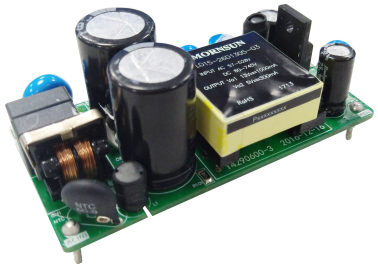
AC/DC Converter

LO15-26D1305-03

MORNSUN®

Three-phase three wire or four wire open frame switched-mode power supply
High isolated, ultra wide input voltage range AC-DC converter for electric meters



RoHS

3 years Warranty

FEATURES

- Ultra wide input voltage range: 57 - 528VAC/80 -745VDC
- Working well with any two phases
- Output short circuit, over-current, over-voltage protection
- High efficiency, High reliability
- Low ripple & noise, Low standby power consumption

LO15-26D1305-03----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. The product meets IEC/EN61000 "Burst (4kV)", "Surge (2kV)". 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.

Selection Guide

Part No.	Output Power	Nominal Output Voltage and Current(Vo/Io)		Efficiency (220VAC, %/Typ.)	Max. Capacitive Load (μF)	
		(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
LO15-26D1305-03	15W	13.5VDC/1.0A	5VDC/0.3A	78	1300	400

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	--	--	0.5	A
Inrush Current	115VAC	--	25	--	
	220VAC	--	40	--	
Recommended External Input		3.15A, slow fusing, necessary			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Balance load	Primary output (Vo1)	--	±2	--	%
		Secondary output (Vo2)	--	±10	--	
Line Regulation	Full load	Primary output (Vo1)	--	±0.5	--	
		Secondary output (Vo2)	--	±1.5	--	
Load Regulation	10%-100% load	Primary output (Vo1)	--	±3	--	
		Secondary output (Vo2)	--	±5	--	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	Primary output (Vo1)	--	--	150	mV
		Secondary output (Vo2)	--	--	250	
Temperature Coefficient	Primary output (Vo1)		--	±0.02	--	%/℃
Stand-by Power Consumption	220VAC		--	0.5	--	W
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			>150% Io, self-recovery			
Over-voltage Protection	Primary output (Vo1)	Balance load	≤16VDC			
	Secondary output (Vo2)		≤7.5VDC			

Min. Load		10	--	--	%
Hold-up Time	220VAC input, Io=100%	--	50	--	ms

Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	Test time: 1min	4000	--	--	VAC
	Output-output		3000	--	--	
Insulation Resistance			50	--	--	MΩ
Operating Temperature			-40	--	+70	℃
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	90	%RH
Altitude			--	--	2000	m
Welding Temperature		Wave-soldering	260 ± 5℃; time: 5 - 10s			
		Manual-welding	360 ± 10℃; time: 3 - 5s			
Switching Frequency			--	65	--	KHz
Power Derating		-40℃ to 0℃	1.00	--	--	%/℃
		+50℃ to +70℃	2.00	--	--	
Safety Class			CLASS II			
MTBF		MIL-HDBK-217F@25℃	> 300,000 h			

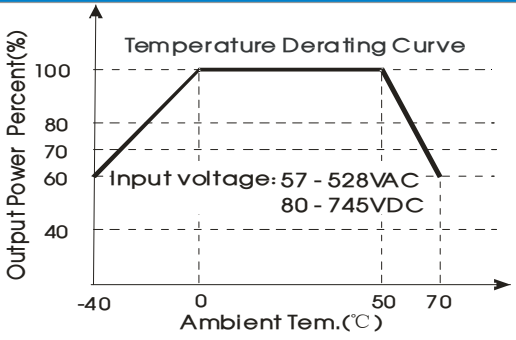
Physical Specifications

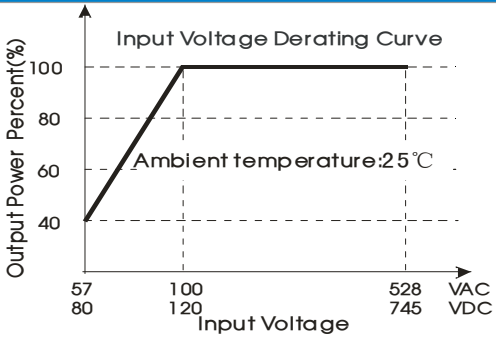
Dimension	80.00*40.00*35.00 mm
Weight	75g (Typ.)
Cooling Method	Free air convection

EMC Specifications

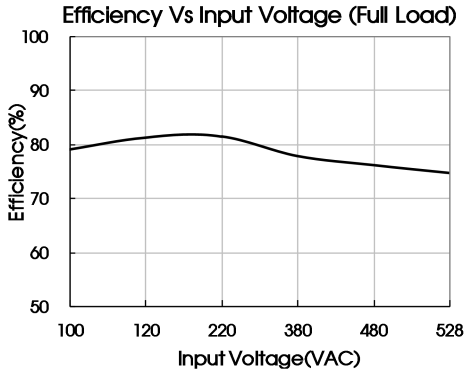
EMI	CE	CISPR22/EN55022 CLASS A	
	RE	CISPR22/EN55022 CLASS A	
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±4KV	perf. Criteria B
	Surge	IEC/EN61000-4-5 Line to line ±2KV	perf. Criteria B
		IEC/EN61000-4-5 Line to line ±4KV (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 0%,70%	perf. Criteria B

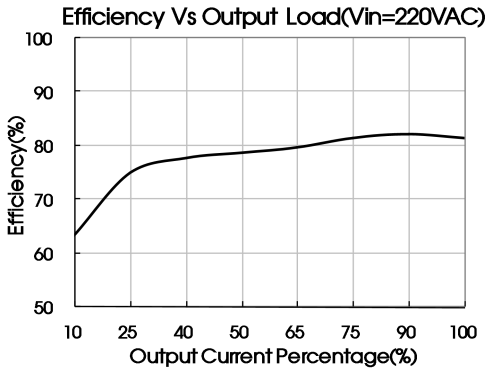
Product Characteristic Curve





Note:
①Input voltage should be derated based on temperature derating when it is 57 - 100VAC/80 - 120VDC;
②This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.





Design Reference

1. Typical application circuit

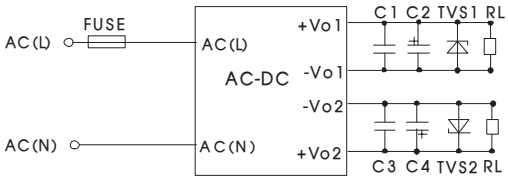


Fig. 1

Note:

Output filtering capacitor C2/C4 is electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor (recommended value, C2: 100μF/25V; C4:47μF/25V). Capacitor voltage reduced to at least 80%. C1/C3 is ceramic capacitor, which is used to filter high-frequency noise, recommended to use 0.1μF/50V. It is recommended that the 13.5V main output circuit add TVS1 (P6KE20A) and the 5V auxiliary output circuit add TVS2 (P6KE7.0A) to protect post-circuits (if converter fails).

2. EMC solution-recommended circuit

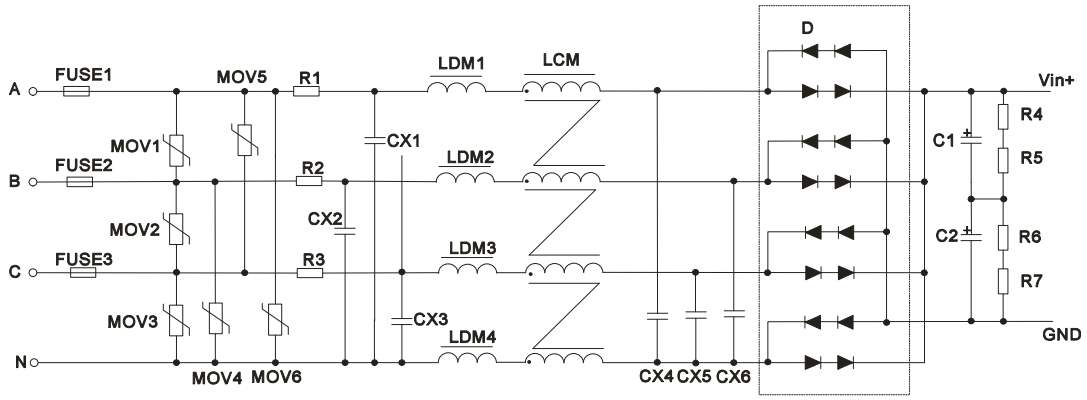


Fig. 2:Recommended circuit for applications which require 4KV differential-mode inrush standard (full-wave rectification)

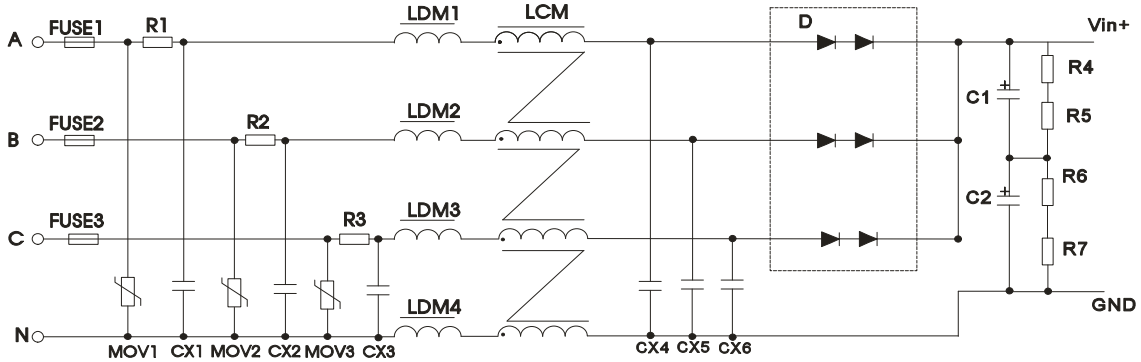


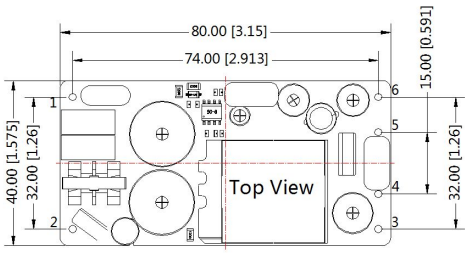
Fig. 3:Recommended circuit for applications which require 4KV differential-mode inrush standard (half-wave rectification)

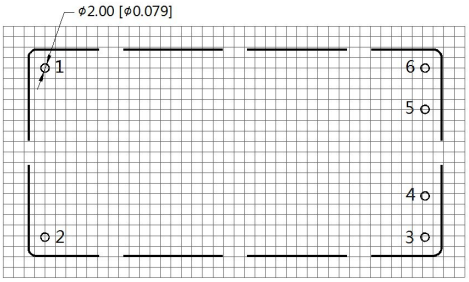
Recommend Parameter For Higher EMC Standard Circuit	
Element model	Recommended value
MOV1, MOV2, MOV3, MOV4, MOV5, MOV6	S20K550
CX1, CX2, CX3, CX4, CX5, CX6	0.15μF
LDM1, LDM2, LDM3, LDM4	56μH
LCM	3mH
C1, C2	47μF/400VDC
R4, R5, R6, R7	560kΩ/1206
D	2A/1000V
R1, R2, R3	5Ω/5W
FUSE1, FUSE2, FUSE3	3.15A, slow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

3. For more information, Please find the application note on www.mornsun-power.com

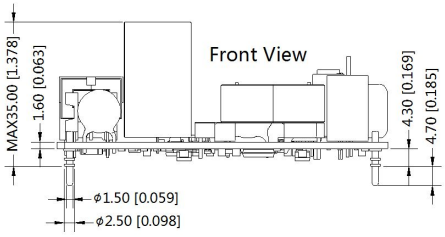
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note : Grid 2.54*2.54mm



Note:
Unit: mm[inch]
General tolerances: ±0.50[±0.020]
FR-4, 1.6mm thick double sided glass fiber PCB
The layout of the device is for reference only, please refer to the actual product

Pin	Name	Function Define
1	AC(L)	AC voltage line wire(L wire) or DC voltage positive
2	AC(N)	AC voltage neutral wire(N wire) or DC voltage negative
3	+Vo2	The second output positive(+)
4	-Vo2	The second output negative(-)
5	-Vo1	The first output voltage negative(-)
6	+Vo1	The first output voltage positive (+)

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing 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 Ta=25℃, 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's corporate standards;
7. We can provide product customization service, please contact our technicians directly for specific information;
8. Specifications are subject to change without prior notice.

MORNSUN Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China
Tel: 86-20-38601850-8801 Fax: 86-20-38601272 E-mail: info@mornsun.cn