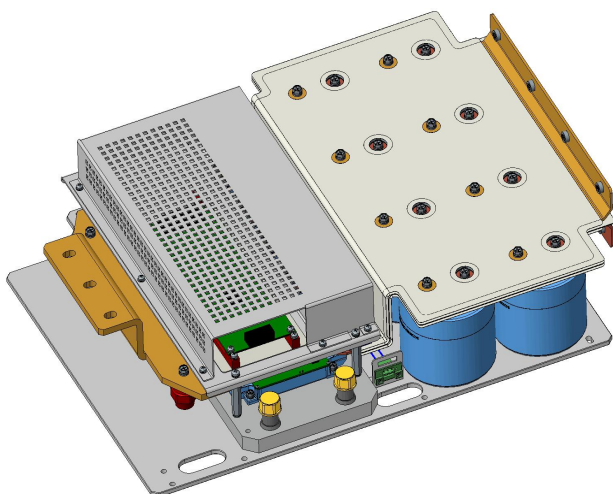


FPS150H176XW001 Preliminary Data sheet

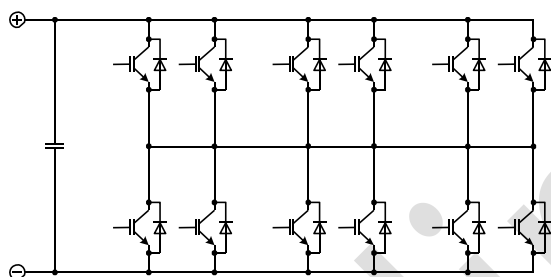


General Information

- Power stack for typical voltages of up to $660V_{RMS}$
- Rated output current $900A_{RMS}$

Typical Applications

- High power converter
- Wind power converter
- Motor drives



Topology	Topology
Load type	Resistive, inductive
Bus capacitor	3.36mF
Cooling	Liquid cooling
Drive signal	Optical signal
Part number	FPS150H176XW001

Maximum Rated Parameters

Collector-emitter voltage	IGBT; $T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1700	V
Repetitive peak reverse voltage	Diode; $T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	1700	V
DC bus voltage	No switch; $t=5\text{s}$, once a day	V_{DC}	890	V
Insulation management	Installation altitude 2000m	V_{line}	660	V_{RMS}
Insulation test voltage	According to EN 50178, $f = 50\text{Hz}$, $t = 5\text{s}$	V_{ISOL}	2.5	kV_{RMS}
Junction temperature	Under switching condition	T_{vjop}	150	$^{\circ}\text{C}$
Minimum storage temperature		T_{stor}	-40	$^{\circ}\text{C}$
Maximum storage temperature		T_{stor}	65	$^{\circ}\text{C}$
Minimum operating temperature		T_{amb}	-25	$^{\circ}\text{C}$
Minimum operating temperature		T_{amb}	55	$^{\circ}\text{C}$
Auxiliary power supply voltage		V_{aux}	15	V
Maximum switching frequency of the inverter section		f_{sw2}	2	kHz
Note: Detailed maximum ratings are specified in the following dedicated sections.				

Characteristic Parameters

Parameters	Note	Symbol	Min	Typ	Max	Unit
DC Part						
Rated voltage	Continuous mode	V_{DC}		890		V
Overvoltage turn off	Within 150 μ s			1300		V
Capacitor	1s, 30 p, rated tolerance. $\pm 10\%$	C_{DC}		3.36		mF
		Type				

Note

- When operating above 1100V, working time must be restricted in accordance with EN 61071.
- Short-circuit protection must be restricted when exceeding 1200V.

Inverter Part

Rated continuous current I_{AC}	$V_{DC}=890V$, $V_{AC}=660V_{RMS}$, $\cos\theta=0.97$, $f_{AC\ sine}=50\ Hz$, $f_{sw}=2000\ Hz$, $T_{inlet}=40^{\circ}C$	I_{AC}		900		A_{RMS}
Loss P_{loss}	$I_{AC}=900\ A$, $V_{DC}=890\ V$, $V_{AC}=660\ V_{RMS}$, $\cos\theta=0.97$, $f_{AC\ sine}=50\ Hz$, $f_{sw}=2000\ Hz$, $T_{inlet}=40\ ^{\circ}C$	P_{loss}		1836		W

Controller Interface

Auxiliary power supply voltage		V_{aux}	13	15	16	V
Frequency signal corresponding to the NTC resistor f_{NTC}	$T_{NTC}=25^{\circ}C$	R_{NTC}		5		k
Minimum turn-on time (IGBT)		$t_{on\ min}$	5			μs
Minimum turn-off time (IGBT)		$t_{off\ min}$	5			μs

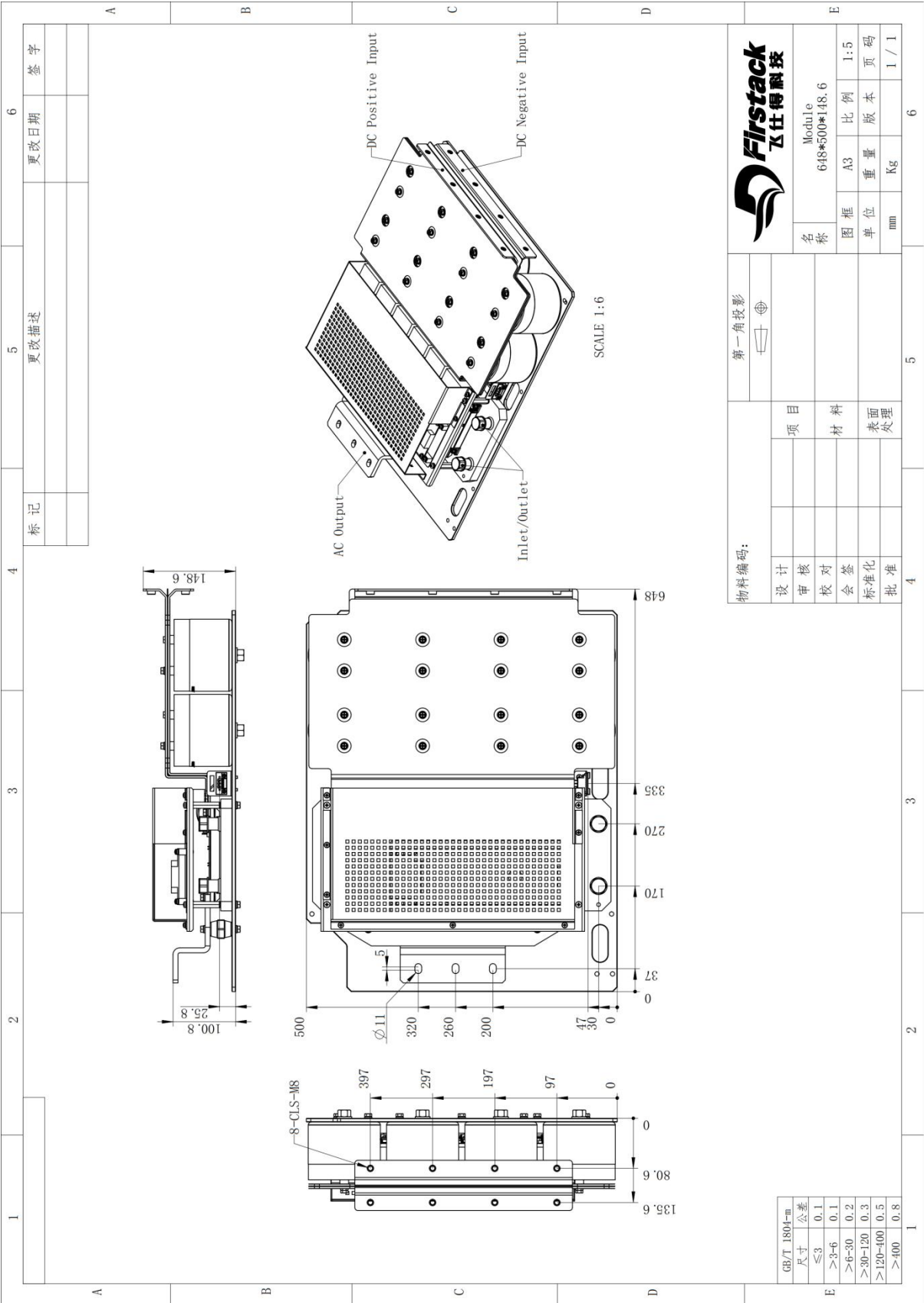
System Parameters

EMC robustness	In accordance with IEC 61800-3 at the specified interface	Power	V_{Burst}		2		kV
		Control	V_{Burst}		1		
		Auxiliary (15V)	V_{surge}		1		
Storage temperature			T_{stor}	-40		65	°C
Operational ambient temperature	PCB, busbar capacitor, busbar, excluding cooling medium		$T_{op\ amb}$	-25		55	°C
Cooling gas flow	PCB, busbar capacitor, busbar, standard atmospheric pressure		V_{air}	2			m/s
Humidity	No condensation		Rel. F	0		85	%
Vibration	According to IEC 60721					10	m/s ²
Shock	According to IEC 60721					100	m/s ²
Protection degree				IP00			
Pollution degree				2			
Dimensions	Length × width × height			525.2	512.3	198.2	mm
Weight					35		kg

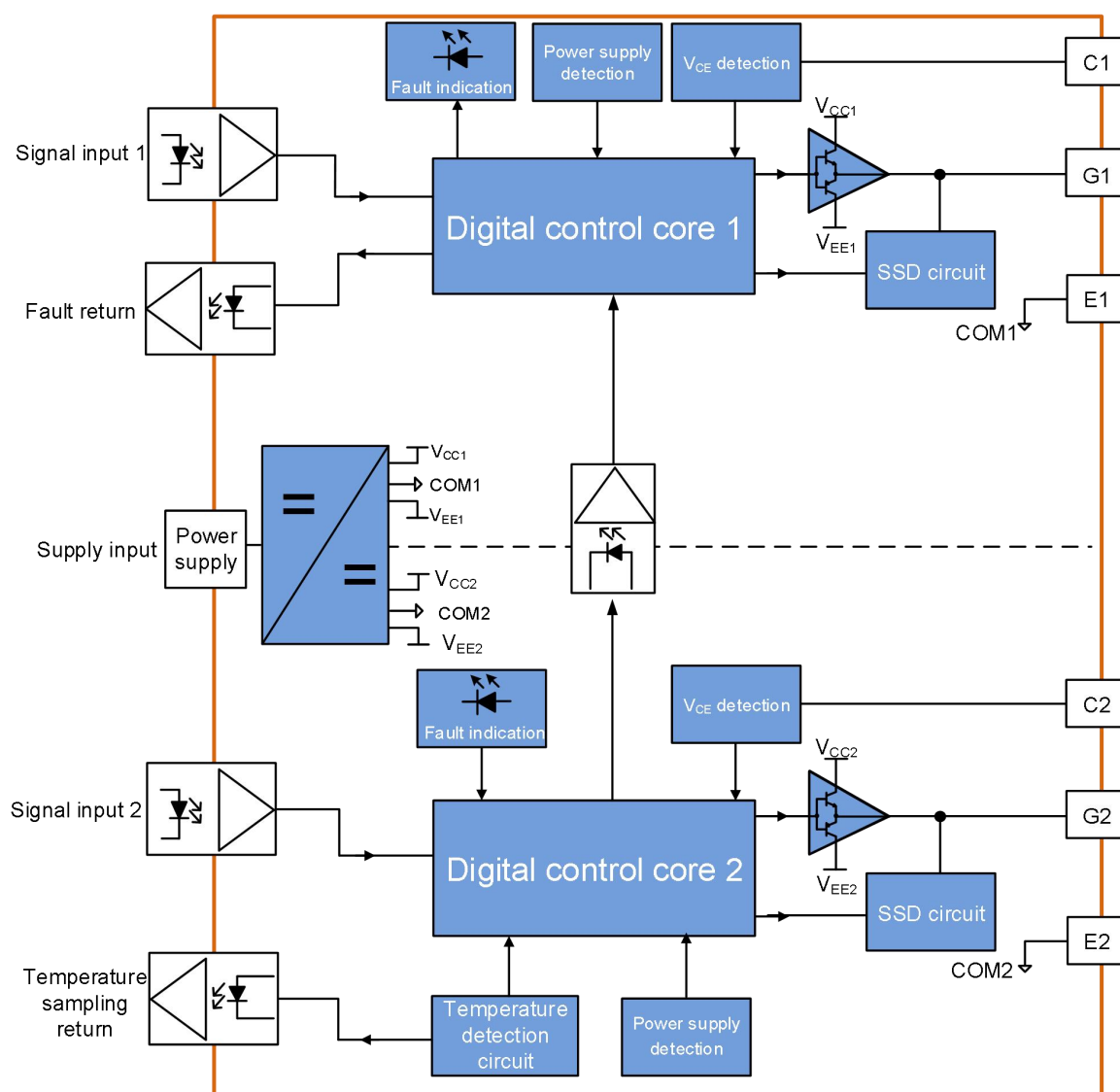
Liquid Cooling

Liquid volume		$\Delta V/\Delta t$	30				L ³ /min
Junction-Case resistor – IGBT		$R_{th\ (J-C)}\ IGBT$				0.0369	K/W
Junction-Case resistor – Diode		$R_{th-Diode}$				0.073	K/W
Case-heatsink -IGBT	Installation torque 5Nm, thermal grease 1W/(m·K)	$R_{th\ (C-H)}$				0.0328	K/W
Case-heatsink -Diode	Installation torque 5Nm,thermal grease 1W/(m·K)	$R_{th-Diode\ (C-H)}$				0.0378	K/W
Heatsink-environment resistor	Flow rate = 30 L ³ /min, Ta = 40°C, 500m altitude	$R_{th\ (H-A)}$				0.018	K/W
Inlet temperature		T_{inlet}	-40			40	°C
Heatsink material			Aluminium				

Dimensions



System Block Diagram



Technical drawing of a server rack layout, showing front, side, and top views with dimensions in mm.

Front View Dimensions:

- Total width: 187
- Total height: 90
- Top section height: 20.3
- Section 1 width: 10.9
- Section 2 width: 16.6
- Section 3 width: 11.6
- Section 4 width: 30.5
- Section 5 width: 5

Side View Dimensions:

- Total depth: 250
- Top section depth: 53
- Section 1 depth: 10.9
- Section 2 depth: 16.6
- Section 3 depth: 11.6
- Section 4 depth: 30.5
- Section 5 depth: 5

Top View Dimensions:

- Total width: 187
- Total depth: 250
- Section 1 width: 10.9
- Section 2 width: 16.6
- Section 3 width: 11.6
- Section 4 width: 30.5
- Section 5 width: 5

Component Labels:

- NTC1, NTC2, NTC3, NTC4, NTC5, NTC6, NTC7, NTC8, NTC9, NTC10, NTC11, NTC12, NTC13, NTC14, NTC15, NTC16, NTC17, NTC18, NTC19, NTC20, NTC21, NTC22, NTC23, NTC24, NTC25, NTC26, NTC27, NTC28, NTC29, NTC30, NTC31, NTC32, NTC33, NTC34, NTC35, NTC36, NTC37, NTC38, NTC39, NTC40, NTC41, NTC42, NTC43, NTC44, NTC45, NTC46, NTC47, NTC48, NTC49, NTC50, NTC51, NTC52, NTC53, NTC54, NTC55, NTC56, NTC57, NTC58, NTC59, NTC60, NTC61, NTC62, NTC63, NTC64, NTC65, NTC66, NTC67, NTC68, NTC69, NTC70, NTC71, NTC72, NTC73, NTC74, NTC75, NTC76, NTC77, NTC78, NTC79, NTC80, NTC81, NTC82, NTC83, NTC84, NTC85, NTC86, NTC87, NTC88, NTC89, NTC90, NTC91, NTC92, NTC93, NTC94, NTC95, NTC96, NTC97, NTC98, NTC99, NTC100, NTC101, NTC102, NTC103, NTC104, NTC105, NTC106, NTC107, NTC108, NTC109, NTC110, NTC111, NTC112, NTC113, NTC114, NTC115, NTC116, NTC117, NTC118, NTC119, NTC120, NTC121, NTC122, NTC123, NTC124, NTC125, NTC126, NTC127, NTC128, NTC129, NTC130, NTC131, NTC132, NTC133, NTC134, NTC135, NTC136, NTC137, NTC138, NTC139, NTC140, NTC141, NTC142, NTC143, NTC144, NTC145, NTC146, NTC147, NTC148, NTC149, NTC150, NTC151, NTC152, NTC153, NTC154, NTC155, NTC156, NTC157, NTC158, NTC159, NTC160, NTC161, NTC162, NTC163, NTC164, NTC165, NTC166, NTC167, NTC168, NTC169, NTC170, NTC171, NTC172, NTC173, NTC174, NTC175, NTC176, NTC177, NTC178, NTC179, NTC180, NTC181, NTC182, NTC183, NTC184, NTC185, NTC186, NTC187, NTC188, NTC189, NTC190, NTC191, NTC192, NTC193, NTC194, NTC195, NTC196, NTC197, NTC198, NTC199, NTC200, NTC201, NTC202, NTC203, NTC204, NTC205, NTC206, NTC207, NTC208, NTC209, NTC210, NTC211, NTC212, NTC213, NTC214, NTC215, NTC216, NTC217, NTC218, NTC219, NTC220, NTC221, NTC222, NTC223, NTC224, NTC225, NTC226, NTC227, NTC228, NTC229, NTC230, NTC231, NTC232, NTC233, NTC234, NTC235, NTC236, NTC237, NTC238, NTC239, NTC240, NTC241, NTC242, NTC243, NTC244, NTC245, NTC246, NTC247, NTC248, NTC249, NTC250, NTC251, NTC252, NTC253, NTC254, NTC255, NTC256, NTC257, NTC258, NTC259, NTC260, NTC261, NTC262, NTC263, NTC264, NTC265, NTC266, NTC267, NTC268, NTC269, NTC270, NTC271, NTC272, NTC273, NTC274, NTC275, NTC276, NTC277, NTC278, NTC279, NTC280, NTC281, NTC282, NTC283, NTC284, NTC285, NTC286, NTC287, NTC288, NTC289, NTC290, NTC291, NTC292, NTC293, NTC294, NTC295, NTC296, NTC297, NTC298, NTC299, NTC300, NTC301, NTC302, NTC303, NTC304, NTC305, NTC306, NTC307, NTC308, NTC309, NTC310, NTC311, NTC312, NTC313, NTC314, NTC315, NTC316, NTC317, NTC318, NTC319, NTC320, NTC321, NTC322, NTC323, NTC324, NTC325, NTC326, NTC327, NTC328, NTC329, NTC330, NTC331, NTC332, NTC333, NTC334, NTC335, NTC336, NTC337, NTC338, NTC339, NTC340, NTC341, NTC342, NTC343, NTC344, NTC345, NTC346, NTC347, NTC348, NTC349, NTC350, NTC351, NTC352, NTC353, NTC354, NTC355, NTC356, NTC357, NTC358, NTC359, NTC360, NTC361, NTC362, NTC363, NTC364, NTC365, NTC366, NTC367, NTC368, NTC369, NTC370, NTC371, NTC372, NTC373, NTC374, NTC375, NTC376, NTC377, NTC378, NTC379, NTC380, NTC381, NTC382, NTC383, NTC384, NTC385, NTC386, NTC387, NTC388, NTC389, NTC390, NTC391, NTC392, NTC393, NTC394, NTC395, NTC396, NTC397, NTC398, NTC399, NTC400, NTC401, NTC402, NTC403, NTC404, NTC405, NTC406, NTC407, NTC408, NTC409, NTC410, NTC411, NTC412, NTC413, NTC414, NTC415, NTC416, NTC417, NTC418, NTC419, NTC420, NTC421, NTC422, NTC423, NTC424, NTC425, NTC426, NTC427, NTC428, NTC429, NTC430, NTC431, NTC432, NTC433, NTC434, NTC435, NTC436, NTC437, NTC438, NTC439, NTC440, NTC441, NTC442, NTC443, NTC444, NTC445, NTC446, NTC447, NTC448, NTC449, NTC450, NTC451, NTC452, NTC453, NTC454, NTC455, NTC456, NTC457, NTC458, NTC459, NTC460, NTC461, NTC462, NTC463, NTC464, NTC465, NTC466, NTC467, NTC468, NTC469, NTC470, NTC471, NTC472, NTC473, NTC474, NTC475, NTC476, NTC477, NTC478, NTC479, NTC480, NTC481, NTC482, NTC483, NTC484, NTC485, NTC486, NTC487, NTC488, NTC489, NTC490, NTC491, NTC492, NTC493, NTC494, NTC495, NTC496, NTC497, NTC498, NTC499, NTC500, NTC501, NTC502, NTC503, NTC504, NTC505, NTC506, NTC507, NTC508, NTC509, NTC510, NTC511, NTC512, NTC513, NTC514, NTC515, NTC516, NTC517, NTC518, NTC519, NTC520, NTC521, NTC522, NTC523, NTC524, NTC525, NTC526, NTC527, NTC528, NTC529, NTC530, NTC531, NTC532, NTC533, NTC534, NTC535, NTC536, NTC537, NTC538, NTC539, NTC540, NTC541, NTC542, NTC543, NTC544, NTC545, NTC546, NTC547, NTC548, NTC549, NTC550, NTC551, NTC552, NTC553, NTC554, NTC555, NTC556, NTC557, NTC558, NTC559, NTC560, NTC561, NTC562, NTC563, NTC564, NTC565, NTC566, NTC567, NTC568, NTC569, NTC570, NTC571, NTC572, NTC573, NTC574, NTC575, NTC576, NTC577, NTC578, NTC579, NTC580, NTC581, NTC582, NTC583, NTC584, NTC585, NTC586, NTC587, NTC588, NTC589, NTC590, NTC591, NTC592, NTC593, NTC594, NTC595, NTC596, NTC597, NTC598, NTC599, NTC600, NTC601, NTC602, NTC603, NTC604, NTC605, NTC606, NTC607, NTC608, NTC609, NTC610, NTC611, NTC612, NTC613, NTC614, NTC615, NTC616, NTC617, NTC618, NTC619, NTC620, NTC621, NTC622, NTC623, NTC624, NTC625, NTC626, NTC

Pin	Name	Description	Pin	Name	Description
1	NC	Free	2	VCC	Supply voltage +15V
3	VCC	Supply voltage +15V	4	VCC	Supply voltage +15V
5	GND	Power supply ground	6	SO	Fault return
7	GND	Power supply ground	8	GND	Power supply ground
9	NC	Free	10	TOP-IN	Top IGBT PWM signal
11	NC	Free	12	NTC1-1	Temperature analogue voltage/connected to P3, J17, J18
13	NTC1-2	Signal ground/connected to P3, J17, J18	14	SO	Fault return
15	NC	Free	16	BOT-IN	Bottom IGBT PWM signal
17	NC	Free	18	NTC2-1	Temperature frequency output/connected to P3, J19, J20
19	NTC2-2	Signal ground/connected to P3, J19, J20	20	NC	Free

P3 Pin definition:

Pin	Name	Description	Pin	Name	Description
1	GND	Power supply ground	2	NTC1-1	Identical to the definition of P2
3	VCC	Supply voltage +15V	4	NTC1-2	Identical to the definition of P2
5	VCC	Supply voltage +15V	6	NTC2-1	Identical to the definition of P2
7	GND	Power supply ground	8	NTC2-2	Identical to the definition of P2

J1, J4, J7, J10, J12, J14 Pin definition:

Pin	Name	Description	Pin	Name	Description
1	TOP_G	Top IGBT _Gate	2	TOP_G	Top IGBT _Gate
3	TOP_E	Top IGBT _Emitter	4	TOP_E	Top IGBT _Emitter
5	TOP_15V	Top IGBT 15V	6	TOP_C	Top IGBT detection C
7	NC	Free	8	NC	Free
9	NC	Free	10	NC	Free
11	BOT_C	Bottom IGBT detection C	12	BOT_15V	Bottom IGBT 15V
13	BOT_G	Bottom IGBT _Gate	14	BOT_G	Bottom IGBT _Gate
15	BOT_E	Bottom IGBT _Emitter	16	BOT_E	Bottom IGBT _Emitter

J5, J6, J8, J9, J11, J13 Pin definition(high-voltage side connector):

Pin	Name	Description	Pin	Name	Description
1	IGBT_xNTC1	Channel x NTC_Pin1	2	IGBT_xNTC2	Channel x NTC_Pin2

J17/J18 Pin definition(low-voltage side connector):

Pin	Name	Description	Pin	Name	Description
1	NTC1-2	NTC1_Pin2	2	NTC1-1	NTC1_Pin1

*Note: When transmitting temperature-isolated analogue outputs, NTC1-1 and NTC1-2 are defined as the analogue temperature output network, with NTC1-2 connected to GND.

J19/J20 Pin definition(low-voltage side connector):

Pin	Name	Description	Pin	Name	Description
1	NTC2-2	NTC2_Pin2	2	NTC2-1	NTC2_Pin1

Note: For further information regarding the gate driver, please refer to the 6FSC08110 data sheet.

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.

Contact Information

Tel: +86-571 8817 2737

Fax: +86-571 8817 3973

Website: www.firstack.com

Email: fsales@firstack.com

Address: 4-5/F, Building/5, Xizi Wisdom Park, No.1279 Tongxie Road, Hangzhou, China