

10W, AC-DC converter



UL us CE RoHS

### FEATURES

- Universal input range:85~264VAC, 100~370VDC
- Regulated output, low ripple and noise
- Over-current, short circuit and over-voltage protection
- Plastic case, meets UL94V-0
- Meet UL60950,EN60950 standards
- 3 years product warranty
- PCB mounting, Chassis mounting, DIN-Rail mounting

LH 10series ——a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, which meet IEC/EN61000-4, CISPR22/EN55022, UL60950 and EN60950 standards, and it's widely used in Industrial, office and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

### Selection Guide

Certification	Part No.*	Output Power	Nominal Output Voltage and Current		Efficiency (230VAC, %/Typ.)	Max. Capacitive Load(μF)	
			(Vo1/Io1)	(Vo2/Io2)		Vo1	Vo2
UL/CE	LH10-10B03	6.6 W	3.3V/2000mA	--	70	26400	--
	LH10-10B05		5V/2000mA	--	76	9440	--
	LH10-10B09		9V/1100mA	--	78	3600	--
	LH10-10B12		12V/900mA	--	80	2400	--
	LH10-10B15		15V/700mA	--	81	1170	--
	LH10-10B24		24V/450mA	--	82	370	--
	LH10-10A05	10W	+5V/1000mA	-5V/1000mA	76	8800	8800
	LH10-10A12		+12V/450mA	-12V/450mA	80	1970	1970
	LH10-10A15		+15V/350mA	-15V/350mA	81	1970	1970
	LH10-10A24		+24V/200mA	-24V/200mA	84	660	660
--	LH10-10C0512-02		5V/1000mA	±12V/200mA	75	3200	260
	LH10-10C0515-02		5V/900mA	±15V/200mA	75	2160	80
UL/CE	LH10-10D0505-02		5V/1800mA	5V/200mA	75	8000	540
	LH10-10D0512-02		5V/1500mA	12V/200mA	79	4400	260
	LH10-10D0515-02		5V/1400mA	15V/200mA	79	4400	170
	LH10-10D0524-02		5V/1000mA	24V/200mA	81	4000	170

Note: LH10-10AXX, use both positive and negative output as sampling feedback; and all others use Vo1 as sampling feedback.

### Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	AC input	85	--	264	VAC
	DC input	100	--	370	VDC
Input frequency		47	--	63	Hz
Input current	115VAC	--	--	0.26	A
	230VAC	--	--	0.16	
Inrush current	115VAC	--	10	--	
	230VAC	--	20	--	
Leakage current		0.3mA RMS typ./230VAC/50Hz			

Recommended External Input Fuse(Special package series include fuse)	2A/250V, slow fusing
Hot Plug	Unavailable

### Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Output Voltage Accuracy	Main circuit		--	±2	--		
	Main circuit (3.3V Output voltage)		--	±3	--		
Line Regulation	Full load	Main circuit	--	±0.5	--		
		Auxiliary circuit	--	±1.5	--		
Load Regulation	10%-100% load	Single output	--	±1	--	%	
		Dual output(balanced load)		--	±2		--
		Isolated triple output (balanced load)	Main circuit	--	±3		--
			Auxiliary circuit	--	±5		--
		Isolated and separated twin output (balanced load)	Main circuit	--	±3		--
Auxiliary circuit	--		±5	--			
Ripple & Noise*	20MHz bandwidth (peak-peak value)		--	50	150	mV	
Temperature Coefficient	Main circuit		--	±0.02	--	%/°C	
Short Circuit Protection			Continuous, self-recovery				
Over-current Protection			≥110%Io self-recovery				
Over-voltage Protection	Main circuit	3.3 / 5VDC Output	≤7.5VDC				
		9VDC Output	≤13VDC				
		12 / 15VDC Output	≤20VDC				
		24VDC Output	≤30VDC				
Min. Load	Single output models		0	--	--	%	
	Dual output models (balanced load)		10	--	--		
	Isolated and separated twin output (balanced load)		10	--	--		
	Isolated triple output (balanced load)		10	--	--		
Hold-up Time	115VAC input		--	15	--	ms	
	230VAC input		--	80	--		

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	3000	--	--	VAC
Operating Temperature	LH10-10A24		-25	--	+70	°C
	Others		-40	--	+70	
Storage Temperature	LH10-10A24		-25	--	+105	
	Others		-40	--	+105	
Storage Humidity			--	--	95	%RH
Welding Temperature	Wave-soldering		+260±5°C; time:5~10s			
	Manual-welding		+360±10°C; time:3~5s			
Switching Frequency	LH10-10A/LH10-10C/LH10-10D series		--	65	--	kHz
	LH10-10B series		--	100	--	
Power Derating	-40°C~-10°C		2.0	--	--	%/°C
	+55°C~+70°C		4.0	--	--	
Safety Standard	IEC60950/EN60950/UL60950					
Safety Certification	EN60950/UL60950					
Safety Class	CLASS I					
MTBF	MIL-HDBK-217F@25°C > 300,000 h					

### Physical Specifications

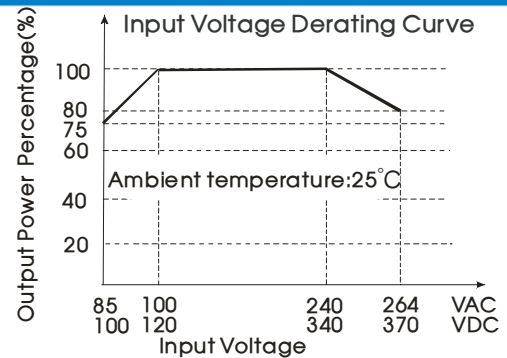
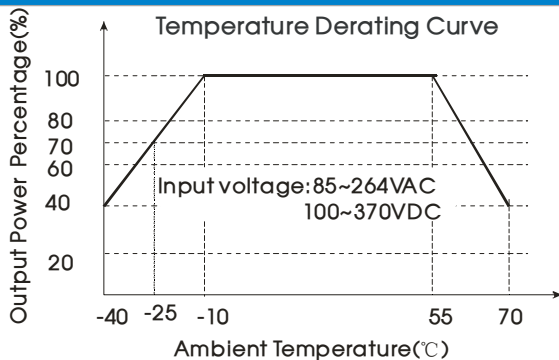
Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)	
Dimension	Horizontal package	55.00*45.00*21.00 mm
	A2 chassis mounting	96.10*54.00*29.50 mm
	A3 chassis mounting	99.00*54.00*29.50 mm
	A4 Din-Rail mounting	96.10*54.00*34.10 mm
Weight	Horizontal package/A2 chassis mounting /A3 chassis mounting/A4 Din-Rail mounting	80g/130g/130g/170g(Typ.)
Cooling method*	Free air convection	

Note: \*This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

### 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	
		IEC/EN61000-4-4	±2KV perf. Criteria B	
	Surge	IEC/EN61000-4-4	±4KV (See Fig. 5 for recommended circuit)	perf. Criteria B
		IEC/EN61000-4-5	±1KV/±2KV perf. Criteria B	
EMS	CS	IEC/EN61000-4-5	±2KV/4KV (See Fig. 5 for recommended circuit) perf. Criteria B	
		IEC/EN61000-4-6	10 Vr.m.s perf. Criteria A	
	PFM	IEC/EN61000-4-8	10A/m perf. Criteria A	
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-11	0%-70% perf. Criteria B	

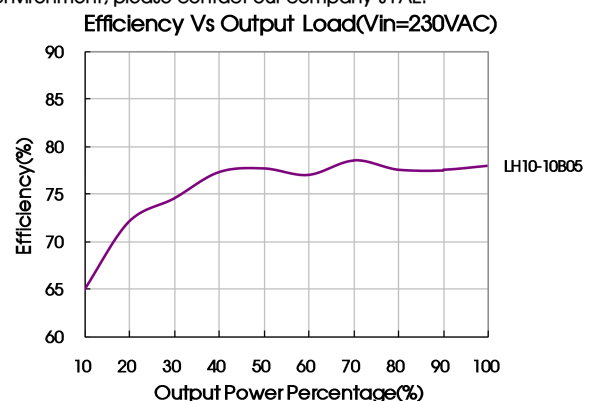
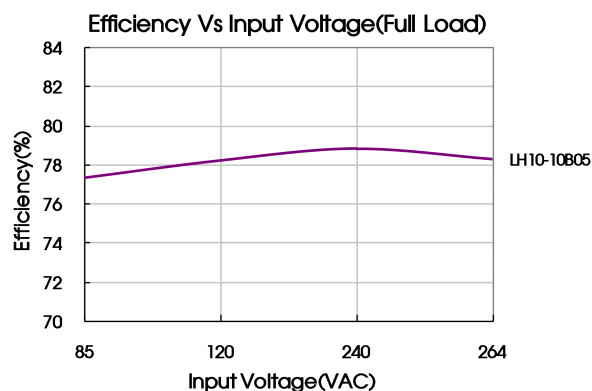
### Product Characteristic Curve



Note: ①When input 85~100VAC/240~264VAC/100~120VDC/340~370VDC, it need to be voltage derated on basis of temperature derating;

②LH10-10A24 lowest temperature is -25°C

③This 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

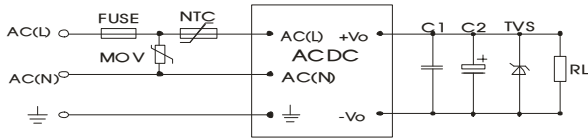


Fig. 1: LH10-10Bxx (Single Output) series typical application circuit

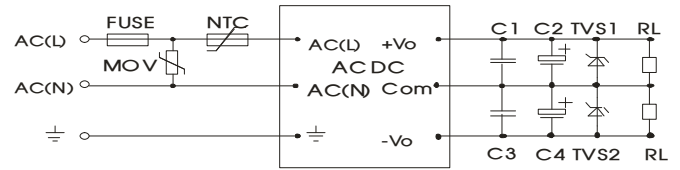


Fig. 2: LH10-10Axx (Dual Output) series typical application circuit

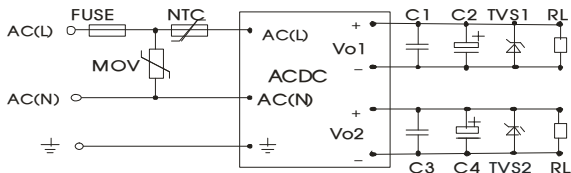


Fig. 3: LH10-10Dxx (Isolate Twin Output) series typical application circuit

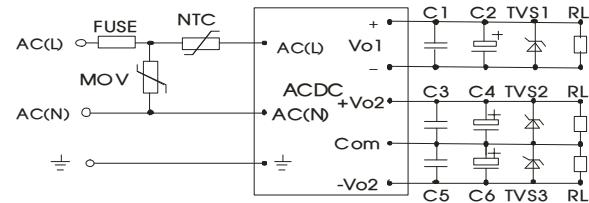


Fig. 4: LH10-10Cxx (Triple Output) series typical application circuit

Model	C2( $\mu$ F)	C4( $\mu$ F)	C6( $\mu$ F)	TVS1	TVS2	TVS3
LH10-10B03	470			SMBJ7.0A		
LH10-10B05	330			SMBJ7.0A		
LH10-10B09	120			SMBJ12A		
LH10-10B12	120			SMBJ20A		
LH10-10B15	120			SMBJ20A		
LH10-10B24	68			SMBJ30A		
LH10-10A05	220	220		SMBJ7.0A		
LH10-10A12	120	120		SMBJ20A	SMBJ20A	
LH10-10A15	47	47		SMBJ20A	SMBJ20A	
LH10-10A24	33	33		SMBJ30A	SMBJ30A	
LH10-10C0512-02	220	68	68	SMBJ7.0A	SMBJ20A	SMBJ20A
LH10-10C0515-02	220	47	47	SMBJ7.0A	SMBJ20A	SMBJ20A
LH10-10D0505-02	220	68		SMBJ7.0A	SMBJ7.0A	
LH10-10D0512-02	220	68		SMBJ7.0A	SMBJ20A	
LH10-10D0515-02	220	47		SMBJ7.0A	SMBJ20A	
LH10-10D0524-02	220	47		SMBJ7.0A	SMBJ30A	

Note:  
 Note: Output filtering capacitors C2, C4, C6 are electrolytic capacitors, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor withstand voltage derating should be 80% or above. C1, C3, C5 are ceramic capacitors, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails. External input FUSE model is recommended to use 2A/250V slow fusing. External input NTC model is recommended to use 5D-9. External input MOV model is recommended to use S14K300.

#### 2. EMC solution-recommended circuit

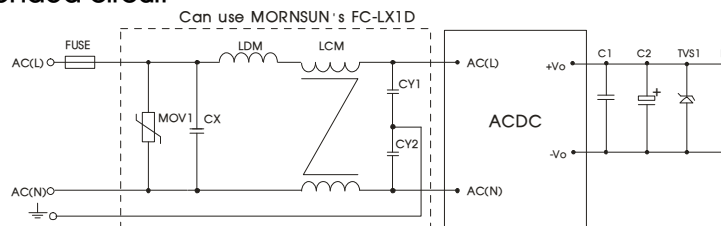
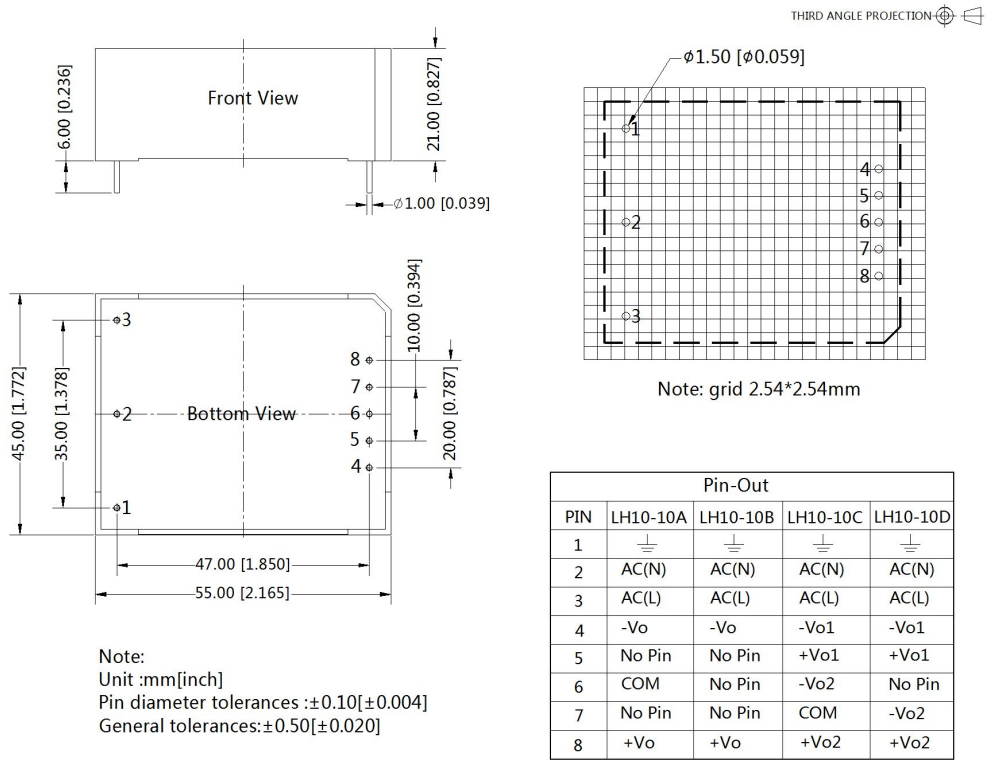


Fig. 5: EMC Recommended circuit with higher requirements

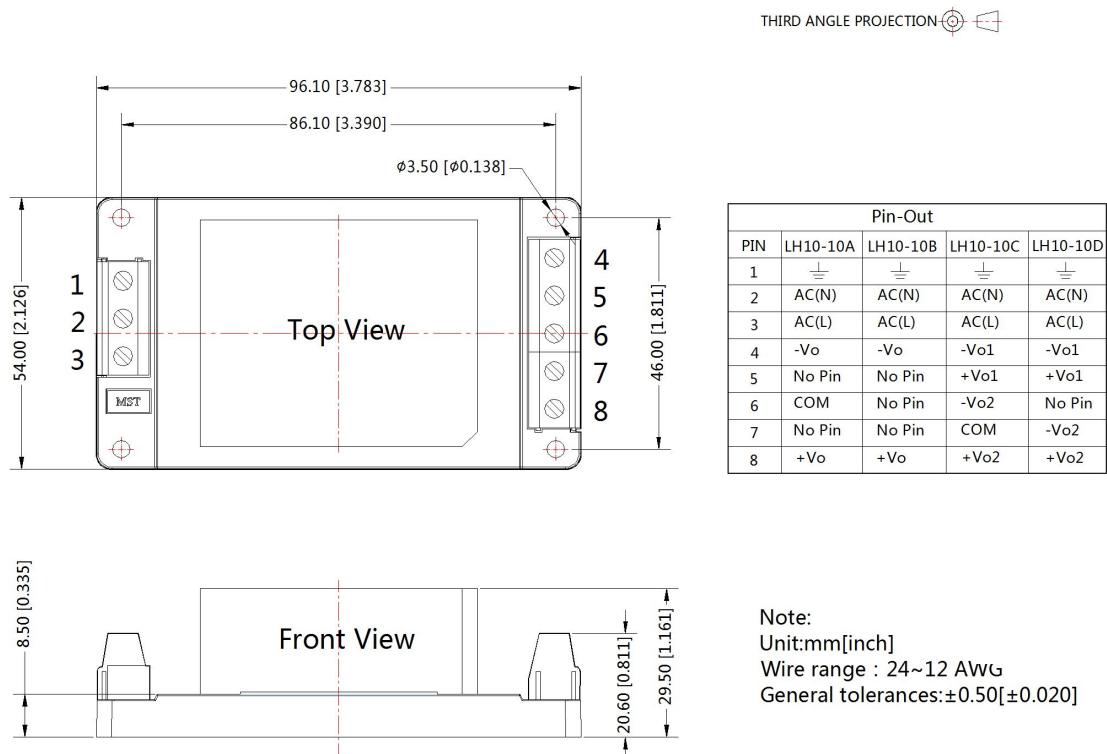
Element model	Recommended value	Element model	Recommended value
MOV1	S14K300	FC-LX1D	2KV/4KV EMC filter
CY1, CY2	1000pF/400VAC	LDM	4.7 $\mu$ H/2A
CX	0.1 $\mu$ F/275VAC	FUSE	2A/250V slow fusing, necessary
LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103		

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

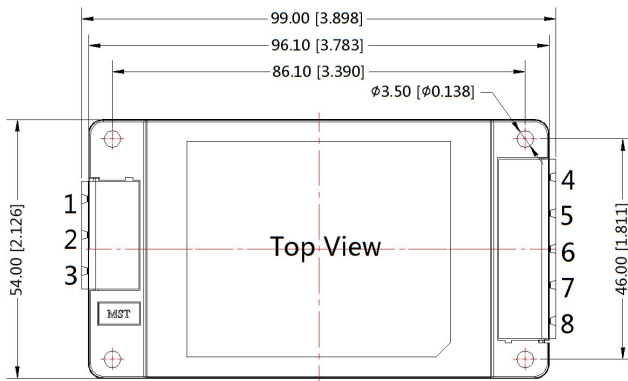


LHXXA2 Dimensions

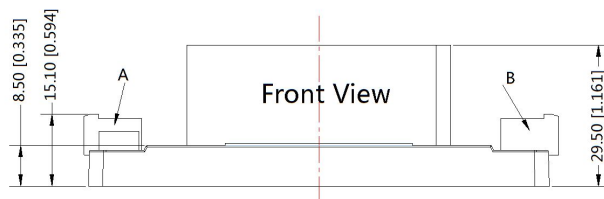


LHXXA3 Dimensions

THIRD ANGLE PROJECTION



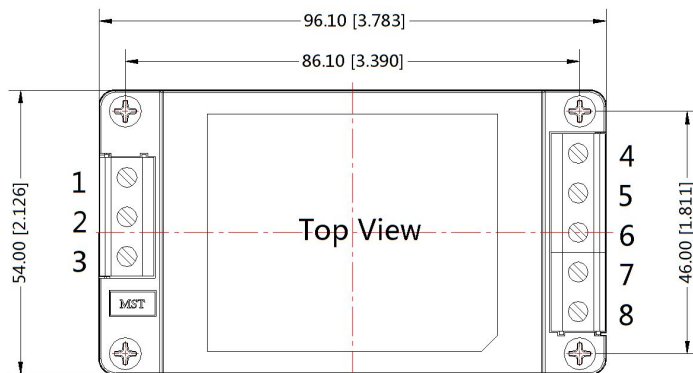
PIN	Pin-Out			
	LH10-10A	LH10-10B	LH10-10C	LH10-10D
1	⏏	⏏	⏏	⏏
2	AC(N)	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1	-Vo1
5	No Pin	No Pin	+Vo1	+Vo1
6	COM	No Pin	-Vo2	No Pin
7	No Pin	No Pin	COM	-Vo2
8	+Vo	+Vo	+Vo2	+Vo2



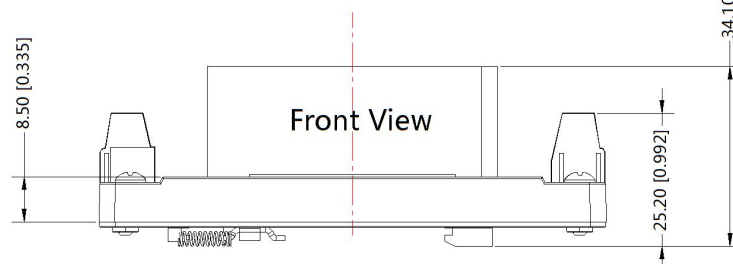
Note:  
Unit:mm[inch]  
General tolerances:±0.50[±0.020]  
A:DEGSON P/N:  
2EDGRC-7.5-03P-14-100A ( H )  
B:DEGSON P/N:  
2EDGRC-7.5-05P-14-100A ( H )

LHXXA4 Dimensions

THIRD ANGLE PROJECTION



PIN	Pin-Out			
	LH10-10A	LH10-10B	LH10-10C	LH10-10D
1	⏏	⏏	⏏	⏏
2	AC(N)	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1	-Vo1
5	No Pin	No Pin	+Vo1	+Vo1
6	COM	No Pin	-Vo2	No Pin
7	No Pin	No Pin	COM	-Vo2
8	+Vo	+Vo	+Vo2	+Vo2



Note:  
Unit:mm[inch]  
Installed on DIN ra  
Wire range : 24~12 AWG  
General tolerances:±0.50[±0.020]

Note:

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 of Horizontal package : 58220006, the Packing bag number of A2/A3/A4 package:58220010;
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  $T_a=25\text{ }^\circ\text{C}$ , humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. 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;
6. We can provide product customization service;
7. Specifications are subject to change without prior notice.

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