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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.

November 2015

FGD5T120SH
1200 V, 5 A FS Trench IGBT

Features

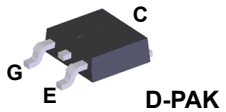
- FS Trench Technology, Positive Temperature Coefficient
- High Speed Switching
- Low Saturation Voltage: $V_{CE(sat)}$ =2.9 V @ I_C = 5 A
- 100% of the Parts tested for I_{LM}(1)
- High Input Impedance
- RoHS Compliant

General Description

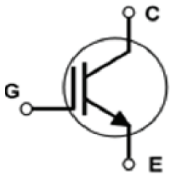
Using novel field stop IGBT technology, Fairchild's new series of field stop 3rd generation IGBTs offer the optimum performance for inrush current limitation, lighting and home appliance applications.

Applications

- Inrush current limitation
- Lighting
- Home appliances



D-PAK



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Description		FGD5T120SH	Unit
V_{CES}	Collector to Emitter Voltage		1200	V
V_{GES}	Gate to Emitter Voltage		±25	V
	Transient Gate to Emitter Voltage		±30	V
I_C	Collector Current	@ T_C = 25°C	10	A
	Collector Current	@ T_C = 100°C	5	A
I_{LM} (1)	Clamped Inductive Load Current	@ T_C = 25°C	12.5	A
I_{CM} (2)	Pulsed Collector Current		12.5	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	69	W
	Maximum Power Dissipation	@ T_C = 100°C	28	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. Vcc = 600 V, V_{GE} = 15 V, I_C = 12.5 A, R_G = 50 Ω, Inductive Load
2. Limited by Tjmax

Thermal Characteristics

Symbol	Parameter	FGD5T120SH	Unit
$R_{\theta JC}$ (IGBT)	Thermal Resistance, Junction to Case, Max.	1.8	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max. (3)	50	°C/W

Notes : 3. Mounted on 1" squre PCB (FR4 or G-10 material)

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Qty per Tube
FGD5T120SH	FGD5T120SH	TO-252 A03	380 mm	16 mm	2500

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 = 250 uA	1200	-	-	V
ΔBV_{CES} / ΔT_J	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0 V, I_C = 250 uA	-	1.2	-	V/°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 = 5 mA, V_{CE} = V_{GE}	2.5	3.5	4.5	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 5 A, V_{GE} = 15 V	-	2.9	3.6	V
		I_C = 5 A, V_{GE} = 15 V, T_C = 150°C	-	4.5	-	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30 V, V_{GE} = 0 V, f = 1 MHz	-	209	-	pF
C_{oes}	Output Capacitance		-	11	-	pF
C_{res}	Reverse Transfer Capacitance		-	2	-	pF
Switching Characteristics						
$T_{d(on)}$	Turn-On Delay Time	V_{CC} = 600 V, I_C = 5 A, R_G = 30 Ω, V_{GE} = 15 V, Inductive Load, T_C = 25°C	-	4.8	-	ns
T_r	Rise Time		-	20.8	-	ns
$T_{d(off)}$	Turn-Off Delay Time		-	24.8	-	ns
T_f	Fall Time		-	104	-	ns
E_{on}	Turn-On Switching Loss		-	247	-	uJ
E_{off}	Turn-Off Switching Loss		-	94	-	uJ
E_{ts}	Total Switching Loss		-	341	-	uJ
$T_{d(on)}$	Turn-On Delay Time	V_{CC} = 600 V, I_C = 5 A, R_G = 30 Ω, V_{GE} = 15 V, Inductive Load, T_C = 150°C	-	4.8	-	ns
T_r	Rise Time		-	40	-	ns
$T_{d(off)}$	Turn-Off Delay Time		-	25.6	-	ns
T_f	Fall Time		-	134	-	ns
E_{on}	Turn-On Switching Loss		-	393	-	uJ
E_{off}	Turn-Off Switching Loss		-	114	-	uJ
E_{ts}	Total Switching Loss		-	507	-	uJ
Q_g	Total Gate Charge	V_{CC} = 600 V, I_C = 5 A, V_{GE} = 15 V	-	6.7	-	nC
Q_{ge}	Gate to Emitter Charge		-	1.8	-	nC
Q_{gc}	Gate to Emitter Charge		-	2.6	-	nC

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

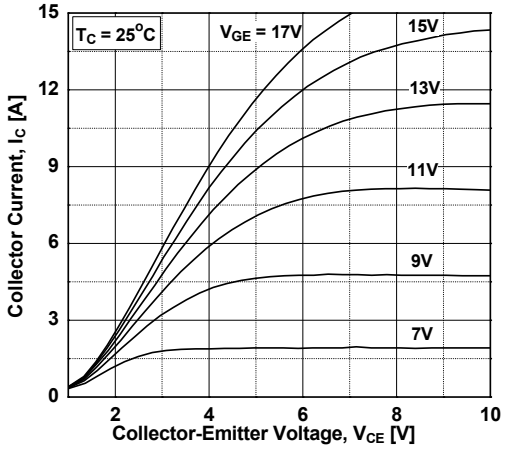


Figure 2. Typical Output Characteristics

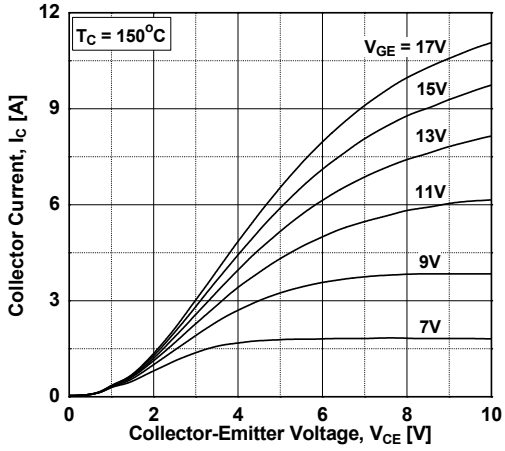


Figure 3. Typical Saturation Voltage Characteritics

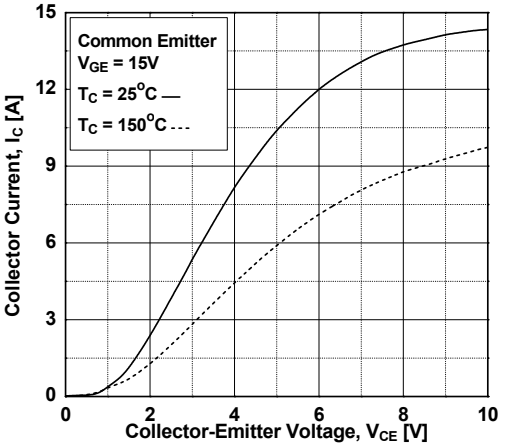


Figure 4. Transfer Characteristics

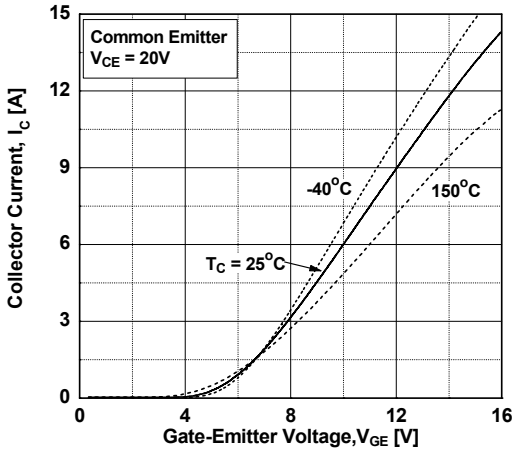


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

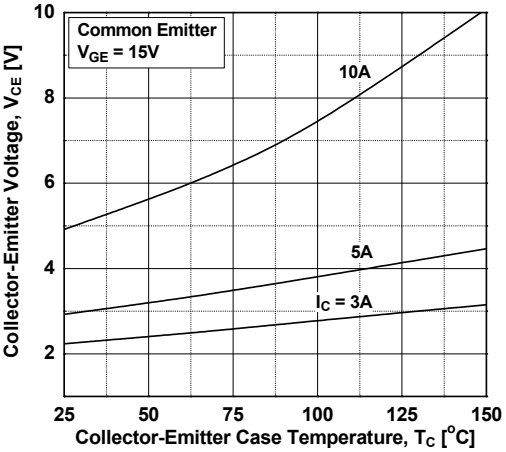
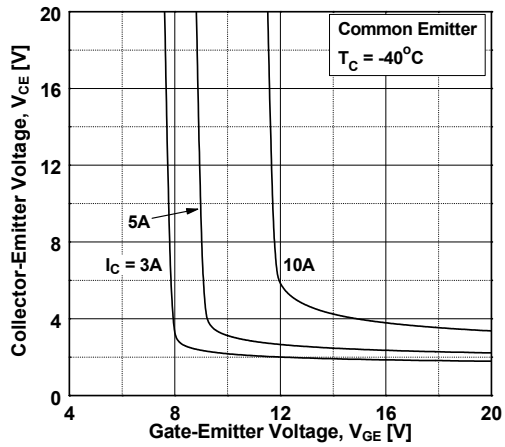


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics

Figure 7. Saturation Voltage vs. V_{GE}

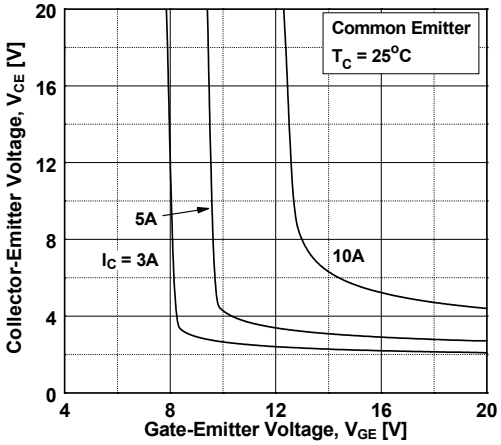


Figure 8. Saturation Voltage vs. V_{GE}

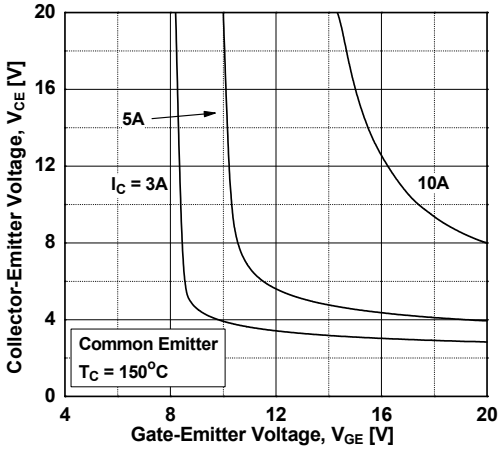


Figure 9. Capacitance Characteristics

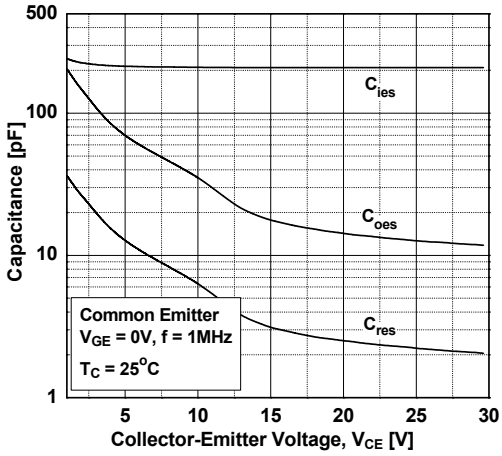


Figure 10. Gate Charge Characteristics

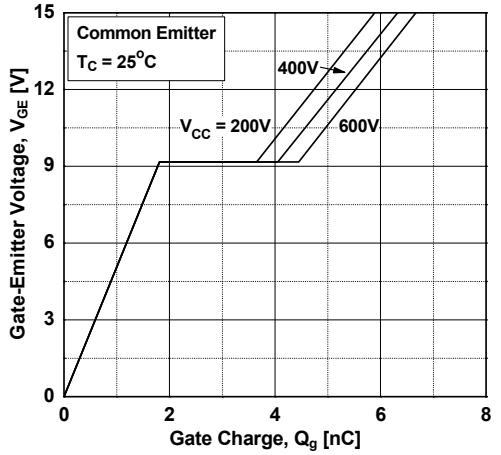


Figure 11. SOA Characteristics

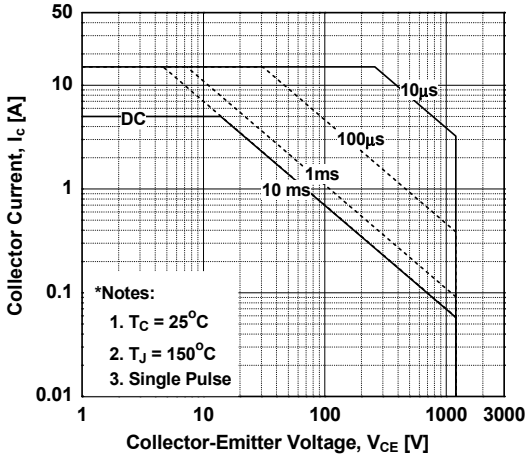
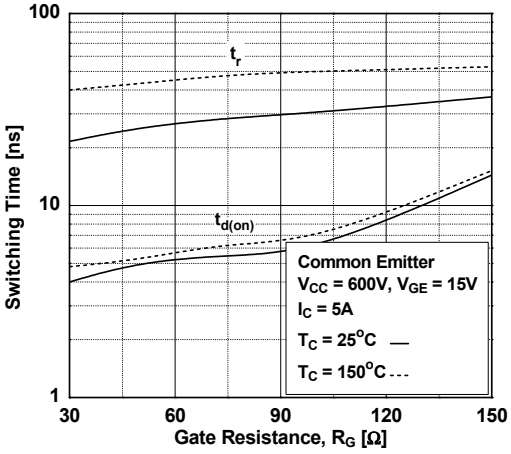


Figure 12. Turn-on Characteristics vs. Gate Resistance



Typical Performance Characteristics

Figure 13. Turn-off Characteristics VS. Gate Resistance

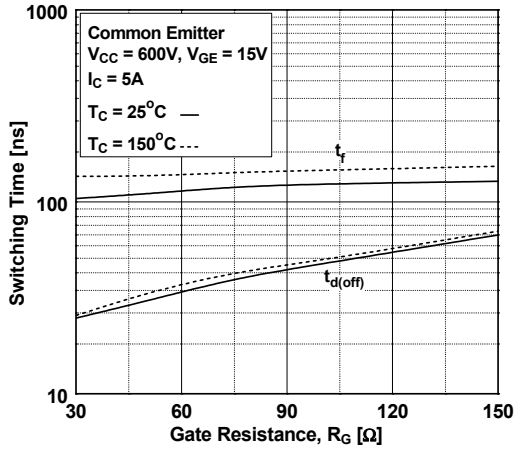


Figure 14.Turn-on Characteristics VS. Collector Current

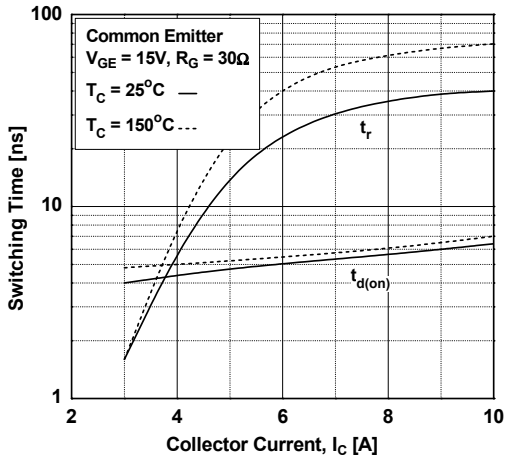


Figure 15.Turn-off Characteristics VS. Collector Current

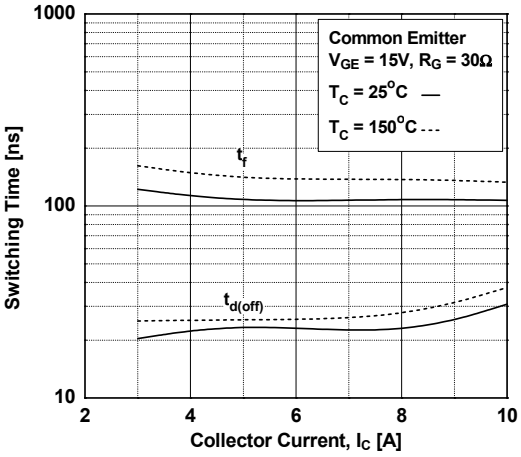


Figure 16.Switching Loss VS. Gate Resistance

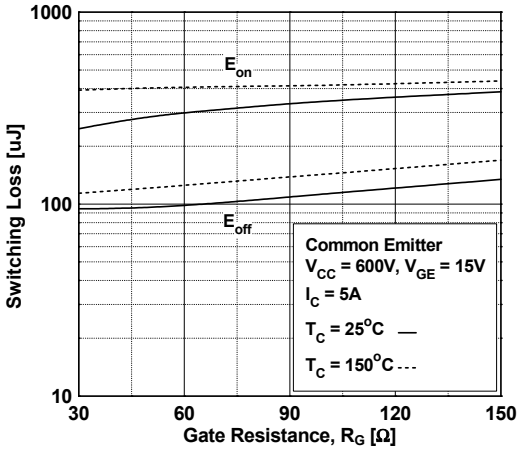


Figure 17. Switching Loss VS. Collector Current

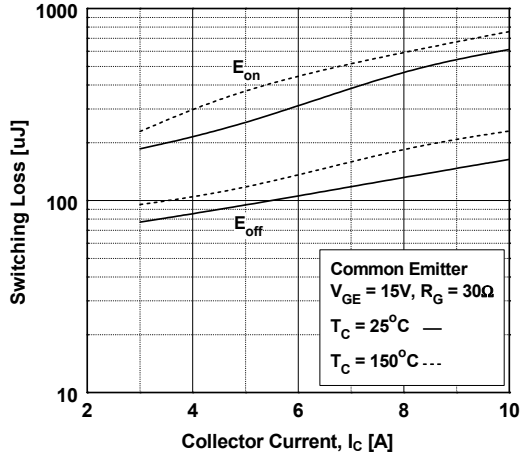


Figure 18. Current Derating

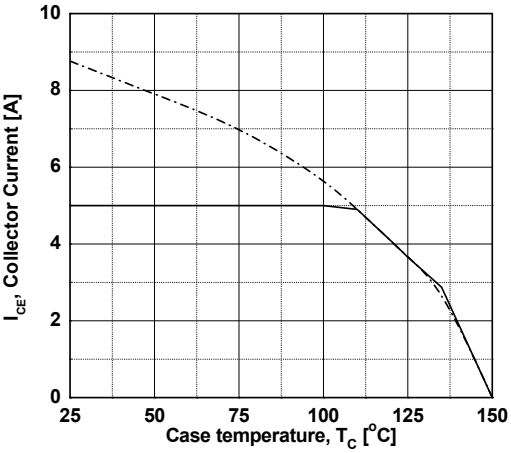


Figure 19. Load Current Vs. Frequency

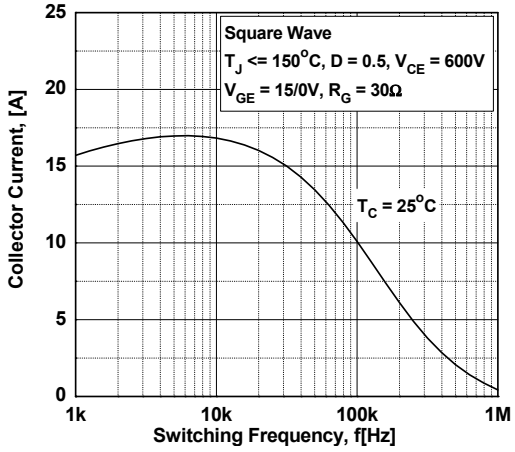
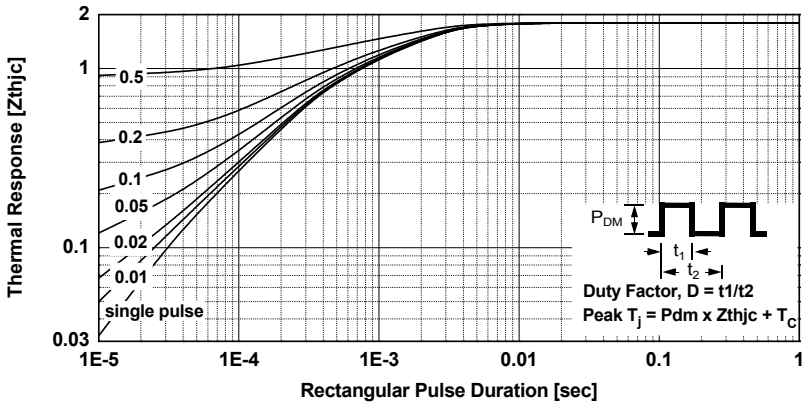
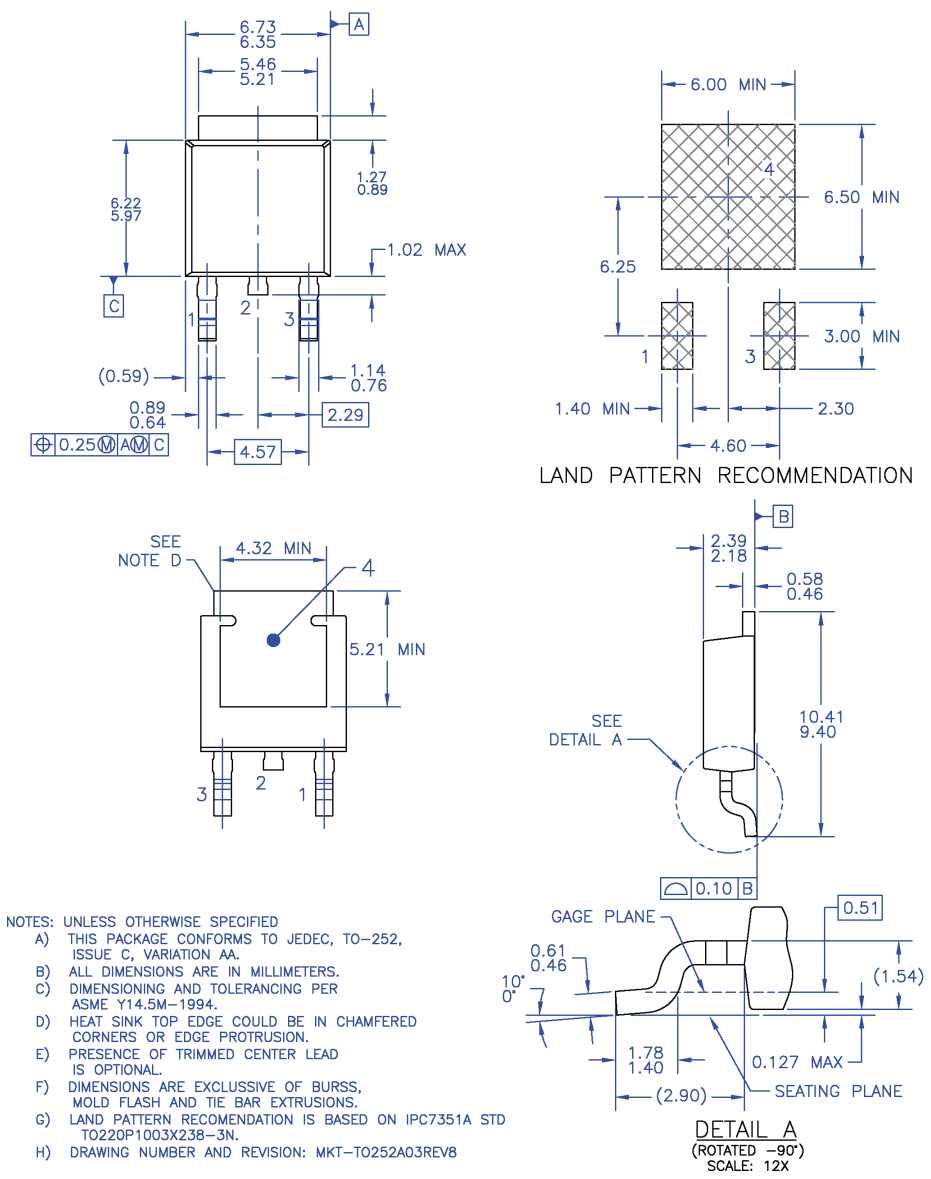


Figure 20. Transient Thermal Impedance of IGBT



Mechanical dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO JEDEC, TO−252, ISSUE C, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONING AND TOLERANCING PER ASME Y14.5M−1994.
D) HEAT SINK TOP EDGE COULD BE IN CHAMFERED CORNERS OR EDGE PROTRUSION.
E) PRESENCE OF TRIMMED CENTER LEAD IS OPTIONAL.
F) DIMENSIONS ARE EXCLUSSIVE OF BURSS, MOLD FLASH AND TIE BAR EXTRUSIONS.
G) LAND PATTERN RECOMENDATION IS BASED ON IPC7351A STD TO220P1003X238−3N.
H) DRAWING NUMBER AND REVISION: MKT−TO252A03REV8

Figure 21. TO252 (D-PAK), Molded, 3-Lead, Option AA&AB

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_TT252-003

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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. I77

PUBLICATION ORDERING INFORMATION

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Email: orderlit@onsemi.com

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Phone: 81−3−5817−1050

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ON Semiconductor:

FGD5T120SH

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

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

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

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:

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *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.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *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.*

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