FAIRCHILD SEMICONDUCTOR®

June 2006

FGA120N30D

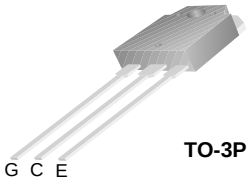
300V PDP IGBT

Features

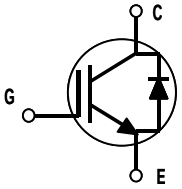
- High Current Capability
- Low saturation voltage: $V_{CE(sat)}$, Typ = 1.1V@ I_C = 25A
- High Input Impedance

Description

Employing Unified IGBT Technology, FGA120N30D provides low conduction and switching loss. FGA120N30D offers the optimum solution for PDP applications where low condution loss is essential.



TO-3P



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Description		FGA120N30D	Units
V_{CES}	Collector-Emitter Voltage		300	V
V_{GES}	Gate-Emitter Voltage		± 30	V
I_C	Collector Current	@ T_C = 25°C	120	A
I_{CM}	Pulsed Collector Current (Note 1)	@ T_C = 25°C	300	A
I_F	Diode Continuous Forward Current	@ T_C = 100°C	10	A
I_{FM}	Diode Maximum Forward Current		40	A
P_D	Maximum Power Dissipation	@ T_C = 25°C	290	W
	Maximum Power Dissipation	@ T_C = 100°C	116	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 test , pulse width = 100usec , Duty = 0.2

* Ic_pulse limited by max Tj

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$(IGBT)	Thermal Resistance, Junction-to-Case for IGBT	--	0.43	°C/W
$R_{\theta JC}$(DIODE)	Thermal Resistance, Junction-to-Case for Diode	--	1.56	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	40	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FGA120N30D	FGA120N30D	TO-3P	--	--	30

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE} = 0V, I_C = 250μA	300	--	--	V
$\Delta BV_{CES}/\Delta T_J$	Temperature Coefficient of Breakdown Voltage	V_{GE} = 0V, I_C = 250μA	--	0.6	--	V/°C
I_{CES}	Collector Cut-Off Current	V_{CE} = V_{CES}, V_{GE} = 0V	--	--	100	μA
I_{GES}	G-E Leakage Current	V_{GE} = V_{GES}, V_{CE} = 0V	--	--	± 250	nA
On Characteristics						
$V_{GE(th)}$	G-E Threshold Voltage	I_C = 250uA, V_{CE} = V_{GE}	2.5	4.0	5.0	V
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage	I_C = 25A, V_{GE} = 15V	--	1.1	1.4	V
		I_C = 120A, V_{GE} = 15V	--	1.9	--	V
		I_C = 120A, V_{GE} = 15V, T_C = 125°C	--	2.0	--	V
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE} = 30V, V_{GE} = 0V, f = 1MHz	--	2310	-	pF
C_{oes}	Output Capacitance		--	360	-	pF
C_{res}	Reverse Transfer Capacitance		--	100	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200V, I_C = 25A, R_G = 8.7Ω, V_{GE} = 15V, Resistive Load, T_C = 25°C	--	30	--	ns
t_r	Rise Time		--	270	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	100	--	ns
t_f	Fall Time		--	130	300	ns
E_{on}	Turn-On Switching Loss		--	0.17	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.56	--	mJ
E_{ts}	Total Switching Loss		--	0.73	--	mJ
$t_{d(on)}$	Turn-On Delay Time	V_{CC} = 200V, I_C = 25A, R_G = 8.7Ω, V_{GE} = 15V, Resistive Load, T_C = 125°C	--	30	--	ns
t_r	Rise Time		--	280	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	105	--	ns
t_f	Fall Time		--	180	--	ns
E_{on}	Turn-On Switching Loss		--	0.18	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.9	--	mJ
E_{ts}	Total Switching Loss		--	1.08	--	mJ
Q_g	Total Gate Charge	V_{CE} = 200V, I_C = 25A, V_{GE} = 15V	--	120	180	nC
Q_{ge}	Gate-Emitter Charge		--	15	22	nC
Q_{gc}	Gate-Collector Charge		--	60	90	nC

Electrical Characteristics of DIODE T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Units
V_{FM}	Diode Forward Voltage	I_F = 10A	T_C = 25°C	--	1.1	1.4	V
			T_C = 125°C	--	0.9	--	
t_{rr}	Diode Reverse Recovery Time	I_F = 10A dI/dt = 200A/μs	T_C = 25°C	--	21	--	ns
			T_C = 125°C	--	35	--	
I_{rr}	Diode Peak Reverse Recovery Current		T_C = 25°C	--	2.8	--	A
			T_C = 125°C	--	5.6	--	
Q_{rr}	Diode Reverse Recovery Charge		T_C = 25°C	--	29.4	--	nC
			T_C = 125°C	--	98	--	

Typical Performance Characteristics

Figure 1. Typical Output Characteristics

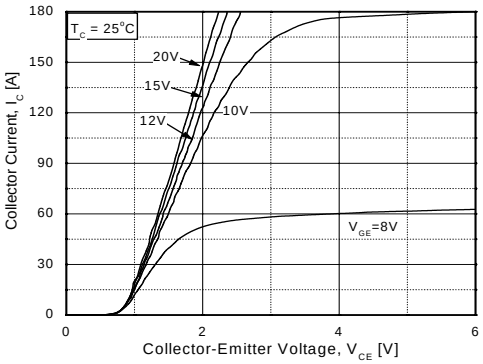


Figure 2. Typical Output Characteristics

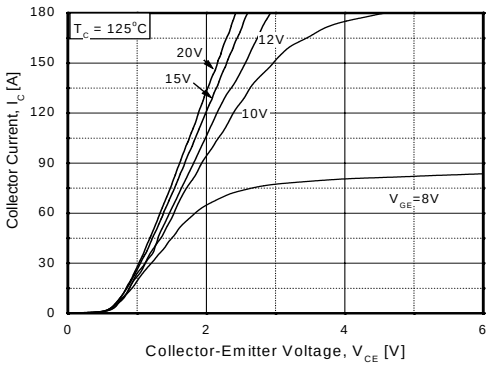


Figure3. Typical Saturation Voltage Characteristics

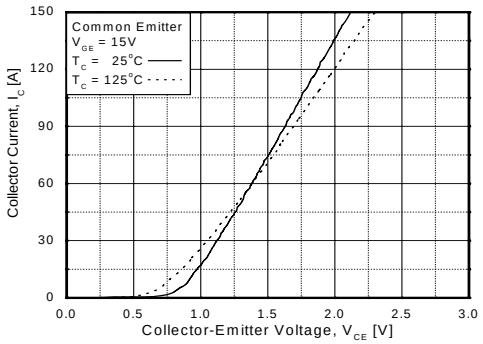


Figure 4. Transfer characteristics

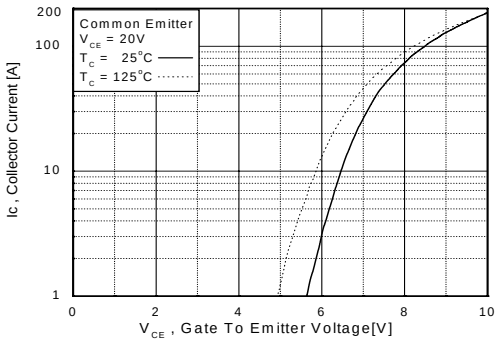


Figure 5. Saturation Voltage vs. Case Temperature at Variant Current Level

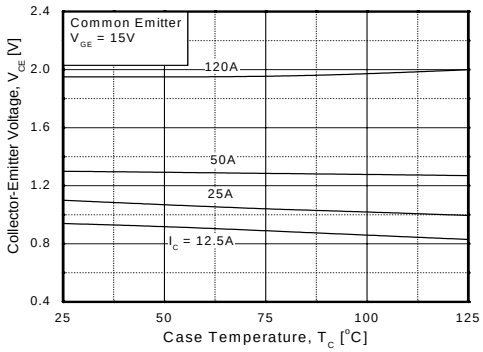
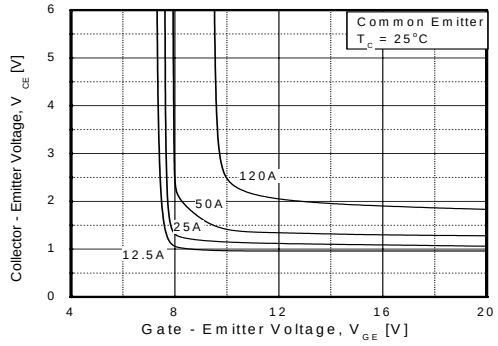


Figure 6. Saturation Voltage vs. V_{GE}



Typical Performance Characteristics (Continued)

Figure 7. Saturation Voltage vs. V_{GE}

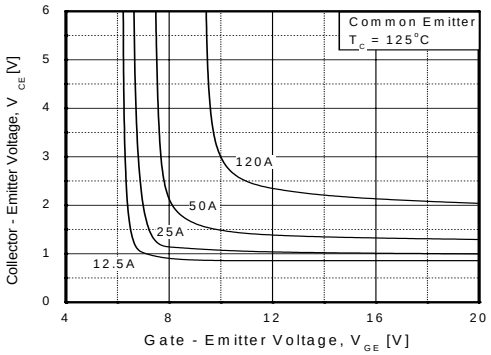


Figure 8. Capacitance Charaacteristics

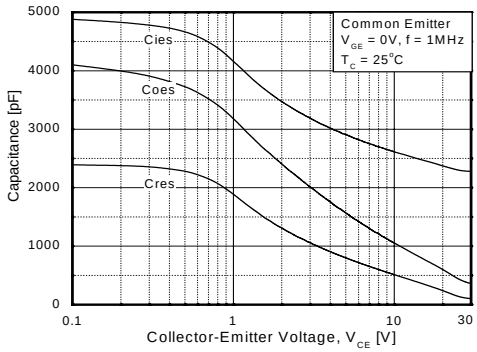


Figure 9. Gate Charge Characteristics

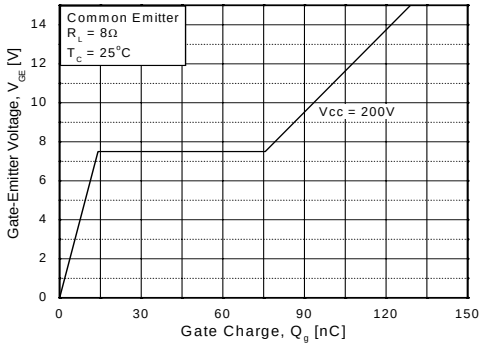


Figure 10. SOA Characteristics

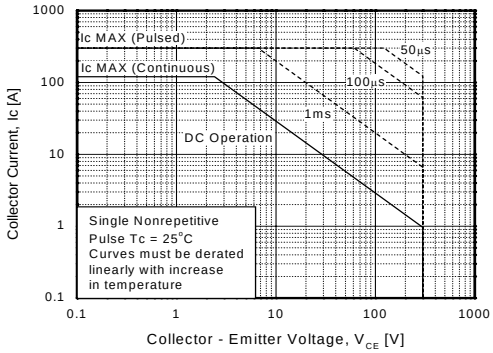


Figure 11. Turn-On Characteristics vs. Gate Resistance

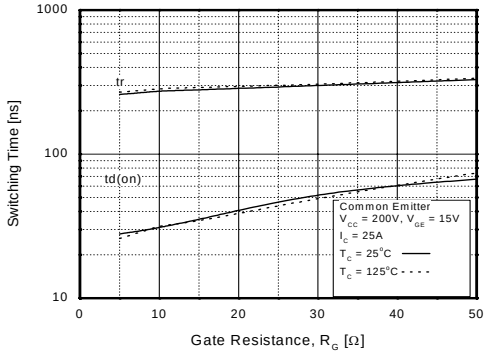
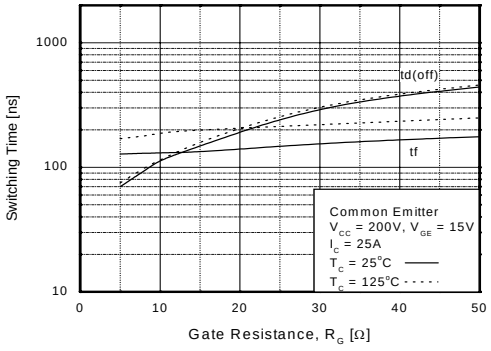


Figure 12. Turn-Off Characteristics vs. Gate Resistance



Typical Performance Characteristics (Continued)

Figure 13. Turn-On Characteristics vs. Collector Current

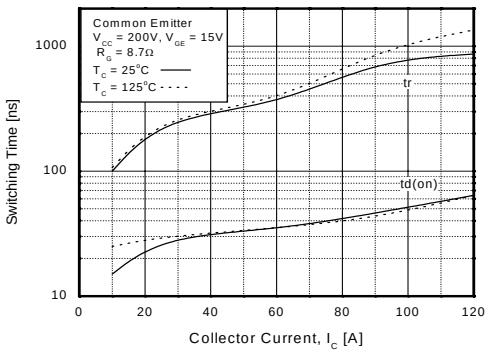


Figure 14.Turn-Off Characteristics vs. Collector Current

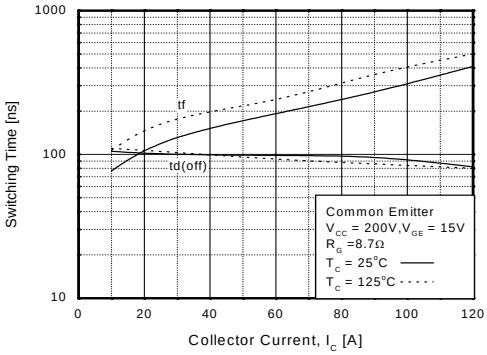


Figure 15. Switching Loss vs. Gate Resistance

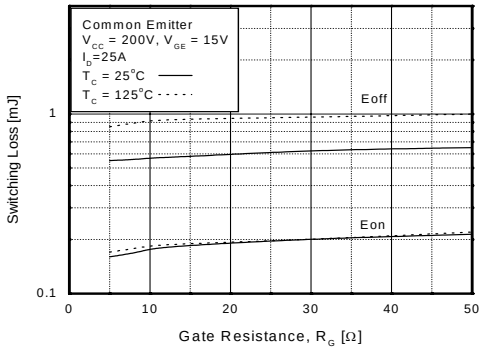


Figure 16. Switching Loss vs. Collector Current

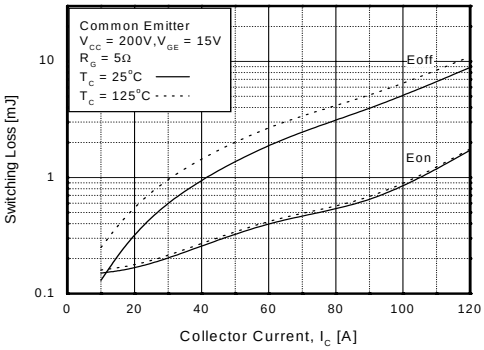
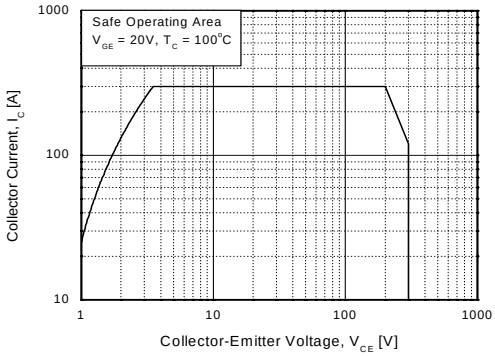


Figure 17. Turn-Off SOA Figure



Typical Performance Characteristics (Continued)

Figure 18. Transient Thermal Impedance of IGBT

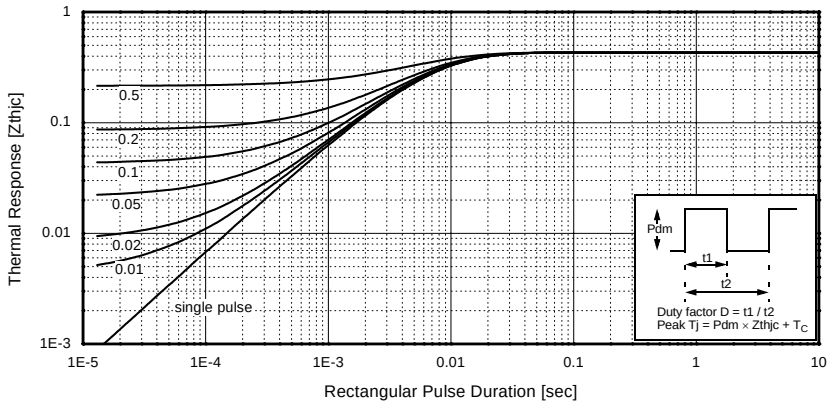


Figure 19. Forward Characteristics

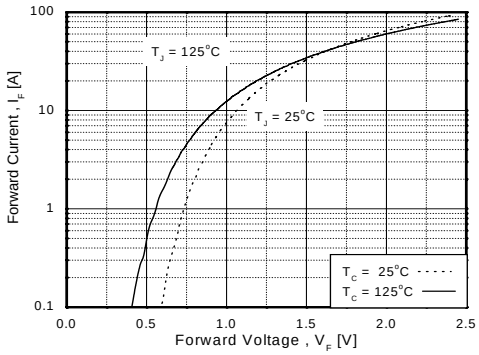


Figure 20. Typical Reverse Recovery Current

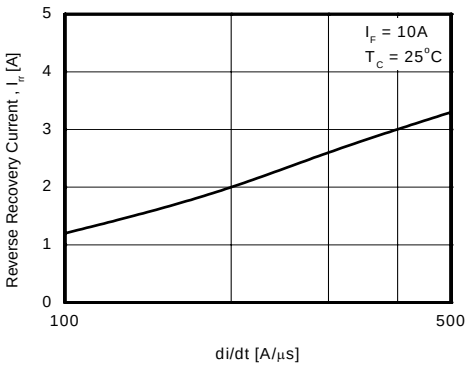
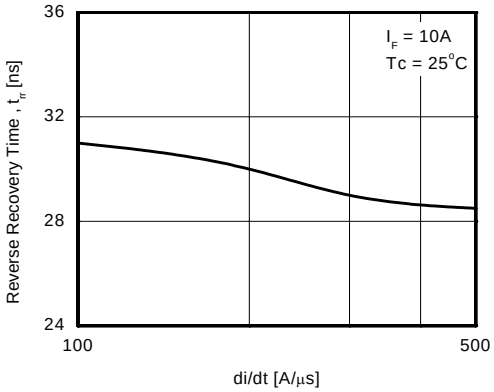
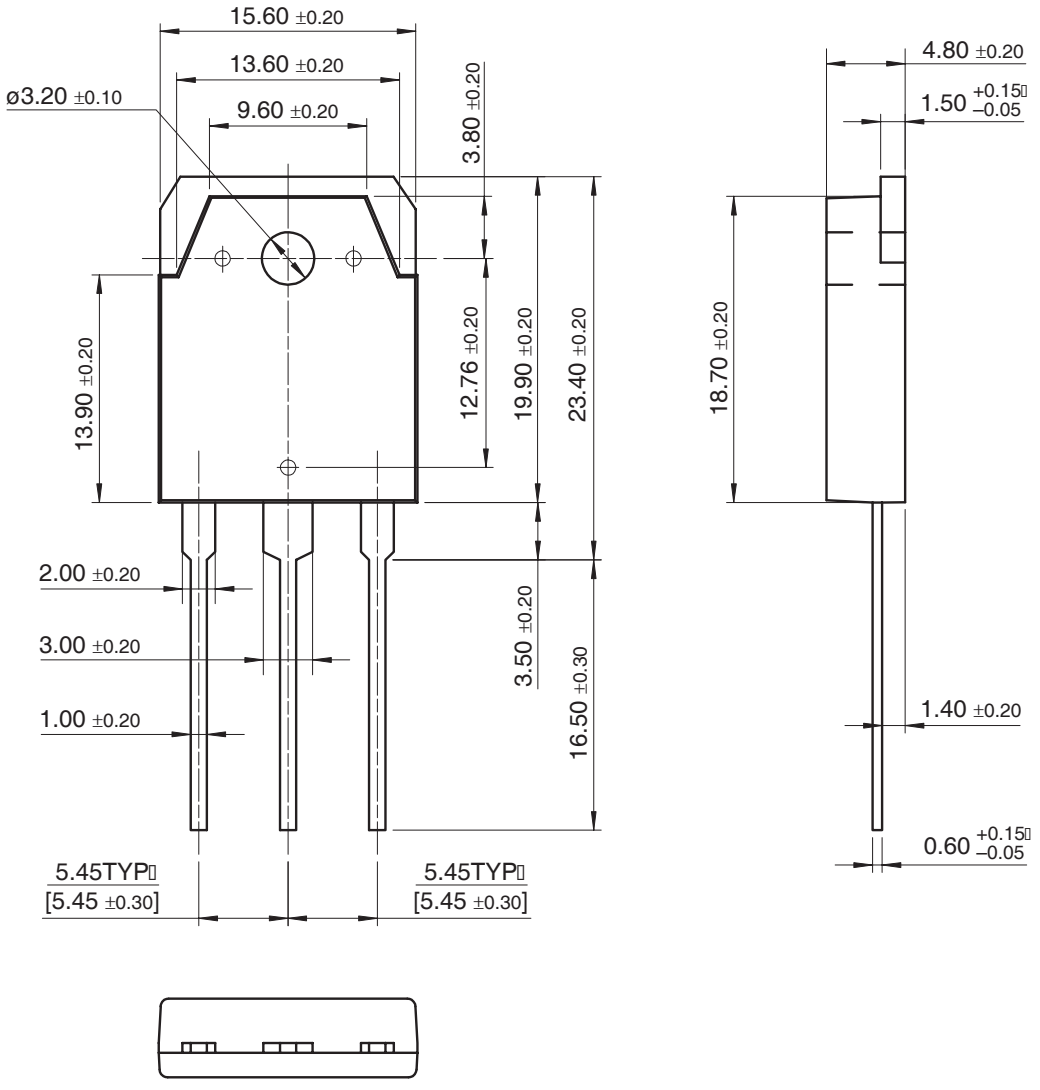


Figure 21. Typical Reverse Recovery Time



Mechanical Dimensions

TO-3P



TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™
ActiveArray™
Bottomless™
Build it Now™
CoolFET™
CROSSVOLT™
DOME™
EcoSPARK™
E^2CMOS™
EnSigna™
FACT™
FACT Quiet Series™
Across the board. Around the world.™
The Power Franchise®
Programmable Active Droop™
FAST®
FASTr™
FPS™
FRFET™
GlobalOptoisolator™
GTO™
HiSeC™
I^2C™
i-Lo™
ImpliedDisconnect™
IntelliMAX™
ISOPLANAR™
LittleFET™
MICROCOUPLER™
MicroFET™
MicroPak™
MICROWIRE™
MSX™
MSXPro™
OCX™
OCXPro™
OPTOLOGIC®
OPTOPLANAR™
PACMAN™
POP™
Power247™
PowerEdge™
PowerSaver™
PowerTrench®
QFET®
QS™
QT Optoelectronics™
Quiet Series™
RapidConfigure™
RapidConnect™
mSerDes™
ScalarPump™
SILENT SWITCHER®
SMART START™
SPM™
Stealth™
SuperFET™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SyncFET™
TCM™
TinyLogic®
TINYOPTO™
TruTranslation™
UHC™
UniFET™
UltraFET®
VCX™
Wire™

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 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, or (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 significant injury to the user.

2. A critical component is 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.

PRODUCT STATUS DEFINITIONS

Definition of Terms

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

Rev. I19

FGA120N30D

300V PDP IGBT

Contents

BUY

Datasheet
Download this datasheet

e-mail this datasheet

This page
Print version

Related Links

- Request samples
- How to order products
- Product Change Notices (PCNs)
- Support
- Sales support
- Quality and reliability
- Design center

General description

Employing Unified IGBT Technology, FGA120N30D provides low conduction and switching loss. FGA120N30D offers the optimum solution for PDP applications where low condution loss is essential.

back to top

Features

- High Current Capability
- Low saturation voltage: $V_{CE(sat)}$, Typ = 1.1V@ I_C = 25A
- High Input Impedance

back to top

Product status/pricing/packaging

BUY

Product	Product status	Pb-free Status	Pricing*	Package type	Leads	Packing method	Package Marking Convention**
FGA120N30DTU	Full Production	Full Production	$4.74	TO-3P	3	RAIL	Line 1: **$Y** (Fairchild logo) Line 2: FGA120N30D Line 3: &3

* Fairchild 1,000 piece Budgetary Pricing
** A sample button will appear if the part is available through Fairchild's on-line samples program. If there is no sample button, please contact a Fairchild distributor to obtain samples

 Indicates product with Pb-free second-level interconnect. For more information click here.

Package marking information for product FGA120N30D is available. Click here for more information .

back to top

Qualification Support

Click on a product for detailed qualification data

Product
FGA120N30DTU

back to top