EMC Filter

FEATURES

- Ultra-Wide input voltage range: 14 -160VDC
- High efficiency up to 98%
- Operating ambient temperature range -40℃ to +105℃
- Insertion Loss＞55dB@7MHz
- Meet IEC/EN61000-4 series standards and CISPR32/EN55032
- Meet railway industry EN50155、EN50121-3-2 standards
- Safety according to EN60939-2

The filter module are extremely useful in noise-sensitive analog circuit applications. FC-C08D 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-C08D maximum voltage rating.

Selection Guide

Model	Operating Voltage(VDC)		Operating Current(A)		Efficiency(%) Min/Typ.
	Typ. (Range)	Max*	Typ.	Max	
FC-C08D	110 (14-160)	180	--	8.0	96/98

Note: * The input voltage must not exceed this value, otherwise permanent and unrecoverable damage may be caused;

Instantaneous Specifications

Item	Test Conditions	Min.	Typ.	Max.	Unit
Transient Maximum Voltage①	@1S	--	--	200	V
Transient Maximum Current②	@100mS	--	--	10	A

Note:
①Meet the instantaneous input voltage of 1S, the maximum voltage is 200V.
②Meet the instantaneous load of 100mS, the maximum output current is 10A.

General Specifications

Item	Test Conditions	Min.	Typ.	Max.	Unit
Insertion Loss	@600kHz～15MHz	40	--	--	dB
Operating Temperature		-40	--	105	℃
Storage Temperature		-55	--	125	
Storage Humidity		5	--	95	%RH
Case Temperature Rise	25℃, 110VDC @100W	--	7	--	℃
Withstand voltage	Vin+～PE , Vin-～PE, electric strength test for 1 minute with a leakage current of 5mA max	2800	--	--	VAC
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours
Insertion Loss（CM/DM）	150KHz~1MHz	25	30	-	dB
	1MHz~10MHz	40	45	-	dB
	10MHz~30MHz	20	25	-	dB

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)

Dimensions	67.0 x 37.0 x 19.8 mm
Weight	75.0g(Typ.)

Insertion Loss Specifications

Insertion Loss Curve

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

EMI	CE	EN50121-3-2	150kHz-500kHz 99dBuV QP 500kHz-30MHz 93dBuV QP	(see Fig.1 or Fig.2 for recommended circuit)
		EN55032	150kHz-500kHz 79dBuV QP , 66dBuV AV 500kHz-30MHz 73dBuV QP , 60dBuV AV	(see Fig.1 or Fig.2 for recommended circuit)
	RE	EN50121-3-2 CISPR32/EN55032	30MHz-230MHz 50dBuV/m QP at 3m 230MHz-1GHz 57dBuV/m QP at 3m	(see Fig.1 or Fig.2 for recommended circuit)
EMS	ESD	EN61000-4-2	Contact ±6kV , Air ±8kV	perf. Criteria A
	RS	EN61000-4-3	80 – 800MHz 20V/m 800 – 1000MHz 20V/m 1400 – 2000MHz 10V/m 2000 – 2700MHz 5V/m 5100 – 6000MHz 3V/m	perf. Criteria A
	EFT	EN61000-4-4	±2kV , 5/50ns , 5kHz (see Fig.1 or Fig.2 for recommended circuit)	perf. Criteria A
	Surge	EN61000-4-5	line to line ±2kV (42Ω, 0.5μF) line to ground ±4kV (42Ω, 0.5μF) (see Fig.1 or Fig.2 for recommended circuit)	perf. Criteria A
			line to line ±2kV (2Ω, 18μF) line to ground ±4kV (12Ω, 9μF) (see Fig.1 or Fig.2 for recommended circuit)	
	CS	EN61000-4-6	0.15MHz-80MHz 10V r.m.s	perf. Criteria A

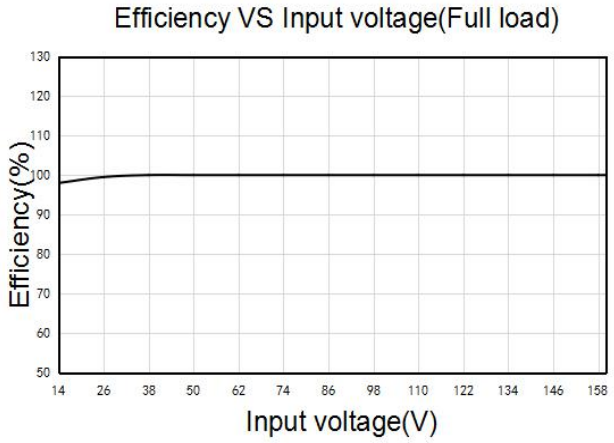
Note: The above performance indexes are the test results of Filter matching UWTH series railway power supply.

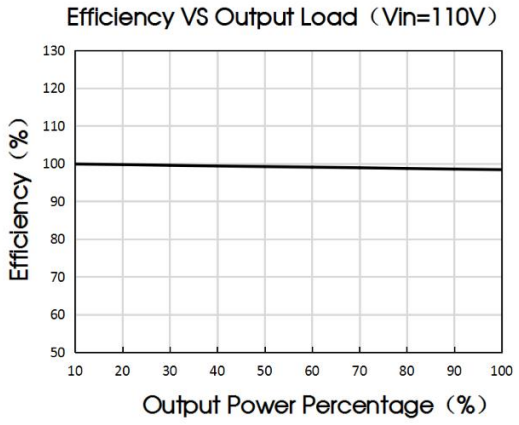
Electromagnetic Compatibility (EMC) (AREMA)

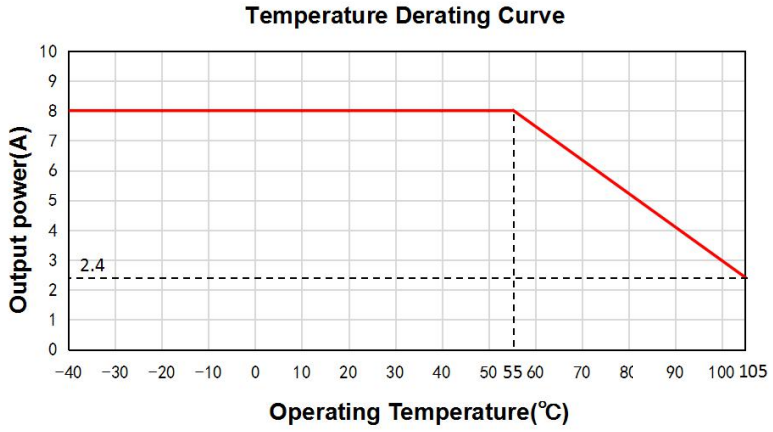
EMI	CE	EN55032	150kHz-500kHz 79dBuV QP , 66dBuV AV 500kHz-30MHz 73dBuV QP , 60dBuV AV	(see Fig.1 or Fig.2 for recommended circuit)
	RE	EN50121-3-2/ EN55032	30MHz-230MHz 50dBuV/m QP at 3m 230MHz-1GHz 57dBuV/m QP at 3m	(see Fig.1 or Fig.2 for recommended circuit)

EMS	ESD	IEC61000-4-2	Contact ±6kV , Air ±8kV	perf. Criteria A
	RS	IEC61000-4-3	80 – 1000MHz 10V/m 160 – 165MHz 20V/m 450 – 470MHz 20V/m 800 – 960MHz 20V/m 1400 – 2000MHz 20V/m 2100 – 2500MHz 5V/m	perf. Criteria A
	EFT	IEC61000-4-4	±2kV , 5/50ns , 5kHz (see Fig.1 or Fig.2 for recommended circuit)	perf. Criteria A
	Surge	IEC61000-4-5	line to line ±2kV (2Ω, 18μF) line to ground ±4kV (12Ω, 9μF) (see Fig.1 or Fig.2 for recommended circuit)	perf. Criteria A
	CS	IEC61000-4-6	0.15MHz-80MHz 10V r.m.s	perf. Criteria A
	MS	IEC61000-4-8	Power frequency: 50/60Hz 100A/m (see Fig.1 or Fig.2 for recommended circuit)	perf. Criteria A
			Pulse: 50/60Hz 300A/m (see Fig.1 or Fig.2 for recommended circuit)	
Note: The above performance indexes are the test results of Filter matching UWTH series railway power supply.				

Product Typical Curve







Notes：

1. Test conditions of Efficiency VS Input Voltage curve: output power 100W, input voltage range 14 -160VDC;
2. Test conditions of Efficiency VS Output load curve: input voltage 110VDC, output power 20-100W.

Design Reference

1. Typical application

Notes：Matching the UWTH series of railway power module.

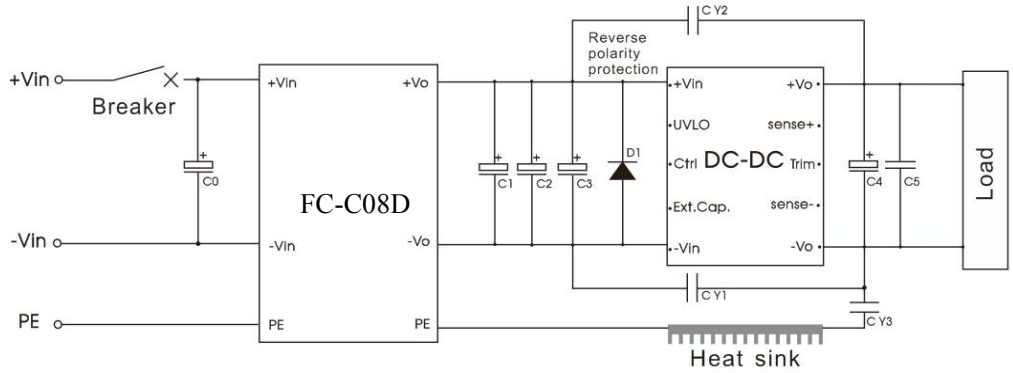


Fig.1

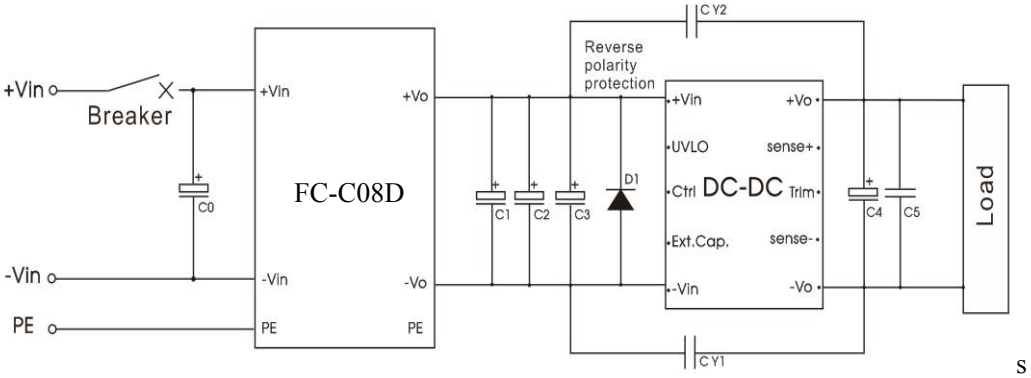
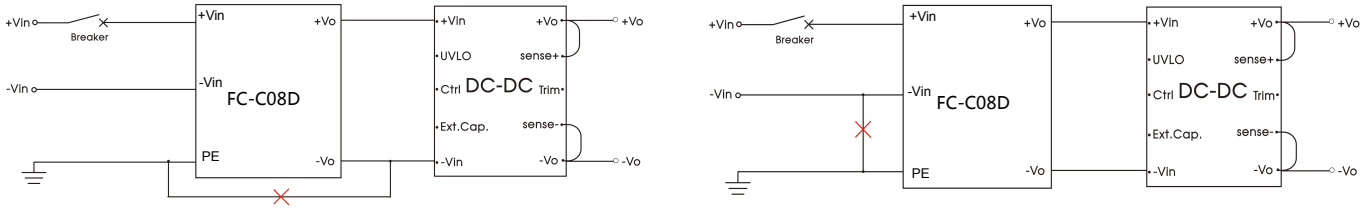


Fig.2

Components Value / Matching / Power output voltage	C0	C4	C5	CY1,CY2,CY3	D1
12V	330μF Voltage≥200V	330μF Voltage≥1.2*Vo	1μF Voltage≥1.2*Vo	3300 pF /400VAC Y1 safety capacitor	20A Voltage≥200V
24V					
28V					
48V	560μF Voltage≥200V				
54V					
Breaker	The Breaker value varies with different power modules and must be selected in accordance with the specified input current of the corresponding power converter, but not exceeding the filter specifications.				
Note: A ferrite core on the power lines and load lines can ensures a better EMI test margin.					

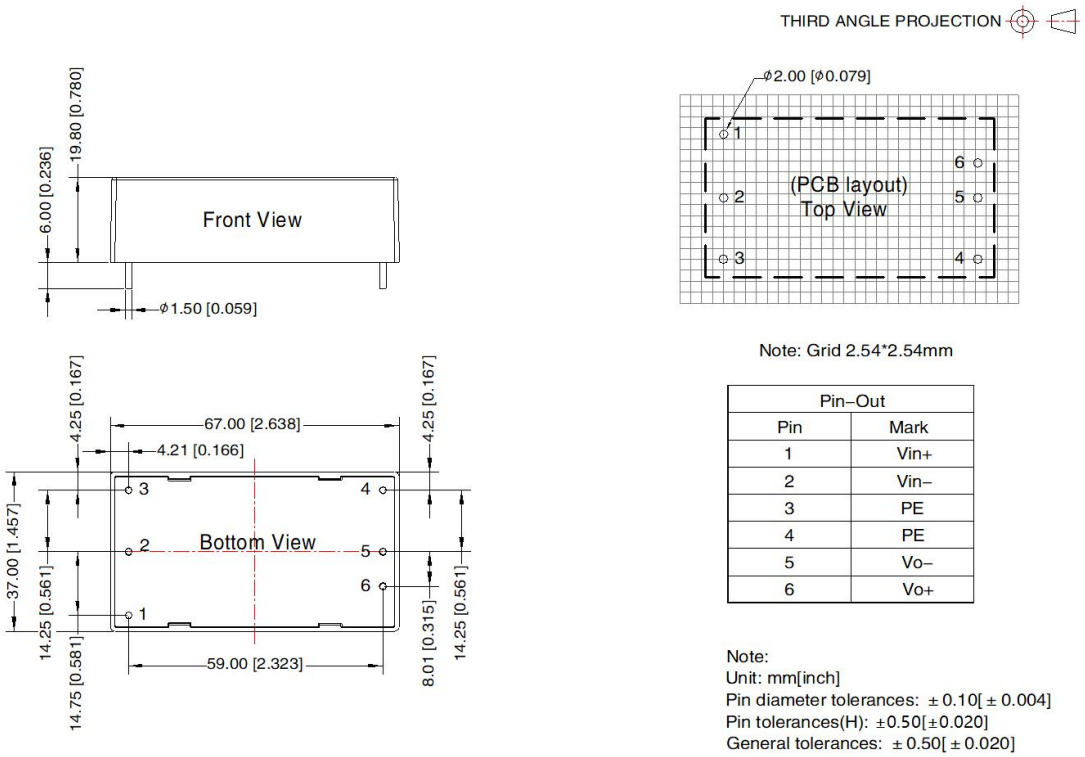
Surge standard	Components	Value	Recommended Component
line to line ±2KV (42Ω, 0.5μF)	C1	100μF	Voltage≥200V
line to ground ±4kV (42Ω, 0.5μF)	C2, C3	--	--
line to line ±1KV (2Ω,18μF)	C1, C2	100μF	Voltage≥200V
line to ground ±2kV (12Ω, 9μF)	C3	--	--
line to line ±2KV (2Ω,18μF) line to ground ±4kV (12Ω, 9μF)	C1, C2, C3	100μF	Voltage≥200V



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

2. **For a**dditional information please refer to application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	Vin+
2	Vin–
3	PE
4	PE
5	Vo–
6	Vo+

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
Pin tolerances(H): ±0.50[±0.020]
General tolerances: ±0.50[±0.020]

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200038;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. 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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