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.

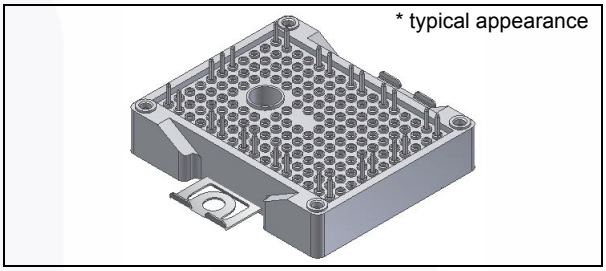
June 2015

FPF2G120BF07ASP

F2, 3ch Boost module PCM and NTC

General Description

The FPF2G120BF07ASP is the 3ch boost topology which is providing an optimized solution for the multi-string solar application. And the integrated high speed field stop IGBTs and SiC diodes are providing lower conduction and switching losses. And the pre-applied PCM requires no additional process of the thermal interface material printing. Furthermore, the screw clamp provides a fast and reliable mounting method.



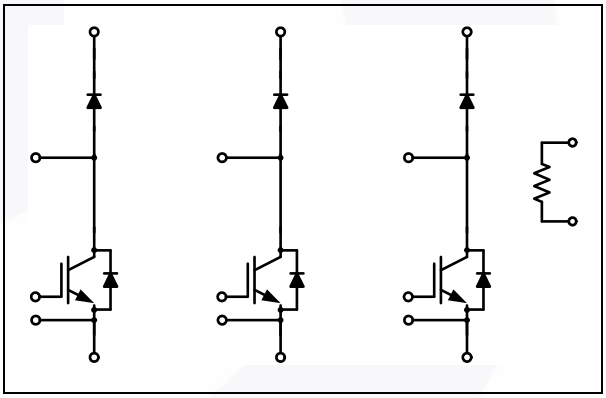
Package Code: F2

Electrical Features

- High Efficiency
- Low Conduction and Switching Losses
- High Speed Field Stop IGBT
- SiC SBD for Boost Diode
- Built-in NTC for Temperature Monitoring

Mechanical Features

- Compact Size : F2 Package
- Soldering Pin
- Al_2O_3 Substrate with Low Thermal Resistance
- Pre-applied PCM (Phase Change Material)



Internal Circuit Diagram

Applications

- Solar Inverter

Related Materials

- AN-5077: Design Considerations for High Power Module (HPM)
- AN-4186: F1 and F2 Modules with Pre-applied Phase Change Material (PCM)

Package Marking and Ordering Information

Device	Device Marking	Package	PCM	Packing Type	Quantity / Tray
FPF2G120BF07AS	FPF2G120BF07AS	F2	X	Tray	14
FPF2G120BF07ASP	FPF2G120BF07ASP	F2	O	Tray	14

Absolute Maximum Ratings $T_C = 25^oC$ unless otherwise noted.

Symbol	Description	Condition	Rating	Units
Boost IGBT				
V_{CES}	Collector-Emitter Voltage		650	V
V_{GES}	Gate-Emitter Voltage		± 20	V
	Transient Gate-Emitter Voltage		± 25	V
I_C	Continuous Collector Current	T_C = 80 °C, T_{Jmax} = 175 °C	40	A
I_{CM}	Pulsed Collector Current	limited by T_{Jmax}	80	A
P_D	Maximum Power Dissipation		156	W
T_J	Operating Junction Temperature		- 40 to + 150	°C
Protection Diode				
V_{RRM}	Peak Repetitive Reverse Voltage		650	V
I_F	Continuous Forward Current	T_C = 80 °C, T_{Jmax} = 175 °C	15	A
I_{FM}	Maximum Forward Current		30	A
I_{FSM}	Non-repetitive Peak Surge Current	60Hz Single Half-Sine Wave	150	A
I^2t - value	Surge Current Integral Value		93	A^2s
P_D	Maximum Power Dissipation		140	W
T_J	Operating Junction Temperature		- 40 to + 150	°C
Boost Diode				
V_{RRM}	Peak Repetitive Reverse Voltage		650	V
I_F	Continuous Forward Current	T_C = 80 °C, T_{Jmax} = 175 °C	15	A
I_{FM}	Maximum Forward Current		30	A
I_{FSM}	Non-repetitive Peak Surge Current	60Hz Single Half-Sine Wave	120	A
I^2t - value	Surge Current Integral Value		60	A^2s
P_D	Maximum Power Dissipation		98	W
T_J	Operating Junction Temperature		- 40 to + 150	°C
Module				
T_{STG}	Storage Temperature		- 40 to + 125	°C
V_{ISO}	Isolation Voltage	AC 1 min.	2500	V
Iso._Material	Internal Isolation Material		Al_2O_3	-
T_{MOUNT}	Mounting Torque		2.0 to 5.0	N•m
Creepage	Terminal to Heat Sink		11.5	mm
	Terminal to Terminal		6.3	mm
Clearance	Terminal to Heat Sink		10.0	mm
	Terminal to Terminal		5.0	mm

Electrical Characteristics T_C = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
Boost IGBT						
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE} = 0 V, I_C = 1 mA	650	-	-	V
I_{CES}	Collector Cut-off Current	V_{CE} = V_{CES}, V_{GE} = 0 V	-	-	250	μA
I_{GES}	Gate-Emitter Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0 V	-	-	± 2	μA
On Characteristics						
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	V_{GE} = V_{CE}, I_C = 40 mA	3.9	5.1	6.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 40 A, V_{GE} = 15 V	-	1.55	2.2	V
		I_C = 40 A, V_{GE} = 15 V, T_C = 125 °C	-	1.85	-	V
R_{LEAD}	Lead Resistance of Pin to Chip	per Chip	-	3.3	-	mΩ
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V I_C = 40 A V_{GE} = 15 V R_G = 15 Ω Inductive Load T_C = 25 °C	-	24	-	ns
t_r	Rise Time		-	24	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	132	-	ns
t_f	Fall Time		-	17	-	ns
E_{ON}	Turn-On Switching Loss per Pulse		-	0.40	-	mJ
E_{OFF}	Turn-Off Switching Loss per Pulse		-	0.28	-	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 300 V I_C = 40 A V_{GE} = 15 V R_G = 15 Ω Inductive Load T_C = 125 °C	-	22	-	ns
t_r	Rise Time		-	27	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	148	-	ns
t_f	Fall Time		-	17	-	ns
E_{ON}	Turn-On Switching Loss per Pulse		-	0.59	-	mJ
E_{OFF}	Turn-Off Switching Loss per Pulse		-	0.37	-	mJ
Q_g	Total Gate Charge	V_{CC} = 300 V, I_C = 40 A, V_{GE} = 15 V	-	65	-	nC
$R_{\theta JC}$	Thermal Resistance of Junction to Case	per Chip	-	-	0.96	°C/W
$R_{\theta CH}$	Thermal Resistance of Case to Heat sink	per Chip, λ_{PCM} = 3.4 W/mK	-	0.54	-	°C/W
Protection Diode						
V_F	Diode Forward Voltage	I_F = 15 A	-	1.05	1.4	V
		I_F = 15 A, T_C = 125 °C	-	0.95	-	V
R_{LEAD}	Lead Resistance of Pin to Chip	per Chip	-	2.4	-	mΩ
I_R	Reverse Leakage Current	V_R = 650 V	-	-	250	μA
$R_{\theta JC}$	Thermal Resistance of Junction to Case	per Chip	-	-	1.07	°C/W
$R_{\theta CH}$	Thermal Resistance of Case to Heat sink	per Chip, λ_{PCM} = 3.4 W/mK	-	0.33	-	°C/W
Boost Diode						
V_F	Diode Forward Voltage	I_F = 15 A	-	1.45	1.9	V
		I_F = 15 A, T_C = 125 °C	-	1.75	-	V
R_{LEAD}	Lead Resistance of Pin to Chip	per Chip	-	2.8	-	mΩ
I_R	Reverse Leakage Current	V_R = 650 V	-	-	60	μA
I_{rr}	Reverse Recovery Current	V_R = 300 V, I_F = 15 A, di / dt = 1390 A/us, T_C = 25 °C	-	9.2	-	A
Q_C	Total Capacitive Charge		-	60	-	nC
E_{rec}	Reverse Recovery Energy		-	4.9	-	μJ
I_{rr}	Reverse Recovery Current	V_R = 300 V, I_F = 15 A, di / dt = 1390 A/us, T_C = 125 °C	-	9.2	-	A
Q_C	Total Capacitive Charge		-	65	-	nC
E_{rec}	Reverse Recovery Energy		-	4.9	-	μJ
$R_{\theta JC}$	Thermal Resistance of Junction to Case	per Chip	-	-	1.52	°C/W
$R_{\theta CH}$	Thermal Resistance of Case to Heat sink	per Chip, λ_{PCM} = 3.4 W/mK	-	0.18	-	°C/W

Electrical Characteristics T_C = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
NTC (Thermistor)						
R_{NTC}	Rated Resistance	T_C = 25 °C	-	10	-	kΩ
		T_C = 100 °C	-	936	-	Ω
	Tolerance	T_C = 25 °C	- 3	-	+ 3	%
P_D	Power Dissipation	T_C = 25 °C	-	-	20	mW
B_{Value}	B-Constant	$B_{25/50}$	-	3450	-	K
		$B_{25/100}$	-	3513	-	K

Typical Performance Characteristics

Fig 1. Typical Output Characteristics - IGBT

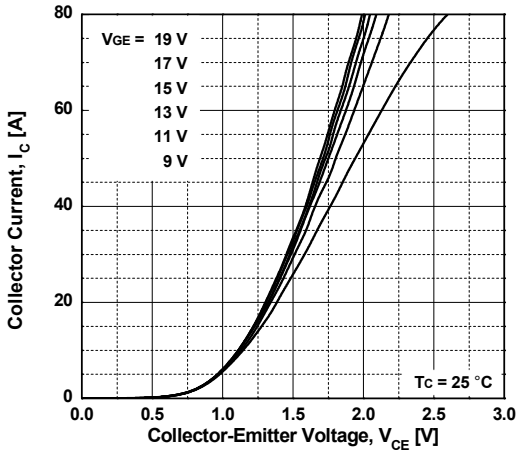


Fig 2. Typical Output Characteristics - IGBT

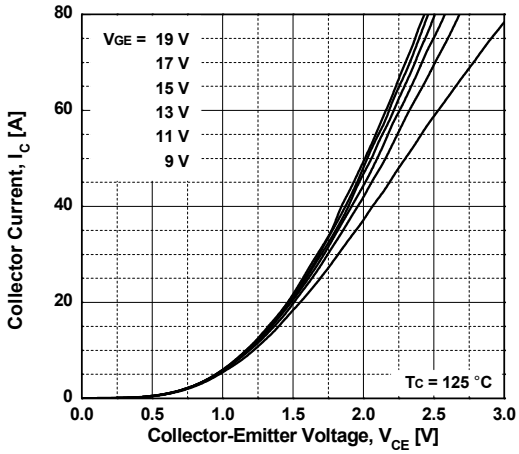


Fig 3. Typical Saturation Voltage Characteristics - IGBT

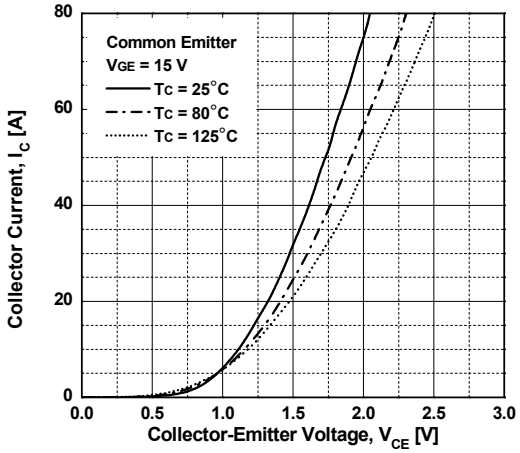


Fig 4. Switching Loss vs. Collector Current - IGBT

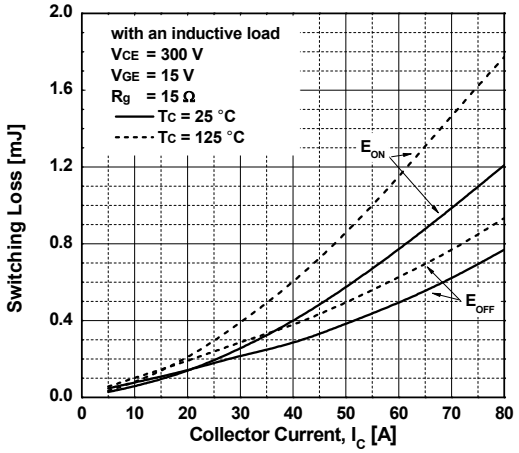


Fig 5. Switching Loss vs. Gate Resistance - IGBT

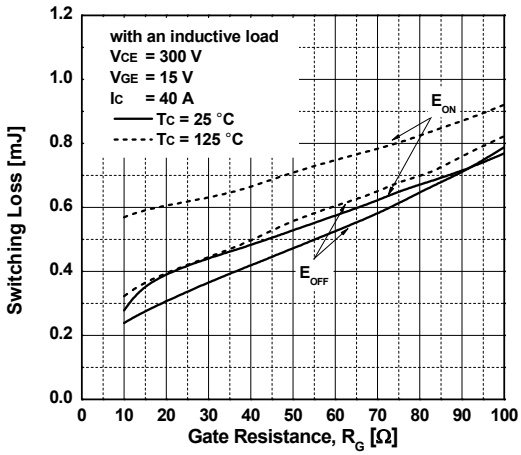
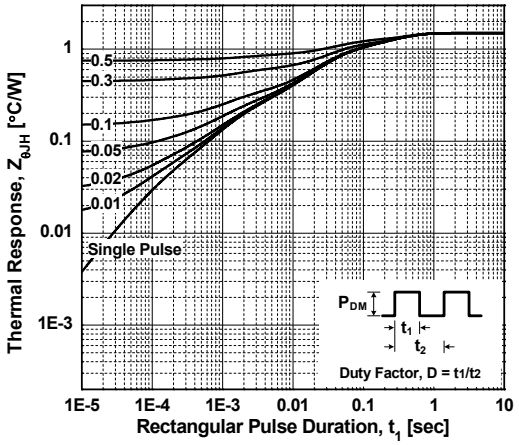


Fig 6. Transient Thermal Impedance - IGBT



Typical Performance Characteristic

Fig 7. Typical Forward Voltage Drop - Protection Diode

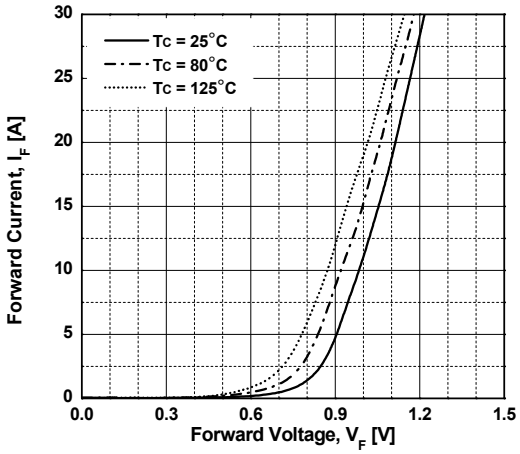


Fig 8. Transient Thermal Impedance - Protection Diode

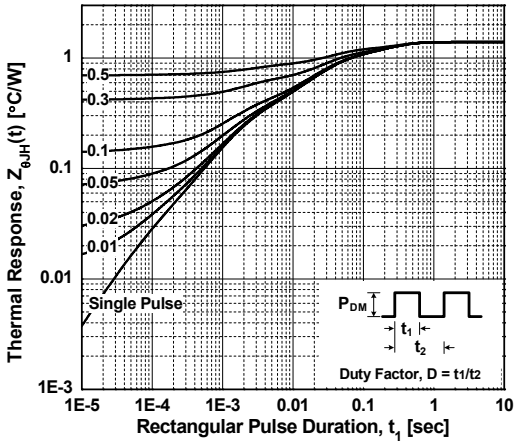


Fig 9. Typical Forward Voltage Drop - Boost Diode

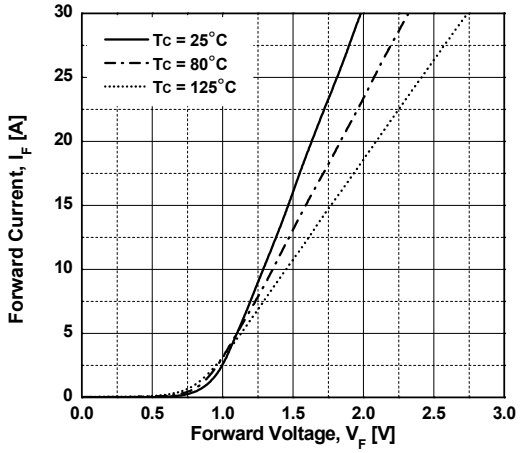


Fig 10. Reverse Recovery Energy vs. Forward Current - Boost Diode

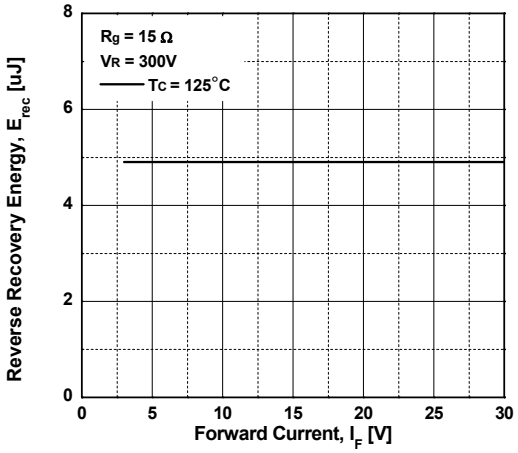


Fig 11. Reverse Recovery Energy vs. Gate Resistance - Boost Diode

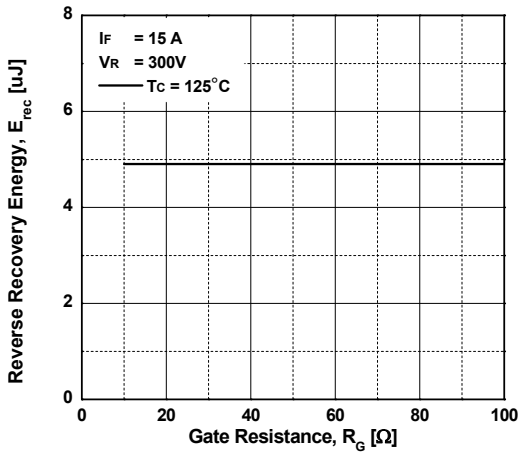
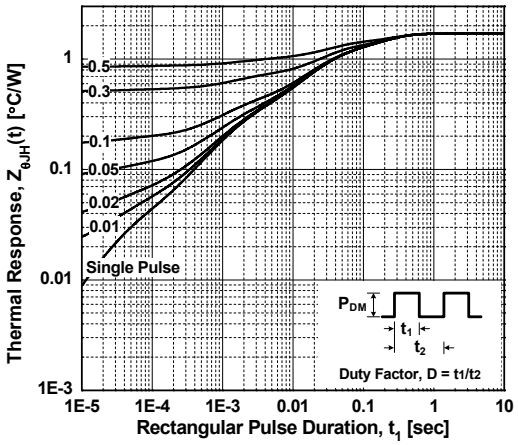
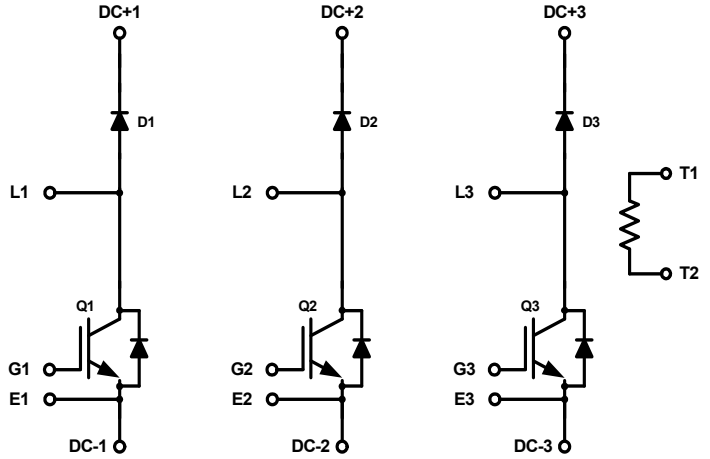


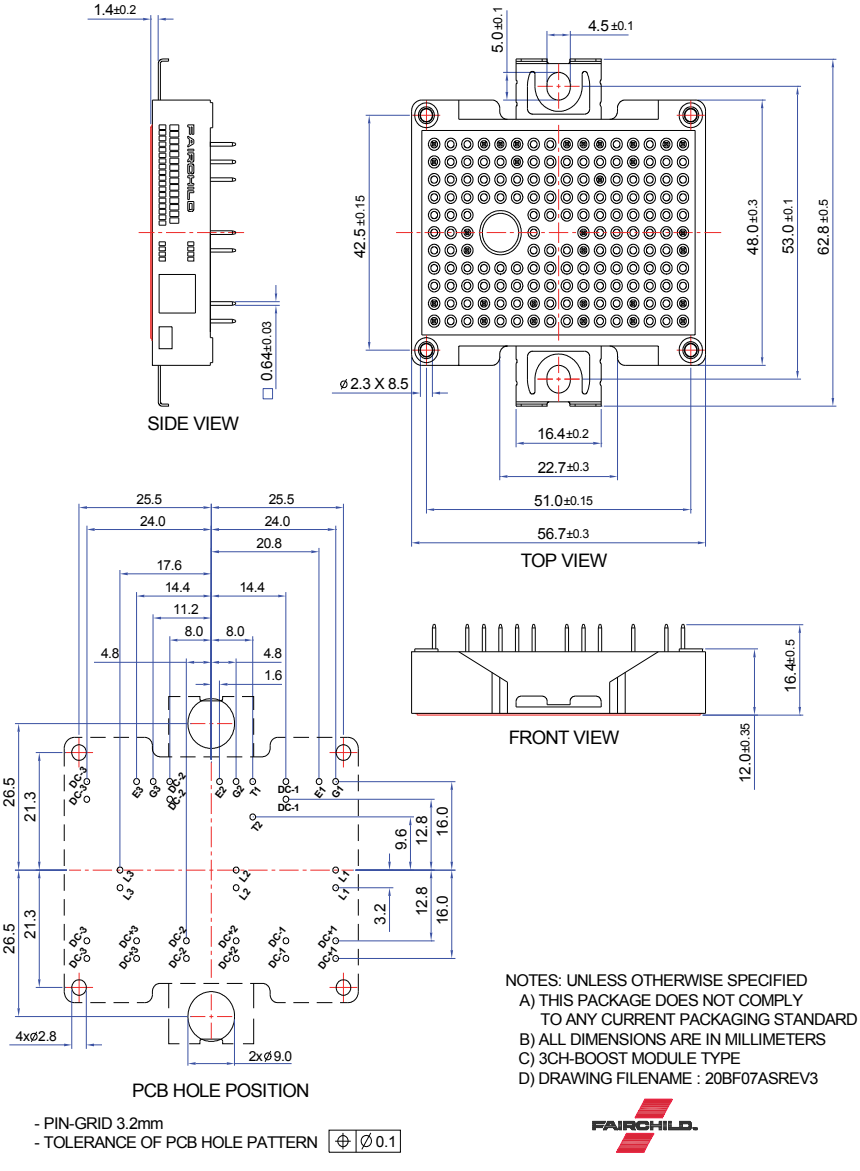
Fig 12. Transient Thermal Impedance - Boost Diode



Internal Circuit Diagram



Package Outlines [mm]



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™
AttitudeEngine™
Awinda®
AX-CAP®*
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
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™
Gmax™
GTO™
IntelliMAX™
ISOPLANAR™
Making Small Speakers Sound Louder and Better™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
MotionGrid®
MTi®
MTx®
MVN®
mWSaver®
OptoHiT™
OPTOLOGIC®
OPTOPLANAR®
Power Supply WebDesigner™
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™
Xsens™
仙童™

* 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. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT HTTP://WWW.FAIRCHILDSEMI.COM. 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 herein:

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 manufacturers 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 applications, 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 handling 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 any 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. I74

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 Modules ***category:***

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

Other Similar products are found below :

F3L400R07ME4_B22 F4-50R07W2H3_B51 FB15R06W1E3 FB20R06W1E3_B11 FD1000R33HE3-K FD400R12KE3 FD400R33KF2C-K FD401R17KF6C_B2 FD-DF80R12W1H3_B52 FF200R06YE3 FF300R12KE4_E FF450R12ME4P FF600R12IP4V FP15R12W2T4 FP20R06W1E3 FP50R12KT3 FP75R07N2E4_B11 FS10R12YE3 FS150R07PE4 FS150R12PT4 FS200R12KT4R FS20R06W1E3_B11 FS50R07N2E4_B11 FZ1000R33HE3 FZ1800R17KF4 DD250S65K3 DF1000R17IE4 DF1000R17IE4D_B2 DF1400R12IP4D DF200R12PT4_B6 DF400R07PE4R_B6 BSM75GB120DN2_E3223c-Se F3L300R12ME4_B22 F3L75R07W2E3_B11 F4-50R12KS4_B11 F475R07W1H3B11ABOMA1 FD1400R12IP4D FD200R12PT4_B6 FD800R33KF2C-K FF150R12ME3G FF300R17KE3_S4 FF300R17ME4_B11 FF401R17KF6C_B2 FF650R17IE4D_B2 FF900R12IP4D FF900R12IP4DV STGIF7CH60TS-L FP50R07N2E4_B11 FS100R07PE4 FS150R07N3E4_B11