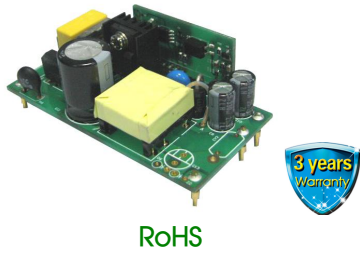


Ultra wide input voltage range switched-mode power supply for electric-meter



FEATURES

- Wide input voltage range:
30-280VAC/30-400VDC
- Output short circuit, over-voltage protections
- High efficiency, high reliability
- Low ripple & noise, low standby power consumption
- Long-life low-impedance electrolytic capacitors
- Gild pin, customized available

LO10-24BxxK series is one of Mornsun's electric-meter power converter. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32 standards and are suitable for various applications requiring high isolation voltage and strict electromagnetic compatibility. 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.
LO10-24B05K	6W	5V/1.20A	71	6000
LO10-24B12K	6.6W	12V/0.55A	77	2000
LO10-24B13K	6.5W	13V/0.50A	77	1500

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	30	--	280	VAC
	DC input	30	--	400	VDC
Input Frequency		47	--	440	Hz
Input Current	115VAC	--	--	0.3	A
	220VAC	--	--	0.1	
Inrush Current	115VAC	--	25	--	
	220VAC	--	40	--	
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	--	%
Line Regulation	Full load	--	±0.5	--	
Load Regulation	10%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	130	mV
Temperature Coefficient		--	--	±0.02	%/°C
Stand-by Power Consumption	220VAC	--	0.2	--	W
Short Circuit Protection		Hiccup, continuous, self-recovery			
Over-voltage Protection	LO10-24B05K	≤7.5V		(Feedback-clamp) Voltage limited	
	LO10-24B12K/ LO10-24B13K	≤15V			
Minimum Load		10	--	--	%
Start-up Delay Time	220VAC input, Io=100%	--	50	--	ms
Hold-up Time	220VAC input, Io=100%	--	200	--	

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 Test	Input-output	Electric Strength Test for 1min.,	4000	--	--	VAC
Operating Temperature		-25	--	+70	°C	
Storage Temperature		-25	--	+85		
Storage Humidity		--	--	90	%RH	
Altitude	Operating altitude	--	--	3000	m	
	Storage altitude	--	--	3000		
Soldering Temperature	Wave-soldering	260±5°C; time: 5-10s				
	Manual-welding	360±10°C; time: 3-5s				
Switching Frequency		--	60	--	KHz	
Power Derating	-25°C to -10°C	3.3	--	--	% / °C	
	+55°C to +70°C	2	--	--		
Leakage Current (mA)		0.3Typ @Vin=220Vac				
Safety Standard		Design refer to IEC62368-1				
Safety Class		CLASS II				
MTBF		MIL-HDBK-217F@25°C > 300,000 h				

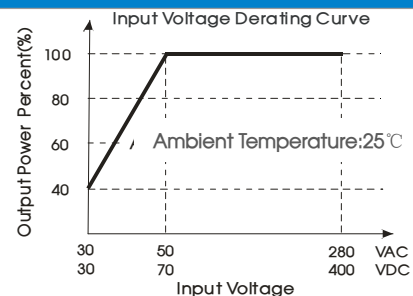
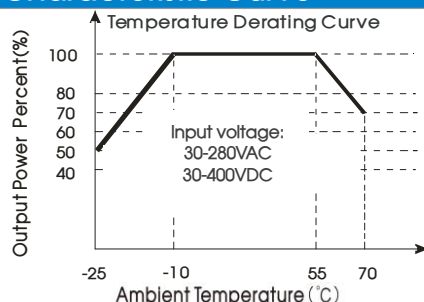
Mechanical Specifications

Dimension	80.00 x 40.00 x 30.00 mm
Weight	55g (Typ.)
Cooling Method	Free air convection

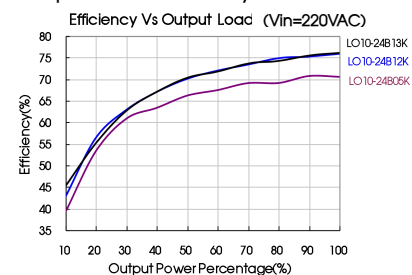
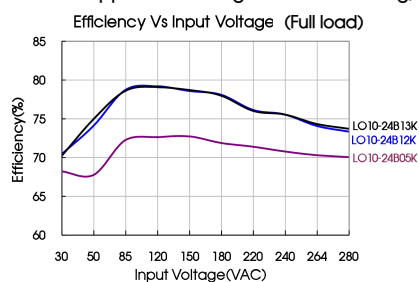
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	±6KV/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	±2KV	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m	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 30-50VAC and a DC input between 30-70VDC, 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 factory or one of our FAE.



Design Reference

1. Typical application

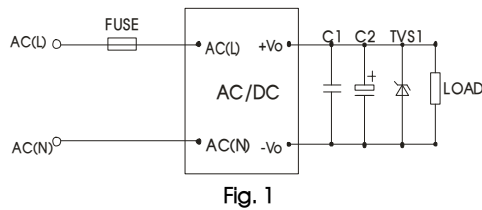


Fig. 1

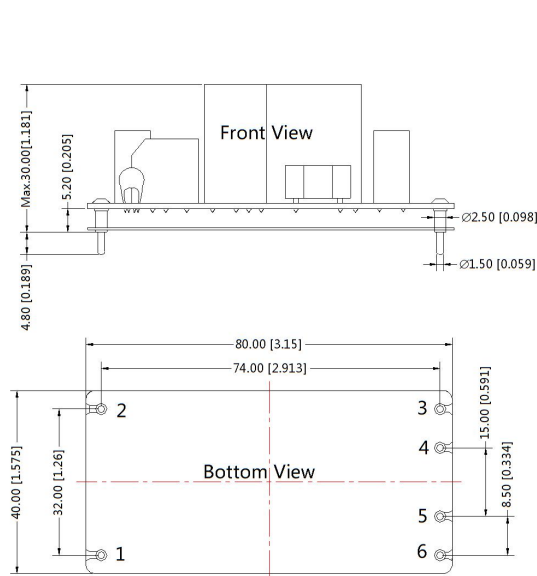
Model	C1 (μF)	C2 (μF)	TVS1
LO10-24B05K	1	680	SMBJ7.0A
LO10-24B12K	1	100	SMBJ20A
LO10-24B13K			

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 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. For additional information please refer to application notes on www.mornsun-power.com

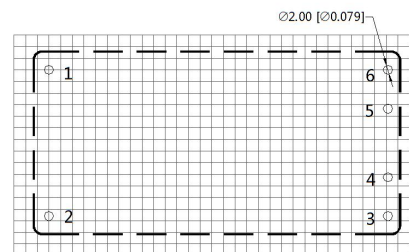
Dimensions and Recommended Layout



Note:

- Unit: mm[inch]
- General tolerances: $\pm 0.50[\pm 0.020]$
- FR-4, 1.6mm thick double sided glass fiber PCB
- 0.40mm black MYLAR insulating sheet material

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin	Name	Function
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	NC	NC
4	No Pin	No Pin
5	OUT1-	The first output voltage negative(-)
6	OUT1+	The first output voltage positive (+)

Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220192;
- 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;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25\text{ }^\circ\text{C}$, humidity<75% with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
- The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
- We can provide product customization service;
- Specifications are subject to change without prior notice.

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