EMC Filter

FC-L01D & FC-L01D2 Series

MORNSUN®

EMC Filter



RoHS

FEATURES

- Compact size EMC Filter modules
- Filters provide primary side protection by suppressing AC power surge in compliance with IEC61000-4-5
- Filters input of power supply modules to ensure compliance with CISPR32/EN55032 Class B requirements
- Allows cost-effective converter designs
- Excellent temperature performance
- Flexible mounting options include direct PCB mounting, chassis or DIN-Rail mounting with screw terminals

These filter modules are extremely useful in noise-sensitive analog circuit applications. For compliance with IEC/EN61000-4-5 with surge levels of ±2kV (2Ω source resistance)/±4kV (12Ω source resistance) use FC-L01D on the input side of the AC-DC modules. For higher protection to surge levels of up ±4kV (2Ω source resistance)/±6kV (12Ω source resistance) according to IEC/EN61000-4-5 use module FC-L01D2 instead, which also ensures compliance to EMI requirements as per CISPR22 /EN 55022 Class B. With EMC filter used to protect MORNSUN AC-DC converter modules, the system's max. Input voltage and Input current ***must not exceed*** *the EMC filter's maximum Voltage and/or nominal current specifications.*

Selection Guide

Model	Input Voltage Range (VAC)	Nominal Current (A)(max)	Extended Packaging Model
FC-L01D	85-305	0.5	--
FC-L01D2	85-305	0.5	FC-L01D2A2

Note: The product model with suffix "A2" indicates a wiring package. For example: FC-L01D2A2.

General Specifications

Item	Test Conditions	Min.	Typ.	Max.	Unit
Operating Temperature		-40	--	85	°C
Storage Temperature		-40	--	105	
Welding Temperature	Wave soldering welding,10 seconds MAX	+255	+260	+265	
Case Temperature Rise	220VAC @0.05A	--	--	5	
	220VAC @0.25A	--	--	20	
	220VAC @0.5A	--	--	30	
Leakage current (line to ground)	2000VAC, tested for 1 minute	--	2	--	mA

Mechanical Specifications

Case Material		Flame-retardant package, meets UL94V-0	
Dimensions	FC-L01D	Horizontal package	48.50 × 36.00 × 20.50 mm
		A2 wiring package	96.10 × 54.00 × 29.00 mm
		A4 rail package	96.10 × 54.00 × 33.60 mm

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	FC-L01D2	Horizontal package	62.00 × 45.00 × 22.50 mm
		A2 wiring package	96.10 × 54.00 × 31.00 mm
		A4 rail package	96.10 × 54.00 × 35.60 mm
Weight	FC-L01D	Horizontal package/A2 wiring package/ A4 rail package	50.0g/100.0g/140.0g (Typ.)
	FC-L01D2		85.0g/135.0g/175.0g (Typ.)

Frequency Attenuation Specifications

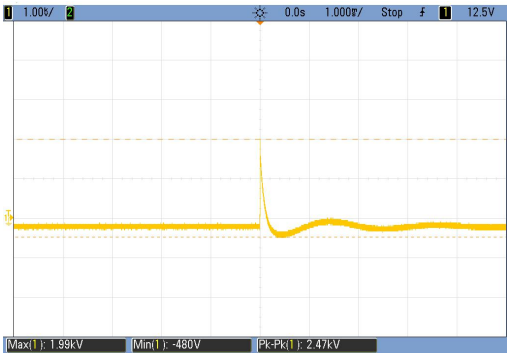
Item	Test Conditions		Min.	Typ.	Max.	Unit
Frequency attenuation coefficient	150KHz—1GHz	FC-L01D	--	20	--	dB
		FC-L01D2	--	30	--	

Standards Compliance

FC-L01D filter module on the input of AC/DC converters are design to meet Surge levels up to ±2kV (2Ω source resistance) / ±4kV (12Ω source resistance) per IEC/EN61000-4-5. Using filter module FC-L01D2 instead to meet higher surge levels up to ±4kV (2Ω source resistance) / ±6kV (12Ω source resistance) per IEC/EN61000-4-5 and EMI requirements according to CISPR22/EN55022 Class B.

Electromagnetic Compatibility (EMC)

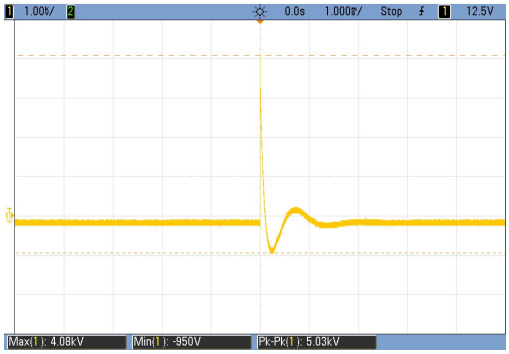
①FC-L01D Surge Test Result



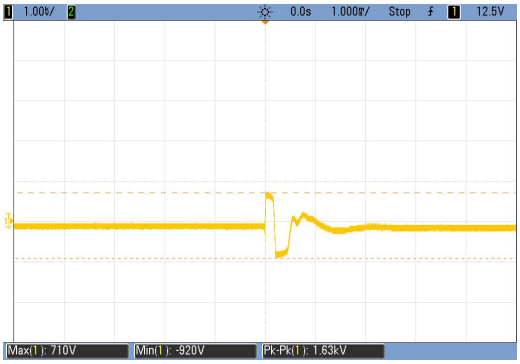
Input voltage waveform (Differential mode 1.99KV)



Output voltage waveform (0.9 KV)



Input voltage waveform (Common mode 4.084.62KV)



Output voltage waveform(0.71 KV)

Note: Above result was based on open-circuit test.

②FC-L01DD2 Surge Test Result

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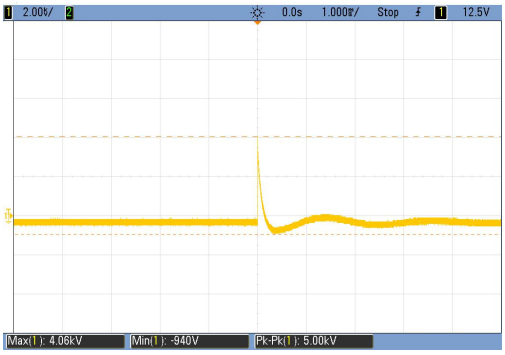
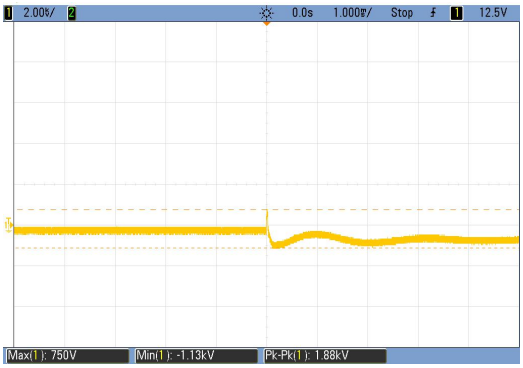
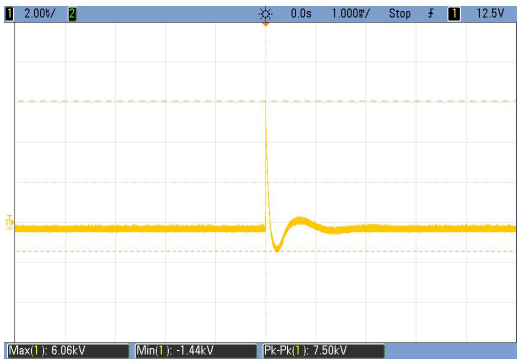


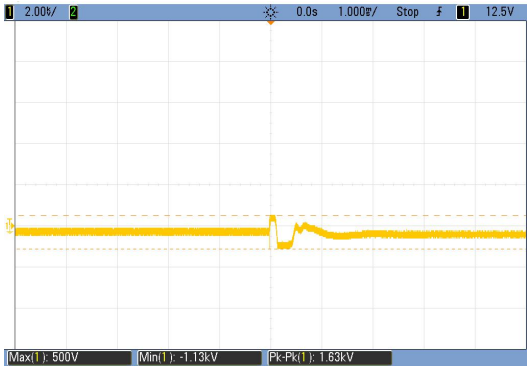
Input voltage waveform (Differential mode 4.06KV)



Output voltage waveform (0.75KV)



Input voltage waveform (Common mode 6.06KV)



Output voltage waveform(0.5KV)

Note: Above result was based on open-circuit test.

Design Reference

1. Internal schematic

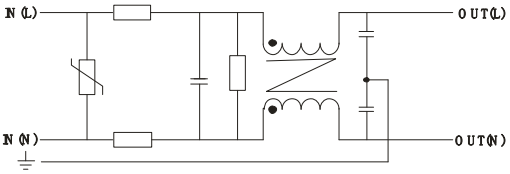


Fig.1 FC-L01D

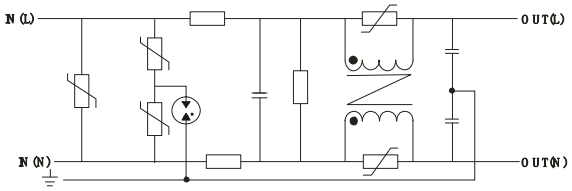
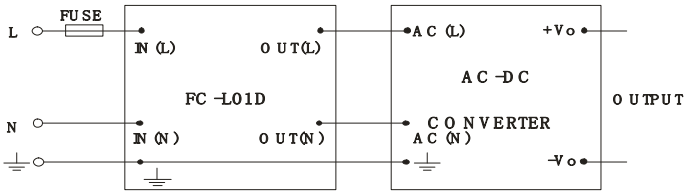


Fig. 2 FC-L01D2

2. Typical application



FUSE: Input currents can vary with different power modules. Therefore please refer to the individual specifications of the power converter used to identify the correct fuse values and make sure not to exceed the filter’ s maximum specifications.

3. Compliance table when Filters are used with following Converter products

Converter	EMI (without external circuit)	EMI (with EMC filter)	EFT (without external circuit)	EFT (with EMC filter)	Surge (without external circuit)	Surge （with FC-L01D）	Surge (with FC-L01D2)

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LB(03-25)-10BXX(LT) Series	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±2KV	IEC/EN61000-4-4 ±4KV	IEC/EN61000-4-5 ±1KV/±2KV	IEC/EN61000-4-5 ±2KV/±4KV	--
LD(01-02)-10BXX Series	CISPR22/EN55022 CLASS B	--	--	IEC/EN61000-4-4 ±2KV	--	IEC/EN61000-4-5 ±1KV/±2KV	--
LD03-10BXX Series	CISPR22/EN55022 CLASS A	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±2KV	--	IEC/EN61000-4-5 ±1KV/±2KV	--
LD05-20BXX Series	CISPR22/EN55022 CLASS A	CISPR22/EN55022 CLASS B	IEC/EN61000-4-4 ±2KV	IEC/EN61000-4-4 ±4KV	IEC/EN61000-4-5 ±1KV/±2KV	IEC/EN61000-4-5 ±2KV/±4KV	--
LD05-23BXX Series	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±2KV	IEC/EN61000-4-4 ±4KV	IEC/EN61000-4-5 ±1KV	IEC/EN61000-4-5 ±2KV/±4KV	--
LD10-20BXX Series	CISPR22/EN55022 CLASS A	CISPR22/EN55022 CLASS B	IEC/EN61000-4-4 ±2KV	IEC/EN61000-4-4 ±4KV	IEC/EN61000-4-5 ±1KV	IEC/EN61000-4-5 ±2KV/±4KV	--
LD10-20BXX Series	CISPR22/EN55022 CLASS A	CISPR22/EN55022 CLASS B	IEC/EN61000-4-4 ±2KV	IEC/EN61000-4-4 ±4KV	IEC/EN61000-4-5 ±1KV	IEC/EN61000-4-5 ±2KV/±4KV	--
LD10-23BXX Series	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±2KV	IEC/EN61000-4-4 ±4KV	IEC/EN61000-4-5 ±1KV	IEC/EN61000-4-5 ±2KV/±4KV	--
LD12-20BXX Series	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±4KV	--	IEC/EN61000-4-5 ±2KV	--	IEC/EN61000-4-5 ±4KV/±6KV
LD20-10BXX Series	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±4KV	--	IEC/EN61000-4-5 ±2KV	--	IEC/EN61000-4-5 ±4KV/±6KV

Model	EMI(without external circuit)	EMI(with EMC filter)	EFT (without external circuit)	EFT (with EMC filter)	Surge(without external circuit)	Surge(with FC-L01D)	Surge(with FC-L01D2)
LH Series	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±2KV	IEC/EN61000-4-4 ±4KV	IEC/EN61000-4-5 ±1KV/±2KV	IEC/EN61000-4-5 ±2KV/±4KV	--
Dedicated Power Converter For Power System LH(ER2) Series	CISPR22/EN55022 CLASS A	CISPR22/EN55022 CLASS B	IEC/EN61000-4-4 ±4KV	--	IEC/EN61000-4-5 ±2KV/±4KV	--	EC/EN61000-4-5 ±4KV/±6KV
LM30-00J0512-03E	CISPR22/EN55022 CLASS B	--	IEC/EN61000-4-4 ±4KV	--	IEC/EN61000-4-5 ±2KV/±4KV	--	EC/EN61000-4-5 ±4KV/±6KV

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

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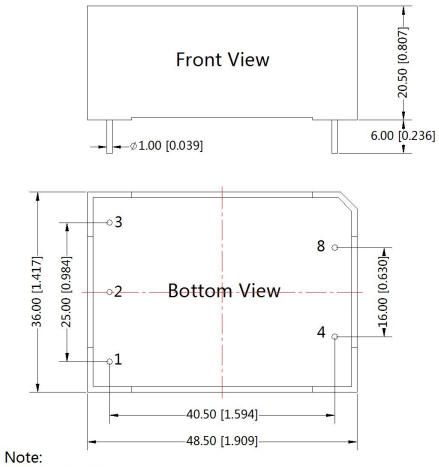
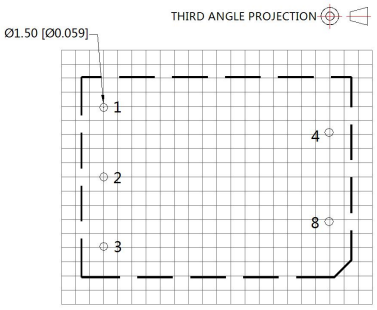
FC-L01D Dimensions and Recommended Layout



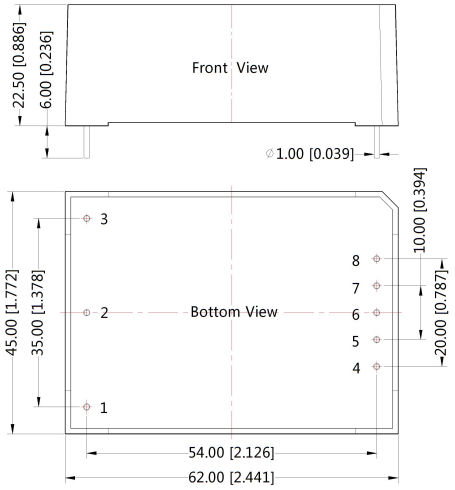
Note:
Unit:mm[inch]
Pin diameter tolerances:±0.10[±0.004]
General tolerances:±0.50[±0.020]



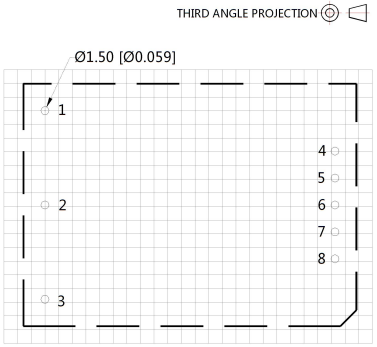
Note : Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	⏚
2	IN(N)
3	IN(L)
4	OUT(N)
8	OUT(L)

FC-L01D2 Dimensions and Recommended Layout



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



Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	⏚
2	IN(N)
3	IN(L)
4	OUT(N)
5, 6, 7	NC
8	OUT(L)

NC: No Connection

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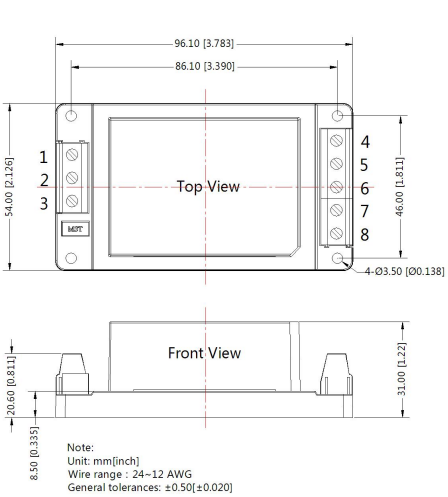
FC-L01D2A2 Dimensions



Pin	FC-L01DA2	FC-L01D2A2
1	⏚	⏚
2	IN(N)	IN(N)
3	IN(L)	IN(L)
4	OUT (N)	OUT (N)
5	NC	NC
6	NC	NC
7	NC	NC
8	OUT (L)	OUT (L)

*The figure above is related to FC-L01D2A2 series, the height of other series is different.

OUTLINE AND DIMENSIONS	
MODEL	DIMENSIONS
FC-L01DA2	96.1*54*29.0mm
FC-L01D2A2	96.1*54*31.0mm

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number of PCB mount packages are 58220007 (FC-L01D) / 58220006 (FC-L01D2) respectively, and the Packaging bag number of A2 package is 58220010;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. 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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