

45W AC to DC Converter - PCB Mount

multicomp PRO

**RoHS
Compliant**



Features

- 85V to 264V Universal AC or wide 100V DC to 370V DC Input
- Operating ambient temperature range: -40°C to +70°C
- High I/O isolation test voltage of up to 4000V AC
- Regulated output, low output ripple & noise, low power consumption
- High efficiency, high power density
- Output short circuit, over-current, over-voltage protection
- Plastic case meets flammability per UL94V-0
- EMI performance meets CISPR32 / EN55032 CLASS B
- Designed to meet UL/IEC/EN62368 safety standards
- (Approval Pending)



This is a compact size power converters. It features universal AC input and at the same time accepts DC input voltage, low power consumption, high efficiency, high reliability, reinforced isolation. The converters are widely used in industry, electricity, instrument, 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 (Vo/Io) | Efficiency at 230V AC (%) Typ. | Max. Capacitive Load (μF) |
|-----------------------|----------------|--------------|--|--------------------------------|---------------------------|
| CE/UL/CB (Pending) | MP-LDE45-20B05 | 40W | 5V/8A | 81 | 30000 |
| | MP-LDE45-20B12 | 45W | 12V/3.8A | 84 | 6400 |
| | MP-LDE45-20B24 | | 24V/1.9A | 86 | 2000 |
| | MP-LDE45-20B48 | | 48V/0.94A | 87 | 600 |

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---------------------------------|----------------------|---------------------------------|------|------|------|
| Input Voltage Range | AC input | 85 | - | 264 | V DC |
| | DC input | 100 | | 370 | |
| Input Frequency | | 47 | | 63 | Hz |
| Input Current | 115V AC | - | | 1.5 | A |
| | 230V AC | | | 0.75 | |
| Inrush Current | 115V AC | - | 50 | - | |
| | 230V AC | | 70 | - | |
| Recommended External Input Fuse | | 3.15A/250V, slow-blow, required | | | |
| Hot Plug | | Unavailable | | | |

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Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit | | |
|----------------------------|--------------------------------------|--|-------|------|------|-----|------|
| Output Voltage Accuracy | Full load | - | ±2 | - | % | | |
| Line Regulation | Rated load | | ±0.5 | | | | |
| Load Regulation | 0%-100% load | | ±1 | | | | |
| Ripple & Noise* | 20MHz Bandwidth (peak-to-peak value) | | 60 | | | 120 | mV |
| Temperature Coefficient | | | ±0.02 | | | - | %/°C |
| Stand-by Power Consumption | 230VAC, normal temperature | - | - | 0.5 | W | | |
| Short Circuit Protection | | Hiccup, continuous, self-recovery | | | | | |
| Over-current Protection | | ≥110%Io, self-recovery | | | | | |
| Over-voltage Protection | 5V DC output | ≤ 9V (Output voltage clamp or hiccup) | | | | | |
| | 12V DC output | ≤ 16V (Output voltage clamp or hiccup) | | | | | |
| | 15V DC output | ≤ 24V (Output voltage clamp or hiccup) | | | | | |
| | 24V DC output | ≤ 35V (Output voltage clamp or hiccup) | | | | | |
| | 48V DC output | ≤ 56V (Output voltage clamp or hiccup) | | | | | |
| Minimum Load | | 0 | - | - | % | | |
| Hold-up Time | 115V AC input | - | 8 | - | ms | | |
| | 230V AC input | | 50 | | | | |

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 Test | Input-output Electric Strength Test for 1min., Leakage current <5mA | 4000 | - | - | V AC |
| Operating Temperature | | -40 | - | +70 | °C |
| Storage Temperature | | | | +85 | |
| 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 -25°C | 4 | - | - | % / °C |
| | -40°C to -25°C | 0 | | | |
| | +50°C to +70°C | 2.5 | | | |
| | 85V AC to 100V AC | 1.33 | | | |
| | 240V AC to 264V AC | 1.25 | | | % / V AC |
| Safety Standard | | IEC62368/EN62368/UL62368 | | | |
| Safety Certification | | IEC62368/EN62368/UL62368 (Pending) | | | |
| Safety Class | | CLASS II | | | |
| MTBF | | MIL-HDBK-217F@25°C > 300,000 h | | | |

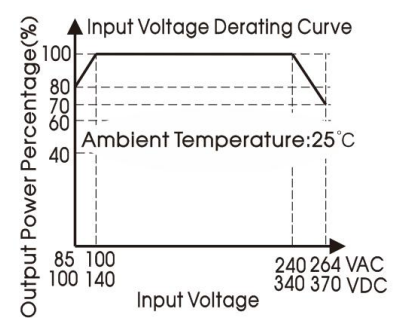
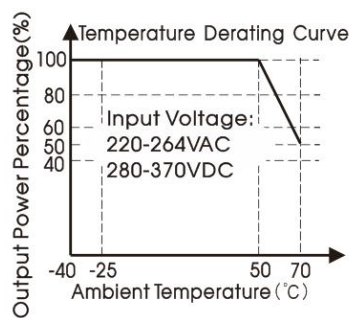
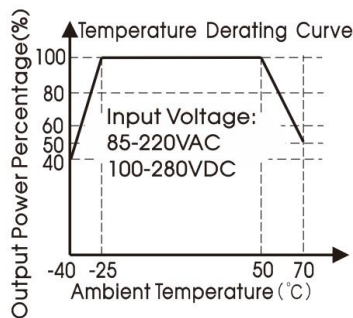
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| Mechanical Specifications | | |
|---------------------------|---|--|
| Casing Material | Black plastic, flame-retardant and heat-resistant (UL94V-0) | |
| Dimension | 87mm × 52mm × 29.5mm | |
| Weight | 205g (Typ.) | |
| Cooling Method | Free air convection | |

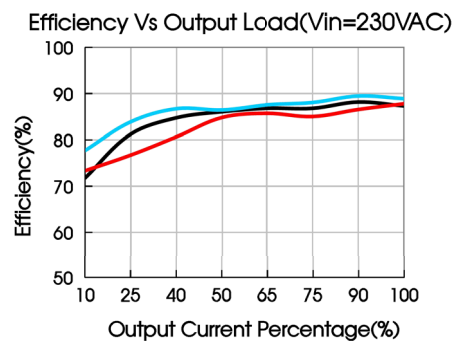
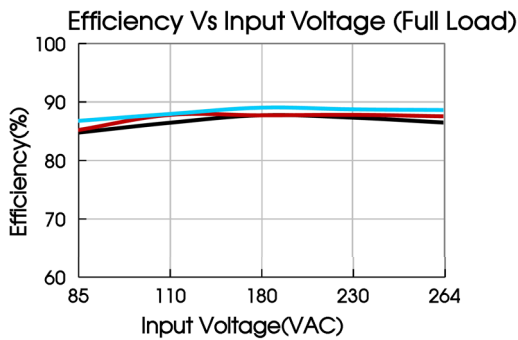
| Electromagnetic Compatibility (EMC) | | | |
|--|------------------|----------------------------|--|
| Emissions | CE | CISPR32/EN55032 | CLASS B |
| | RE | CISPR32/EN55032 | CLASS B |
| Immunity | ESD | IEC/EN61000-4-2 | Contact ±6KV/ Air ±8KV perf. Criteria B |
| | RS | IEC/EN61000-4-3 | 10V/m perf. Criteria A |
| | EFT | IEC/EN 61000-4-4 | ±4KV perf. Criteria B |
| | Surge | IEC/EN 61000-4-5 | line to line ±1KV perf. Criteria B |
| | | IEC/EN 61000-4-5 | line to line ±1KV/ line to ground ±2KV (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 | IEC/EN61000-4-11 | 0%,70% perf. Criteria B | |

Product Characteristic Curve



Note: ① With a n_A C_{in} input between 85-100VAC / 240-264VAC and a D C_{in} 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 environments, please consult factory or your FAE.

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Design Reference

1. Typical application

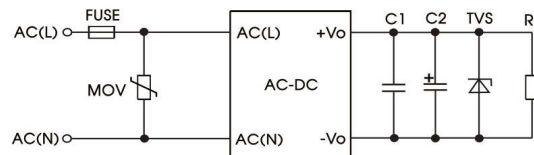


Fig.1: Typical circuit diagram

| Part No. | C1(μF) | C2(μF) | FUSE | MOV | TVS tube |
|----------------|--------|--------|------------------------------------|---------|----------|
| MP-LDE45-20B05 | 1 | 680 | 3.15A/250V, slow-blow, required | S14K350 | SMBJ7A |
| MP-LDE45-20B12 | | 220 | | | SMBJ20A |
| MP-LDE45-20B24 | | 120 | | | SMBJ30A |
| MP-LDE45-20B48 | | 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

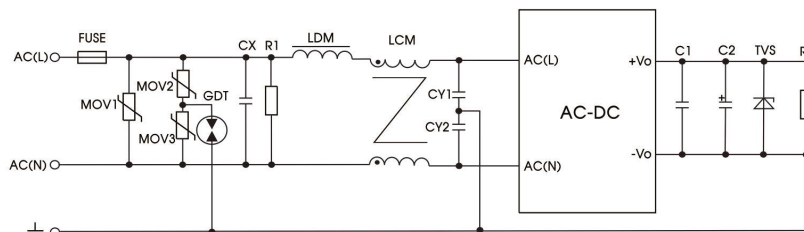


Fig 2: EMC circuit for harsh requirements

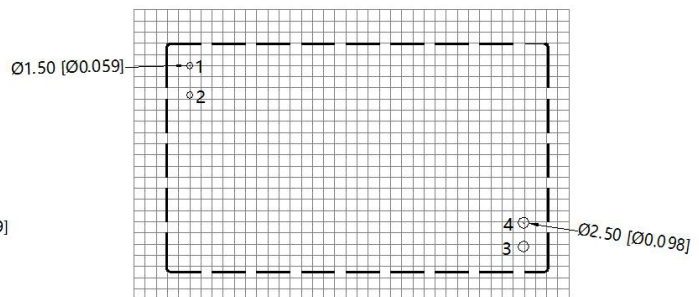
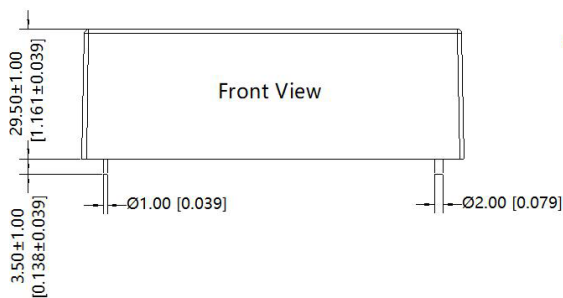
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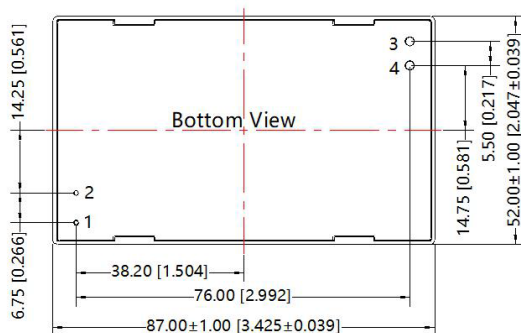
| Component | Recommended value |
|-----------|-------------------------------|
| FUSE | 3.15A/250V slow-blow required |
| MOV1 | 20D471K |
| MOV2 | 10D471K |
| MOV3 | 10D471K |
| GDT | EM3600XS |
| CX | 0.22 μ F/275V AC |
| CY1, CY2 | 1nF/400V AC |
| R1 | 1M Ω /2W |
| LDM | 4.7uH |
| LCM | 2mH |

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note : Grid 2.54*2.54mm



| Pin-Out | |
|---------|----------|
| Pin | Function |
| 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]

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