

Three-phase power supply specific for meter
High isolated, ultra wide input voltage range
AC-DC converter for electric meters



FEATURES

- Ultra wide input voltage range: 57 - 528VAC/80 - 745VDC
- Operating ambient temperature range -40°C to +70°C
- Working well with any two phases
- CE/RE: CISPR32/EN55032 CLASS B
- EFT/Surge: ±4kV Perf. Criteria B
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Low ripple & noise, low standby power consumption

LO10-26D0512-04L—Ultra wide input voltage range open frame switched-mode power supply for electric-meter application. This AC-DC converter is designed for electric-meter application and operates over a very wide input voltage range: 57-528VAC or 80-745VDC. It means that this converter can operate with any two wires connection from the three-phase three wire or four-wire system. The isolation voltage is 4000VAC between input and output, and two outputs. The product meets IEC/EN61000 "Burst (4kV)", "Surge (2kV)" and "EN55032 Class B Conduction/ Radiation". So it is a design solution for electric-meter application sourced from a three-phase AC supply with the requirement of high isolation voltage and rigorous EMC. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)		Efficiency at 220VAC (%) Typ.	Capacitive Load (μF) Max.	
		(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
LO10-26D0512-04L	10.92W	5.1VDC/1.2A	12VDC/0.4A	78	4000	1200

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	57	--	528	VAC
	DC input	80	--	745	VDC
Input Frequency		47	--	63	Hz
Input Current	100VAC	--	--	0.4	A
Inrush Current	115VAC	--	25	--	
	220VAC	--	40	--	
Leakage Current	220VAC	--	0.3	--	mA
Recommended External Input		3.15A/500VAC, slow-blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Balance load	Vo1	--	±2	--	%
		Vo2	--	±10	--	
Line Regulation	Full load	Vo1	--	±0.5	--	
		Vo2	--	±1.5	--	
Load Regulation	10%-100% load	Vo1	--	±3	--	mV
		Vo2	--	±5	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	57 - 528VAC input	Vo1	--	150	
			Vo2	--	250	
	220VAC input	Vo1	--	60	--	
		Vo2	--	120	--	
Temperature Coefficient	Vo1		--	±0.02	--	% / °C
	Vo2		--	±0.06	--	
Stand-by Power Consumption	220VAC		--	0.30	--	W
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			120 - 300% Io, self-recovery			

Over-voltage Protection	Vo1	≤8VDC			
	Vo2	≤20VDC			
Minimum Load		10	--	--	%
Hold-up Time	220VAC input, Io=100%	--	80	--	ms

Note: * The "parallel cable" method is used for ripple and noise test, please refer to AC-DC Converter Application Notes for specific information.

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input - output	Electric Strength Test for 1min., leakage current <5mA	4000	--	--	VAC
	Output - output		4000	--	--	
Insulation Resistance			100	--	--	MΩ
Operating Temperature			-40	--	+70	°C
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	90	%RH
Altitude			--	--	2000	m
Soldering Temperature	Wave-soldering		260 ± 5°C; time: 5 - 10s			
	Manual-welding		360 ± 10°C; time: 3 - 5s			
Switching Frequency			--	65	--	KHz
Power Derating	-40°C to 0°C		0.50	--	--	% / °C
	+60°C to +70°C		3.00	--	--	
	57VAC - 100VAC		1.4	--	--	%/VAC
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C ≥ 300,000 h			

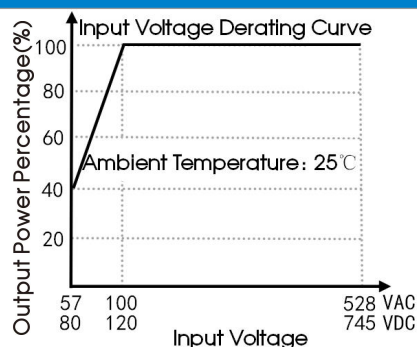
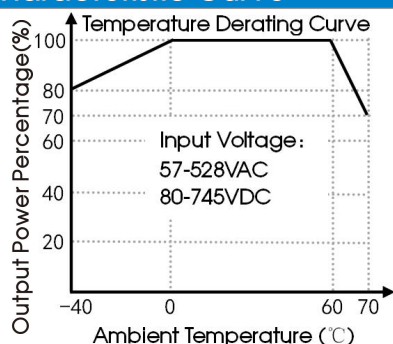
Mechanical Specifications

Dimension	80.00 x 40.00 x 35.00 mm
Weight	70g (Typ.)
Cooling Method	Free air convection

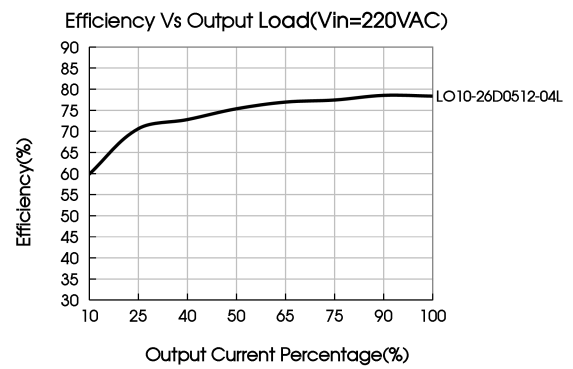
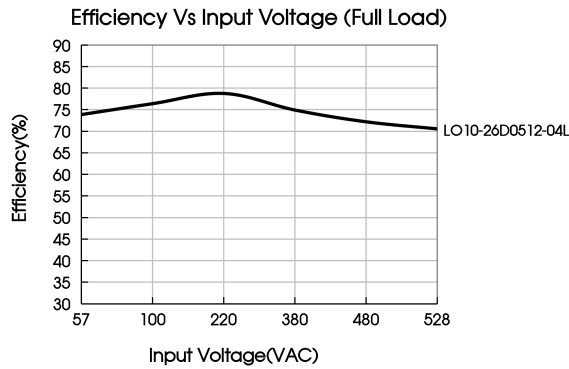
Electromagnetic Compatibility (EMC)

EMI	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria B
	Surge	IEC/EN61000-4-5	Line to line ±2KV	Perf. Criteria B
		IEC/EN61000-4-5	Line to line ±4KV (See Fig. 2 or Fig. 3 for recommended circuit)	Perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	100% dip 1 periods, 30% dip 25 periods, 100% interruptions 250 periods	Perf. Criteria B

Product Characteristic Curve



Note: ① With an AC input between 57-100VAC and a DC input between 80-120VDC, the output power must be derated as per temperature derating curves;
 ② This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application

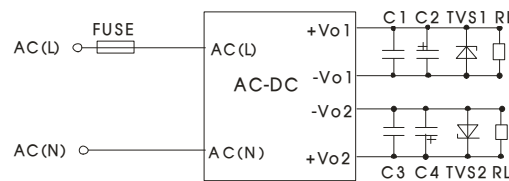


Fig. 1

Part No.	C1, C3	C2	C4	FUSE	TVS1	TVS2
LO10-26D0512-04L	0.1uF/50V	220uF/10V	100uF/25V	3.15A/500VAC slow-blow required	P6KE6.8A	P6KE15A

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2, C4 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1, C3 is a ceramic capacitor used for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

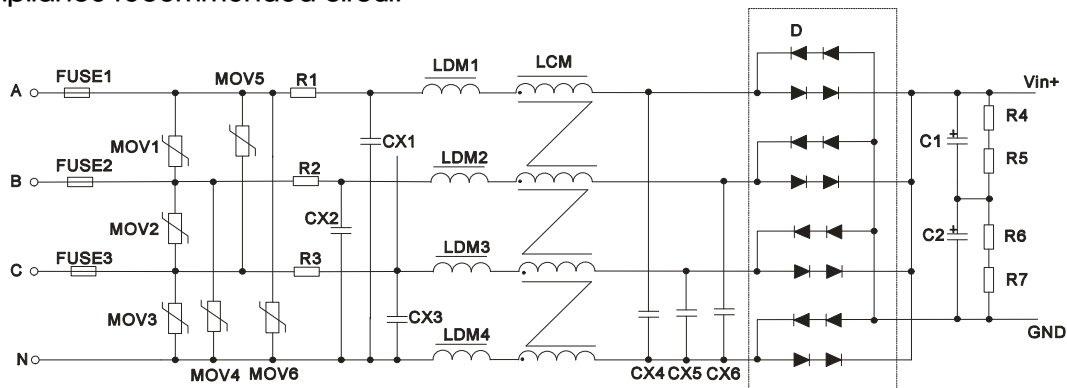


Fig. 2: Recommended circuit for applications which require 4KV differential-mode inrush standard (full-wave rectification)

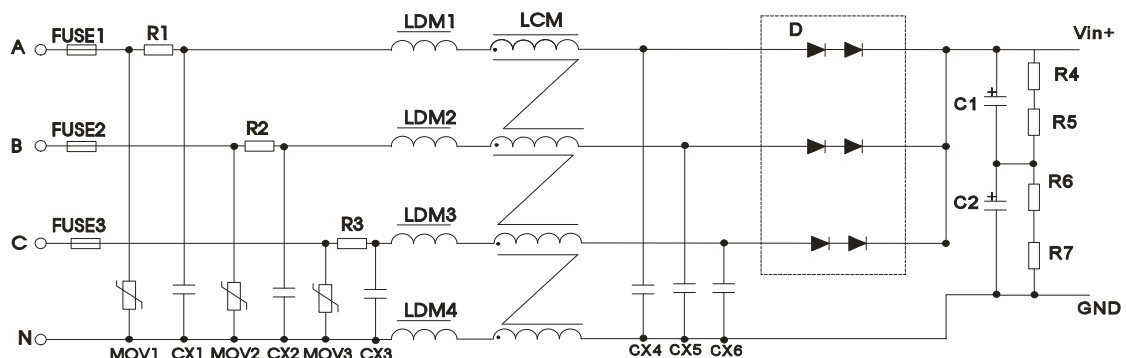
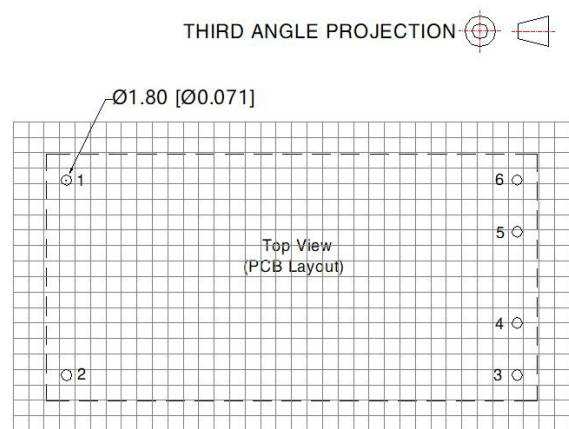
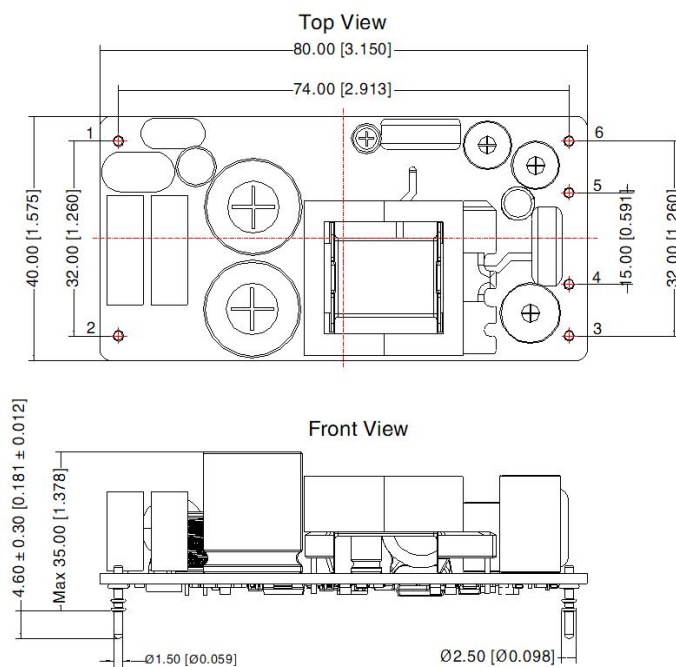


Fig. 3: Recommended circuit for applications which require 4KV differential-mode inrush standard (half-wave rectification)

Recommend Parameter For Higher EMC Standard Circuit	
Component	Recommended value
MOV1/MOV2/MOV3/MOV4/MOV5/MOV6	S20K550
CX1/CX2/CX3/CX4/CX5/CX6	0.15μF
LDM1/LDM2/LDM3/LDM4	56μH
LCM	3mH
C1/C2	47μF/400VDC
R4/R5/R6/R7	560kΩ/1206
D	2A/1000V
R1/R2/R3	5Ω/5W
FUSE1/FUSE2/FUSE3	3.15A/500VAC, slow-blow, required

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

Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm

Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.5 [± 0.020]
The layout of the device is for reference only, please refer to the actual product

Pin-Out	
Pin	Mark
1	AC(L)
2	AC(N)
3	+Vo2
4	-Vo2
5	-Vo1
6	+Vo1

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220042;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75% with nominal input voltage and rated output load;
4. In order to improve the conversion efficiency, when the module is working under high pressure, the module may have certain audio noise, but does not affect the reliability of the product;
5. The product picture is for reference only, please refer to the actual product;
6. All index testing methods in this datasheet are based on our company corporate standards;
7. We can provide product customization service, please contact our technicians directly for specific information;
8. Products are related to laws and regulations: see "Features" and "EMC";
9. 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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