

25W, AC-DC converter



FEATURES

- Input voltage range: 176 - 418VAC and 248 - 591VDC
- Accepts AC or DC input (dual-use of same terminal)
- Operating ambient temperature range: -40°C to +85°C
- Low standby power consumption: 0.3W
- conversion efficiency up to 88%
- High I/O isolation test voltage up to 4200VAC
- Output short circuit, over-current, over-voltage protection

LD25-25BxxR2 series AC-DC converters is one of Mornsun's new generation compact size power converters. It features ultra-wide 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 and meets EN62368 standards. The converters are widely used in power, instrumentation 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 (W) | Nominal Output Voltage and Current (Vo/Io) | Efficiency at 230VAC (%) Typ. | Capacitive Load (uF) Max. |
|---------------|--------------|------------------|--|-------------------------------|---------------------------|
| EN | LD25-25B03R2 | 16.5 | 3.3V/5A | 82 | 15000 |
| | LD25-25B05R2 | 25 | 5V/5A | 84 | 15000 |
| | LD25-25B09R2 | 25.2 | 9V/2.8A | 85 | 8200 |
| | LD25-25B12R2 | 25.2 | 12V/2.1A | 85 | 4700 |
| | LD25-25B15R2 | 25.05 | 15V/1.67A | 85 | 3300 |
| | LD25-25B24R2 | 26.4 | 24V/1.1A | 86 | 1500 |
| | LD25-25B48R2 | 26.4 | 48V/0.55A | 88 | 600 |

Note: *The product picture is for reference only. For details, please refer to the actual product.

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---------------------------------|----------------------|---------------------------------|------|------|------|
| Input Voltage Range | AC input | 176 | -- | 418 | VAC |
| | DC input | 248 | -- | 591 | VDC |
| Input Frequency | | 47 | -- | 63 | Hz |
| Input Current | 230VAC | -- | -- | 0.5 | A |
| | 380VAC | -- | -- | 0.35 | |
| Inrush Current | 230VAC | -- | 35 | -- | |
| | 380VAC | -- | 60 | -- | |
| Leakage Current | 277VAC/50Hz | 0.707mA RMS Max. | | | |
| Recommended External Input Fuse | | 3.15A/500V, slow-blow, required | | | |
| Hot Plug | | Unavailable | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-------------------------|--------------------------------------|-----------------------|-------|------|------|
| Output Voltage Accuracy | 3.3V | -- | ±3.0 | -- | |
| | 5V/9V/12V/15V/24V/48V | -- | ±2.0 | -- | |
| Line Regulation | Full load | 3.3V | ±1.0 | -- | % |
| | | 5V/9V/12V/15V/24V/48V | ±0.5 | -- | |
| Load Regulation | 0% - 100% load | 3.3V | ±2.0 | -- | |
| | | 5V/9V/12V/15V/24V/48V | ±1.0 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-to-peak value) | -- | 80 | 150 | mV |
| Temperature Coefficient | | -- | ±0.02 | -- | %/°C |

| | | | | | |
|----------------------------|--------------|--------------------------------------|----|-----|----|
| Stand-by Power Consumption | 230VAC | -- | -- | 0.3 | W |
| | 380VAC | -- | -- | 0.5 | |
| Short Circuit Protection | | Hiccup, continuous, self-recovery | | | |
| Over-current Protection | | ≥130% I _o , self-recovery | | | |
| Over-voltage Protection | 3.3V/5V | ≤7.5VDC (Output voltage hiccup) | | | |
| | 9V/12V | ≤16VDC (Output voltage hiccup) | | | |
| | 15V | ≤25VDC (Output voltage hiccup) | | | |
| | 24V | ≤35VDC (Output voltage hiccup) | | | |
| | 48V | ≤60VDC (Output voltage hiccup) | | | |
| Minimum Load | | 0 | -- | -- | % |
| Hold-up Time | 230VAC input | -- | 25 | -- | ms |
| | 380VAC input | -- | 90 | -- | |

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 <5 mA | 4200 | -- | -- | VAC |
| Insulation Resistance | Input - output | At 500VDC | 100 | -- | -- | MΩ |
| Operating Temperature | | -40 | -- | +85 | °C | |
| Storage Temperature | | -40 | -- | +85 | | |
| Storage Humidity | | -- | -- | 95 | %RH | |
| Soldering Temperature | Wave-soldering | 260 ± 5°C; time: 5 - 10s | | | | |
| | Manual-welding | 360 ± 10°C; time: 3 - 5s | | | | |
| Switching Frequency | | -- | 65 | -- | kHz | |
| Power Derating | +55°C to +70°C | 3 | -- | -- | %/°C | |
| | +70°C to +85°C | 1.33 | -- | -- | | |
| Safety Standard | | BS EN/EN62368-1(report) safety approval | | | | |
| Safety Class | | CLASS II | | | | |
| MTBF | MIL-HDBK-217F@25°C | ≥500,000 h | | | | |

Mechanical Specifications

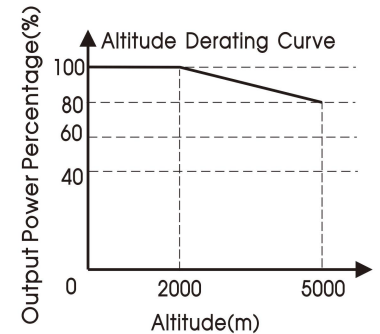
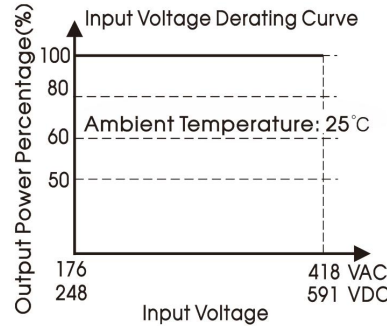
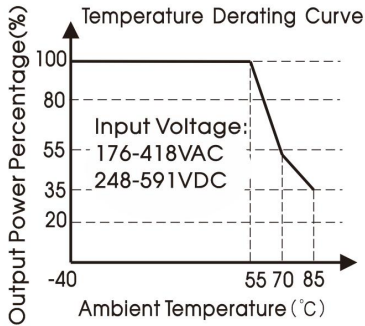
| | |
|----------------|---|
| Case Material | Black plastic, flame-retardant and heat-resistant (UL94V-0) |
| Dimension | 69.50 x 39.00 x 24.00 mm |
| Weight | 100g (Typ.) |
| Cooling method | Free air convection |

Electromagnetic Compatibility (EMC)

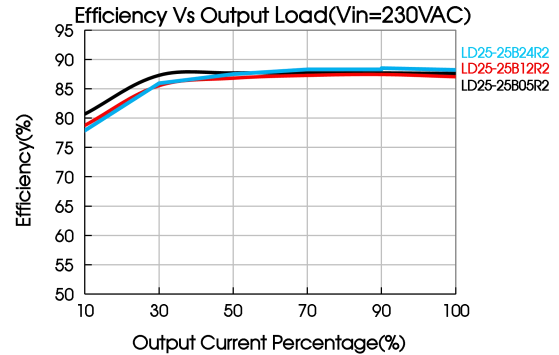
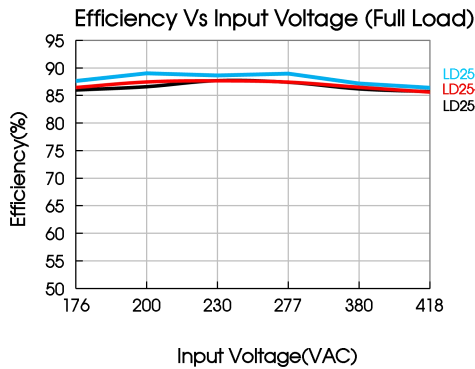
| Emissions | CE | CISPR32/EN55032 | CLASS B | |
|-----------------|-------|---|---|------------------|
| | RE | CISPR32/EN55032 | CLASS B | |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±6KV/Air ±8KV perf. Criteria A | |
| | RS | IEC/EN61000-4-3 | 10V/m perf. Criteria A | |
| | EFT | IEC/EN61000-4-4 | ±2KV (See Fig. 1 for recommended circuit) | perf. Criteria A |
| | | IEC/EN61000-4-4 | ±4KV (See Fig. 2, Fig. 3 for recommended circuit) | perf. Criteria A |
| | Surge | IEC/EN61000-4-5 | line to line ±2KV (See Fig. 1 for recommended circuit) | perf. Criteria A |
| | | IEC/EN61000-4-5 | line to line ±4KV (See Fig. 2 for recommended circuit) | perf. Criteria A |
| IEC/EN61000-4-5 | | line to line ±2KV/line to PE ±4KV (See Fig. 3 for recommended circuit) | perf. Criteria A | |

| | | |
|---|--------------------------|------------------|
| 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: This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application

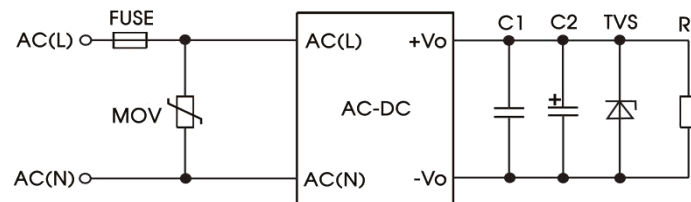


Fig. 1: Typical circuit diagram

| Part No. | FUSE | MOV | C1 | TVS |
|--------------|---------------------------------------|---------|----------|----------|
| LD25-25B03R2 | 3.15A/500V, slow-blow, required | 14D751K | 1uF/100V | SMBJ7.0A |
| LD25-25B05R2 | | | | SMBJ7.0A |
| LD25-25B09R2 | | | | SMBJ12A |
| LD25-25B12R2 | | | | SMBJ20A |
| LD25-25B15R2 | | | | SMBJ30A |
| LD25-25B24R2 | | | | SMBJ30A |
| LD25-25B48R2 | | | | SMBJ64A |

Output Filter Components: 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

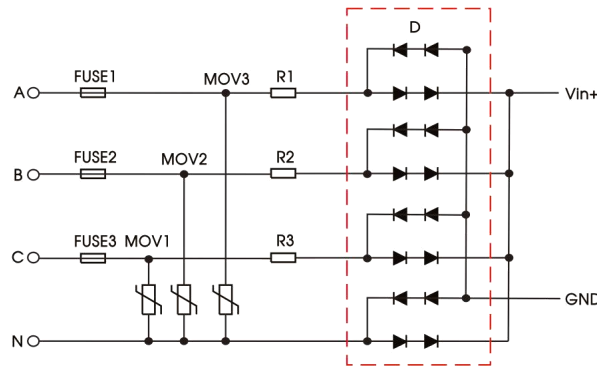


Fig. 2: Line to line ±4kV EMC application circuit with higher requirements

| Component | Recommended value |
|-------------------|---------------------------------|
| MOV1/MOV2/MOV3 | 14D751K |
| D | 2A/1000V |
| R1/R2/R3 | 12 Ω /5W (wire-wound resistor) |
| FUSE1/FUSE2/FUSE3 | 3.15A/500V, slow-blow, required |

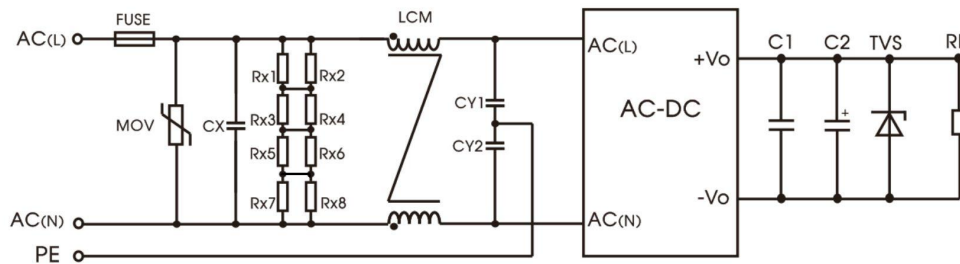


Fig. 3: Recommended circuit for class I equipment

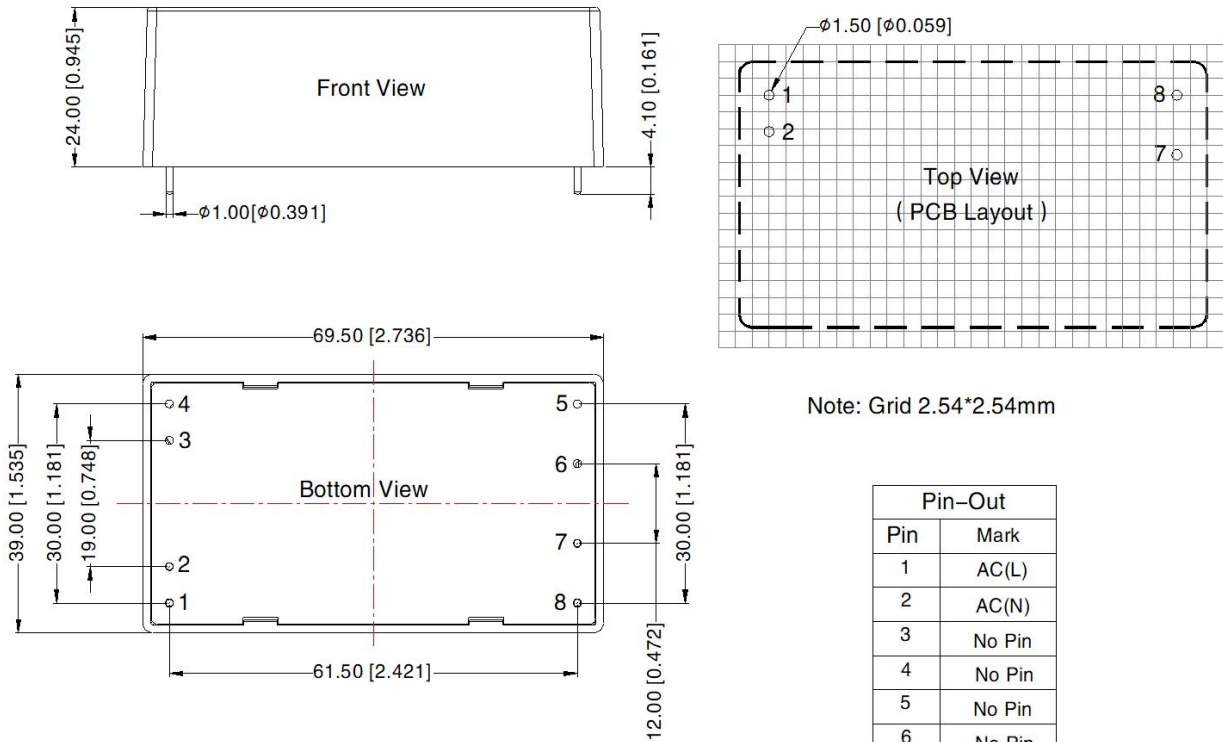
| Component | Recommended value |
|-----------|--|
| FUSE | 3.15A/500V, slow-blow, required |
| MOV | 14D751K |
| CX | 0.1uF/480VAC |
| CY1/CY2 | 1nF/400VAC |
| LCM | 10 mH, P/N: FL2D-Z5-103 (MORNSUN) is recommended |

Note: Rx1/Rx2/Rx3/Rx4/Rx5/Rx6/Rx7/Rx8 is the bleeder resistance of CX, and the recommended resistance value is 2.5MΩ.

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Note: Grid 2.54*2.54mm

| Pin-Out | |
|---------|--------|
| Pin | Mark |
| 1 | AC(L) |
| 2 | AC(N) |
| 3 | No Pin |
| 4 | No Pin |
| 5 | No Pin |
| 6 | No Pin |
| 7 | +Vo |
| 8 | -Vo |

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

- Note:
- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220193;
 - 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";
 - If product involves multi-brand materials and there are differences in color etc, please refer to the standards of each manufacturer;
 - 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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