

3-15W, AC-DC converter



UL[®] CE CB RoHS

FEATURES

- Universal Input :85 ~ 264VAC/100~370VDC,50/60Hz
- Regulated output, low ripple and noise
- High efficiency up to 83%
- Small Volume, green environmental protection
- Output short circuit, over-current, over-voltage protection
- Plastic case, meets UL94V-0
- UL60950, EN60950, IEC60950 approval
- Three years warranty
- Mounting: PCB mounting, Chassis mounting, DIN-Rail mounting

LB series — is 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, meets IEC/EN61000-4, CISPR22/EN55022, UL60950, EN60950 standards, and is widely used in industrial, office and civil applications. For harsh EMC environment, this series of product must use the referred application circuit.

Selection Guide

Certification	Model	Output Power	Nominal Output Voltage and Current (Vo/Io)		Efficiency (230VAC, %/Typ.)	Max. Capacitive Load(μF)
			(Vo1/Io1)	(Vo2/Io2)		
UL/CE	LB03-10B05	3W	5V/600mA	--	71	30000
	LB03-10B12		12V/250mA	--	74	2500
	LB03-10B24		24V/125mA	--	77	800
UL/CE/CB	LB05-10B05	5W	5V/1000mA	--	73	9600
	LB05-10B12		12V/450mA	--	76	2500
	LB05-10B24		24V/230mA	--	79	400
UL/CE	LB05-10D0505-01	5W	+5V/900mA	+5V/100mA	70	8500/550
	LB05-10D0515-01		+5V/700mA	+15V/100mA	74	4500/180
	LB05-10D0524-01		+5V/600mA	+24V/100mA	75	4200/180
UL/CE/CB	LB10-10B12	10W	12V/900mA	--	78	5500
	LB10-10B24		24V/450mA	--	80	950
--	LB10-10A12		+12V/450mA	-12V/450mA	78	2500/2500
UL/CE/CB	LB15-10B24	15W	24V/625mA	--	83	1500

Note: LB10-10AXX, 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	LB03	115VAC	--	--	0.125	A
	LB05		--	--	0.26	
	LB10		--	--	0.37	
	LB15		--	--	0.6	
	LB03	230VAC	--	--	0.08	
	LB05		--	--	0.16	
	LB10		--	--	0.22	
	LB15		--	--	0.34	

Inrush current	LB03/LB05/LB10/LB15	115VAC	--	10	--	A
		230VAC	--	20	--	
Leakage current		0.3mA RMS typ. 230VAC/50Hz				
Recommended External Input Fuse (Special package series include fuse)		LB03/LB05	1A/250V, slow fusing			
		LB10/LB15	2A/250V, slow fusing			

Output Specifications

Item				Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy				Main circuit		--	±2	--	%
Line Regulation				Main circuit		--	±0.5	--	
				Auxiliary circuit		--	±1.5	--	
Load Regulation	0%-100% load			Single output		--	±1	--	
	10%-100% load (Balanced load)			Dual output		--	±2	--	
				Isolation & twin output	main circuit	--	±3	--	
					auxiliary circuit	--	±5	--	
Output Ripple & Noise*(Main circuit)				20MHz bandwidth (peak-peak value)		--	50	100	mV
Temperature Drift Coefficient				Main circuit		--	±0.02	--	%/°C
				Auxiliary circuit		--	±0.15	--	
Short Circuit Protection				Continuous, self-recovery					
Over-current Protection				≥110%Io self-recovery					
Over-voltage Protection				5VDC		≤7.5VDC			
				12/15VDC		≤20VDC			
				24VDC		≤30VDC			
Min. Load				Single output		0	--	--	%
				Dual output (Balanced load)		10	--	--	
				Isolation & twin output (Balanced load)		10	--	--	
Hold-up Time				230VAC input		--	80	--	ms

Note: *Parallel line test method is adopted to test the ripple and noise, please see *AC-DC Converter Application Notes* for specific operation methods.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	Test time: 1min		3000	--	--	VAC
Operating Temperature		LB10-10A/LB03		-25	--	+70	°C
		LB10-10B/LB05/LB15		-40	--	+70	
Storage Temperature		LB10-10A/LB03		-25	--	+105	
		LB10-10B/LB05		-40	--	+105	
		LB15		-40	--	+85	
Storage Humidity				--	--	85	%RH
Welding Temperature		Wave-soldering		260±5℃; time:5~10s			
		Manual-welding		360±10℃; time:3~5s			
Switching Frequency		LB03		--	--	140	kHz
		LB05-10D/LB10/LB15		--	65	--	
		LB05-10B		--	100	--	
Power Derating		LB10-10A/LB03	-25℃~-10℃	2.0	--	--	% / °C
		LB10-10B/LB05/LB15	-40℃~-10℃	2.0	--	--	
		LB03/LB05/LB10/LB15	+55℃~+70℃	4.0	--	--	
Safety Standard		IEC60950/EN60950/UL60950					
Safety-regulated Certification	LB03/LB05-10D	EN60950/UL60950					
	LB05-10B/LB10/ LB15	IEC60950/EN60950/UL60950					

Safety Class	LB10-10BXX	CLASS II
	Others	CLASS I
Hot Plug	Unavailable	
MTBF	MIL-HDBK-217F@25°C > 300,000 h	

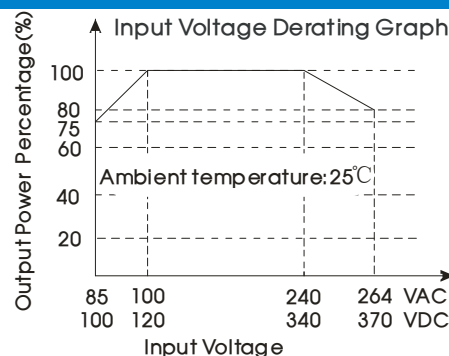
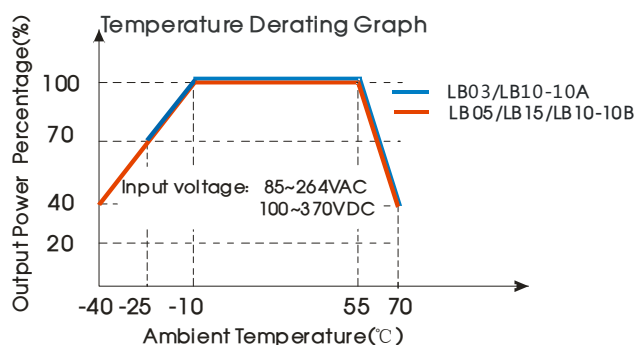
Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)
Package Dimensions	Refer to the Dimensions
Weight	Refer to the Dimensions
Cooling method	Free air convection

EMC Specifications

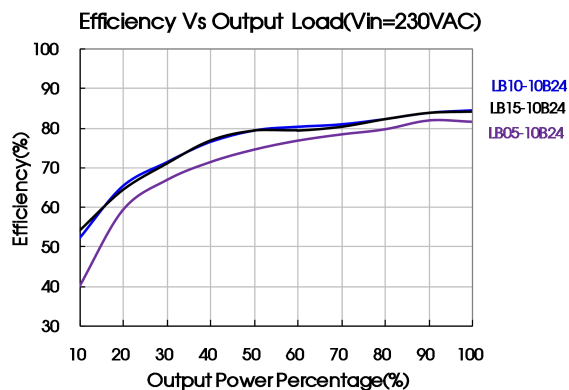
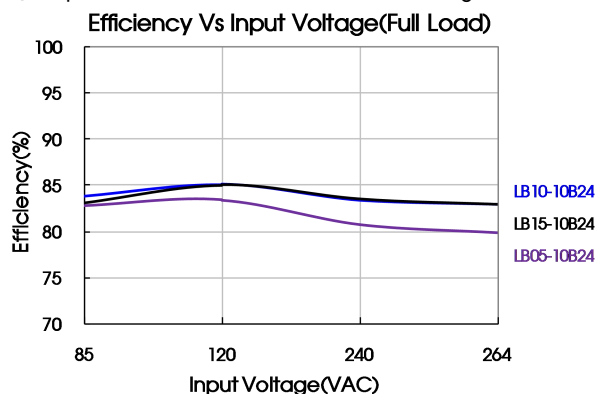
EMI	Conducted Disturbance	CISPR22/EN55022, CLASS B	
	Radiated Emission	CISPR22/EN55022, CLASS B	
EMS	Electrostatic Discharge	IEC/EN61000-4-2	±6KV/±8KV Perf. Criteria B
	Radiation Immunity	IEC/EN61000-4-3	10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 4 for recommended circuit) perf. Criteria B
	Surge Immunity	IEC/EN61000-4-5	±1KV/±2KV perf. Criteria B
		IEC/EN61000-4-5	±2KV/±4KV (See Fig. 4 for recommended circuit) perf. Criteria B
	Conducted Disturbance Immunity	IEC/EN61000-4-6	10 Vr.m.s perf. Criteria A
	Immunity for Power frequency magnetic field	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:① Input voltage should be derated based on temperature derating when it is 100~120VDC/340~370VDC

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

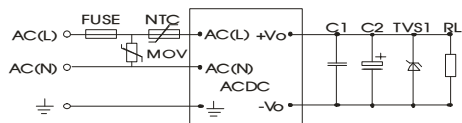


Fig. 1: LBXX-10B**(Single)

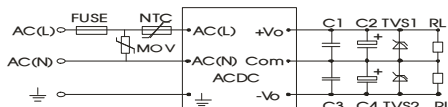


Fig. 2: LBXX-10A**(Dual)

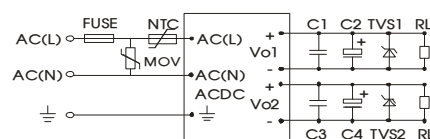


Fig. 3: LBXX-10D**(Isolation & twin)

Model	C2	C4	TVS1	TVS2	Model	C2	C4	TVS1	TVS2
LB03-10B05	220		SMBJ7.0		LB05-10D0515-01	220	47	SMBJ7.0	SMBJ20A
LB03-10B12	120		SMBJ20A		LB05-10D0524-01	220	47	SMBJ7.0	SMBJ30A
LB03-10B24	10		SMBJ30A		LB10-10B12	120		SMBJ20	
LB05-10B05	330		SMBJ7.0A		LB10-10B24	68		SMBJ30	
LB05-10B12	120		SMBJ20A		LB10-10A12	120	120	SMBJ20	SMBJ20A
LB05-10B24	68		SMBJ30A		LB15-10B24	68		SMBJ30A	
LB05-10D0505-01	220	68	SMBJ7.0	SMBJ7.0A					

Note:

Output filtering capacitor C2 and C4 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitance withstand voltage derating should be 80% or above. C1 and C3 is ceramic capacitor, advice use 1μF which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

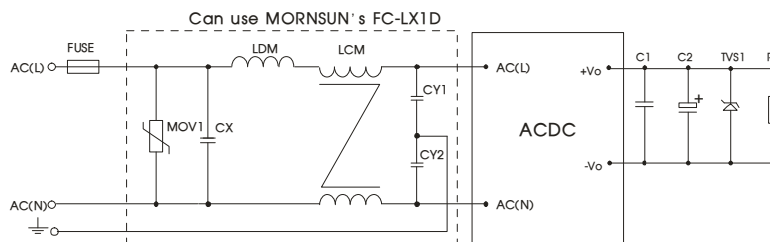
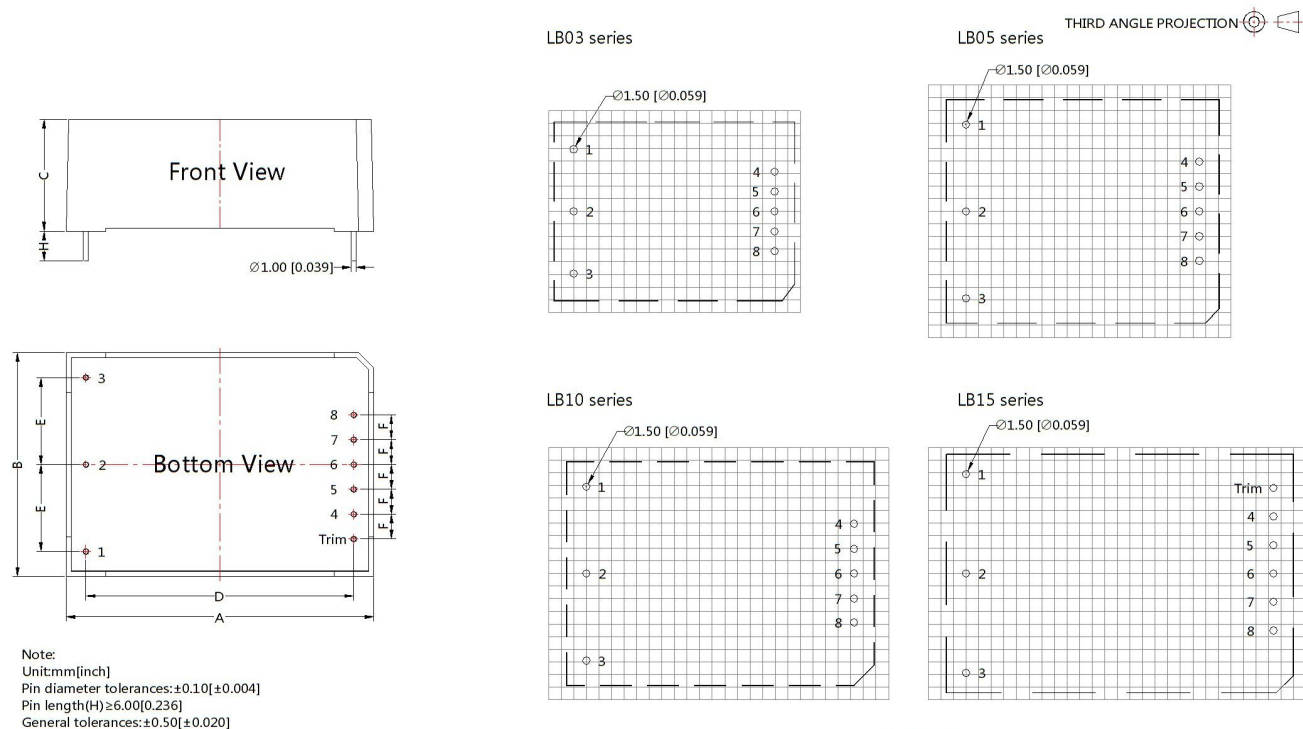


Fig. 4: EMC Recommended circuit with higher requirements

Element model	Recommended value	Element model	Recommended value
MOV1	S14K300	LDM	4.7uH/2A
CY1 , CY2	1000pF/400VAC	FC-LX1D	2KV/4KV EMC filter
CX	0.1μF/275VAC	FUSE	LB03/LB05/LB10 / LB15
LCM	10mH, recommended to use MORN SUN's FL2D-Z5-103		2A/250V slow fusing, necessary

3. For more information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Outline and dimensions (Unit: mm)				
No.	LB03	LB05	LB10	LB15
A	48.50	55.00	62.00	70.00
B	36.00	45.00	45.00	48.00
C	20.50	21.00	22.50	23.50
D	40.50	47.00	54.00	62.00
E	12.50	17.50	17.50	20.00
F	4.00	5.00	5.00	5.75
H	6(Min)			

Modles weight				
Weight	LB03	LB05	LB10	LB15
(Typ.)	55g	80g	85g	120g

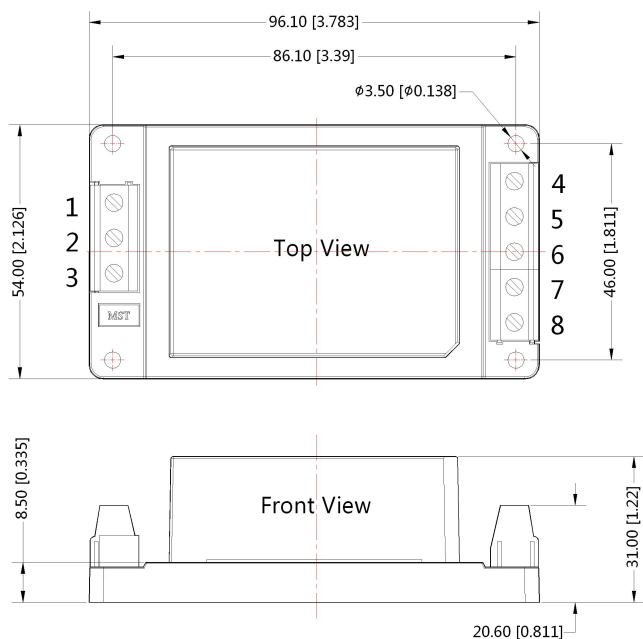
Footprint details			
Pin	LBXX-10B	LBXX-10A	LBXX-10D
1			
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1
5	No Pin	No Pin	+Vo1
6	No Pin	COM	No Pin
7	No Pin	No Pin	-Vo2
8	+Vo	+Vo	+Vo2
Trim	Trim**	No Pin	No Pin

There is no pin "1" on LB10-10BXX

Trim**: only for LB15-10BXX Series.

LBXXA2 Dimensions

THIRD ANGLE PROJECTION



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

Outline and dimensions (Unit: mm)	
Model	Dimensions
LB03XXA2	96.10*54.00*29.00
LB05XXA2	96.10*54.00*29.50
LB10XXA2	96.10*54.00*31.00
LB15XXA2	96.10*54.00*32.00

Pin	LBXX-10B	LBXX-10A	LBXX-10D
1	$\perp$	$\perp$	$\perp$
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1
5	NC	NC	+Vo1
6	NC/Trim**	COM	NC
7	NC	NC	-Vo2
8	+Vo	+Vo	+Vo2

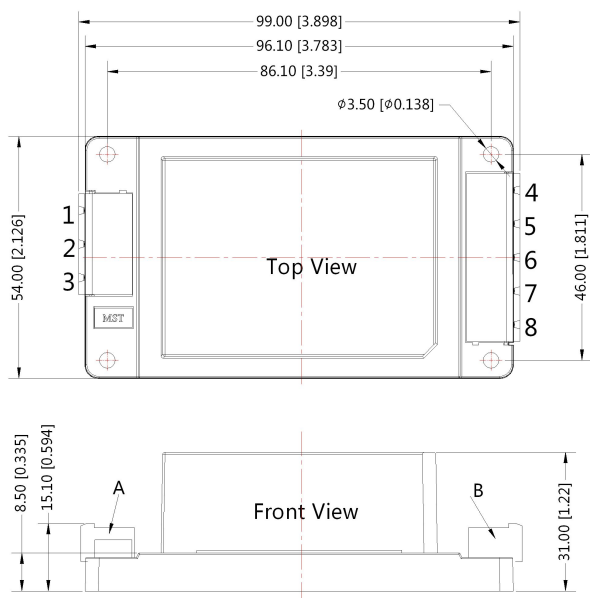
There is no pin "1", $\perp$ on LB10-10BXXA2.
NC/Trim**: The pin is Trim on LB15-10BXXA2,
The pin is not connected on other single output products.

*The figure above is related to LB10XXA2 series, the height of other series is different.

Models weight				
Weight	LB03	LB05	LB10	LB15
Typ.	100g	130g	135g	170g

LBXXA3 Dimensions

THIRD ANGLE PROJECTION



Pin	LBXX-10B	LBXX-10A	LBXX-10D
1	$\perp$	$\perp$	$\perp$
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1
5	NC	NC	+Vo1
6	NC/Trim**	COM	NC
7	NC	NC	-Vo2
8	+Vo	+Vo	+Vo2

There is no pin "1", $\perp$ on LB10-10BXXA3.
NC/Trim**: The pin is Trim on LB15-10BXXA3,
The pin is not connected on other single output products.

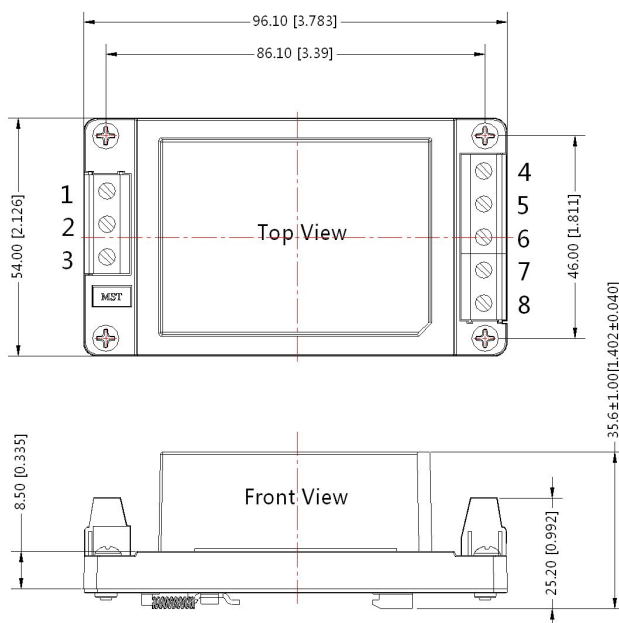
*The figure above is related to LB10XXA3 series, the height of other series is different.

Note:
Unit:mm[inch]
Wire range : 24~12 AWG
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)

Outline and dimensions (Unit: mm)	
Model	Dimensions
LB03XXA3	99.00*54.00*29.00
LB05XXA3	99.00*54.00*29.50
LB10XXA3	99.00*54.00*31.00
LB15XXA3	99.00*54.00*32.00

Models weight				
Weight	LB03	LB05	LB10	LB15
Typ.	100g	130g	135g	170g

LBXXA4 Dimensions



THIRD ANGLE PROJECTION

Pin	LBXX-10B	LBXX-10A	LBXX-10D
1	⏏	⏏	⏏
2	AC(N)	AC(N)	AC(N)
3	AC(L)	AC(L)	AC(L)
4	-Vo	-Vo	-Vo1
5	NC	NC	+Vo1
6	NC/Trim**	COM	NC
7	NC	NC	-Vo2
8	+Vo	+Vo	+Vo2

There is no pin "1", ⏏ on LB10-10BXXA4.
 NC/Trim**: The pin is Trim on LB15-10BXXA4,
 The pin is not connected on other single output products.

*The figure above is related to LB10XXA4 series, the height of other series is different.

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

Outline and dimensions (Unit: mm)	
Model	Dimensions
LB03XXA4	96.10*54.00*33.60
LB05XXA4	96.10*54.00*34.10
LB10XXA4	96.10*54.00*35.60
LB15XXA4	96.10*54.00*36.60

Models weight				
Weight	LB03	LB05	LB10	LB15
Typ.	140g	170g	175g	210g

Note:

1. Packing Information please refer to 'Product Packing Information'. The Packing bag number of Horizontal package : 58220007 (LB03), 58220006(others), the Packing bag number of A2/A3/A4 package:58220010;
2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
5. We can provide product customization service;
6. Specifications of this product are subject to changes without prior notice.

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