

20W, AC-DC converter



CE CB RoHS



FEATURES

- Wide 85-264V universal AC or 100-370VDC input voltage
- Operating temperature range: -40°C to +85°C
- High I/O isolation test voltage up to 4000VAC
- Regulated output, low ripple & noise
- Output short circuit, over-current, over-voltage protection
- High efficiency, high reliability
- Plastic case meets UL94V-0 flammability
- EMI performance meets CISPR32 / EN55032 CLASS B
- Used in industrial, office, civil and white goods applications
- IEC61558, EN61558 safety approval

LHE20-20B24WG 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, reinforced isolation. It offers good EMC performance compliant to IEC/EN61000-4 and CISPR32/EN55032 standards. The converters are widely used in industrial, office, civil and white goods 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. |
|---------------|---------------|--------------|------------------------------------|-------------------------------|---------------------------|
| CE/CB | LHE20-20B24WG | 20W | 24V/850mA | 84 | 900 |

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 | -- | -- | 0.60 | A |
| | 230VAC | -- | -- | 0.34 | |
| Inrush Current | 115VAC | -- | 20 | -- | |
| | 230VAC | -- | 30 | -- | |
| Recommended External Input Fuse | | 2A/250V, slow-blow, required | | | |
| Hot Plug | | Unavailable | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|--------------------------|--------------------------------------|---|-------|------|------|
| Output Voltage Accuracy | Other output | -- | ±2 | -- | |
| Line Regulation | Full load | -- | ±0.5 | -- | |
| Load Regulation | 0%-100% load | -- | ±1 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-to-peak value) | -- | 50 | 100 | mV |
| Temperature Coefficient | | -- | ±0.02 | -- | %/°C |
| Short Circuit Protection | | Hiccups, Continuous, self-recovery | | | |
| Over-current Protection | | ≥110%Io, self-recovery | | | |
| | 24VDC output | ≤30VDC (Output voltage clamp or hiccup) | | | |
| Minimum Load | | 0 | -- | -- | % |
| Hold-up Time | 115VAC input | -- | 15 | -- | ms |
| | 230VAC input | -- | 80 | -- | |

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 | -- | +85 | °C |
| Storage Temperature | | | -40 | -- | +105 | |
| Storage Humidity | | | -- | -- | 95 | %RH |
| Soldering Temperature | | Wave-soldering | 260 ± 5°C; time: 5 - 10s | | | |
| | | Manual-welding | 360 ± 10°C; time: 3 - 5s | | | |
| Power Derating | | -40°C to -10°C | 2.0 | -- | -- | % / °C |
| | | +50°C to +70°C | 3.0 | -- | -- | |
| | | +70°C to +85°C | 2.0 | -- | -- | |
| | | 85VAC - 100VAC | 1.67 | -- | -- | % / VAC |
| | | 240VAC - 264VAC | 0.83 | -- | -- | |
| Safety Standard | | | IEC61558/EN61558 | | | |
| Safety Certification | | | IEC61558/EN61558 | | | |
| Safety Class | | | CLASS II | | | |
| MTBF | | | MIL-HDBK-217F@25°C > 300,000 h | | | |

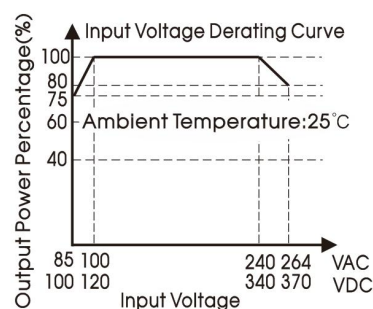
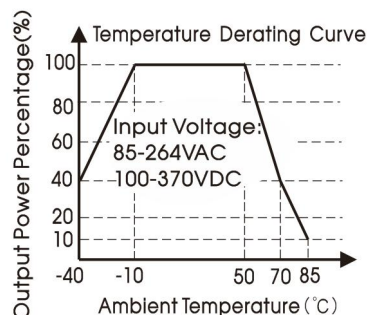
Mechanical Specifications

| | |
|----------------|---|
| Case Material | Black plastic, flame-retardant and heat-resistant (UL94V-0) |
| Dimension | 62.00 x 45.00 x 22.50 mm |
| Weight | 95g (Typ.) |
| Cooling method | Free air convection |

Electromagnetic Compatibility (EMC)

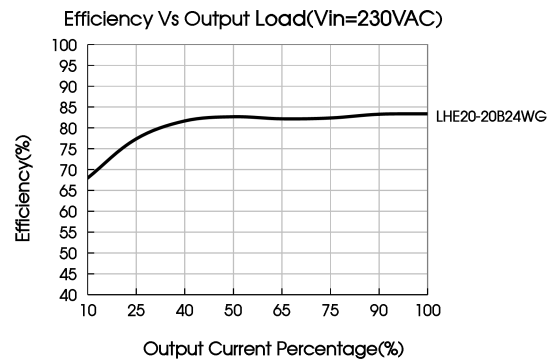
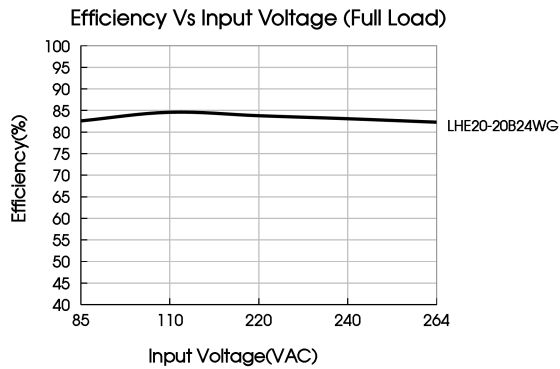
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|-----------|---|------------------|---|------------------|
| Emissions | CE | CISPR32/EN55032 | CLASS B | |
| | RE | CISPR32/EN55032 | CLASS B | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±6KV/Air ±8KV | Perf. Criteria B |
| | RS | IEC/EN61000-4-3 | 10V/m | perf. Criteria A |
| | EFT | IEC/EN61000-4-4 | ±2KV | 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 | 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 85-100V/240-264VAC and a DC input between 100-120V/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 factory or one of our FAE.



Design Reference

1. Typical application

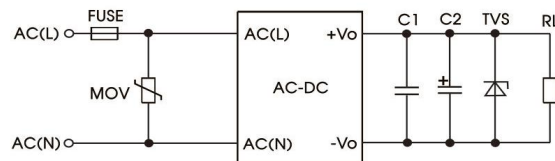


Fig. 1: Typical circuit diagram

| Part No. | C1(μF) | C2(μF) | FUSE | MOV | TVS |
|----------------|--------|--------|------------------------------|---------|---------|
| LHE20-20B24-WG | 1 | 68 | 2A/250V, slow-blow, required | S14K300 | 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

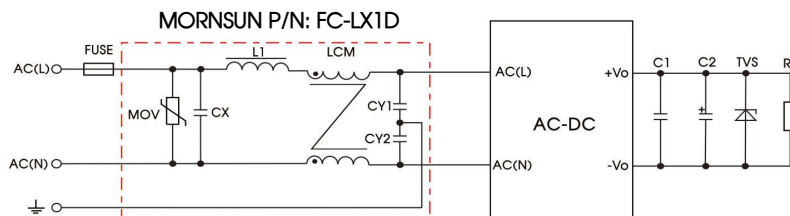
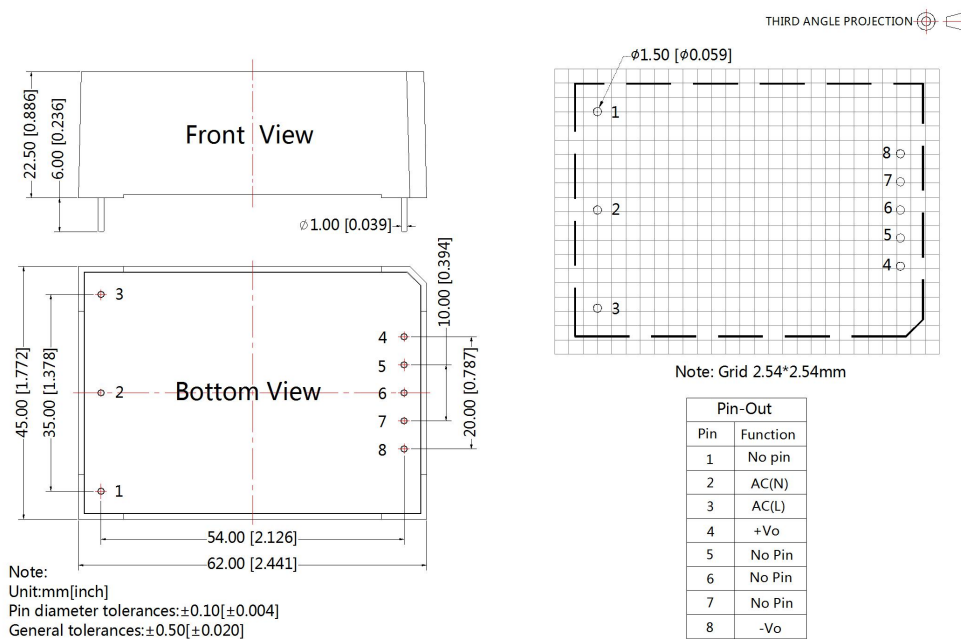


Fig 2: EMC application circuit with higher requirements

| Component | Recommended value |
|-----------|--|
| MOV | S14K300 |
| CY1 , CY2 | 1000pF/400VAC |
| CX | 0.1μF/275VAC |
| LCM | 10mH, we recommended using part no FL2D-Z5-103 (MORNSUN) |
| L1 | 4.7μH/2A |
| FC-LX1D | 2KV/4KV EMC filter |
| 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



Note:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220006;
- 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;
- 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 and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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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