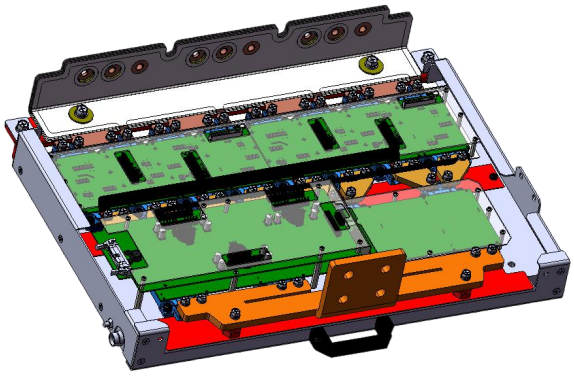
# FPS210HA124FW004 Data Sheet



## General Information

·**Power stack for typical voltages of up to 690 $V_{RMS}$**

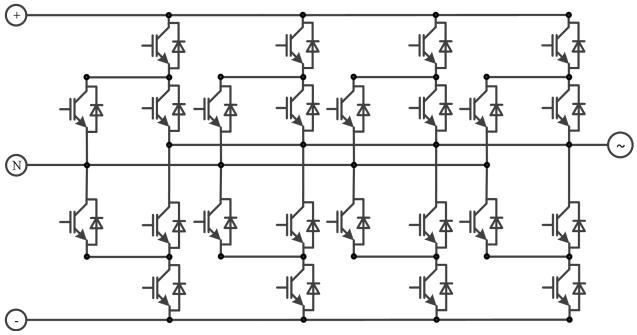
·**Rated output current 2100 $A_{RMS}$**

## Typical Applications

·**Energy storage system converter**

·**Wind power converter**

·**PV inverter**




| | |
|---|---|
| Topology | Single-Phase/3-level ANPC |
| IGBT Power Module | 12*2MBI800XNE120-50(Fuji) |
| Load Type | Resistive, inductive |
| Cooling | Liquid cooling |
| Interface | Electrical |
| Ordering Part Number | FPS210HA124FW004 |

## Characteristic Parameters

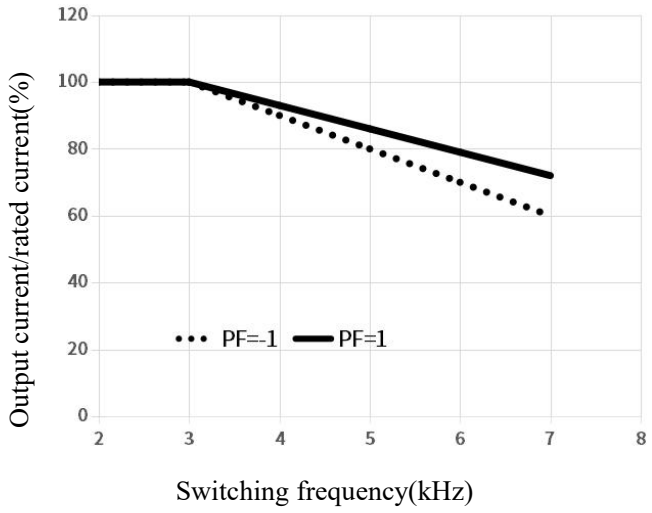
| Parameters | Note | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **DC Bus** | | | | | |
| Rated voltage $V_{DC}$ | Full bus voltage, applied between + and - | | 1500 | | V |
| **AC Phase** | | | | | |
| Rated operating voltage $V_{line}$ | | | 690 | | $V_{RMS}$ |
| Rated continuous current $I_{AC}$ | $V_{DC}$=1500V,<br>$V_{AC}$=690$V_{RMS}$,<br>PF=±1,<br>$f_{ACsine}$= 50Hz,<br>fsw=3kHz,<br>$T_{inlet}$= 45°C,<br>$T_J$≤150°C | | | 2100 | $A_{RMS}$ |
| Inverter mode short-time overload capability $I_{AC1}$ | $V_{DC}$=1500V,<br>$V_{AC}$=690$V_{RMS}$,<br>PF =1,<br>Duration: 90s,<br>$f_{AC\ sine}$=50 Hz,<br>fsw=3kHz,<br>$T_{inlet}$= 45°C,<br>$T_J$ ≤ 150°C | | | 2600 | $A_{RMS}$ |
| Rectifier mode short-time overload capability $I_{AC2}$ | $V_{DC}$=1500V,<br>$V_{AC}$=690$V_{RMS}$,<br>PF =-1,<br>duration: 60s,<br>$f_{AC\ sine}$=50 Hz,<br>fsw=3kHz,<br>$T_{inlet}$= 45°C,<br>$T_J$ ≤ 150°C | | | 2600 | $A_{RMS}$ |
| Switching frequency $f_{SW}$ | | | 3 | | kHz |
| Loss $P_{loss}$ | $I_{AC}$ = 2100 A,<br>$V_{DC}$ = 1500 V,<br>$V_{AC}$ = 690 $V_{RMSS}$,<br>PF = ±1,<br>$f_{ACsine}$ = 50 Hz,<br>$f_{sw}$ = 3kHz,<br>$T_{inlet}$ = 45 °C | | 13000 | | W |

| | | | | | |
|---|---|---|---|---|---|
| Power factor PF | | -1.0 | | 1.0 | |
| **Controller Interface** | | | | | |
| Auxiliary power supply voltage $V_{aux}$ | | 14.5 | 15 | 15.5 | V |
| Auxiliary power requirement $P_{aux}$ | | | 50 | | W |
| Auxiliary power supply interface type | | Ejector header with 30 positions and a pitch of 2.54mm | | | |
| Auxiliary power supply undervoltage threshold $V_{aux\_UV}$ | | | 12 | | V |
| PWM signal high level threshold $V_{PWM\_H}$ | | | 8.3 | | V |
| PWM signal low level threshold $V_{PWM\_L}$ | | | 4.8 | | V |
| Frequency signal corresponding to NTC $f_{NTC}$ | $T_{NTC}$ = 25°C | | 21.4 | | kHz |
| Fault output current capability $I_{FLT}$ | Fault condition | | | 500 | mA |
| Fault hold time $t_{FLTH}$ | | | 40 | | ms |
| **System Parameters** | | | | | |
| Insulation test voltage $V_{isol}$ | f=50Hz, t=60s | 2.5 | | | $kV_{RMS}$ |
| Storage temperature $T_{stor}$ | | -40 | | 65 | °C |
| Operational ambient temperature $T_{op\ amb}$ | PCB, DC bus capacitors, DC/AC bus, without cooling | -25 | | 55 | °C |
| Relative humidity Rel. F | No condensation | 0 | | 95 | % |
| Installation altitude | Without derating | 0 | | 2000 | m |
| Protection degree | According to EN 50178 | IP00 | | | |
| Pollution degree | According to IEC 60529 | 2 | | | |
| DC terminal mounting torque $M_{DC}$ | | | 24 | | Nm |
| AC terminal mounting torque $M_{AC}$ | | | 55 | | Nm |
| Dimensions | Length × width × height | 598*463.2*117.5 | | | mm |
| Weight | | | 30 | | kg |

| Liquid Cooling | | | | | |
|---|---|---|---|---|---|
| Liquid volume ΔV/ Δt | $T_{air}$=45°C,<br>$P_{liquid}$=0.8bar, | 25 | | | $L^3$/min |
| Liquid pressure Δp | | | 0.8 | | bar |
| Inlet temperature $T_{inlet}$ | | | | 45 | °C |

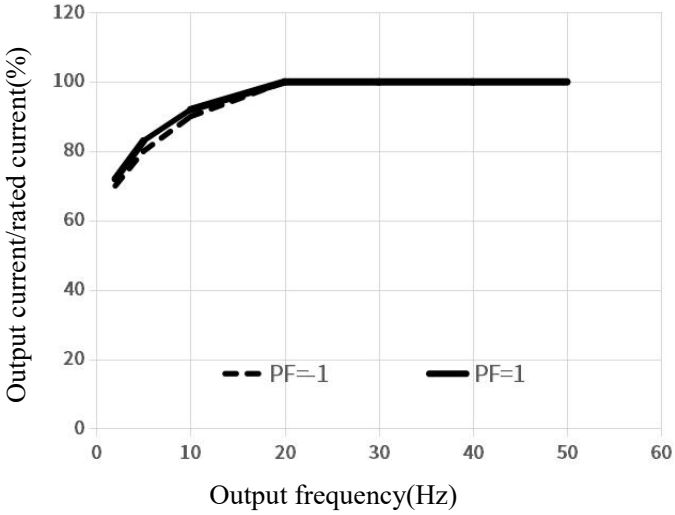
Output current versus switching frequency curve

$V_{DC}$=1500 V, $V_{AC}$ = 690 $V_{RMS}$, $f_{AC\ sine}$ = 50 Hz, $T_{inlet}$ = 45°C

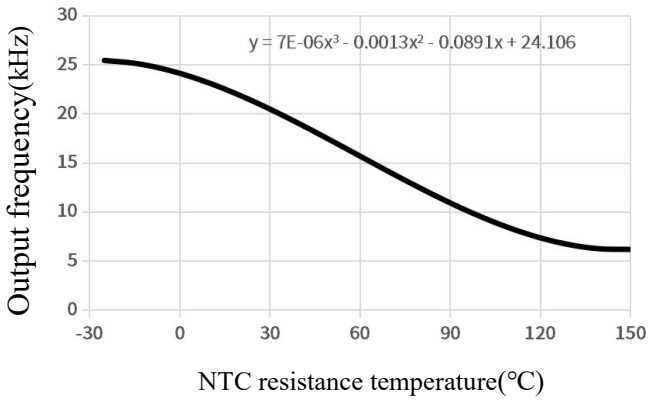



Output current versus output frequency

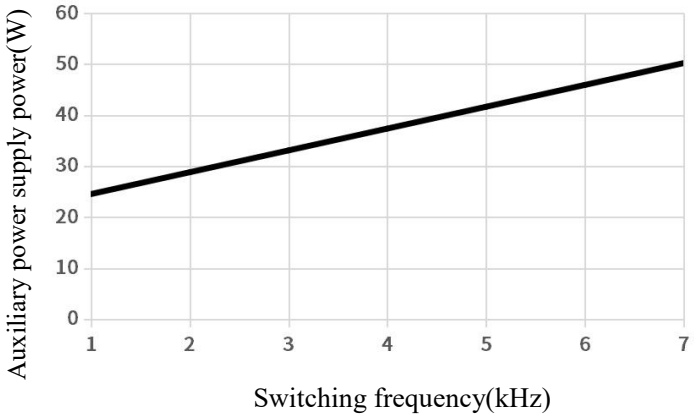
$V_{DC}$=1500 V, $V_{AC}$ = 690 $V_{RMS}$, $f_{SW}$ = 3kHz, $T_{inlet}$= 45°C



Output frequency versus NTC temperature curve




Auxiliary power requirement versus switching frequency curve



## Controller Signal Connector Pin Definitions

| Pin | Name | Function | Pin | Name | Function |
|---|---|---|---|---|---|
| 1 | 1 to 20 | Connected to pin 20 | 2 | 15V | 15V supply signal |
| 3 | 15V | 15V supply signal | 4 | 15V | 15V supply signal |
| 5 | GND | Primary side ground | 6 | FAULT | Fault summary output signal |
| 7 | GND | Primary side ground | 8 | GND | Primary side ground |
| 9 | GND | Primary side ground | 10 | T1-IN | T1 PWM input signal |
| 11 | GND | Primary side ground | 12 | NTC1-1 | External NTC1-pin1 |
| 13 | NTC1-2 | External NTC1-pin2 | 14 | NC | Free |
| 15 | GND | Primary side ground | 16 | T2-IN | T2 PWM input signal |
| 17 | GND | Primary side ground | 18 | NTC2-1 | External NTC2-pin1 |
| 19 | NTC2-2 | External NTC2-pin2 | 20 | 1 to 20 | Connected to pin 1 |
| 21 | GND | Primary side ground | 22 | T3-IN | T3 PWM input signal |
| 23 | GND | Primary side ground | 24 | T4-IN | T4 PWM input signal |
| 25 | GND | Primary side ground | 26 | T5-IN | T5 PWM input signal |
| 27 | GND | Primary side ground | 28 | T6-IN | T6 PWM input signal |
| 29 | GND | Primary side ground | 30 | NTC-VF | Frequency signal corresponding to the maximum temperature of the NTC temperature |

| NTC Temperature VS Output Frequency Table | |
|---|---|
| **NTC temperature/℃** | **Frequency/kHz** |
| -25 | 25.4 |
| 0 | 24.1 |
| 25 | 21.2 |
| 50 | 17.3 |
| 75 | 13.1 |
| 100 | 9.2 |
| 125 | 6.3 |
| 150 | 5.1 |

## Safety instructions

1. The data contained in this product data sheet is intended for trained engineers only. The usefulness of this product for your planned application scenario, and the completeness of the product information must be evaluated before using this product. No warranty or guarantee is given in this specification for any shipping, product suitability related to this product.

2. Please contact us if you require information that is not presented in the specification or relates to specific product information.

3. Please contact us if you plan to use this product in aviation, health or life support related or similar applications. Please note that for any such applications, we recommend the following:

- Conduct risk and quality assessments
- Complete quality agreement

And we will decide whether or not to provide the product based on the completion of the above measures.

4. This product is not permitted to exceed the nominal maximum value of each parameter under any operating conditions, but this does not mean that the product can be operated under conditions where each parameter reaches the nominal maximum value at the same time.

5. When using this product, you must strictly follow the requirements of the external heat dissipation conditions as indicated in the specifications for the relevant configurations in order to avoid causing the performance of this product to be derated.

6. Before installing or applying this product, you must carefully read the safety-related warning labels or safety instructions on the product and ensure that all safety labels are clearly visible.

## Technical support

Firstack's professional team will provide you with business consultation, technical support, product selection, price, lead time and other related information, and guarantee to answer your questions within 48 hours.

## Legal disclaimer

This manual gives a detailed introduction about the product, but cannot promise to provide specific parameters. No warranty or guarantee, express or implied, is given herein as to the delivery, performance or applicability of the product.

Firstack reserves the right to modify technical data and product specifications at any time without prior notice. Firstack's general payment terms and conditions apply.

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