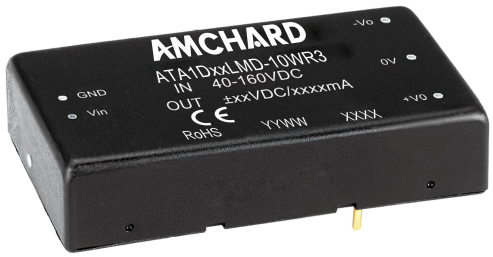
FEATURES

1. Ultra-wide input voltage range: 40VDC - 160VDC
2. No-load power consumption as low as 0.3W
3. Reinforced insulation, isolation voltage 2250VDC
4. Operating temperature range: -40°C to +85°C
5. Input under-voltage protection, output short circuit/over-current/over-voltage protection
6. Bare board EMI meets EN50121-3-2 & CISPR32/EN55032 CLASS A
7. Compliant with railway rolling stock standard EN50155
8. Compliant with IEC62368 standard
9. International standard pinout
10. 3 years warranty



RoHS CE 3 years Warranty

Selection Guide

Part No.	Input		Output		Efficiency (%) @Full Load Min./Typ.	Max. Capacitive Load (μF)
	Nominal (Range) (VDC)	Max. (VDC)	Voltage (VDC)	Current(mA) Max./Min.		
ATA1D05LMD-10WR3	110 (40-160)	170	±5	±1000/0	78/80	1000
ATA1D12LMD-10WR3			±12	±417/0	82/84	470
ATA1D15LMD-10WR3			±15	±334/0	82/84	330

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (Full load / No load)	Nominal Input Voltage	±5Vout	--	113/3	177/8	mA
		±12V, ±15Vout	--	108/3	111/8	
Reflected Ripple Current	Nominal Input Voltage		--	25	--	
Surge Voltage (1sec. max.)			-0.7	--	180	VDC
Start-up Voltage			--	--	40	
Under-Voltage Shutdown			28	33	--	
Start-up Time	Nominal Input Voltage & Resistive Load		--	10	--	ms
Input Filter			PI Type			
Remote Control (Ctrl) *	Module ON		Ctrl open or TTL high level (3.5-12VDC)			
	Module OFF		Ctrl connected to GND or TTL low level (0-1.2VDC)			
	OFF-state Input Current		--	2	7	mA
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	±5V output	5%-100% load	--	±1	±3	%
		0%-5% load	--	±3	±5	
	±12V, ±15V output	0%-100% load	--	±1	±3	
Line Regulation	Full load, Input voltage low to high	Vo1	--	±0.2	±0.5	
		Vo2	--	±0.5	±1	
Load Regulation①	5% - 100% load	Vo1	--	±0.5	±1	
		Vo2	--	±0.5	±1.5	
Cross Regulation	Dual output, Main 50% load, Aux 25%-100% load		--	--	±5	
Transient Recovery Time	25% load step, Nominal Input Voltage		--	300	500	μs
Transient Response Deviation		±5VDC output	--	±4	±8	%
		±12VDC, ±15VDC output	--	±3	±5	
Temperature Drift Coefficient	Full load		--	±0.02	±0.03	%/℃
Ripple & Noise ②	20MHz BW, 5%-100% load		--	50	100	mVp-p
Over-Voltage Protection	Input voltage range		110	--	160	%Vo
Over-Current Protection			110	--	210	%Vo
Short Circuit Protection			Continuous, Self-recovery			
Over-temperature Protection	230VAC, rated load, self-recover	Over-temperature protection release	60	--	--	℃

Note: ① When test condition is 0%-100%, load regulation max. is ±5% Vo. ② For 0%-5% load, ripple & noise ≤ 5% Vo. Ripple & noise test method uses the parallel line test method. Refer to the "DC-DC (Wide Input Voltage) Converter Module Application Guide" for specific procedures.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-Output, Test 1 min, Leakage current < 1mA	2250	--	--	VDC
	Input/Output to Case, Test 1 min, Leakage current < 1mA	1500			
Insulation Resistance	Input-Output, Test voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output, 100kHz/0.1V	--	2200	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Pin Soldering Resistance	1.5mm from case, 10S	--	--	300	
Storage Humidity	No condensation	5	--	95	%RH
Vibration		IEC61373, Category 1 Class B			
Switching Frequency①	PWM Mode	--	300	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Note: ① This series uses frequency reduction technology. The switching frequency value is tested at full load. When the load drops below 50%, the switching frequency decreases as the load reduces.

Mechanical Specifications

Case Material	Aluminum Alloy
Dimensions	50.80 × 25.40 × 11.80 mm
Weight	27g (Typ.)
Cooling Method	Free air convection

EMC Specifications(EN62368)

EMI	CE	CISPR32/EN55032 CLASS A (Bare machine) / CLASS B (Recommended circuit Fig.3 or Fig.4)	
	RE	CISPR32/EN55032 CLASS A (Bare machine) / CLASS B (Recommended circuit Fig.3 or Fig.4)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6kV / Air ±8kV	perf. Criteria B
	RS	EN50121-3-2 20V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±4kV (Recommended circuit Fig.3 or Fig.4)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2kV (2Ω, 18μF see recommended circuit Fig.3) line to ground ±4kV (12Ω, 9μF see recommended circuit Fig.3)	perf. Criteria B
	CS	IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A

EMC Specifications(EN50155)

EMI	CE	EN50121-3-2 150kHz-500kHz 99dBuV EN55016-2-1 500kHz-30MHz 93dBuV	
	RE	EN50121-3-2 30MHz-230MHz 40dBuV/m at 10m EN55016-2-1 230MHz-1GHz 47dBuV/m at 10m	
EMS	ESD	EN50121-3-2 Contact ±6kV / Air ±8kV	perf. Criteria B
	RS	EN50121-3-2 20V/m	perf. Criteria A
	EFT	EN50121-3-2 ±2kV 5/50ns 5kHz	perf. Criteria A
	Surge	EN50121-3-2 line to line ±1kV (42Ω, 0.5μF) line to ground ±2kV (42Ω, 0.5μF)	perf. Criteria B
	CS	EN50121-3-2 0.15MHz-80MHz 10 Vrms	perf. Criteria A

Note: The above tests are all measured with an input 100μF/200V capacitor or the FC-01D filter. Both conditions can meet the requirements.

Product characteristic curve

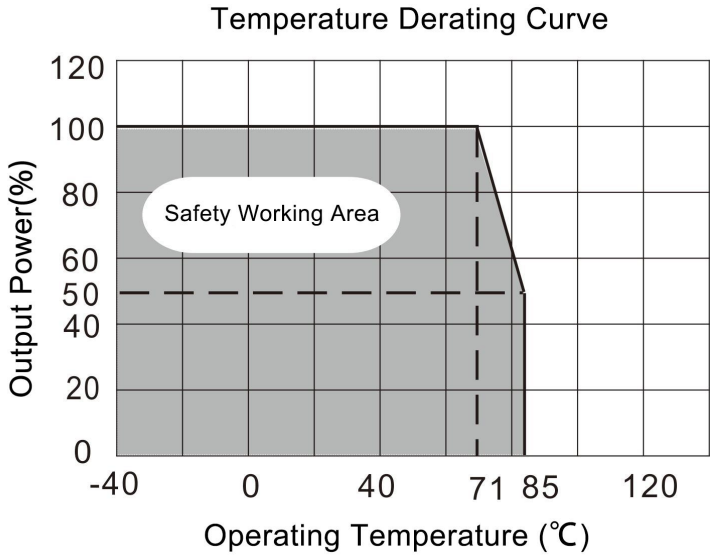
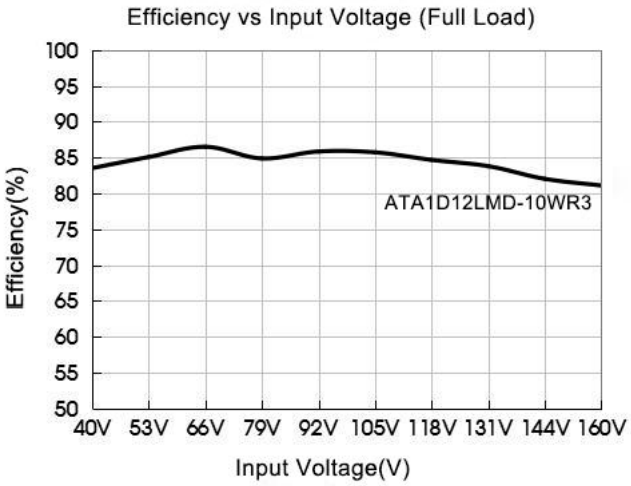
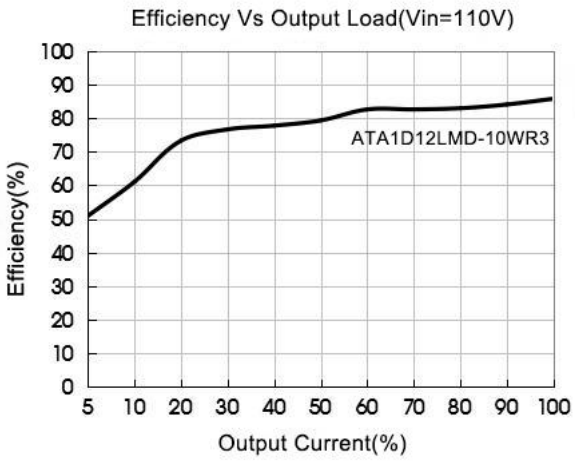


Figure 1





Design Reference

1. Application Circuit

All DC/DC converters in this series are tested according to the recommended test circuit (Figure 2) before leaving the factory. To further reduce input and output ripple, the external capacitors CIn and Cout can be increased, or capacitors with lower equivalent series impedance can be selected. However, the capacitance value cannot exceed the product's maximum capacitive load.

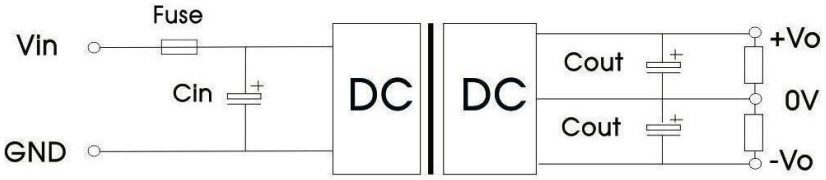


Figure 2

Vout (VDC)	Fuse	Cin	Cout
±5	2A, Slow Blow	100μF/200V	100μF/16V
±12、±15			100μF/25V

2. EMC Solution — Recommended Circuit

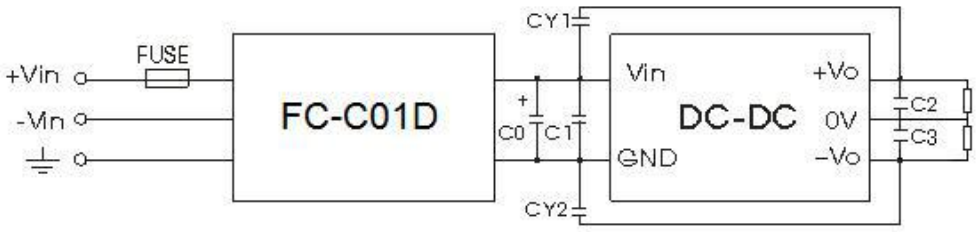


Figure 3

Figure 3 Parameter Description	
FUSE	Select according to customer's actual input current
FC-C01D	EMC auxiliary device, Input voltage range: 40V-160V
C0	Refer to Cin parameter in Figure 2
C1	0.22μF/250V
C2、C3	Refer to Cout parameter in Figure 2
CY1、CY2	1000pF/400VAC

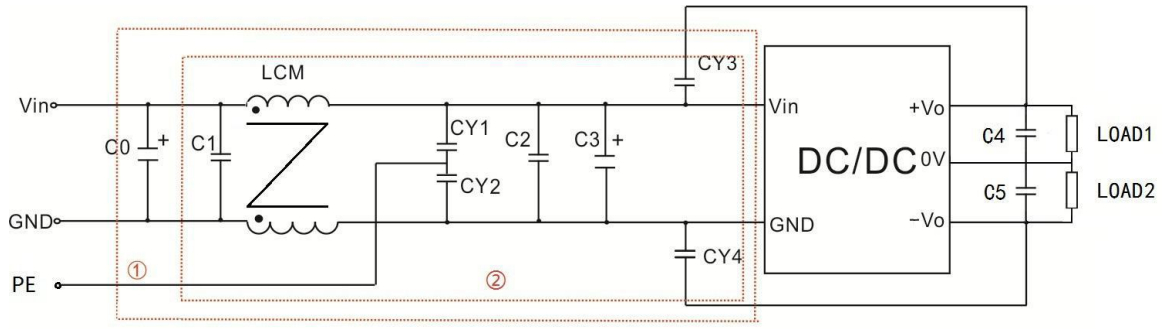


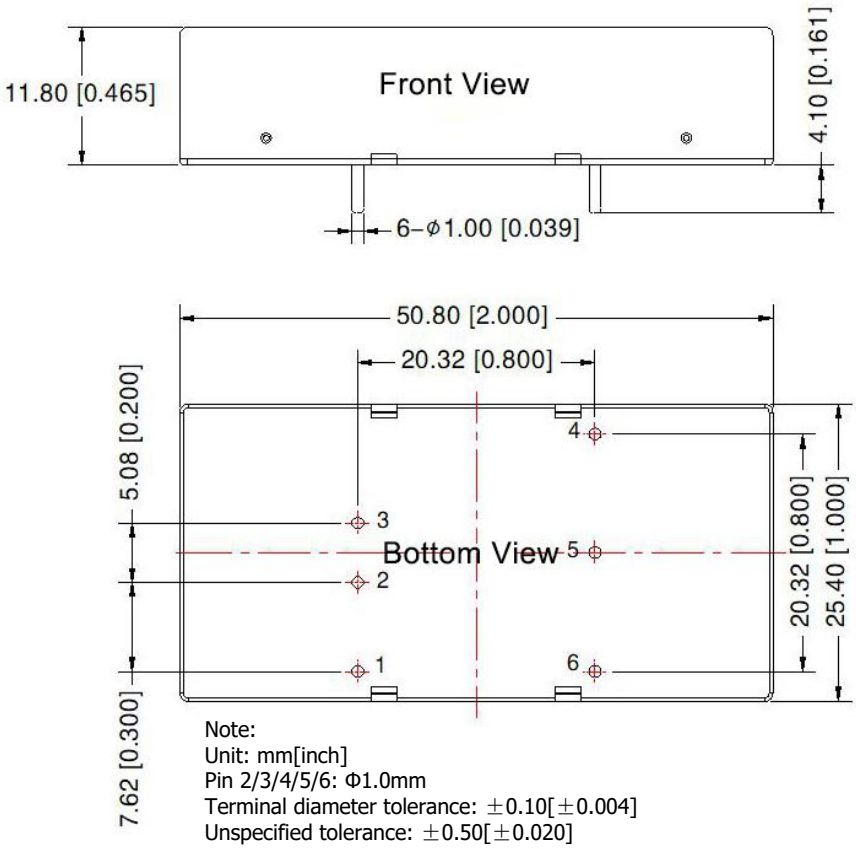
Figure 4

Note:Part ① in Figure 4 is for EMS testing; Part ② is for EMI filtering, can be selected based on requirements.

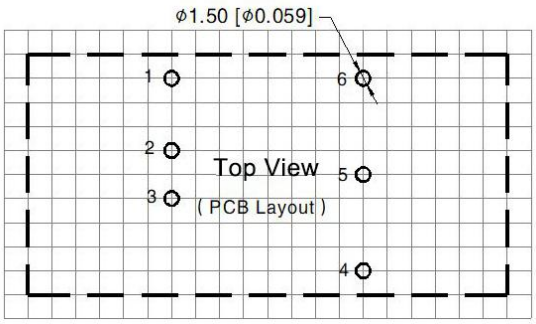
Figure 4 Parameter Description	
C0	330μF/200V
C1	0.47μF/250V
C2	0.22μF/250V
C3	Refer to Cin parameter in Figure 2
LCM	2.2mH(FL2D-10-222)
CY1、CY2、CY3、CY4	1000pF/400VAC
C4、C5	Refer to Cout parameter in Figure 2

3. Product does not support parallel connection for increased output power.

Product Dimensions & Recommended PCB Layout



Note:
Unit: mm[inch]
Pin 2/3/4/5/6: Φ1.0mm
Terminal diameter tolerance: ±0.10[±0.004]
Unspecified tolerance: ±0.50[±0.020]



Note: Grid 2.54 * 2.54mm

Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	0V
6	-Vo