

Datasheet

RS Pro LDE15-20Bxx AC/DC Converter

15W, AC-DC converter



Features

- Universal 85 - 264V AC and wide 100 - 370V DC Input
- Operating ambient temperature range -40°C to +70°C
- High I/O isolation test voltage up to 4000VAC
- Regulated output, Low output 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
- IEC62368, UL62368 and EN62368 approval

UL US CE CB RoHS

LDE15-20Bxx series features a universal AC input and DC input voltage, low power consumption, high efficiency, high reliability and double or reinforced insulation. The converters meet IEC/EN61000-4, CISPR32/EN55032, UL62368, EN62368, IEC62368 standards and are widely used in industrial, medical, instrumentation, telecommunications applications

Selection Guide

| Certification | RS Stock no. (Standard Pack) | Part No.* | Output Power | Nominal Output Voltage and Current (Vo/Io) | Efficiency (230VAC, %/Typ.) | Max. Capacitive Load (µF) |
|---------------|------------------------------|-------------|--------------|--|-----------------------------|---------------------------|
| UL/CE/CB | 1812119 | LDE15-20B03 | 8.9W | 3.3V/2700mA | 72 | 10000 |
| | 1812120 | LDE15-20B05 | 13.5W | 5V/2700mA | 76 | 6600 |
| | 1812121 | LDE15-20B12 | 15W | 12V/1250mA | 80 | 3000 |
| | 1812122 | LDE15-20B24 | | 24V/625mA | 81 | 800 |

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 | -- | 0.27 | 0.32 | A |
| | 230VAC | -- | 0.17 | 0.20 | |
| Inrush current | 115VAC | -- | 12 | -- | |
| | 230VAC | -- | 36 | -- | |
| Recommended External Input Fuse | | 3.15A/250V, slow fusing, necessary | | | |
| Hot Plug | | Unavailable | | | |

AC/DC Converter

LDE15-20Bxx Series

Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|--------------------------|-----------------------------------|--------------|--------------------------------------|-------|------|------|
| Output Voltage Accuracy | 0%-100% | 3.3V output | -- | ±3 | -- | % |
| | | Other models | -- | ±2 | -- | |
| Line Regulation | Full load | | -- | ±0.5 | -- | % |
| Load Regulation | 0%-100% load | | -- | ±1 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-peak value) | | -- | 50 | 120 | |
| Temperature Coefficient | | | -- | ±0.02 | -- | %/°C |
| Short Circuit Protection | | | Hiccups, Continuous, self-recovery | | | |
| Over-current Protection | | | ≥130% I _o , self-recovery | | | |
| Over-voltage Protection | 3.3/5V output | | ≤7.5V | | | |
| | 9V output | | ≤15V | | | |
| | 12/15V output | | ≤20V | | | |
| | 24V output | | ≤30V | | | |
| Min. Load | | | 0 | -- | -- | % |
| Hold-up Time | 115VAC input | | 5 | 10 | -- | ms |
| | 230VAC input | | 44 | 55 | -- | |

Note: * Ripple and noise tested with "parallel cable" method, Testing at rated load, 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 (leakage current <5mA) | 4000 | -- | -- | VAC | |
| Operating Temperature | | | -40 | -- | +70 | °C | |
| Storage Temperature | | | -40 | -- | +85 | | |
| Storage Humidity | | | -- | -- | 95 | %RH | |
| Welding Temperature | Wave-soldering | | 260 ± 5°C; time: 5 - 10s | | | | |
| | Manual-welding | | 360 ± 10°C; time: 3 - 5s | | | | |
| Switching Frequency | | | -- | 100 | -- | kHz | |
| Power Derating | -40 to -10°C | | 2.0 | -- | -- | %/°C | |
| | +45°C to +70°C | 3.3/5V | 3.0 | -- | -- | | |
| | | Others | 2.4 | -- | -- | | |
| | 85 - 130VAC | 5V | -25°C to +70°C | 0.66 | -- | -- | % / VAC |
| | | | -40°C to -25°C | 1.33 | -- | -- | |
| | 85 - 100VAC | Others | -25°C to +70°C | 2.0 | -- | -- | |
| -40°C to -25°C | | | 4.0 | -- | -- | | |
| 240 - 264VAC | | 0.83 | -- | -- | | | |
| Safety Standard | | | IEC62368/EN62368/UL62368 | | | | |
| Safety-regulated Certification | | | IEC62368/EN62368/UL62368 | | | | |
| Safety Class | | | CLASS I I | | | | |
| MTBF | | | MIL-HDBK-217F@25°C > 300,000 h | | | | |

Physical Specifications

| | | |
|--------------------|---|----------------------|
| Casing Material | Black flame-retardant and heat-resistant plastic (UL94 V-0) | |
| Package Dimensions | DIP | 53.80*28.80*23.50 mm |
| Weight | DIP | 60g (Typ.) |
| Cooling method | Free air convection | |

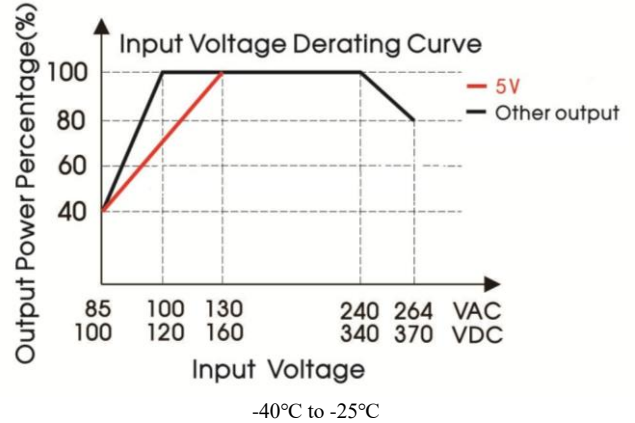
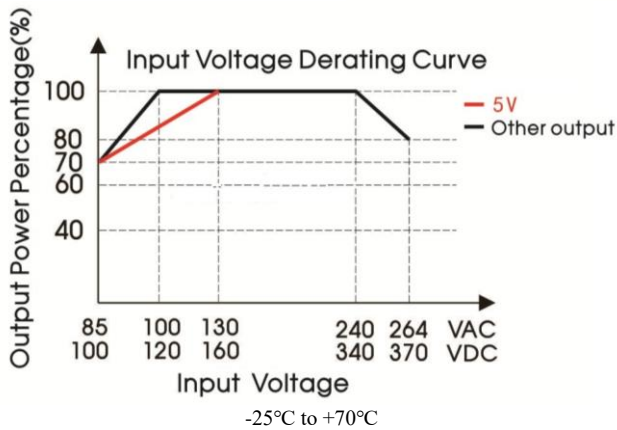
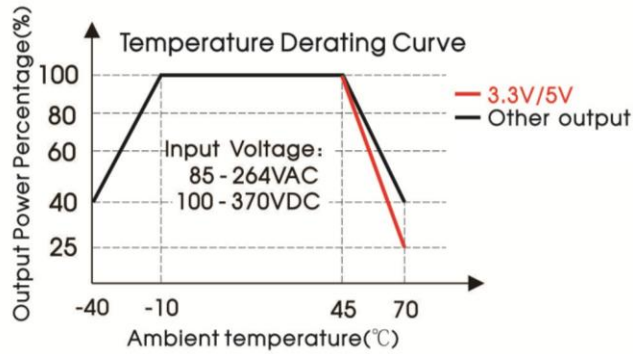
AC/DC Converter

LDE15-20Bxx Series

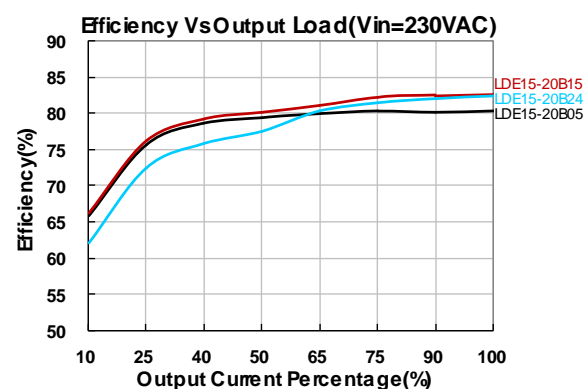
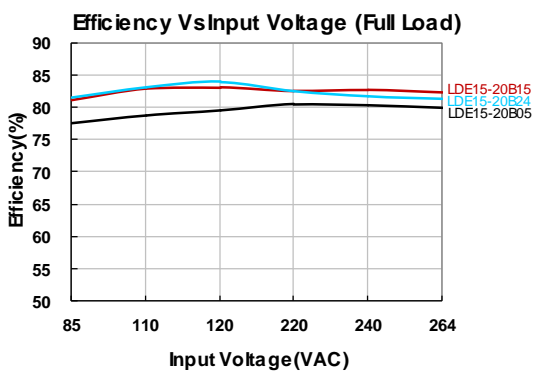
EMC Specifications

| | | | | |
|---|-------|------------------|--|------------------|
| EMI | CE | CISPR32/EN55032 | CLASS B | |
| | RE | CISPR32/EN55032 | CLASS B | |
| EMS | ESD | IEC/EN61000-4-2 | Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$ | Perf. Criteria B |
| | RS | IEC/EN61000-4-3 | 10V/m | perf. Criteria A |
| | EFT | IEC/EN61000-4-4 | $\pm 4\text{KV}$ | perf. Criteria B |
| | Surge | IEC/EN61000-4-5 | line to line $\pm 2\text{KV}$ | perf. Criteria B |
| | | IEC/EN61000-4-5 | line to line $\pm 4\text{KV}$ /line to ground $\pm 6\text{KV}$ (See Fig. 2 for recommended circuit) | perf. Criteria B |
| | CS | IEC/EN61000-4-6 | 10Vr.m.s | perf. Criteria A |
| Voltage dips, short interruptions and voltage variations immunity | | IEC/EN61000-4-11 | 0%,70% | perf. Criteria B |

Product Characteristic Curve



Note: Derating when input is 85-100VAC/240-264VAC/100-140VDC/340-370VDC (LDE15-20B05:85-130VAC/240-264VAC/100-160VDC/340-370VDC). This product is suitable for use in natural air-cooling environments.



Design Reference

1. Typical application circuit

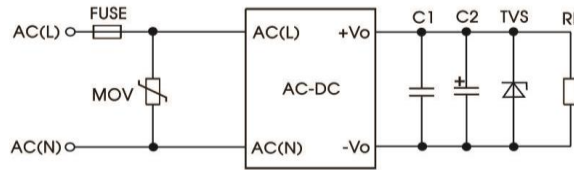


Fig. 1

| Model | FUSE | MOV | C1 | C2 | TVS |
|-------------|--|---------|---------|-----------|----------|
| LDE15-20B03 | 3.15A/250V, slow fusing, necessary | S20K300 | 1μF/50V | 220μF/16V | SMBJ7.0A |
| LDE15-20B05 | | | | 220μF/16V | SMBJ7.0A |
| LDE15-20B12 | | | | 120μF/25V | SMBJ20A |
| LDE15-20B24 | | | | 68μF/35V | SMBJ30A |

Output Filter Components:

Note 1. C2 should be fitted in all applications to achieve low ripple and good dynamic load performance. We recommend using a high frequency, low ESR electrolytic capacitors. **Choose a capacitor voltage rating with at least 20% margin.** C1 is a ceramic capacitor used for filtering high-frequency noise and the TVS provides optional supplementary overvoltage protection.

Note 2. If for applications with fast switching loads, we would recommend C2 values should be increased as below.

| Model | C2 |
|-------------|-----------------------------|
| LDE15-20B03 | 470μF/16V (Solid capacitor) |
| LDE15-20B05 | 470μF/16V (Solid capacitor) |
| LDE15-20B12 | 390μF/25V |
| LDE15-20B24 | 220μF/35V |

2. EMC solution-recommended circuit

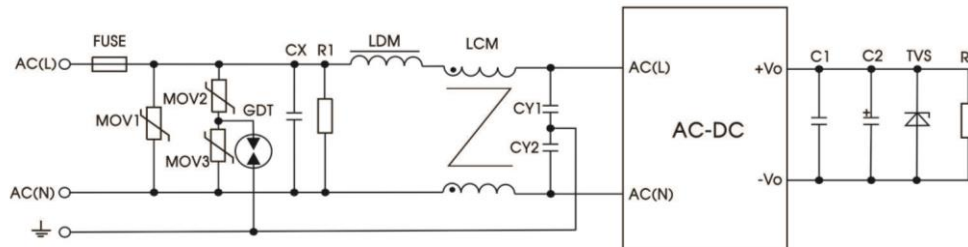


Fig 2

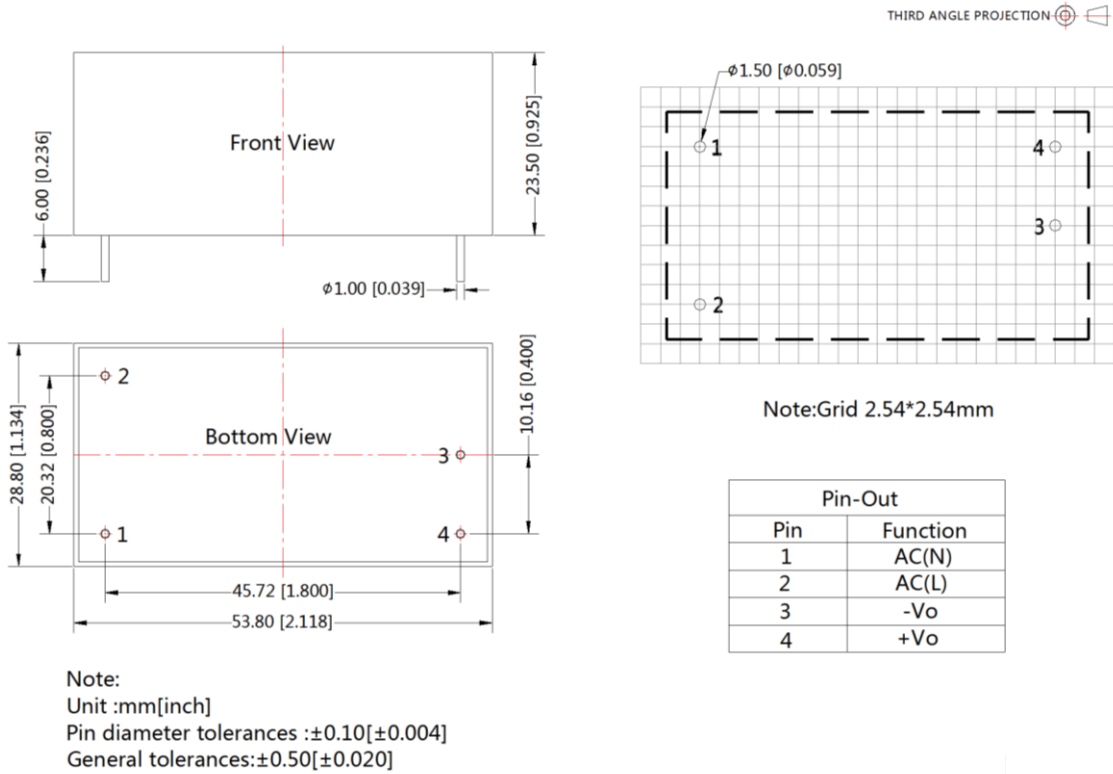
Note: Output external circuit refer to the typical application circuit.

| Element model | Recommended value |
|---------------|-----------------------------------|
| MOV1 | S20K300 |
| MOV2 | S10K300 |
| MOV3 | S10K300 |
| CX | 0.22μF/275VAC |
| CY1, CY2 | 1nF/400VAC |
| R1 | 1MΩ/2W |
| LDM | 4.7uH |
| LCM | 2mH |
| GDT | EM3600XS |
| FUSE | 6.3A/250V, slow fusing, necessary |

AC/DC Converter

LDE15-20Bxx Series

Dimensions and Recommended Layout



Note:

- 1.Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75% with nominal input voltage and rated output load;
- 2.All index testing methods in this datasheet are based on our Company's corporate standards.
- 3.Products are related to laws and regulations: see "Features" and "EMC".
- 4.Products are classified according to ISO14001 and related environmental laws and regulation.