MORNSUN®

## 40W, AC/DC converter


RoHS

3 years Warranty

## FEATURES

- Wide 85 - 264VAC and 100 - 370VDC input voltage range
- High I/O isolation test voltage up to 3000VAC
- Industrial grade operating temperature：-40℃ to +70℃
- EMI performance meets CISPR32 / EN55032 CLASS B
- Stand-by power consumption: 0.5W
- High efficiency up to 82% with full load
- Output short circuit, over-current, over-voltage protection

*LH40-10D0524-12 AC-DC converter is highly efficient, environmental-friendly 40W power modules. It features wideAC input and at the same time accepts DC input voltage, high efficiency, high reliability, low power consumption, reinforced isolation. The converters are widely used in industrial control, electricity and office applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.*

## Selection Guide

| Part No. | Output Power | Nominal Output Voltage and Current | | Efficiency at 230VAC (%) Typ. | Capacitive Load (μF) Max. |
|---|---|---|---|---|---|
| | | (Vo1/Io1) | (Vo2/Io2) | | |
| LH40-10D0524-12 | 38.8W | 5VDC/2000mA | 24VDC/1200mA | 82 | 3300/2000 |

## 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 | -- | -- | 1.0 | A |
| | 230VAC | -- | -- | 0.6 | |
| Inrush Current | 115VAC | -- | 30 | -- | |
| | 230VAC | -- | 50 | -- | |
| Hot Plug | | Unavailable | | | |

## Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output Voltage Accuracy | Vo1 | | -- | ±2 | -- | |
| | Vo2 | | -- | ±8 | -- | |
| Line Regulation | Vo1 | | -- | ±0.5 | -- | |
| | Vo2 | | -- | ±1.5 | -- | |
| Load Regulation | Balance load | Vo1 | -- | ±3 | -- | |
| | | Vo2 | -- | ±5 | -- | |
| Ripple & Noise* | 20MHz bandwidth (peak-to-peak value) | | -- | 80 | 150 | mV |
| Temperature Coefficient | Vo1 | | -- | ±0.02 | -- | %/℃ |
| Stand-by Power Consumption | | | -- | -- | 0.5 | W |
| Short Circuit Protection | | | Continuous, self-recovery | | | |
| Over-current Protection | | | ⩾110%Io, self-recovery | | | |
| Over-voltage Protection | Vo1 | | -- | -- | 7.5 | V |
| | Vo2 | | -- | -- | 35 | |
| Minimum Load | | | 10 | -- | -- | % |
| Hold-up Time | 115VAC input | | -- | 10 | -- | 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. | 3000 | -- | -- | VAC |
| | Output-output | | 500 | -- | -- | VDC |
| Operating Temperature | | | -40 | -- | +70 | ℃ |
| Storage Temperature | | | -40 | -- | +85 | |
| Storage Humidity | | | -- | -- | 95 | %RH |
| Soldering Temperature | | Wave-soldering | 260 ± 5℃; time: 5 - 10s | | | |
| | | Manual-welding | 360 ± 10℃; time: 3 - 5s | | | |
| Switching Frequency | | | -- | 65 | -- | kHz |
| Power Derating | | -40℃ to -25℃ | 3.33 | -- | -- | %/℃ |
| | | +50℃ to +70℃ | 3.0 | -- | -- | |
| | | 85VAC - 100VAC | 1.33 | -- | -- | %/VAC |
| Safety Class | | | CLASS II | | | |
| MTBF | | | MIL-HDBK-217F@25℃ >300,000 h | | | |

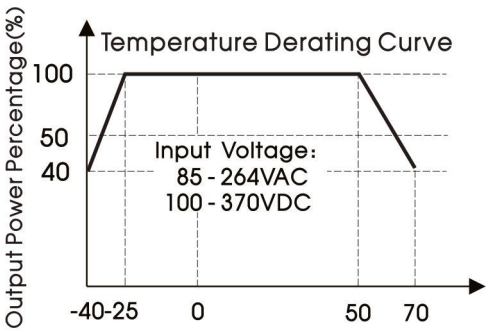
## Mechanical Specifications

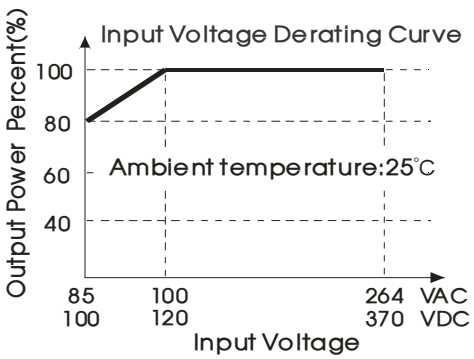
| | | |
|---|---|---|
| Case Material | | Black plastic, flame-retardant and heat-resistant (UL94V-0) |
| Dimensions | Horizontal package | 89.00 x 63.50 x 25.00 mm |
| Weight | Horizontal package | 210g(Typ.) |
| Cooling Method | | Free air convection |

## 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/EN61000-4-4 ±2KV | perf. Criteria B |
| | Surge | IEC/EN61000-4-5 line to line ±1KV | 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 85-100VAC and a DC input between 100-120VDC, 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

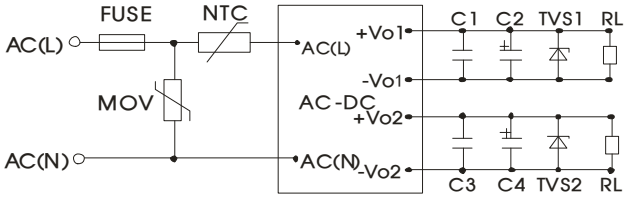



Fig. 1: Typical circuit diagram

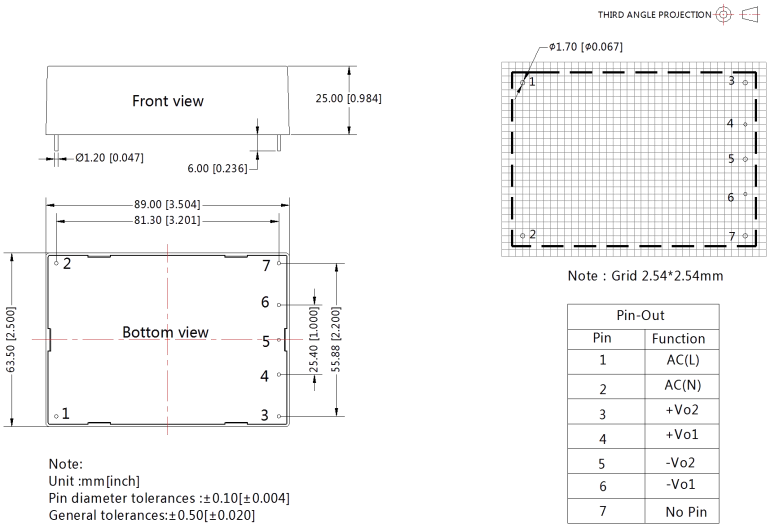
| Part No. | FUSE | NTC | MOV | C2(uF) | C4(uF) | C1/C3 (uF) | TVS1 | TVS2 |
|---|---|---|---|---|---|---|---|---|
| LH40-10D0524-12 | 3.15A/250VAC | 5D-9 | S10K300 | 680 | 120 | 1 | SMBJ7.0A | SMBJ30A |

Output Filter Components:

We recommend using an electrolytic capacitor with high frequency, and low ESR rating for C2, C4 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1, C3 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. For additional information please refer to application notes on www.mornsun-power.com.

## Dimensions and Recommended Layout




| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | AC(L) |
| 2 | AC(N) |
| 3 | +Vo2 |
| 4 | +Vo1 |
| 5 | -Vo2 |
| 6 | -Vo1 |
| 7 | No Pin |

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

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220021;
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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