

EMC Filter



FEATURES

- Ultra-Wide input voltage range: 14 -160VDC
- High efficiency up to 98%
- Operating ambient temperature range -40°C to +105°C
- Meet IEC/EN61000-4 series standards and CISPR32/EN55032
- Meet railway industry EN50155 standards

Patent Protection RoHS



The filter module are extremely useful in noise-sensitive analog circuit applications. FC-F18D connected on the input side of DC/DC converters can ensure system compliance with EMC requirements according to EN50155 standards. MORNSUN's DC/DC railway converter module can be used with the filters as long as the DC-DC converters input voltage does not exceed FC-F18D maximum voltage rating.

Selection Guide

Model	Input Voltage Range (VDC)	Rated Current (A)
FC-F18D	110 (14-160)	8.3

Input Specifications

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage	Operating temperature range	14	110	160	VDC
No Load Input Current	25°C, 110VDC	--	0	--	mA

Output Specifications

Item	Test Conditions	Min.	Typ.	Max.	Unit
Efficiency	25°C, 24VDC@200W	96	98	--	%
Operating Current ^①		--	8.3	12	A
Transient Maximum Current ^②		--	--	18	A

Note:

- ① Operating current please refer to temperature derating curves;
② Meet the instantaneous load of 10s, the maximum output current is 18A.

General Specifications

Item	Test Conditions	Min.	Typ.	Max.	Unit
Operating Temperature		-40	--	105	°C
Storage Temperature		-55	--	125	
Storage Humidity		5	--	95	%RH
Case Temperature Rise	25°C, 110VDC @200W	--	7	--	°C
Withstand voltage	+Vin~ $\frac{\perp}{\perp}$, -Vin~ $\frac{\perp}{\perp}$, electric strength test for 1 minute with a leakage current of 5mA max	2100	--	--	VAC
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	57.90 x 29.20 x 23.50 mm
Weight	74.0g(Typ.)

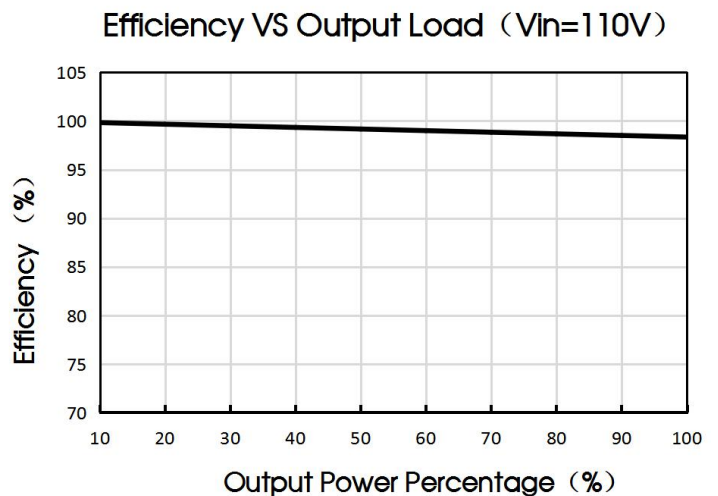
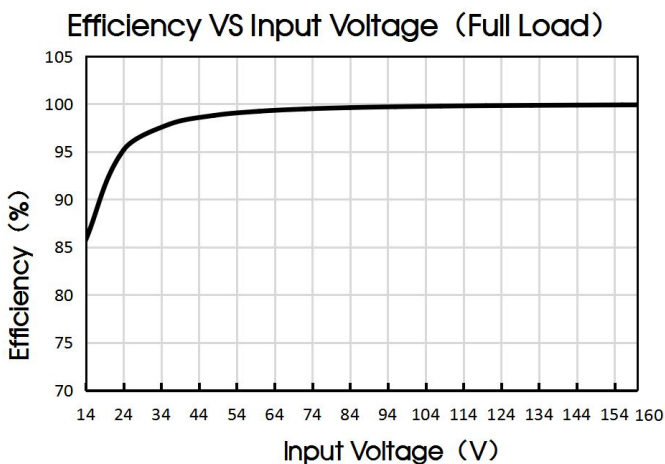
Electromagnetic Compatibility (EMC) (EN50121-3-2)

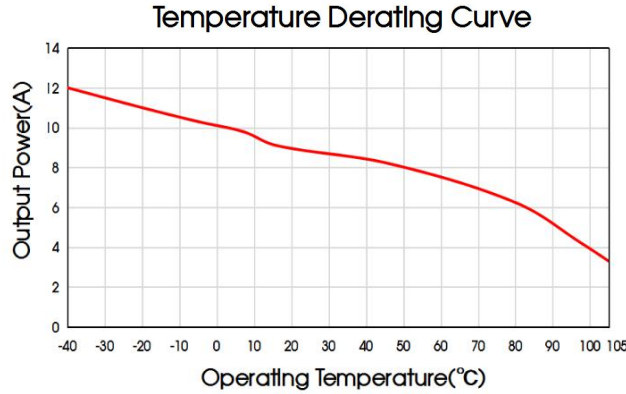
Emissions	CE	EN50121-3-2	EN55016-2-1	150kHz-500kHz 500kHz-30MHz	99dBuV (see Fig.1 for recommended circuit) 93dBuV (see Fig.1 for recommended circuit)	
		EN55032	EN55032-11	150kHz-500kHz 500kHz-30MHz	79dBuV (see Fig.1 for recommended circuit) 73dBuV (see Fig.1 for recommended circuit)	
Emissions	RE	CISPR16-2-3	30MHz-230MHz	40dBuV/m at 10m	(see Fig.1 for recommended circuit)	
			230MHz-1GHz 1GHz-6GHz	47dBuV/m at 10m 47dBuV/m at 10m	(see Fig.1 for recommended circuit) (see Fig.1 for recommended circuit)	
Immunity	ESD	EN61000-4-2	Contact ±6KV/Air ±8KV			perf. Criteria A
	RS	EN61000-4-3	80 – 800MHz	20V/m		perf. Criteria A
			800 – 1000MHz	20V/m		
			1400 – 2000MHz	10V/m		
			2000 – 2700MHz	5V/m		
EFT	EN61000-4-4	±2kV 5/50ns 5kHz (see Fig.1 for recommended circuit)			perf. Criteria A	
		Surge	EN61000-4-5	line to line ±1KV (42Ω, 0.5μF) line to ground ±2kV (42Ω, 0.5μF) (see Fig.1 for recommended circuit) line to line ±1KV (2Ω, 0.5μF) line to ground ±2kV (12Ω, 0.5μF) (see Fig.1 for recommended circuit)		
CS	EN61000-4-6			0.15MHz-80MHz	10V r.m.s	perf. Criteria A

Electromagnetic Compatibility (EMC) (AREMA)

Emissions	CE	CISPR16-2-1	150kHz-500kHz	79dBuV	(see Fig.1 for recommended circuit)	
		CISPR16-1-2	500kHz-30MHz	73dBuV	(see Fig.1 for recommended circuit)	
Emissions	RE	CISPR16-2-3	30MHz-230MHz	40dBuV/m at 10m	(see Fig.1 for recommended circuit)	
			230MHz-1GHz	47dBuV/m at 10m	(see Fig.1 for recommended circuit)	
Immunity	ESD	IEC61000-4-2	Contact ±6KV/Air ±8KV			perf. Criteria A
	RS	IEC61000-4-3	80 – 1000MHz	10V/m		perf. Criteria A
			160 – 165MHz	20V/m		
			450 – 470MHz	20V/m		
			800 – 960MHz	20V/m		
	EFT	IEC61000-4-4	±2kV 5/50ns 5kHz (see Fig.1 for recommended circuit)			perf. Criteria A
Surge	IEC61000-4-5	line to line ±2kV (2Ω, 0.5μF) line to ground ±2kV (see Fig.1 for recommended circuit)			perf. Criteria A	
CS	IEC61000-4-6	0.15MHz-80MHz	10V r.m.s	perf. Criteria A		
MS	IEC61000-4-8	60Hz	100A/m	(see Fig.1 for recommended circuit)	perf. Criteria A	
		60Hz	300A/m	(see Fig.1 for recommended circuit)	perf. Criteria A	

Product Typical Curve





Notes:

1. Test conditions of Efficiency VS Input Voltage curve: output power 200W, input voltage range 14 -160VDC;
2. Test conditions of Efficiency VS Output load curve: input voltage 110VDC, output power 20-200W.

Design Reference

1. Typical application

Notes: Matching UWTH1D_HB-100WR3, UWTH1D_HB-200WR3 series.

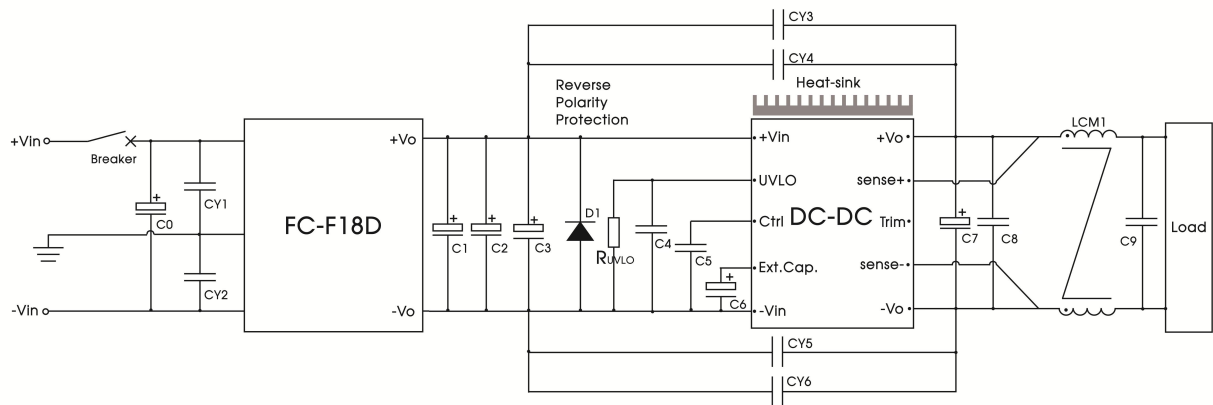
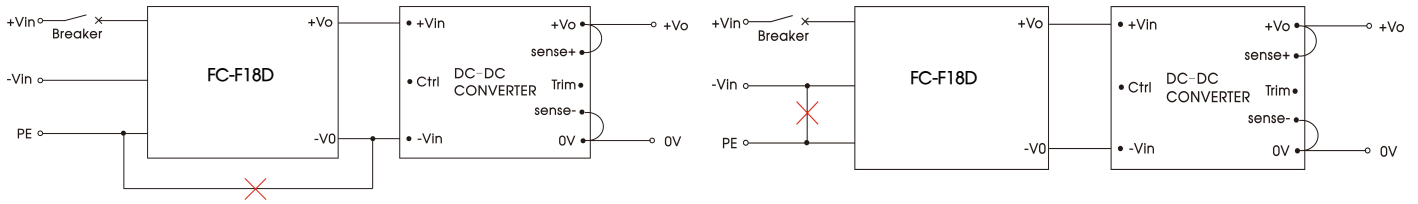


Fig.1

Components	Value	Recommended Component
C0	22μF	Voltage ≥ 450V
C4, C5	1nF	Voltage ≥ 50V
C6	220μF	Voltage ≥ 250V
C7	47μF	Voltage ≥ 1.2*Vo
C8, C9	10μF	Voltage ≥ 1.2*Vo
LCM1	4uH.min	FL2D-D0-040
CY1, CY2, CY3, CY4, CY5, CY6	1000 pF/400VAC	Y1 safety capacitor
D1	20A	Voltage ≥ 250V
Breaker	18A	

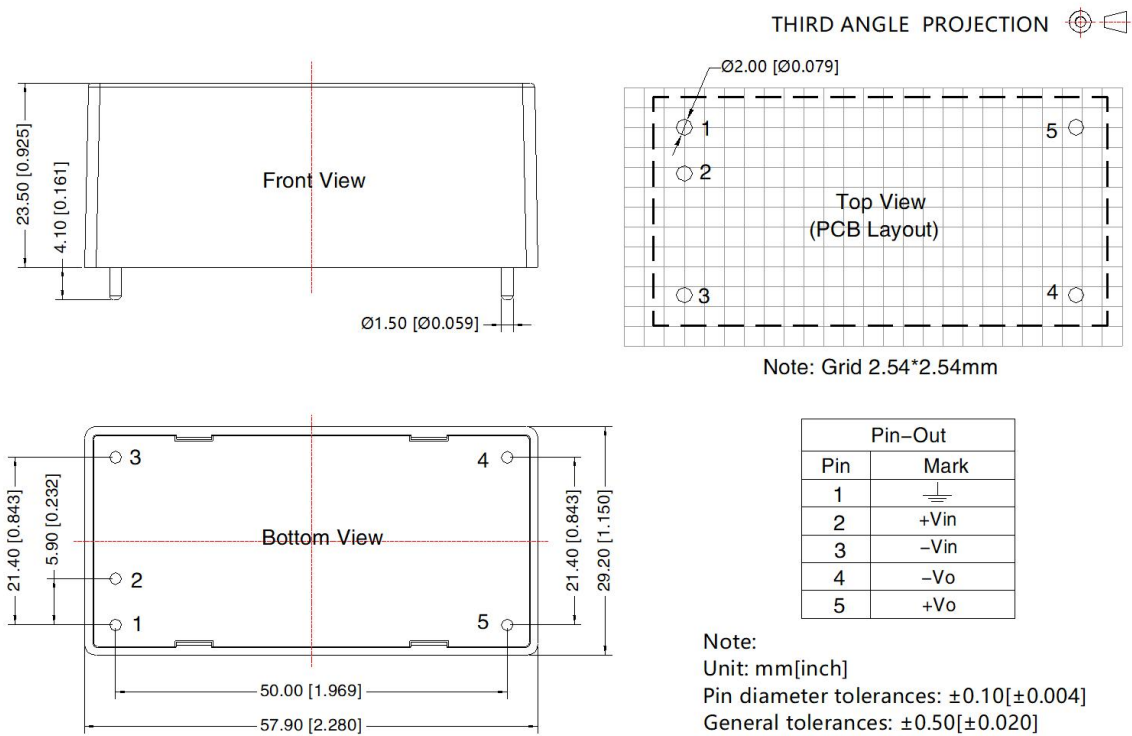
Surge Standards	Components	Value	Recommended Component
line to line ±1KV (42Ω, 0.5 μ F) line to ground ±2kV (42Ω, 0.5 μ F)	C1	68μF	Voltage ≥ 250V
	C2, C3	No need	No need
line to line ±1KV (2Ω, 0.5 μ F) line to ground ±2kV (12Ω, 0.5 μ F)	C1, C2	100μF	Voltage ≥ 250V
	C3	No need	No need
line to line ±2KV (2Ω, 0.5 μ F) line to ground ±2kV (2Ω, 0.5 μ F)	C1, C2, C3	100μF	Voltage ≥ 250V



Note: Connections marked with X interfere with this filter modules performance and should therefore not be used.

2. For additional information please refer to application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220052;
- Unless otherwise specified, data in this datasheet should be tested under the conditions of $T_a=25^\circ\text{C}$, humidity<75%RH with nominal input voltage and rated load;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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