SPM-VFD

3 Phase Inverter Power Module

Features

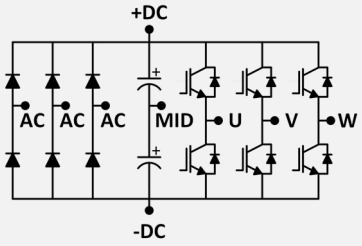
- SiC, IGBT and MOSFET Switches Option
- Built-in 3 Phase Rectifier
- Direct Interface with Gate Drive Modules
- Simple & Cost Effective Solution
- DC Link Over Voltage Protection
- DC Link Safety Discharge & Indication
- TB & Banana Input, Output Connectors
- Test Points for Easy Testing

Description

The SPM Series of Power Modules are simple and modular blocks that could be used for fast prototyping and validation of popular power converter circuits such as, Single & Multi-Phase Inverters, Buck/Boost Converters, Single & Multi-Phase Active Rectifiers and Modular Multi-Level Converters etc. It can cover wide range of applications such as Variable Frequency Drives (VFDs), BLDC Motor Drives, PV inverters and converters in research and educational environments.

User can connect Input and output terminals using pluggable terminal blocks or banana connectors, providing ease of use in labs. Test points are also available for pain free testing. SPM Power Modules are fully compatible with gate drive modules made by Taraz Technologies. In addition, custom solutions could be provided upon request.

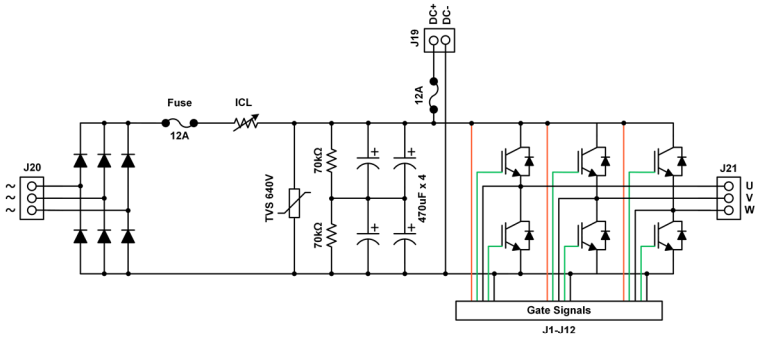
Basic Schematic



Applications

- 3 Phase AC Motor Drive
- 3 Phase BLDC Motor Drive
- PV Inverters
- Multi-channel PFC Boost Converter

Detailed Schematic



Ordering Information

SPM-VFD-XXX

Options

MOS - *MOSFET Switch*
IGBT - *IGBT Switch*
SiC - *Silicon Carbide Switch*

Specifications

Characteristics	Test Conditions/ Note	MOSFET	IGBT	SiC	Unit
DC Input Voltage	25C	600	600	600	V_{DC}
AC Input Voltage	Single or 3 phase, 50 Hz	420	420	420	V_{AC}
Over-Voltage Protection	Clamping Voltage	735	735	735	V_{DC}
Output Current	@ 2kHz, TA 25C, DC Input	6.7	7.5	9.5	A_{RMS}
Output Power	@ 2kHz, 25C, 600V DC Input	4.4	5	6.1	kW
Output Power	@ 2kHz, 25C, 420V AC Input	2.9	3	3.1	kW
Overload Capacity	@ 2kHz, 25C, 10s	100	100	100	%
Gate Drive Voltage	Recommended	+15/0	+15/-8	+18/0	V
Gate Drive Resistance	Minimum	4.7	10	3	Ω
Switching Frequency	Maximum	100	30	200	kHz
Dead-time	Minimum	0.3	1	0.1	µs
Short Circuit Withstand Time	Maximum	0	10	10	µs
Recommended Gate Driver		GDS	GDA	GDX	-
Weight			870		g

Performance Curves

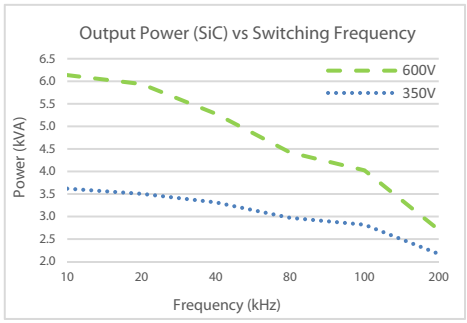


Fig 1: Output Power (SiC) vs Switching Frequency at DC Input

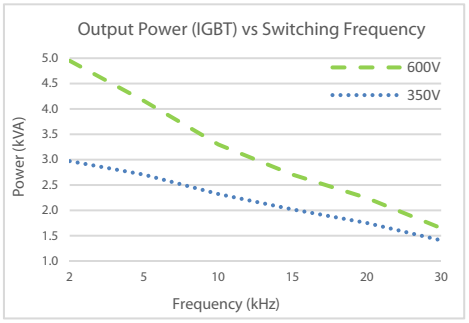


Fig 2: Output Power (IGBT) vs Switching Frequency at DC Input

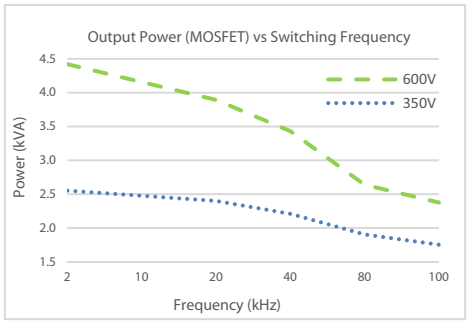


Fig 3: Output Power (MOSFET) vs Switching Frequency at DC Input

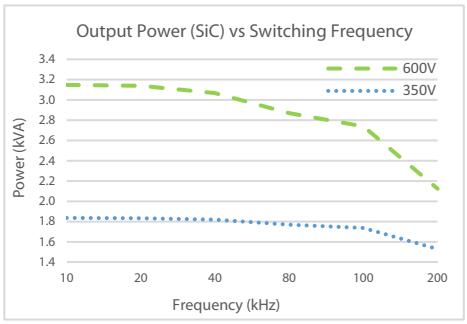


Fig 4: Output Power (SiC) vs Switching Frequency at AC Input

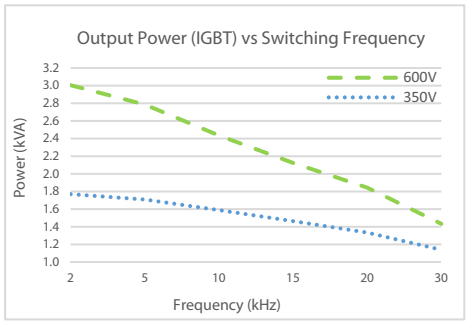


Fig 5: Output Power (IGBT) vs Switching Frequency at AC Input

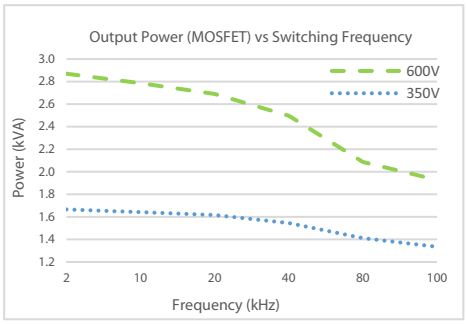


Fig 6: Output Power (MOSFET) vs Switching Frequency at AC Input

Notes:

1) All output power curves are provided for 25°C ambient and 100°C heatsink temperatures.
2) Power ratings are for 600V and 350V DC-Link voltages, sinusoidal current output.
3) At 100 LFM forced cooling, output power is increased by 1.7x factor.
4) Temperature derating curve must be used if ambient temperature will go higher than 25°C.

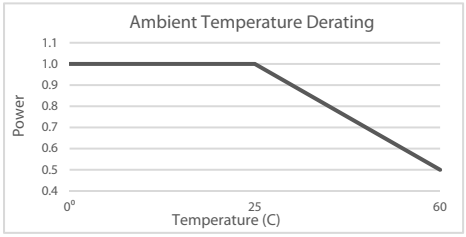
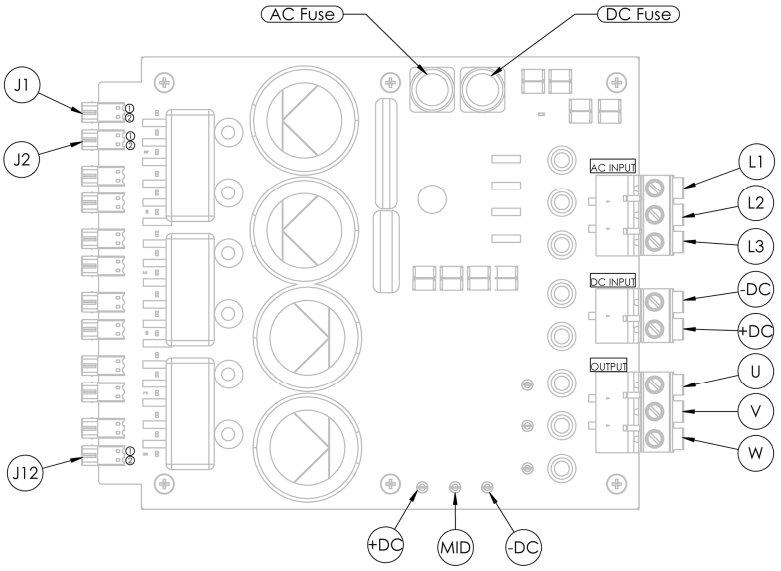


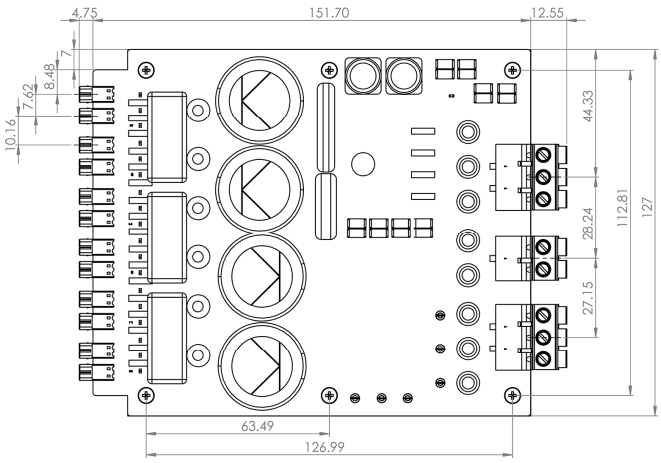
Fig 7: Output power derating factor with ambient temperature

Pin Mapping

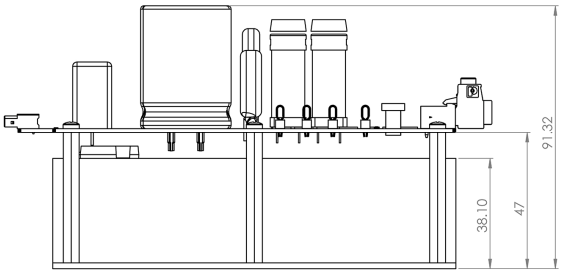


Name	Connector (Pin No.)	Description
Collector	J(1,3,5,7,9,11) (1)	IGBT/MOSFTE or SiC collector/Drain terminals for connection of signals
Gate	J(2,4,6,8,10) (1)	IGBT/MOSFTE or SiC gate terminals for connection of signals
Emitter	J(2,4,6,8,10) (2)	IGBT/MOSFTE or SiC Emitter/Source terminals for connection of signals
AC Input	L1,L2,L3	1/3 Phase AC Input Terminal Block
DC Input	+DC,-DC	0-600V DC Input Terminal Block
Output	U,V,W	3 Phase Output Terminal Block

Mechanical Drawing



TOP VIEW



SIDE VIEW

SAFETY NOTICE!

ATTENTION PLEASE! THIS DEVICE IS ESD SENSITIVE AND NEEDS TO BE HANDLED WITH CARE. HIGH VOLTAGE CONDITION MAY OCCUR DURING OPERATION OF THE DEVICE, AND HENCE USER IS SOLELY RESPONSIBLE OF EQUIPMENT AND PERSONNEL SAFETY. TARAZ TECHNOLOGIES SHALL NOT BE HOLD LIABLE FOR ANY DAMAGE TO PERSONNEL AND/OR PROPERTIES AS A RESULT OF USING THIS DEVICE. USER MUST TAKE ADEQUATE STEPS TO ENSURE ELECTRICAL AND MECHANICAL SAFETLY OF THE DEVICE IN USE.

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