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June 2015

FPF2C8P2NL07A

F2, 3-phase, 3-level NPC module with Press-fit / NTC

General Description

Fairchild's new inverter modules provide low conduction and switching loss as well. And Press-Fit technology provides simple and reliable mounting. These modules are optimized for the applications such as solar inverter and UPS where a high efficiency and robust design is needed.

Electrical Features

- · High Efficiency
- · Low Conduction and Switching Losses
- · Field Stop IGBT for Inner and Outer Switch
- STEALTHTM Diode for Path Diode
- · Built-in NTC for Temperature Monitoring

Mechanical Features

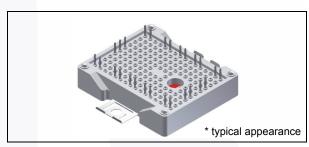
- · Compact Size: F2 Package
- · Press-fit Contact Technology
- Al₂O₃ Substrate with Low Thermal Resistance

Applications

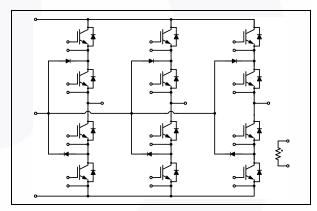
- Solar Inverter
- UPS

Related Materials

 AN-4167: Mounting Guideline for F1 / F2 Modules with Press-Fit Pins



Package Code: F2



Internal Circuit Diagram

Package Marking and Ordering Information

Device	Device Marking	Package	Packing Type	Quantity / Tray
FPF2C8P2NL07A	FPF2C8P2NL07A	F2	Tray	14

Absolute Maximum Ratings $T_C = 25^{\circ}C$ unless otherwise noted.

Symbol	Descr	Rating	Units	
Outer IGBT	(Q1, Q4, Q5, Q8, Q9, Q12)	·		
V _{CES}	Collector-Emitter Voltage		650	V
V _{GES}	Gate-Emitter Voltage		± 20	V
I _C	Continuous Collector Current	@ T _C = 80 °C, T _{Jmax} = 175 °C	30	А
I _{CM}	Pulsed Collector Current	limited by T _{Jmax}	60	Α
P_{D}	Maximum Power Dissipation	@ T _C = 25 °C	135	W
T _J	Operating Junction Temperature		- 40 to + 150	°C
Inner IGBT(Q2, Q3, Q6, Q7, Q10, Q11)			
V _{CES}	Collector-Emitter Voltage		650	V
V _{GES}	Gate-Emitter Voltage		± 20	V
I _C	Continuous Collector Current	@ T _C = 80 °C, T _{Jmax} = 175 °C	50	Α
I _{CM}	Pulsed Collector Current	limited by T _{Jmax}	100	Α
P_{D}	Maximum Power Dissipation	@ T _C = 25 °C	174	W
T _J	Operating Junction Temperature		- 40 to + 150	°C
Outer - Inne	er IGBT Series Connection			
SCWT	Short Circuit Withstand Time	V_{DC} = 300 V, V_{GE} = 15 V T_{C} = 25 °C	4	μS
Diode				
V _{RRM}	Peak Repetitive Reverse Voltage		650	V
l _F	Continuous Forward Current	@ T _C = 80 °C, T _{Jmax} = 175 °C	15	Α
I _{FM}	Maximum Forward Current		30	Α
P_{D}	Maximum Power Dissipation	@ T _C = 25 °C	100	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
IsoMaterial	Internal Isolation Material		Al ₂ O ₃	
T _{MOUNT}	Mounting Torque		2.0 to 5.0	Nm
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.	Тур.	Max.	Units
Outer IGE	ВТ			1	<u> </u>	J
Off Charac	cteristics					
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	μА
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = V _{GES} , V _{CE} = 0 V	-	-	2	μ A
On Charac	<u> </u>	GE GEG, GE				<u> </u>
V _{GE(th)}	Gate-Emitter Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 30 \text{ mA}$	4.5	5.6	6.7	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 30 A, V _{GE} = 15 V	-	1.55	2.2	V
OL(Sat)	3.000	I _C = 30 A, V _{GE} = 15 V @T _C = 125 °C	-	1.75	-	V
		I _C = 60 A, V _{GF} = 15 V	_	2.13	-	V
Switching	Characteristics	C 11 , GL				
t _{d(on)}	Turn-On Delay Time	V _{CC} = 300 V	-	33	-	ns
t _r	Rise Time	I _C = 30 A		43	-	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GE} = \pm 15 \text{ V}$	_	197	-	ns
t _f	Fall Time	$R_G = 20 \Omega$ Inductive Load	_	17	h -	ns
E _{ON}	Turn-On Switching Loss per Pulse	T _C = 25 °C	-	0.68	_	mJ
E _{OFF}	Turn-Off Switching Loss per Pulse		_	0.38	_	mJ
	Turn-On Delay Time	V _{CC} = 300 V	_	29	_	ns
t _{d(on)}	Rise Time	$I_C = 30 \text{ A}$	_	50	_	ns
	Turn-Off Delay Time	$-V_{GE} = \pm 15 \text{ V}$		205		ns
t _{d(off)}	Fall Time	$R_{G} = 20 \Omega$	_	25	_	ns
t _f	Turn-On Switching Loss per Pulse	Inductive Load T _C = 125 °C	-	0.86	_	mJ
E _{ON}	Turn-Off Switching Loss per Pulse	10 120 0	-	0.52	-	mJ
E _{OFF}	Total Gate Charge	V_{CC} = 300 V, I_{C} = 30 A, V_{GE} = ± 15 V	-	0.32	-	μС
Q _g	Thermal Resistance of Junction to Case	per Chip	-	0.20	1.11	°C/V
R _{θJC}		por emp				0,1
Inner IGE	ВТ					
Off Charac	cteristics					
BV _{CES}	Collector-Emitter Breakdown Voltage	$V_{GE} = 0 \text{ V}, I_C = 1 \text{ mA}$	650	-	-	V
I _{CES}	Collector Cut-off Current	$V_{CE} = V_{CES}, V_{GE} = 0 V$	-	-	250	μΑ
I _{GES}	Gate-Emitter Leakage Current	$V_{GE} = V_{GES}$, $V_{CE} = 0$ V		-	2	μΑ
On Charac	cteristics					
V _{GE(th)}	Gate-Emitter Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 50 \text{ mA}$	4.5	5.6	6.7	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C = 50 A, V _{GE} = 15 V	-	1.65	2.3	V
		I _C = 50 A, V _{GE} = 15 V @T _C = 125 °C	-	1.95	-	V
		I _C = 100 A, V _{GE} = 15 V	-	2.49	-	V
Switching	Characteristics					
t _{d(on)}	Turn-On Delay Time	V _{CC} = 300 V	-	41	-	ns
t _r	Rise Time	I _C = 50 A	-	65	-	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GE} = \pm 15 \text{ V}$	-	233	-	ns
t _f	Fall Time	$R_G = 15 \Omega$ Inductive Load	-	18	-	ns
E _{ON}	Turn-On Switching Loss per Pulse	T _C = 25 °C	-	0.87	-	mJ
E _{OFF}	Turn-Off Switching Loss per Pulse		-	0.77	-	mJ
t _{d(on)}	Turn-On Delay Time	V _{CC} = 300 V	-	39	-	ns
t _r	Rise Time	I _C = 50 A	-	76	-	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GE} = \pm 15 \text{ V}$	-	243	_	ns
t _f	Fall Time	$R_G = 15 \Omega$ Inductive Load	_	20	-	ns
E _{ON}	Turn-On Switching Loss per Pulse	T _C = 125 °C	-	0.99	-	mJ
	Turn-Off Switching Loss per Pulse	- · · · · · · ·	-	0.99	-	mJ
E _{OFF}		V_{CC} = 300 V, I_{C} = 50 A, V_{GE} = ± 15 V			- -	
Qg	Total Gate Charge		-	0.39	-	nC °C//
$R_{\theta JC}$	Thermal Resistance of Junction to Case	per Chip	-	-	0.86	°C/V

Electrical Characteristics $T_C = 25$ °C unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Units
Diode			'		•	
V _{FM}	Diode Forward Voltage	I _F = 15 A	-	2.55	3.4	V
		I _F = 15 A @T _C = 125 °C	-	1.78	-	V
I _R	Reverse Leakage Current	V _R = 650 V	-	-	250	μА
t _{rr}	Reverse Recovery Time	V _R = 300 V, I _F = 15 A	-	23	-	ns
I _{rr}	Reverse Recovery Current	di _F / dt = 700 A/us	-	9.9	-	Α
Q _{rr}	Reverse Recovery Charge	$T_C = 25 ^{\circ}C$	-	113	-	nC
t _{rr}	Reverse Recovery Time	V _R = 300 V, I _F = 15 A	-	49	-	ns
I _{rr}	Reverse Recovery Current	di _F / dt = 700 A/us	-	15.2	-	Α
Q _{rr}	Reverse Recovery Charge	$T_{\rm C}$ = 125 °C	-	366	-	nC
$R_{\theta JC}$	Thermal Resistance of Junction to Case	per Chip	-	-	1.44	°C/W
NTC_ The	ermistor					
R _{NTC}	Rated Resistance	T _C = 25 °C	-	5.0	-	kΩ
		T _C = 100 °C	-	493	-	Ω
	Tolerance	T _C = 25 °C	- 5	-	+ 5	%
P_{D}	Power Dissipation	T _C = 25 °C	-	-	20	mW
B _{Value}	B-Constant	B _{25/50}	-	3375	-	K
		B _{25/100}	-	3436	-	K

Typical Performance Characteristic

Fig 1. Typical Output Characteristics

- Outer IGBT

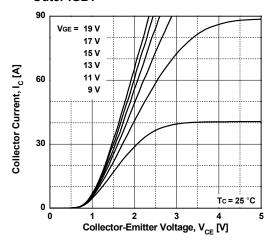


Fig 2. Typical Output Characteristics

- Outer IGBT

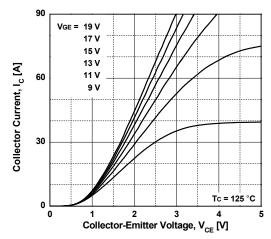


Fig 3. Typical Saturation Voltage Characteristics

- Outer IGBT

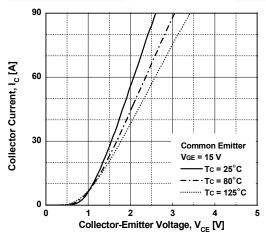


Fig 4. Switching Loss vs. Collector Current

- Outer IGBT

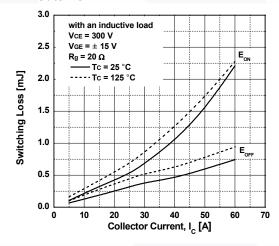


Fig 5. Switching Loss vs. Gate Resistance

- Outer IGBT

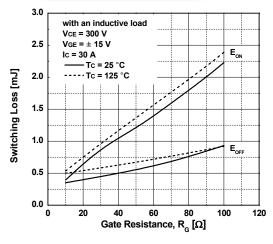
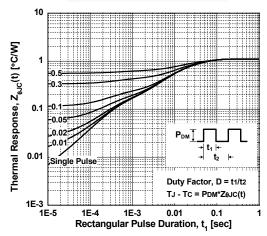


Fig 6. Transient Thermal Impedance

- Outer IGBT



Typical Performance Characteristic

Fig 7. Typical Output Characteristics

- Inner IGBT

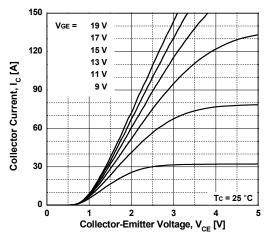


Fig 8. Typical Output Characteristics

- Inner IGBT

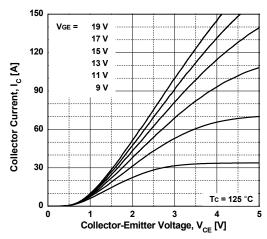


Fig 9. Typical Saturation Voltage Characteristics

- Inner IGBT

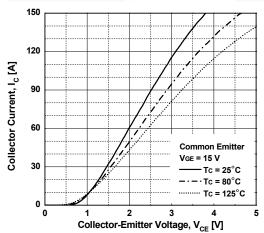


Fig 10. Switching Loss vs. Collector Current

- Inner IGBT

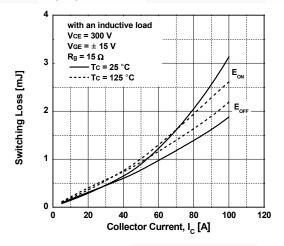


Fig 11. Switching Loss vs. Gate Resistance
- Inner IGBT

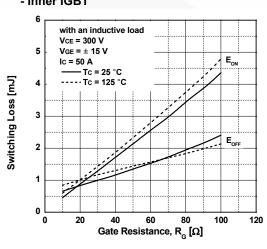
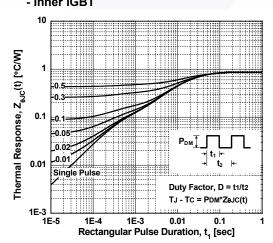


Fig 12. Transient Thermal Impedance
- Inner IGBT



Typical Performance Characteristic

Fig 13. Reverse Bias Safe Operating Area (RBSOA)

- Outer IGBT

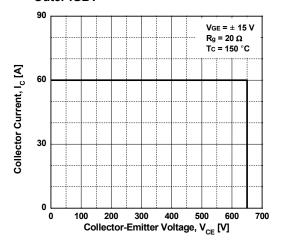


Fig 14. Reverse Bias Safe Operating Area (RBSOA)

- Inner IGBT

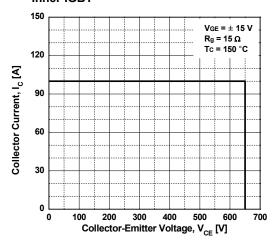


Fig 15. Typical Forward Voltage Drop

- Diode

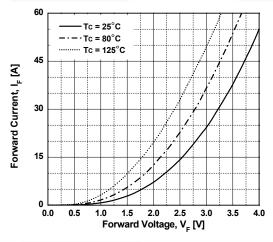


Fig 16. Reverse Recovery Energy vs. Forward Current

- Diode

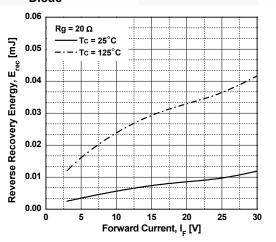
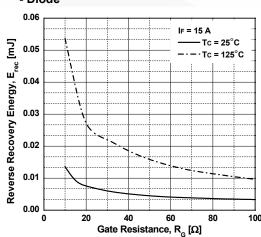
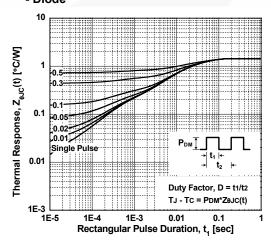


Fig 17. Reverse Recovery Energy vs. Gate Resistance Fig 18. Transient Thermal Impedance

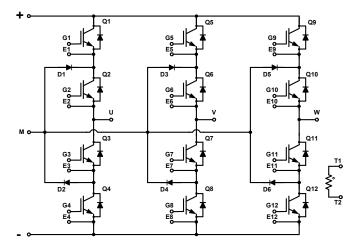
- Diode



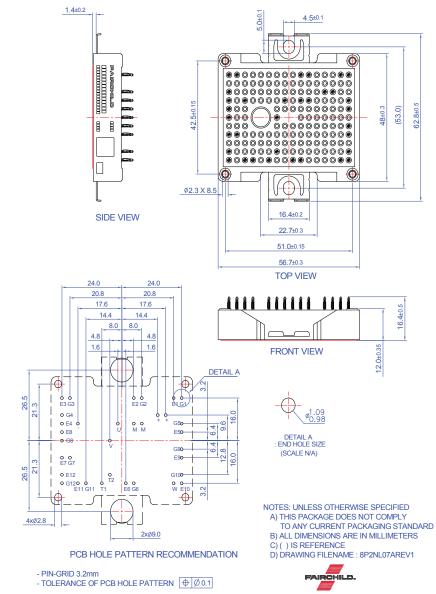
- Diode



Internal Circuit Diagram



Package Outlines [mm]







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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«**FORSTAR**» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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