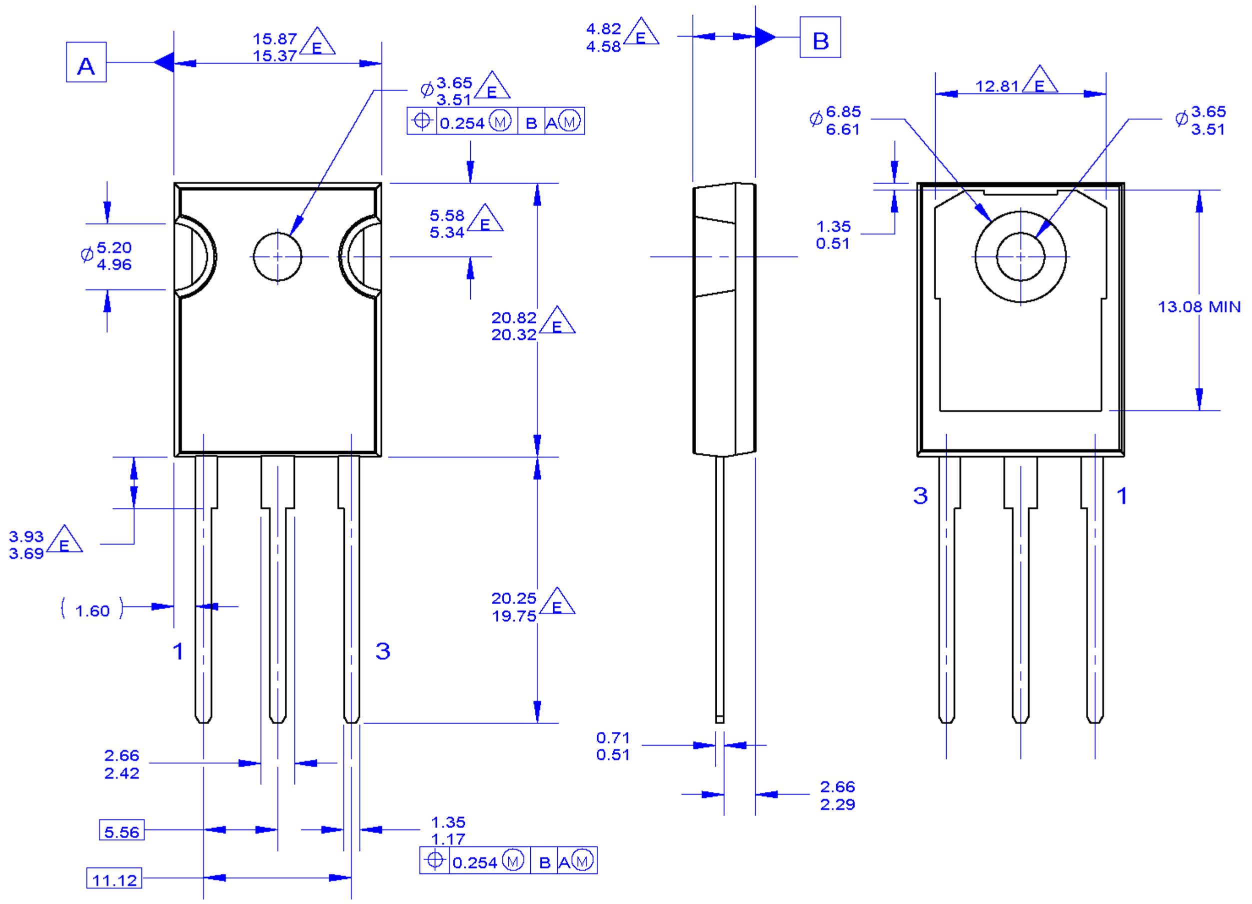


Figure 22. Transient Thermal Impedance of Diode



Mechanical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED.

A. PACKAGE REFERENCE: JEDEC TO-247, ISSUE E, VARIATION AB, DATED JUNE, 2004.
B. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DRAWING CONFORMS TO ASME Y14.5 - 1994

E DOES NOT COMPLY JEDEC STANDARD VALUE
F. DRAWING FILENAME: MKT-TO247G03_REV01

Figure 23. TO247, Molded, 3-Lead, JEDEC AB Long Lead

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.

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http://www.fairchildsemi.com/package/packageDetails.html?id=PN_TO247-0A3

Dimensions in Millimeters

FAIRCHILD SEMICONDUCTOR®

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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.

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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

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Email: orderlit@onsemi.com

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ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

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- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
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- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
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- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru

www.lifeelectronics.ru