

## 3W, Integrated isolated 485 ACDC power supply



RoHS



## FEATURES

- Wide input voltage range:85 - 305VAC/100 - 430VDC
- AC & DC (same terminal input voltage)
- Isolation voltage: 4000VAC
- Output short circuit, over-current protection
- High baud rate up to 500kbps
- The bus is able to support 128 nodes at maximum
- Open frame, Compact size, high power density
- Flexible design of peripheral circuit reduces layout problems
- EN60950 approval, meets UL60950 standard

TLAxx-03K485 series for the integration of isolated 485 3W ACDC power supply, the product can be directly connected to the commercial AC 220V power supply. The output power of the main channel DC power supply is 2.5W, the auxiliary DC power output is used for bus communication. The input AC power source and the two output DC power supply have high isolation voltage of 4000VAC, and the two outputs DC power supply isolation voltage between 1500VDC. Widely used in industrial and electrical instrumentation and other demanding on the volume, wide input voltage requirements, the use of isolation bus, the need to meet UL / CE certification and EMC requirements are not high occasions. This series of products used in electromagnetic compatibility more harsh environment must refer to the recommended circuit.

## Selection Guide

Certification	Part No.	Output Power	Rated Output Voltage(Vo)	Rated Output Current Io (mA)	Efficiency (230VAC, %/Typ.)	Baud rate (kbps)	Number of Nodes
CE	TLA03-03K485	3W	3.3V(1.65W)/5V(0.125W)	500/25	55	500	128
	TLA05-03K485		5V(2.5W)/5V(0.125W))	500/25	68		

## Power Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	305	VAC
	DC input	100	--	430	VDC
Input Frequency		47	--	63	Hz
Input Current	115VAC	--	--	0.15	A
	230VAC	--	--	0.07	
Input Surge Voltage	115VAC	--	--	13	
	230VAC	--	--	23	
Recommended External Input Fuse		Rated current 1.0A, slow blow fuse, necessary			
Hot Plug		Unavailable			

## Power Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Balanced load	Primary output Vo1	3.3V	3.0	3.3	VDC
		Secondary output Vo2	5V	4.75	5	
Line Regulation	Balanced load	Primary output Vo1		--	±1.5	%
		Secondary output Vo2		--	±2	
Load Regulation	Double isolated output (Primary output )		--	--	±5	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	Primary output Vo1		--	200	mV
		Secondary output Vo2		--	300	
Temperature Coefficient			--	--	±0.15	%/°C
Short Circuit Protection			Continuous, self-recovery			
Over-current Protection			120 - 300%Io, self-recovery			
Min. Load	Double isolated output (Primary output )		50	--	--	mA
	Double isolated output (Secondary output )		10	--	--	
Max. Capacitive Load (μF)			1500(Primary output)/22(Secondary output)			

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

Signal Input Specifications(+Vo1=3.3V)

Item		Symbol	Min.	Typ.	Max.	Unit
TXD Logic Level	High-level	V <sub>IH</sub>	0.7 * Vo1	--	Vo1	VDC
	Low-level	V <sub>IL</sub>	0	--	0.8	
RXD Logic Level	High-level	V <sub>OH</sub>	Vo1- 0.4	3.1	--	
	Low-level	V <sub>OL</sub>	0	0.2	0.4	
TXD Drive Current		I <sub>T</sub>	2	--	--	mA
RXD Output Current		I <sub>R</sub>	--	--	4	
CON Drive Current		I <sub>CON</sub>	--	--	5	
Serial Interface	Compatible with + 3.3 V UART interface only					

Signal Input Specifications(+Vo1=5.0V)

Item		Symbol	Min.	Typ.	Max.	Unit
TXD Logic Level	High-level	V <sub>IH</sub>	0.7 * Vo1	--	Vo1	VDC
	Low-level	V <sub>IL</sub>	0	--	0.8	
RXD Logic Level	High-level	V <sub>OH</sub>	Vo1- 0.4	4.8	--	
	Low-level	V <sub>OL</sub>	0	0.2	0.4	
TXD Drive Current		I <sub>T</sub>	2	--	--	mA
RXD Output Current		I <sub>R</sub>	--	--	4	
CON Drive Current		I <sub>CON</sub>	--	--	5	
Serial Interface	Compatible with + 5 V UART interface only					

Signal Output Specifications

Item		Symbol	Min.	Typ.	Max.	Unit
Differential Level		V <sub>diff(α)</sub> , R <sub>L</sub> =54 Ω	1.5	2	+Vo2	VDC
Bus Pin Maximum Voltage			-7	--	12	VDC
Differential Load Resistance			54	--	--	Ω
Differential Input Impedance		-7V ≤ V <sub>CM</sub> ≤ +12V	96	--	--	kΩ
Bus Interface Protection	ESD protection					

Signal Transmission Specifications

Item		Symbol	Min.	Typ.	Max.	Unit
Data Delay	TXD Transmit Delay	t <sub>T</sub>	--	55	110	ns
	RXD Receive Delay	t <sub>R</sub>	--	65	110	
	Switchover delay			--	--	18

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Isolation voltage	Input-output	With the test time of 1 minute and the leak current lower than 5mA	AC-DC	4000	--	--	VAC
			DC-DC	1500	--	--	VDC
Operating Temperature			-40	--	+85	℃	
Storage Temperature			-40	--	+105		
Storage Humidity			--	--	85	%RH	
Power Derating	Operating temperature derating	-40℃ to -20℃	3.0	--	--	% /℃	
		70℃ to 85℃	1.67	--	--		
	Input Voltage derating	85VAC-100VAC	1.2	--	--	% /VAC	
		277AVC-305VAC	1.1	--	--		
Welding Temperature	Wave-soldering	260 ± 5℃; time: 5 - 10s					
	Manual-welding	360 ± 10℃; time: 3 - 5s					
MTBF	MIL-HDBk-217F@25℃		>300,000 h				

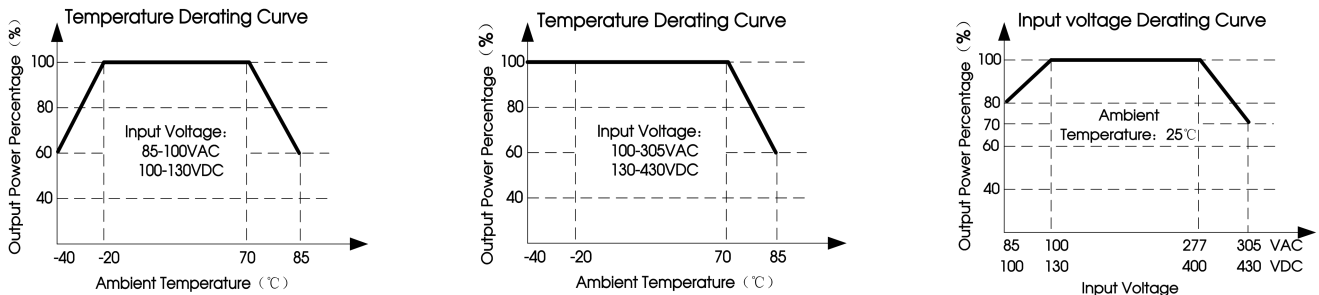
Physical Specifications

Dimensions	44.16*19.62*16.34 mm
Weight	8g (Typ.)
Cooling Method	Free air convection

EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS A (see Fig.1)	
		CISPR32/EN55032	CLASS B (see Fig.2)	
	RE	CISPR32/EN55032	CLASS A (see Fig.1)	
		CISPR32/EN55032	CLASS B (see Fig.2)	
EMS	ESD	IEC/EN 61000-4-2	Contact ±4kV (Power output port and bus port)	Perf. Criteria B
	EFT	IEC/EN61000-4-4	±2kV (see Fig.1)	perf. Criteria B
		IEC/EN61000-4-4	±4kV (L、N) (see Fig.2)	perf. Criteria B
	Surge	IEC/EN61000-4-5	±1kV (L、N) (see Fig.1)	perf. Criteria B
IEC/EN61000-4-5		±2kV (A、B)	perf. Criteria B	

Product Characteristic Curve



Note: ①The products should have input voltage derating based on temperature derating when it is 85 - 100VAC/277 - 305VAC/100 - 130VDC/400 - 430VDC voltage input;

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

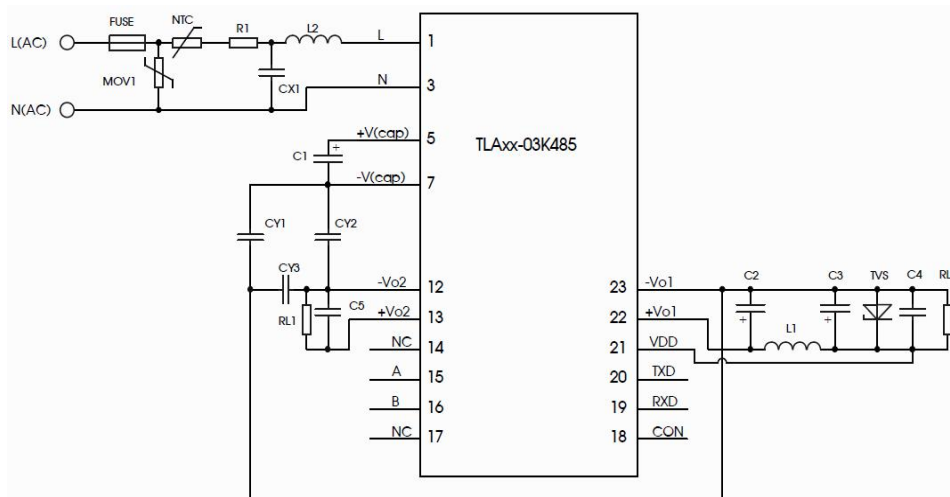


Fig.1

Components	Recommended parameters
FUSE (necessary)	1A/300V
R1	12 Ω /2W
MOV1	14D561
C1 (necessary)	22uF/450V -40°C to 85°C
L2	4.7mH
NTC	13D-5
C2 (necessary)	270uF/16V (Solid Capacitor)
L1(necessary)	4.7uH
C3 (necessary)	120uF/25V
C4	0.1uF
CY1/ CY2 (necessary)	2200pF
TVS	SMBJ7.0A
CY3(necessary)	560pF
CX1	0.047uF/480V
C5(necessary)	100uF/16V

2. EMC solution-recommended circuit

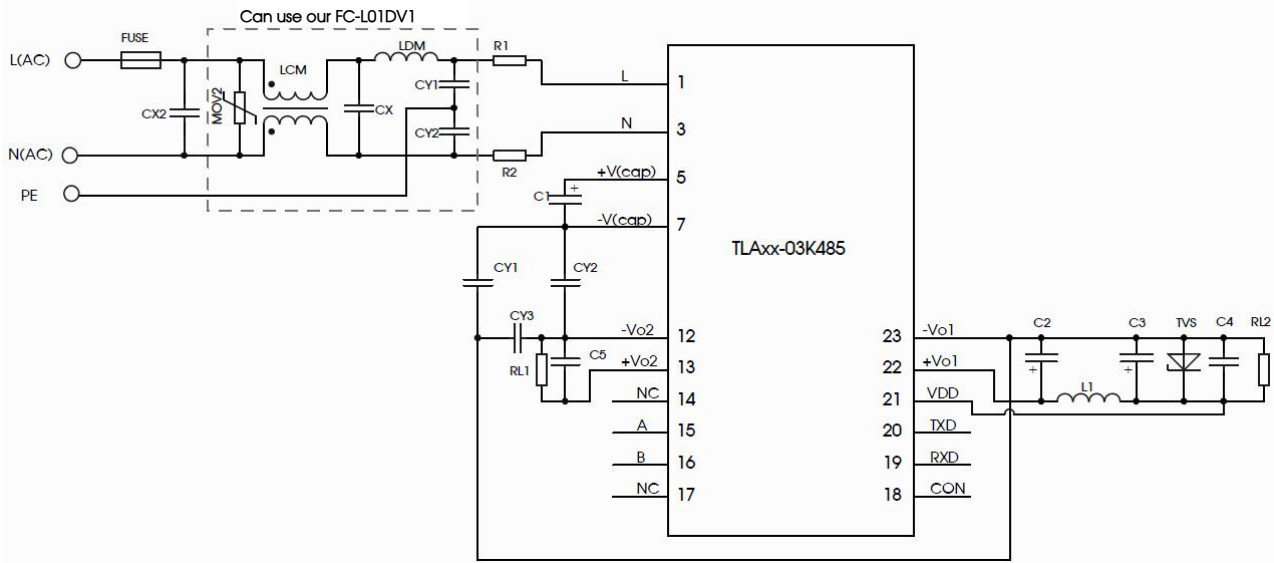


Fig.2

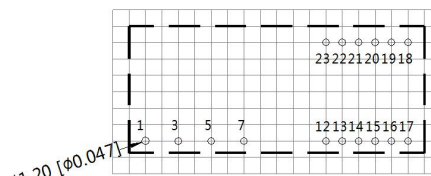
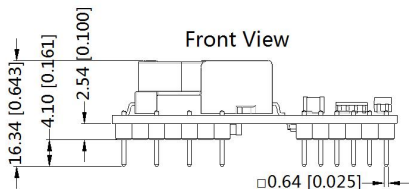
CX2: 0.15uF/480V

R1, R2: for the current limiting resistor, Recommended value  $12\Omega$ , 2W; Other components parameters can be seen in Fig. 1 typical application circuit parameters.

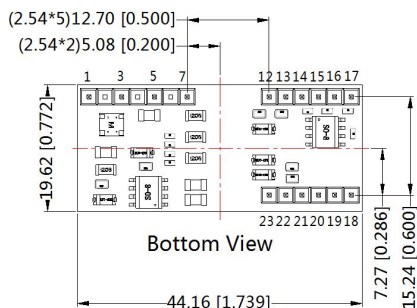
3. For more information about Mornsun EMC Filter products, please visit [www.mornsun-power.com](http://www.mornsun-power.com) to download the Selection Guide of EMC Filter

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54\*2.54mm



Pin-In&Out					
Pin	Function	Function Definition	Pin	Function	Function Definition
1	AC(L)	AC Input (L)	16	B	485 Bus B Pin
3	AC(N)	AC Input (N)	17	NC	Not Connected
5	+V(cap)	Filter Capacitor+	18	CON	Send & Receiving Control Pin
7	-V(cap)	Filter Capacitor-	19	RXD	Receiving Pin
12	-Vo2	Secondary output-	20	TXD	Send Pin
13	+Vo2	Secondary output+	21	VDD	Signal Port I/O Supply Input Pin
14	NC	Not Connected	22	+Vo1	Primary Output+
15	A	485 Bus A Pin	23	-Vo1	Primary Output-

Note:  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.1$ [0.004]  
General tolerances:  $\pm 1$ [ $\pm 0.039$ ]

Notes:

1. 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:58220026;
2. This model is open plate, in order to meet the safety requirements of the module primary and secondary external components between the need to maintain a safe distance of at least 6.4mm;
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 (115V and 230V)and rated output load;
4. In order to improve the efficiency of conversion at light load, the module may have audio noise, but does not affect product performance and reliability;
5. After the module is assembled, it needs to be fixed
6. All index testing methods in this datasheet are based on our Company's corporate standards;
7. We can provide product customization service;
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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