

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



RoHS



## 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 — is designed for electric-meter application and operates over a very wide input voltage range: 30-280VAC/30-400VDC, single output. The isolation voltage is 4000VAC between input and output. The product meets IEC/EN61000. So it supplies 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)
LO10-24B05K	6W	5V/1200mA	71	6000
LO10-24B12K	6.6W	12V/550mA	77	2000
LO10-24B13K	6.5W	13V/500mA	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-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	(Feedback-clamp) Voltage limited ≤ 7.5V			
	LO10-24B12K/ LO10-24B13K	(Feedback-clamp) Voltage limited ≤ 15V			
Min. Load		10	--	--	%
Starting Time	220VAC input, Io=100%	--	50	--	ms
Hold-up Time	220VAC input, Io=100%	--	200	--	

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	4000	--	--	VAC
Operating Temperature		-25	--	+70	°C
Storage Temperature		-25	--	+85	

Storage Humidity		--	--	90	%RH
Altitude	Operating altitude	--	--	3000	m
	Storage altitude	--	--	3000	
Welding 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~-10°C	3.3	--	--	% / °C
	+55°C~+70°C	2	--	--	
Leakage current(mA)		0.3Typ @Vin=220Vac			
Safety Standard		IEC60950			
Safety Class		CLASS II			
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

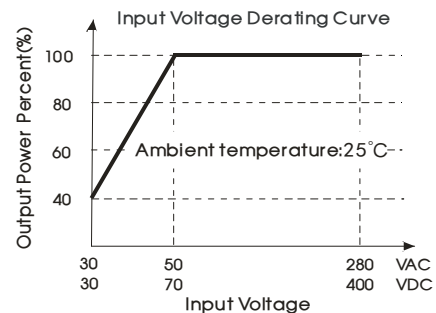
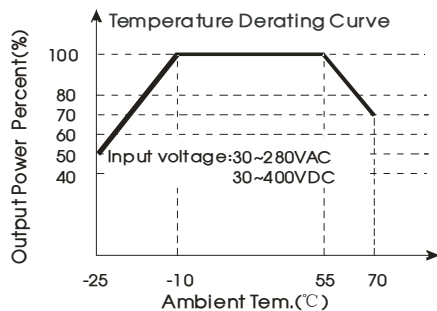
### Physical Specifications

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

### EMC Specifications

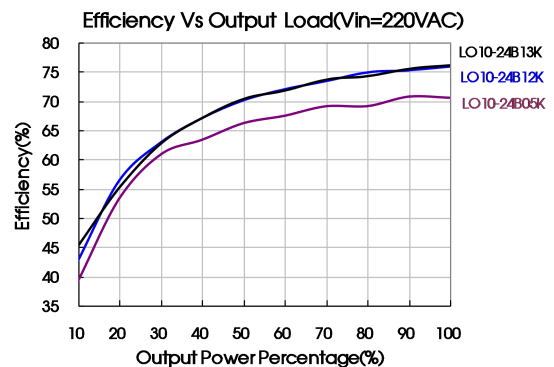
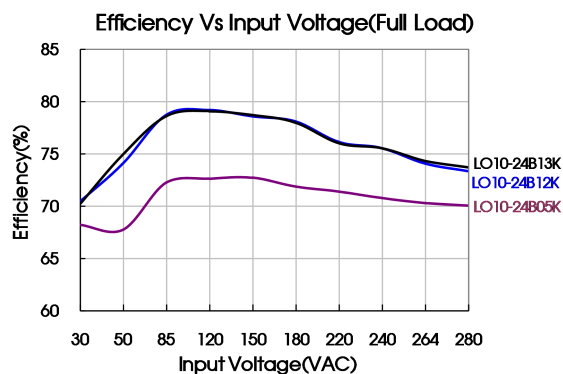
EMI	CE	CISPR22/EN55022, CLASS B		
	RE	CISPR22/EN55022, CLASS B		
EMS	ESD	IEC/EN61000-4-2	±6KV/8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B
	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%-70%	perf. Criteria B

### Product Characteristic Curve



Note: ① Input voltage should be derated based on temperature derating when it is 30~50VAC/30~70VDC;

② This 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

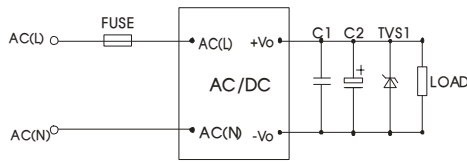


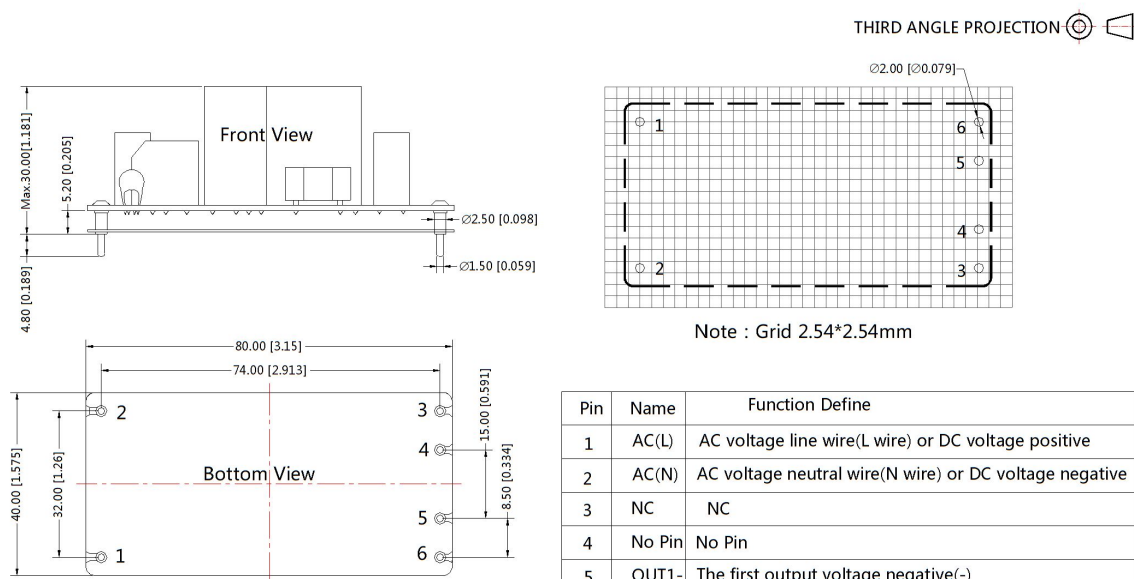
Fig. 1

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

Note: Output filtering capacitor C2 is electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor. Capacitor withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. For more information about Mornsun EMC Filter products, please visit [www.mornsun-power.com](http://www.mornsun-power.com) to download the Selection Guide of EMC Filter

### Dimensions and Recommended Layout



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

- 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

#### Notes:

- Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). Packing bag number: 58220010;
- 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  $T_a=25^\circ\text{C}$ , humidity<75% with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our Company's 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.

## 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