10W, AC-DC converter

CE Report EN62368-1 UKCA BS EN62368-1 RoHS

FEATURES

- Ultra-wide 85 - 264VAC and 100 - 370VDC input voltage range
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation voltage up to 4000VAC
- No-load power consumption as low as 0.15W
- Output short circuit, over-current, over-voltage protection
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32/EN55032 CLASS B

LD10-20BxxR2-AU series is one of Mornsun's compact AC-DC power converters. It features ultra-wide AC input voltage ranges and compatible with DC input voltage, low power consumption, low ripple & noise, high efficiency, high reliability, reinforced insulation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/EN/UL62368 safety standard. The converters are widely used in industrial, electric automation, home appliances and instrumentation applications. For extremely harsh EMC environment, we recommend to use the application circuit shown in Design Reference of this datasheet.

Selection Guide

Certification	Part No.	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 230VAC (%) Typ.	Capacitive Load (uF) Max.
EN	LD10-20B03R2-AU	6.6W	3.3V/2000mA	74	6000
	LD10-20B05R2-AU	7.5W	5V/1500mA	76	6000
	LD10-20B12R2-AU	10W	12V/830mA	82	2000
	LD10-20B24R2-AU		24V/410mA	83	500

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	--	--	0.23	A
	230VAC	--	--	0.15	
Inrush Current	115VAC	--	10	--	
	230VAC	--	20	--	
Leakage Current	240VAC/50Hz	0.5mA RMS Max.			
Recommended External Input Fuse		2A/250V, slow-blow, required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range		--	±2	--	%
Line Regulation	Full load		--	±0.5	--	
Load Regulation	Rated Input Voltage		--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	3.3V/5V/12V	--	50	100	mV
		24V	--	100	150	
Temperature Coefficient			--	±0.02	--	%/℃
Stand-by Power Consumption	230VAC		--	0.1	0.15	W
Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			⩾130% Io, self-recovery			
Over-voltage Protection	3.3V/5V output		⩽7.5VDC (Output voltage clamp or hiccup)			
	12V output		⩽16VDC (Output voltage clamp or hiccup)			

	24V output	≤30VDC (Output voltage clamp or hiccup)			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	8	--	ms
	230VAC input	--	40	--	
Note: *The "parallel cable" method is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 1uF ceramic capacitor, please refer to AC-DC Converter Application Notes for specific information.					

General Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output	Electric Strength Test for 1min., leakage current<5mA	4000	--	--	VAC
Insulation Resistance	Input-output	At 500VDC	100	--	--	MΩ
Operating Temperature			-40	--	+85	℃
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260 ± 5℃; time: 5 - 10s			
		Manual-welding	360 ± 10℃; time: 3 - 5s			
Switching Frequency			--	65	--	kHz
Power Derating		-40℃ to -25℃	4.0	--	--	%/℃
		+65℃ to +75℃	5.0	--	--	
		+75℃ to +85℃	2.0	--	--	
		85VAC - 100VAC	1.33	--	--	%/VAC
		240VAC - 264VAC	0.83	--	--	
Safety Standard			EN/BS EN62368-1(Report) safety approved; Designed refer to UL/IEC62368-1			
Safety Class			CLASS I I			
MTBF			MIL-HDBK-217F@25℃ ≥300,000 h			

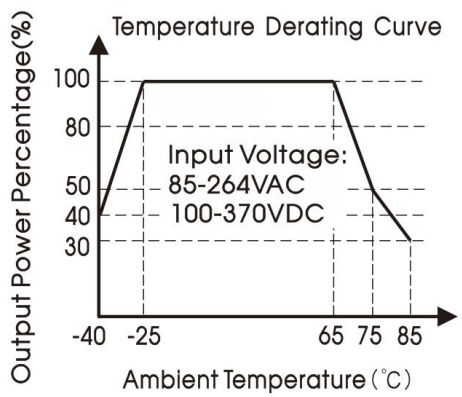
Mechanical Specifications

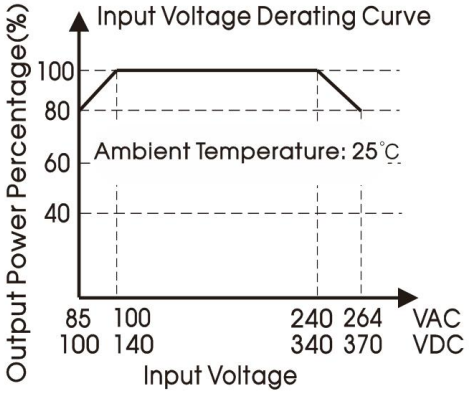
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	53.80 x 28.80 x 19.00 mm
Weight	35g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

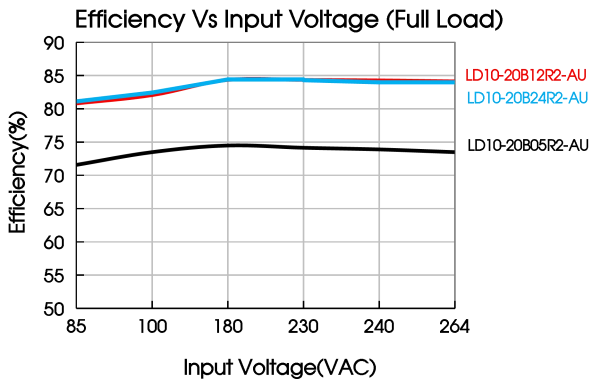
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
	Harmonic current	IEC/EN6100-3-2	CLASS A	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV (See Fig. 1 for recommended circuit)	perf. Criteria B
		IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±1KV (See Fig. 1 for recommended circuit)	perf. Criteria B
		IEC/EN61000-4-5	line to line ±2KV/line to PE ±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	PFMF	IEC/EN6100-4-8	10A/m	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

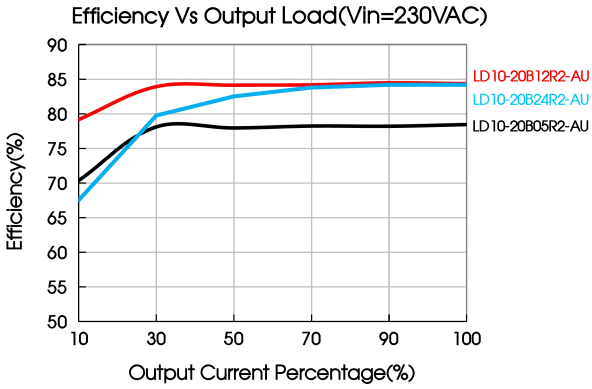
Product Characteristic Curve





Note: ① With an AC input between 85-100VAC/240-264VAC and a DC input between 100-140VDC/340-370VDC, 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 Mornsun FAE.





Design Reference

1. Typical application

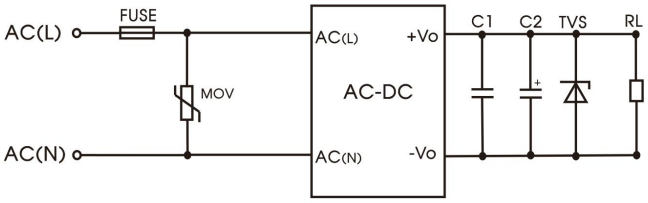


Fig.1: Typical circuit diagram

Part No.	C1	C2	FUSE	MOV	TVS
LD10-20B03R2-AU	1uF/50V	470uF/10V	2A/250V, slow-blow, required	S14K300	SMBJ7.0A
LD10-20B05R2-AU		470uF/10V			SMBJ7.0A
LD10-20B12R2-AU		220uF/25V			SMBJ20A
LD10-20B24R2-AU		100uF/35V			SMBJ30A

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. EMC compliance recommended circuit

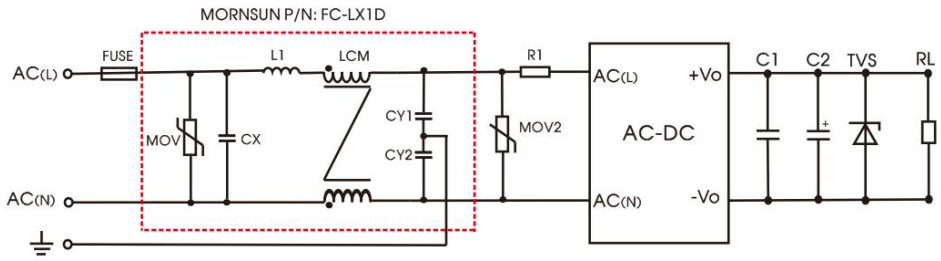
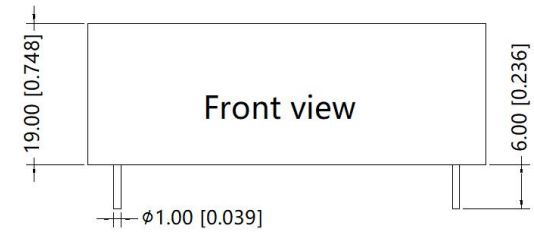


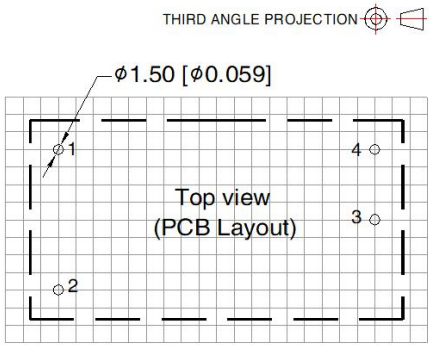
Fig. 2: EMC application circuit with higher requirements

Component		Recommended value
FUSE		3.15A/250V, slow-blow, required
MOV	FC-LX1D (2KV/4KV EMC Filter)	S14K350
CY1/CY2		1000pF/400VAC
CX		0.1uF/310VAC
L1		4.7uH/2A
LCM		2.2mH, P/N: FL2D-10-222 (MORNSUN) is recommended
MOV2		S14K300
R1		24Ω/5W (wire-wound resistor, required)

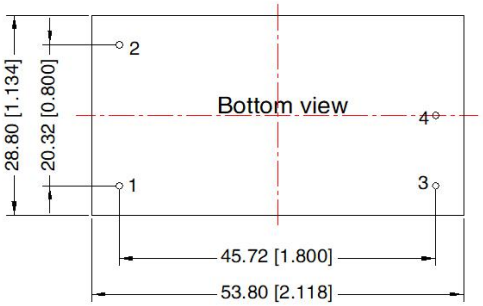
3. For additional information please refer to application notes on www.mornsun-power.com.

Dimensions and Recommended Layout





Note: Grid 2.54*2.54mm



Pin-Out	
Pin	Mark
1	AC(N)
2	AC(L)
3	-Vo
4	+Vo

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220005;
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 Ta=25℃, humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. If product involves multi-brand materials and there are differences in color etc, please refer to the standards of each manufacturer;
8. 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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