AC/DC Converter
LDE60-20Bxx Series

MORNSUN®

60W, AC-DC converter

UL62368-1 EN62368-1 CB Report RoHS

FEATURES

- Universal 85-264VAC or 100-370VDC input voltage
- Operating ambient temperature range: -40℃ to +70℃
- High I/O isolation test voltage up to 4000VAC
- High reliability, high power density, high efficiency
- Output short circuit, over-current, over-voltage protection
- Regulated output, low ripple & noise
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32 / EN55032 CLASS B

LDE60-20Bxx series is one of Mornsun's compact size power converter. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, high power density, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 and meets IEC/UL/EN62368 standards. The converters are widely used in industrial, power, instrumentation, communication and civil applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Part No.*	Output Power	Nominal Output Voltage and Current	Efficiency at 230VAC (%) Typ.	Capacitive Load (μF) Max.
UL/EN/IEC	LDE60-20B05	50W	5V/10000mA	84	20000
	LDE60-20B12	60W	12V/5000mA	87	4000
	LDE60-20B15		15V/4000mA	88	3000
	LDE60-20B24		24V/2500mA	89	1800
	LDE60-20B48		48V/1250mA	90	470

Note: * Use suffix "A2S" for chassis and suffix "A4S" for DIN-Rail mounting.

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	--	--	1.8	A
	230VAC	--	--	1.0	
Inrush Current	115VAC	--	45	--	
	230VAC	--	90	--	
Leakage Current	240VAC/50Hz	0.25mA RMS Max.			
Built-in Fuse		3.15A/250V, slow-blow			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±0.5	--	
Load Regulation	0%-100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	120	mV
Stand-by Power Consumption		--	--	0.5	W
Temperature Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Hiccup, continuous, self-recovery			

Over-current Protection		≥110%Io, self-recovery			
Over-voltage Protection	5VDC Output	≤9VDC (Output voltage clamp or hiccup)			
	12VDC Output	≤16VDC (Output voltage clamp or hiccup)			
	15VDC Output	≤25VDC (Output voltage clamp or hiccup)			
	24VDC Output	≤35VDC (Output voltage clamp or hiccup)			
	48VDC Output	≤60VDC (Output voltage clamp or hiccup)			
Minimum Load		0	--	--	%
Hold-up Time	115VAC input	--	8	--	ms
	230VAC input	--	65	--	

Note: * The "parallel cable" method is used for ripple and noise test, 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
Operating Temperature			-40	--	+70	°C
Storage Temperature			-40	--	+85	
Storage Humidity			--	--	95	%RH
Soldering Temperature		Wave-soldering	260 ± 5℃; time：5 - 10s			
		Manual-welding	360 ± 10℃; time：3 - 5s			
Power Derating		-40℃ to -25℃ (85-220VAC input)	4.0	--	--	%/°C
		+40°C to +70°C (5V output)	1.83	--	--	
		+50°C to +70°C (12V, 15V, 24V, 48V output)	2.75	--	--	
		85VAC - 110VAC	0.8	--	--	%/VAC
Safety Standard			IEC/UL62368-1 Safety Approval & EN62368-1 (Report)			
Safety Class			CLASS II			
MTBF			MIL-HDBK-217F@25°C > 300,000 h			

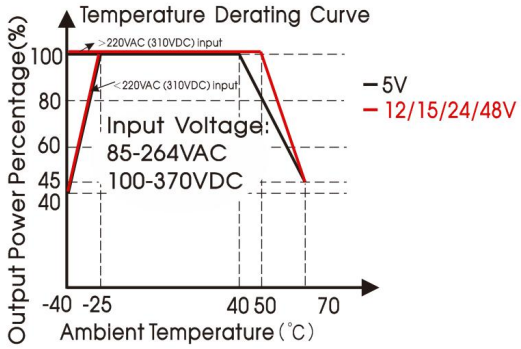
Mechanical Specifications

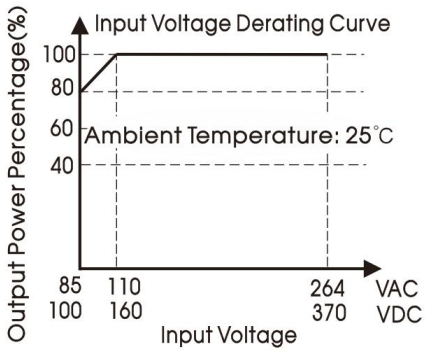
Case Material		Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	DIP	87.00 x 52.00 x 29.50 mm
	A2S chassis mounting	135.00 x 70.00 x 37.90 mm
	A4S Din-Rail mounting	137.00 x 70.00 x 42.40 mm
Weight	DIP	210g (Typ.)
	A2S chassis mounting	290g (Typ.)
	A4S Din-Rail mounting	360g (Typ.)
Cooling method		Free air convection

Electromagnetic Compatibility (EMC)

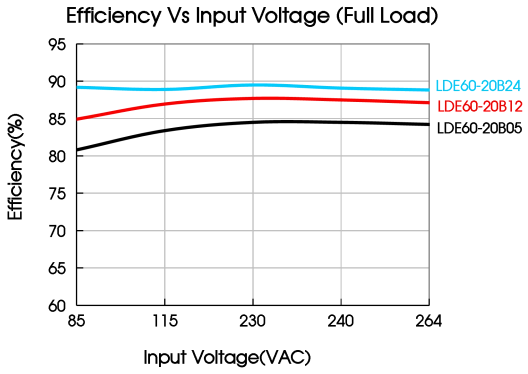
Emissions	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
Immunity	ESD	IEC/EN 61000-4-2 Contact ±6KV / Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±4KV	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±1KV	perf. Criteria B
		IEC/EN61000-4-5 line to line ±2KV/line to ground ±4KV (See Fig.2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 10Vr.m.s	perf. Criteria A
	Voltage dip, short interruption and voltage variation	IEC/EN61000-4-11 0%, 70%	perf. Criteria B

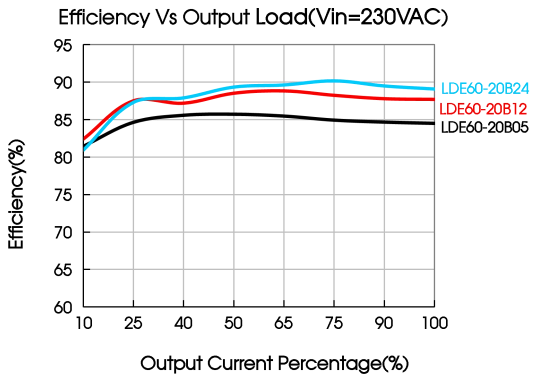
Product Characteristic Curve





Note: ① With an AC input between 85-110VAC and a DC input between 100-160VDC, 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 factory or one of our FAE.





Design Reference

1. Typical application

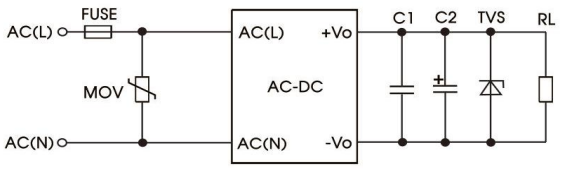


Fig. 1: Typical circuit diagram

Part No.	C1(μF)	C2(μF)	FUSE	MOV	TVS
LDE60-20B05	1	680	3.15A/250V, slow-blow	S10K300	SMBJ7.0A
LDE60-20B12		330			SMBJ20A
LDE60-20B15		330			SMBJ20A
LDE60-20B24		200			SMBJ30A
LDE60-20B48		100			SMBJ64A

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

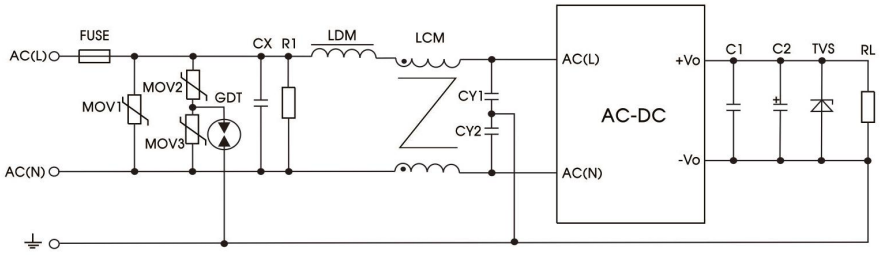
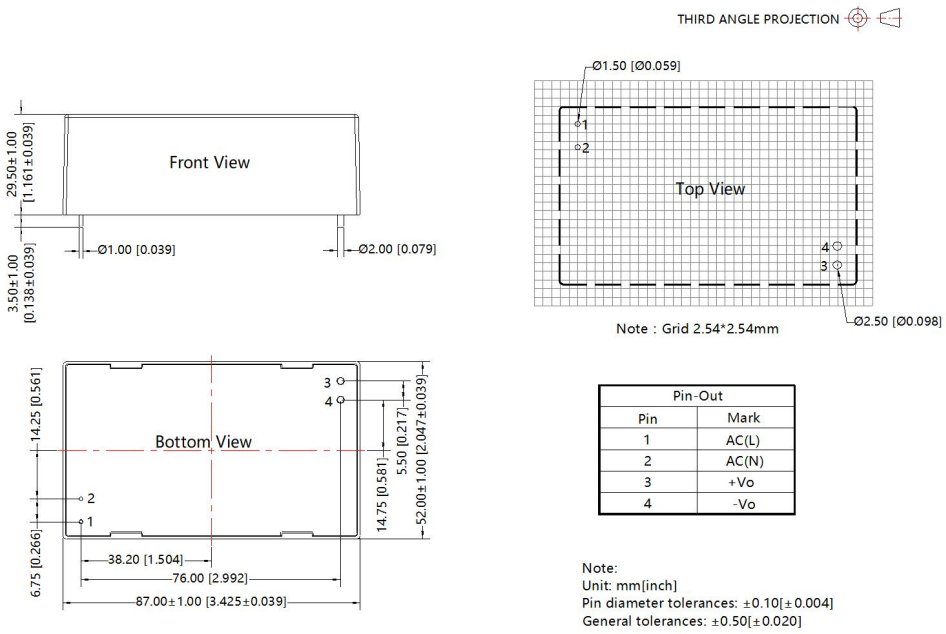


Fig 2: EMC application circuit with higher requirements

Component	Recommended value
MOV1	S20K300
MOV2/MOV3	S10K300
CX	0.22μF/275VAC
CY1/CY2	1nF/400VAC
R1	1MΩ/2W
LDM	4.7uH
LCM	2mH
GDT	EM3600XS
FUSE	3.15A/250V, slow-blow, required

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

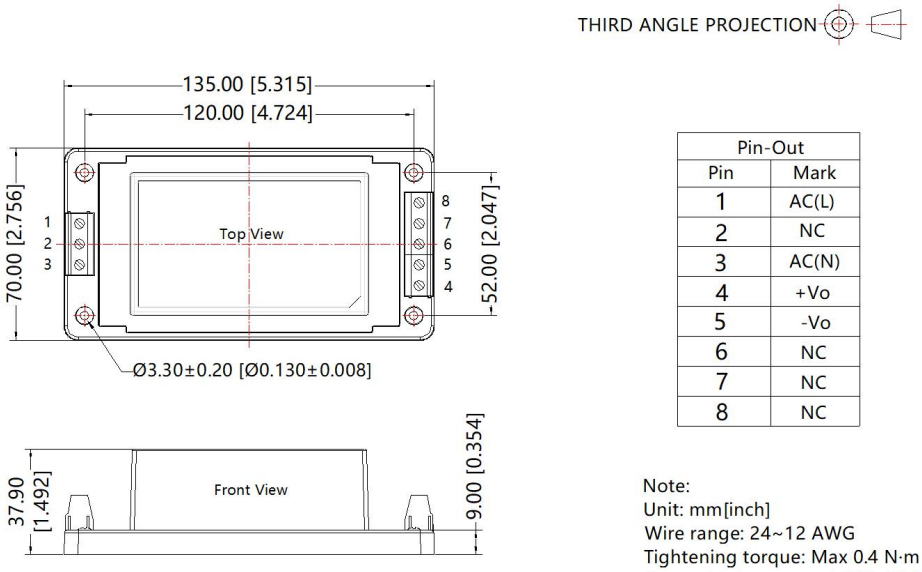
Dimensions and Recommended Layout



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

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

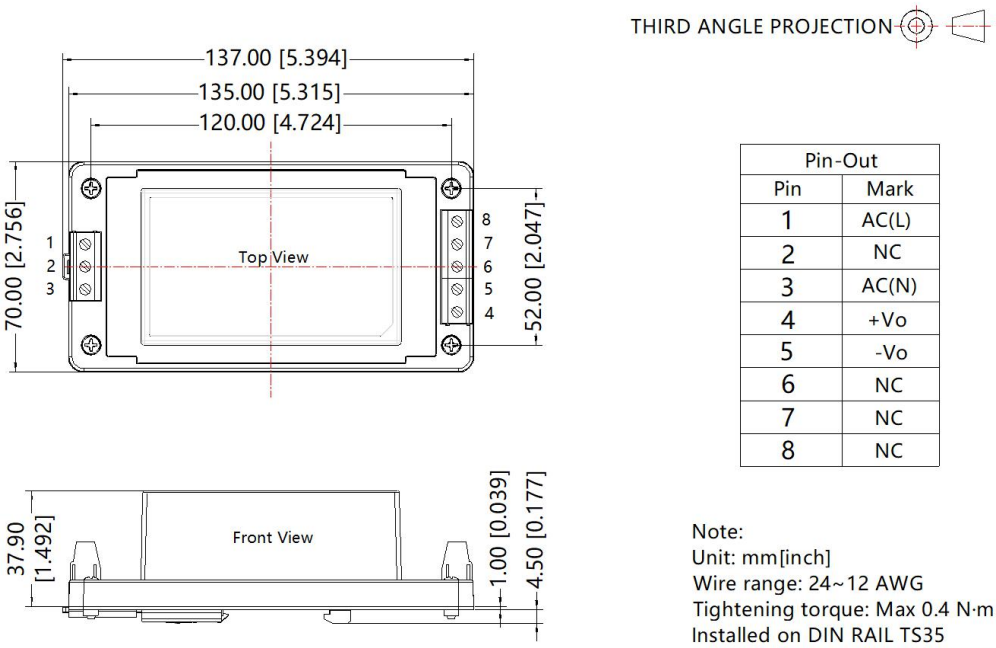
A2S Dimensions



Pin-Out	
Pin	Mark
1	AC(L)
2	NC
3	AC(N)
4	+Vo
5	-Vo
6	NC
7	NC
8	NC

Note:
Unit: mm[inch]
Wire range: 24~12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.040]

A4S Dimensions



Pin-Out	
Pin	Mark
1	AC(L)
2	NC
3	AC(N)
4	+Vo
5	-Vo
6	NC
7	NC
8	NC

Note:
Unit: mm[inch]
Wire range: 24~12 AWG
Tightening torque: Max 0.4 N·m
Installed on DIN RAIL TS35
General tolerances: ±1.00[±0.040]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220019 (DIP package); 58220031 (A2S/A4S package);
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. 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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