

Typical Features

- ◆ Wide Input Range: 90 - 528 VAC / 100-745 VDC
- ◆ No-load power consumption ≤ 0.5 W(Typ)
- ◆ Efficiency: 84% (Typ)
- ◆ Operating Temperature: -40°C to $+70^{\circ}\text{C}$
- ◆ Switching Frequency: 65 kHz
- ◆ Protection types: Short-circuit, overcurrent, and overvoltage protection
- ◆ Isolation Voltage: 4000 VAC
- ◆ Maximum operating altitude: 2000 m
- ◆ Complies with IEC 62368/UL 62368/EN 62368 testing standards
- ◆ CE and RoHS certified (CE certification covers an Input Voltage Range of 100 - 400 VAC)
- ◆ Fully enclosed plastic housing, compliant with UL 94 V-0
- ◆ Through-hole mounting on PCB



Application Field

The **FA20-300SXXH2D4(-T)(-TS)** series is a compact, high-efficiency power module featuring universal input voltage (AC/DC compatible), low ripple, and low temperature rise. It offers high reliability, safety isolation, and excellent EMC performance, complying with EN55032 and IEC/EN61000 standards. Widely applied in electric power, industrial, instrumentation, and smart home sectors, it requires the recommended application circuit when used in harsh electromagnetic environments.

Selection Guide

Certificate	Part No.	Input Voltage Range		Output Specifications			Max. Capacitive Load 230 VAC (MAX)	Ripple & Noise 20 MHz (MAX)	Standard Voltage, Full Load Output Efficiency (Typ)
		Nominal Value (VAC)	Range Value (VAC)	Power P (W)	Voltage Vo(V)	Current Io (mA)	uF	mVp-p	%
CE/RoHS	FA20-300S05H2D4	230	90-528	20	5	4000	7,000	90	78
CE/RoHS	FA20-300S12H2D4				12	1660	5000	120	83
CE/RoHS	FA20-300S15H2D4				15	1333	2000	120	83
CE/RoHS	FA20-300S24H2D4				24	833	1000	150	84

Note 1: Typical efficiency is measured after the module has been aging for 30 minutes at full load.

Note 2: Full load efficiency (Typ.) may vary by $\pm 2\%$; it is defined as the total output power divided by the input power.

Note 3: Ripple and noise are measured by the parallel cable method. Refer to "Ripple & Noise Test Instruction" for details.

Note 4: Suffix "-T" denotes chassis mounting, and "-TS" denotes DIN-Rail mounting (35mm rail).

Note 5: This list is for reference only. For models not listed, please contact our Sales Department.

Input Characteristics

Test Item	Test Conditions	Minimum	Typical	Max	Unit	
Input Voltage Range	AC Input	90	230	528	VAC	
	DC Input	100	325	745	VDC	
Input frequency	-	47	50	63	Hz	
Standby Power Consumption	115 VAC	-	-	0.5	W	
	230 VAC					
Input current	115 VAC	-	-	0.60	A	
	230 VAC	-	-	0.30		
Inrush current	115 VAC	-	35	-		
	230 VAC	-	60	-		
Leakage current	-	0.5 mA (typ.) / 230 VAC / 50 Hz				
Hot Plug	-	N/A				
Recommended external fuse rating	-	2 - 3.15 A/600 VAC slow blow fuse				
Remote Control (Ctrl)	-	N/A				

Output Characteristics

Test Item	Test Conditions	Minimum	Typical	Max	Unit
Output Voltage Accuracy	Across the full Input Voltage Range with any load Vo	-	± 2.0	± 3.0	%
Line Regulation	Nom. Load Vo	-	-	± 0.5	%
Load regulation	Nominal Input Voltage, 20%–100% rated load Vo	-	-	± 1.0	%
Ripple & Noise	5%–100% load, 20 MHz bandwidth Vo	-	-	150	mVp-p
	Note 1: The test method for ripple and noise uses the parallel cable test method. For specific test procedures and equipment configuration, please refer to the section below (Ripple & Noise Test Instructions).				
Dynamic Response	Overshoot 25%–50%–25%	-10.0	-	+10.0	%
	Recovery time 50%–75%–50%	-	-	+5.0	ms
Minimum load	Single-channel output	0	-	-	%
Temperature Coefficient	-	-	-	± 0.02	%/°C
Start-up delay time	Input 230 VAC (full load)	-	-	4000	ms
	Input 400 VAC (full load)	-	-		
Power-off hold time	Input 230 VAC (full load)	-	50	-	ms
	Input 400 VAC (full load)	-	100	-	

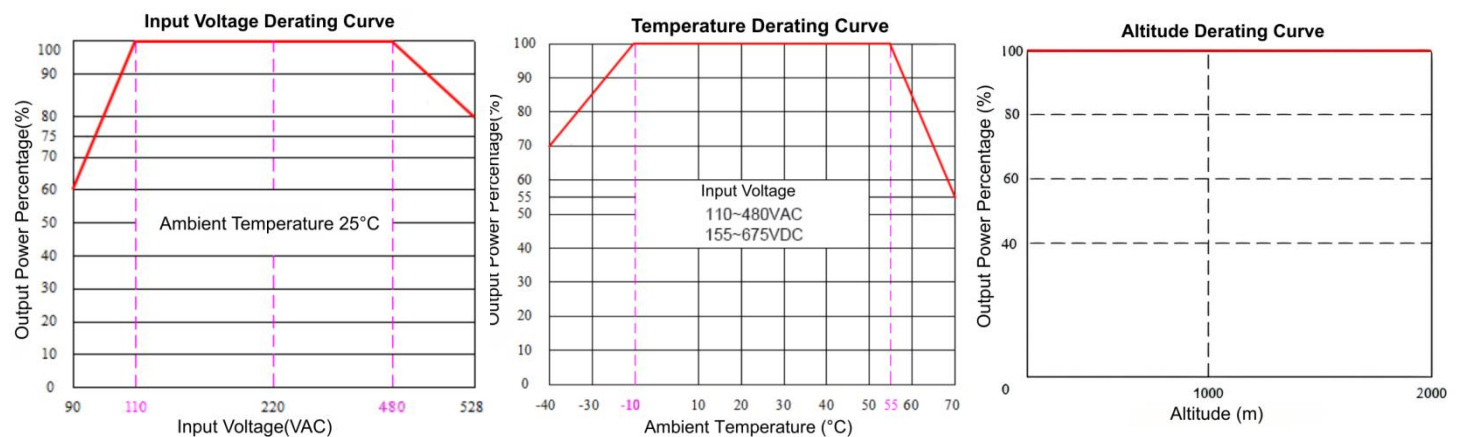
Output startup overshoot voltage	Full Input Voltage Range	≤10			%Vo
Short-circuit protection		Contiuous, Self-recovery			Hiccup
Output Over-current Protection (OCP)	Input 230 VAC	130% Io	-	240% Io	mA
Overvoltage protection	5 VDC output	≤7.5			VDC
	12 VDC output	≤20			
	15 VDC output	≤20			
	24 VDC output	≤30			

General Characteristics							
Test Item		Test Conditions		Minimum	Typical	Max	Unit
Switching Frequency		-		-	65	-	kHz
Operating Temperature		Derate for use by referring to the Derating Curve		-40	-	+70	°C
Storage temperature		-		-40	-	+85	°C
Soldering temperature		Wave soldering		260±4°C, duration 5–10 s			
		Manual soldering		360±8°C, duration 4–7 s			
Relative Humidity		-		10	-	90	%RH
Isolation Voltage	Input-Output	Test for 1 min; leakage current less than 5 mA		4000	-	-	VAC
Insulation Resistance	Input-Output	@500 VDC		100	-	-	MΩ
MTBF		MIL-HDBK-217F at 25°C		300	-	-	K hours
Safety Standards		-		IEC 62368/EN 62368/UL 62368			
Vibration		10–55 Hz, 10G, 30 min, along X, Y, Z					
Safety Rating		-		CLASS I			
Enclosure Rating		-		UL 94 V-0			
Weight/Dimensions		Package Code	Weight (Typ)	Dimensions L x W x H			
		H2	130 g	70.0 x 48.0 x 24.0 mm		2.756 x 1.890 x 0.945 in	
		H2-T	170g	96.0 x 53.8 x 32.5 mm		3.780 x 2.118 x 1.280 in	
		H2-TS	215 g	96.0 x 53.8 x 37.0 mm		3.780 x 2.118 x 1.457 in	

Electromagnetic Compatibility

Component	Sub-item	Technical Standard	Performance Criteria
EMC	EMI	CE	CISPR 32/EN 55032 CLASS B
		RE	CISPR 32/EN 55032 CLASS B
	EMS	Radiated Immunity	IEC/EN 61000-4-3 10 V/m Performance Criteria A
		CS	IEC/EN 61000-4-6 3 V r.m.s Performance Criteria A
		ESD	IEC/EN 61000-4-2 Contact ± 6 kV / Air ± 8 kV Performance Criteria B
		Surge Immunity	IEC/EN 61000-4-5
			Line-to-line ± 2 kV Performance Criteria B Line-to-line ± 4 kV Performance Criteria B (Recommended circuit shown in Figures 2 and 3)
		EFT	IEC/EN 61000-4-4
			± 2 kV Performance Criteria B ± 4 kV Performance Criteria B (Recommended circuits shown in Figures 2 and 3)
		Voltage Dips and Interruptions, and short interruptions immunity	IEC/EN 61000-4-11 0%–70% Performance Criteria B

Product Characteristic Curves



Note 1: Input voltage is 90–110 VAC/480–528 VAC/100–155 VDC/675–745 VDC; voltage derating must be performed based on the input voltage derating curve. (CE-certified input voltage range is 100 - 400 VAC)

Note 2: This product is suitable for use in environments with natural convection cooling. Please contact us if using in enclosed environments.

Typical Application Circuit Diagram and Recommended EMC Parameters

1. Typical Application Circuit

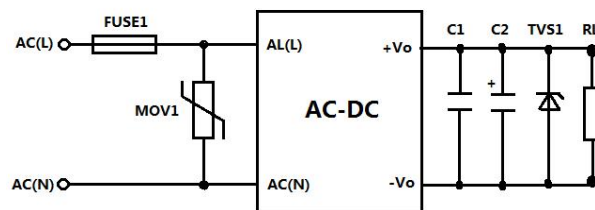


Figure 1

2. Recommended EMC Circuit (for use under stringent EMC requirements)

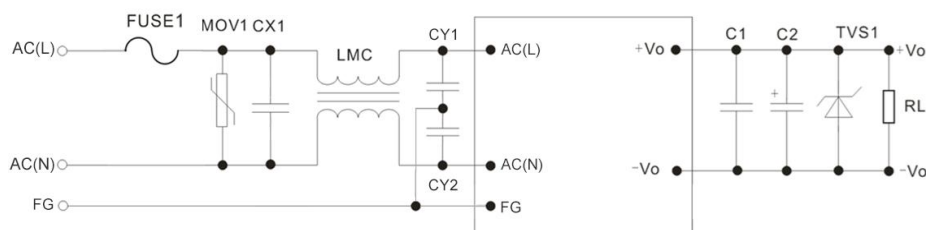


Figure 2

Model	FUSE1	MOV1	C1 (uF)	C2 (uF)	TVS1
FA20-300S05H2D4	2.5A/600VAC	20D102K/ 6500A	1	330uF	SMBJ7.0A
FA20-300S12H2D4	slow-blow			220 μ F	SMBJ20A
FA20-300S15H2D4	fuse, must be			220uF	SMBJ30A
FA20-300S24H2D4	connected			220 μ F	SMBJ30A

Note:

1. CX1 is the X-capacitor; the recommended model is X2/334K/530VAC;
2. LMC is a Common Mode Choke; the recommended inductance is 25 mH/0.6 A;
3. The output filter capacitor C2 is an electrolytic capacitor; it is recommended to use a high-frequency, low-ESR electrolytic capacitor. Refer to the technical specifications provided by each manufacturer for capacitance and current rating. The voltage rating of C2 must be derated to at least 80%. C1 is a ceramic capacitor used to filter out high-frequency noise;
4. CY1 and CY2 are Y-capacitors; the recommended model is Y1/102M/500VAC;
5. The TVS1 diode protects the downstream circuitry in the event of a module malfunction; its use is recommended.

3. Recommended Circuit for General Systems in Severe Lightning Surge Environments

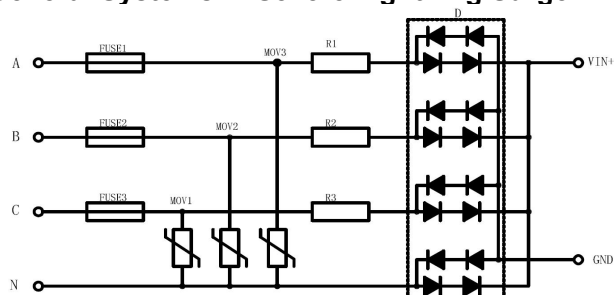


Figure 3: Recommended External Circuit for 4 kV Differential-Mode Surge with High Requirements - Full-Wave Rectification

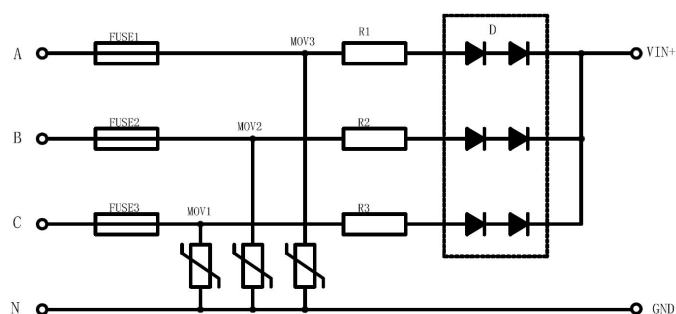


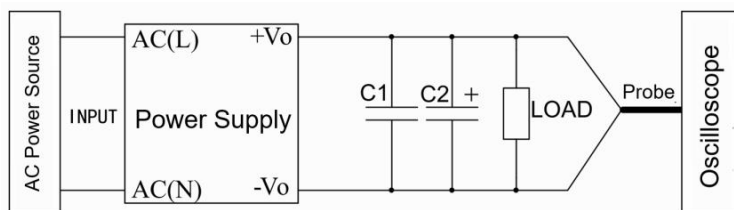
Fig. 4: 4KV DM Surge Recommended Circuit (Half-wave)

Recommended Parameter Values for Circuits with Higher EMC Requirements

Component Model	Recommended Values
MOV1, MOV2, MOV3	20D821K/6500A
D	2A/1000V
R1, R2, R3	10Ω/5W, wire-wound resistor
FUSE1, FUSE2, FUSE3	2.5A/600VAC, slow-blow, mandatory

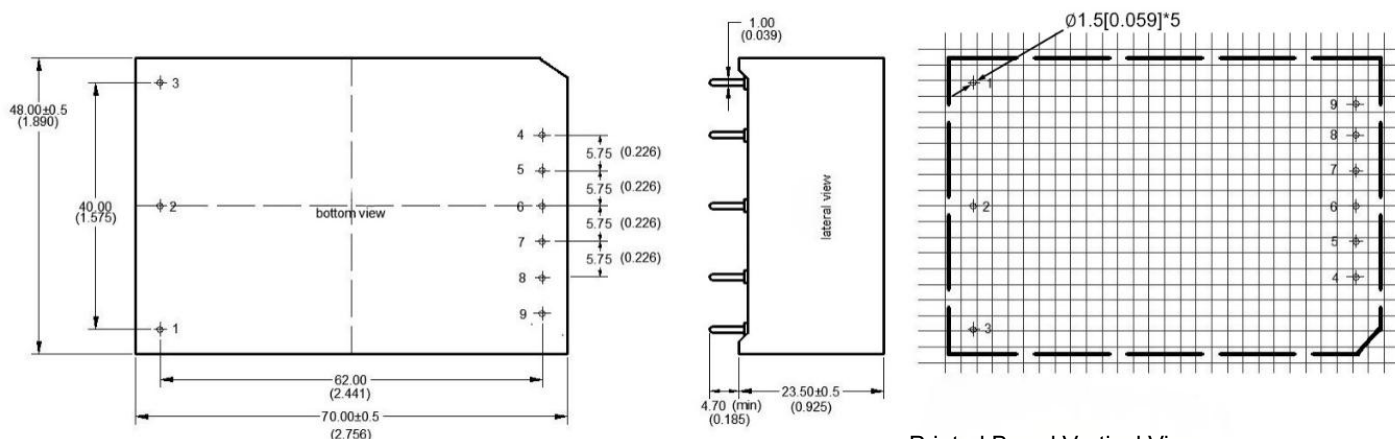
Ripple & Noise Test Specifications (Parallel Cable Method, 20 MHz Bandwidth)

Test Method:



1. The ripple and noise test uses a parallel connection. Set the oscilloscope bandwidth to 20 MHz (100 MHz bandwidth). Remove the probe cap and ground clip from the probe, and connect C1 (0.1 μ F ceramic capacitor) and C2 (10 μ F high-frequency low-ESR electrolytic capacitor) in parallel at the probe tip. Use the "Sample" sampling mode on the oscilloscope.
2. Schematic diagram for output ripple and noise testing: Connect the module's input terminal to the input power supply; connect the power supply's output to the electronic load via the fixture board; and use a separate test lead to sample directly from the power supply's output port. Select insulated wires with an appropriate wire gauge based on the magnitude of the output current.

Mechanical Dimensions



Printed Board Vertical View

Unit: mm[inch]

Lattice spacing: 2.54mm[0.1 inch]

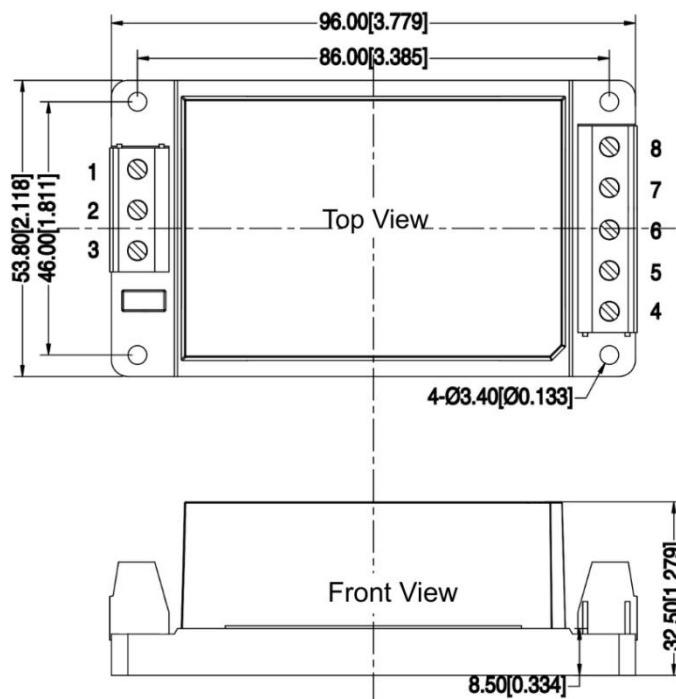
General tolerance: ± 0.25 mm[± 0.010 inch]

Pin diameter tolerance: ± 0.10 mm[± 0.004 inch]

Pin Definitions

Pin Description	1	2	3	4	5	6	7	8	9
Function	FG	AC(N)	AC(L)	+Vo	NP	NP	NP	-Vo	NP
	Ground	AC Neutral	AC Line	Positive Output	No Pin	No Pin	No Pin	Negative Output	No Pin

-T Package Mechanical Dimensions



Notes:

Unit: mm [inch]

Wire Range: 24-12AWG

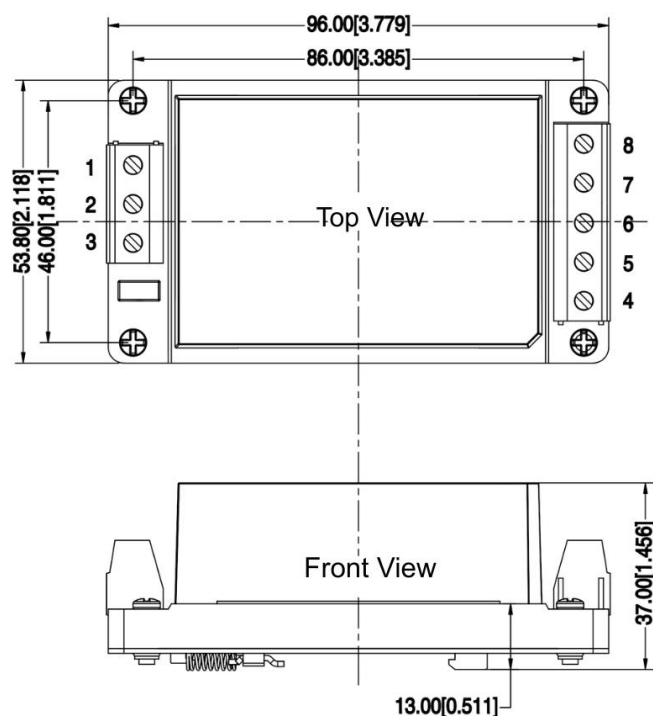
Tightening Torque: 0.4 N·m (Max)

General Tolerance: ± 1.00 [± 0.039]

Pin Definitions

Pin Description	1	2	3	4	5	6	7	8
Function	FG	AC(N)	AC(L)	+Vo	NC	NC	NC	-Vo
	Ground	AC Neutral	AC Line	Positive Output	No Function	No Function	No Function	Negative Output

-TS Package Mechanical Dimensions



Notes:

Unit: mm [inch]

Wire Range: 24-12AWG

Tightening Torque: 0.4 N·m (Max)

General Tolerance: ± 1.00 [± 0.039]

Pin Definitions								
Pin Description	1	2	3	4	5	6	7	8
Function	FG	AC(N)	AC(L)	+Vo	NC	NC	NC	-Vo
	Ground	AC Neutral	AC Live	Positive Output	No Function	No Function	No Function	Negative Output

Note:

1. The product must be used within the specified operating range; otherwise, it may be permanently damaged;
2. If the product operates below the minimum required load, it cannot be guaranteed that all Performance Specifications in this manual will be met;
3. If the product operates outside its rated load range, performance compliance with all Performance Specifications in this manual cannot be guaranteed;
4. Unless otherwise specified, all data above was measured at $T_a = 25^{\circ}\text{C}$, humidity < 75%, with the Nominal Input Voltage and output rated load (resistive load);
5. All test methods for the above specifications are based on our company's standards;
6. The above Performance Specifications apply to the product models listed in this manual. Certain Performance Specifications for non-standard models may exceed the requirements listed above; please contact our technical staff directly for specific details;
7. We offer product customization;

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: <http://www.aipupower.com>