

10W, AC-DC converter



UL us CE RoHS

FEATURES

- Universal input range:85~264VAC, 100~370VDC
- Regulated output, low ripple and noise
- Over-current, short circuit and over-voltage protection
- Plastic case, meets UL94V-0
- Meet UL60950,EN60950 standards
- 3 years product warranty
- PCB mounting, Chassis mounting, DIN-Rail mounting

LH 10series ——a compact size power converter offered by Mornsun. It features universal input voltage, taking both DC and AC input voltage, low power consumption, high efficiency, high reliability, safer isolation. It offers good EMC performance, which meet IEC/EN61000-4, CISPR22/EN55022, UL60950 and EN60950 standards, and it's widely used in Industrial, office and civil applications. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.

Selection Guide

| Certification | Part No.* | Output Power | Nominal Output Voltage and Current | | Efficiency (230VAC, %/Typ.) | Max. Capacitive Load(μF) | | |
|---------------|-----------------|--------------|------------------------------------|------------|-----------------------------|--------------------------|------|------|
| | | | (Vo1/Io1) | (Vo2/Io2) | | Vo1 | Vo2 | |
| UL/CE | LH10-10B03 | 6.6 W | 3.3V/2000mA | -- | 70 | 26400 | -- | |
| | LH10-10B05 | | 5V/2000mA | -- | 76 | 9440 | -- | |
| | LH10-10B09 | | 9V/1100mA | -- | 78 | 3600 | -- | |
| | LH10-10B12 | | 12V/900mA | -- | 80 | 2400 | -- | |
| | LH10-10B15 | | 15V/700mA | -- | 81 | 1170 | -- | |
| | LH10-10B24 | | 24V/450mA | -- | 82 | 370 | -- | |
| | -- | LH10-10A05 | 10W | +5V/1000mA | -5V/1000mA | 76 | 8800 | 8800 |
| | | LH10-10A12 | | +12V/450mA | -12V/450mA | 80 | 1970 | 1970 |
| | | LH10-10A15 | | +15V/350mA | -15V/350mA | 81 | 1970 | 1970 |
| | | LH10-10A24 | | +24V/200mA | -24V/200mA | 84 | 660 | 660 |
| -- | LH10-10C0512-02 | 5V/1000mA | | ±12V/200mA | 75 | 3200 | 260 | |
| | LH10-10C0515-02 | 5V/900mA | | ±15V/200mA | 75 | 2160 | 80 | |
| UL/CE | LH10-10D0505-02 | 5V/1800mA | | 5V/200mA | 75 | 8000 | 540 | |
| | LH10-10D0512-02 | 5V/1500mA | | 12V/200mA | 79 | 4400 | 260 | |
| | LH10-10D0515-02 | 5V/1400mA | | 15V/200mA | 79 | 4400 | 170 | |
| | LH10-10D0524-02 | 5V/1000mA | | 24V/200mA | 81 | 4000 | 170 | |

Note: LH10-10AXX, use both positive and negative output as sampling feedback; and all others use Vo1 as sampling feedback.

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 | -- | -- | 0.26 | A |
| | 230VAC | -- | -- | 0.16 | |
| Inrush current | 115VAC | -- | 10 | -- | |
| | 230VAC | -- | 20 | -- | |
| Leakage current | | 0.3mA RMS typ./230VAC/50Hz | | | |

| | |
|--|----------------------|
| Recommended External Input Fuse(Special package series include fuse) | 2A/250V, slow fusing |
| Hot Plug | Unavailable |

Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit | |
|--------------------------|--|--|-------------------|-------|------|------|----|
| Output Voltage Accuracy | Main circuit | | -- | ±2 | -- | | |
| | Main circuit (3.3V Output voltage) | | -- | ±3 | -- | | |
| Line Regulation | Full load | Main circuit | -- | ±0.5 | -- | | |
| | | Auxiliary circuit | -- | ±1.5 | -- | | |
| Load Regulation | 10%-100% load | Single output | -- | ±1 | -- | % | |
| | | Dual output(balanced load) | | -- | ±2 | | -- |
| | | Isolated triple output (balanced load) | Main circuit | -- | ±3 | | -- |
| | | | Auxiliary circuit | -- | ±5 | | -- |
| | | Isolated and separated twin output (balanced load) | Main circuit | -- | ±3 | | -- |
| Auxiliary circuit | -- | | ±5 | -- | | | |
| Ripple & Noise* | 20MHz bandwidth (peak-peak value) | | -- | 50 | 150 | mV | |
| Temperature Coefficient | Main circuit | | -- | ±0.02 | -- | %/°C | |
| Short Circuit Protection | Continuous, self-recovery | | | | | | |
| Over-current Protection | ≥110%Io self-recovery | | | | | | |
| Over-voltage Protection | Main circuit | 3.3 / 5VDC Output | ≤7.5VDC | | | | |
| | | 9VDC Output | ≤13VDC | | | | |
| | | 12 / 15VDC Output | ≤20VDC | | | | |
| | | 24VDC Output | ≤30VDC | | | | |
| Min. Load | Single output models | | 0 | -- | -- | % | |
| | Dual output models (balanced load) | | 10 | -- | -- | | |
| | Isolated and separated twin output (balanced load) | | 10 | -- | -- | | |
| | Isolated triple output (balanced load) | | 10 | -- | -- | | |
| Hold-up Time | 115VAC input | | -- | 15 | -- | ms | |
| | 230VAC input | | -- | 80 | -- | | |

Note: * Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

General Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|-----------------------|-----------------------------------|--|----------------------|------|------|------|
| Isolation Voltage | Input-output | | 3000 | -- | -- | VAC |
| Operating Temperature | LH10-10A24 | | -25 | -- | +70 | °C |
| | Others | | -40 | -- | +70 | |
| Storage Temperature | LH10-10A24 | | -25 | -- | +105 | |
| | Others | | -40 | -- | +105 | |
| Storage Humidity | | | -- | -- | 95 | %RH |
| Welding Temperature | Wave-soldering | | +260±5°C; time:5~10s | | | |
| | Manual-welding | | +360±10°C; time:3~5s | | | |
| Switching Frequency | LH10-10A/LH10-10C/LH10-10D series | | -- | 65 | -- | kHz |
| | LH10-10B series | | -- | 100 | -- | |
| Power Derating | -40°C~-10°C | | 2.0 | -- | -- | %/°C |
| | +55°C~+70°C | | 4.0 | -- | -- | |
| Safety Standard | IEC60950/EN60950/UL60950 | | | | | |
| Safety Certification | EN60950/UL60950 | | | | | |
| Safety Class | CLASS I | | | | | |
| MTBF | MIL-HDBK-217F@25°C > 300,000 h | | | | | |

Physical Specifications

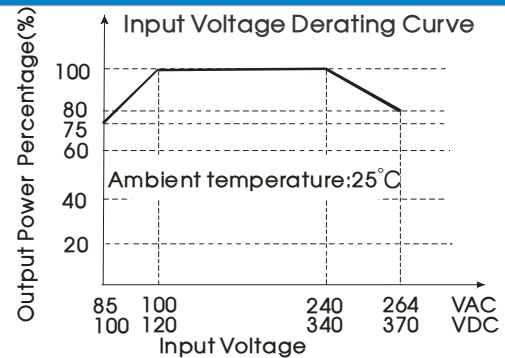
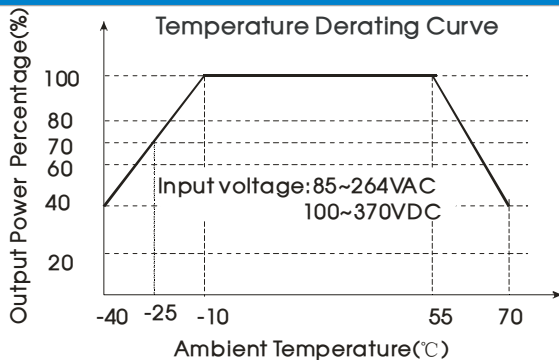
| | | |
|-----------------|---|--------------------------|
| Casing Material | Black flame-retardant and heat-resistant plastic (UL94-V0) | |
| Dimension | Horizontal package | 55.00*45.00*21.00 mm |
| | A2 chassis mounting | 96.10*54.00*29.50 mm |
| | A3 chassis mounting | 99.00*54.00*29.50 mm |
| | A4 Din-Rail mounting | 96.10*54.00*34.10 mm |
| Weight | Horizontal package/A2 chassis mounting /A3 chassis mounting/A4 Din-Rail mounting | 80g/130g/130g/170g(Typ.) |
| Cooling method* | Free air convection | |

Note: *This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.

EMC Specifications

| | | | |
|-----------------|---|--|--|
| EMI | CE | CISPR22/EN55022, CLASS B | |
| | RE | CISPR22/EN55022, CLASS B | |
| EMS | ESD | IEC/EN61000-4-2 | ±6KV/±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. 5 for recommended circuit) perf. Criteria B |
| | Surge | IEC/EN61000-4-5 | ±1KV/±2KV perf. Criteria B |
| IEC/EN61000-4-5 | | ±2KV/4KV (See Fig. 5 for recommended circuit) perf. Criteria B | |
| EMS | CS | IEC/EN61000-4-6 | 10 Vr.m.s perf. Criteria A |
| | PFM | IEC/EN61000-4-8 | 10A/m perf. Criteria A |
| | Immunities of voltage dip, drop and short interruption | IEC/EN61000-4-11 | 0%-70% perf. Criteria B |

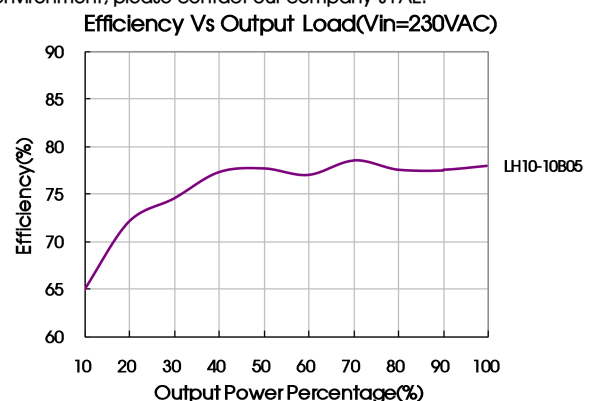
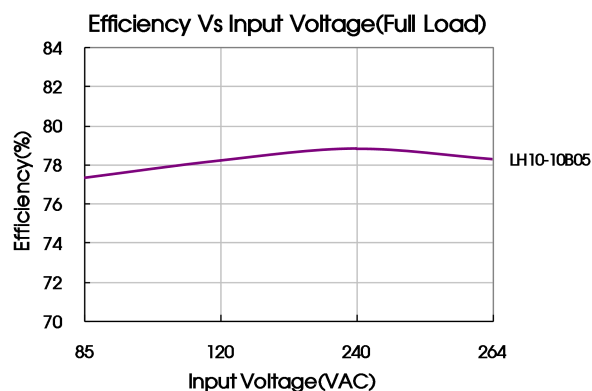
Product Characteristic Curve



Note: ①When input 85~100VAC/240~264VAC/100~120VDC/340~370VDC, it need to be voltage derated on basis of temperature derating;

②LH10-10A24 lowest temperature is -25°C

③This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.



Design Reference

1. Typical application circuit

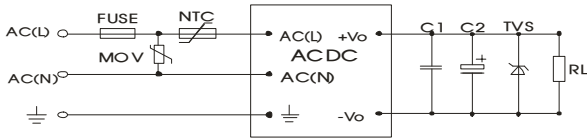


Fig. 1: LH10-10Bxx (Single Output) series typical application circuit

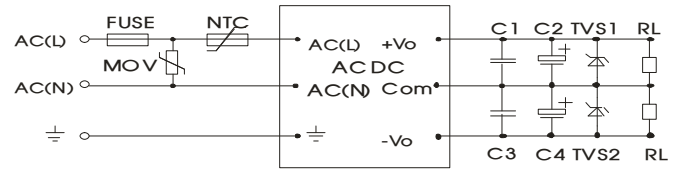


Fig. 2: LH10-10Axx (Dual Output) series typical application circuit

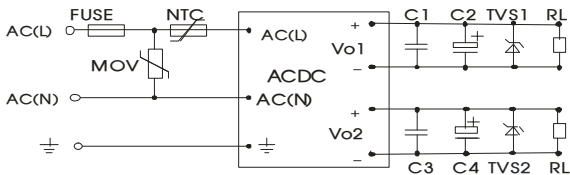


Fig. 3: LH10-10Dxx (Isolate Twin Output) series typical application circuit

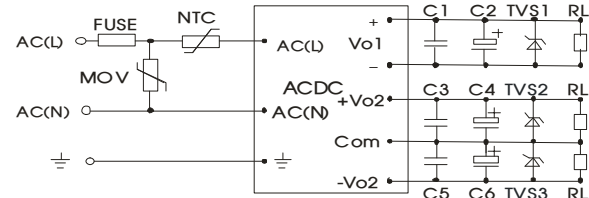


Fig. 4: LH10-10Cxx (Triple Output) series typical application circuit

| Model | C2(μF) | C4(μF) | C6(μF) | TVS1 | TVS2 | TVS3 |
|-----------------|--------|--------|--------|----------|----------|---------|
| LH10-10B03 | 470 | | | SMBJ7.0A | | |
| LH10-10B05 | 330 | | | SMBJ7.0A | | |
| LH10-10B09 | 120 | | | SMBJ12A | | |
| LH10-10B12 | 120 | | | SMBJ20A | | |
| LH10-10B15 | 120 | | | SMBJ20A | | |
| LH10-10B24 | 68 | | | SMBJ30A | | |
| LH10-10A05 | 220 | 220 | | SMBJ7.0A | | |
| LH10-10A12 | 120 | 120 | | SMBJ20A | SMBJ20A | |
| LH10-10A15 | 47 | 47 | | SMBJ20A | SMBJ20A | |
| LH10-10A24 | 33 | 33 | | SMBJ30A | SMBJ30A | |
| LH10-10C0512-02 | 220 | 68 | 68 | SMBJ7.0A | SMBJ20A | SMBJ20A |
| LH10-10C0515-02 | 220 | 47 | 47 | SMBJ7.0A | SMBJ20A | SMBJ20A |
| LH10-10D0505-02 | 220 | 68 | | SMBJ7.0A | SMBJ7.0A | |
| LH10-10D0512-02 | 220 | 68 | | SMBJ7.0A | SMBJ20A | |
| LH10-10D0515-02 | 220 | 47 | | SMBJ7.0A | SMBJ20A | |
| LH10-10D0524-02 | 220 | 47 | | SMBJ7.0A | SMBJ30A | |

Note:
 Note: Output filtering capacitors C2, C4, C6 are electrolytic capacitors, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor withstand voltage derating should be 80% or above. C1, C3, C5 are ceramic capacitors, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails. External input FUSE model is recommended to use 2A/250V slow fusing. External input NTC model is recommended to use 5D-9. External input MOV model is recommended to use S14K300.

2. EMC solution-recommended circuit

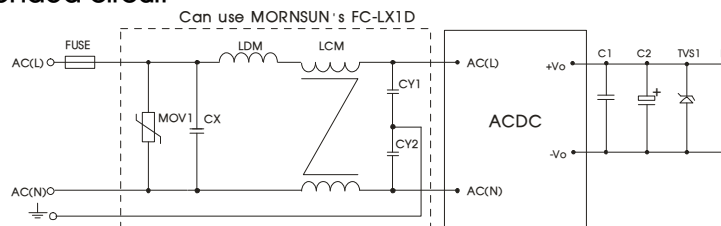
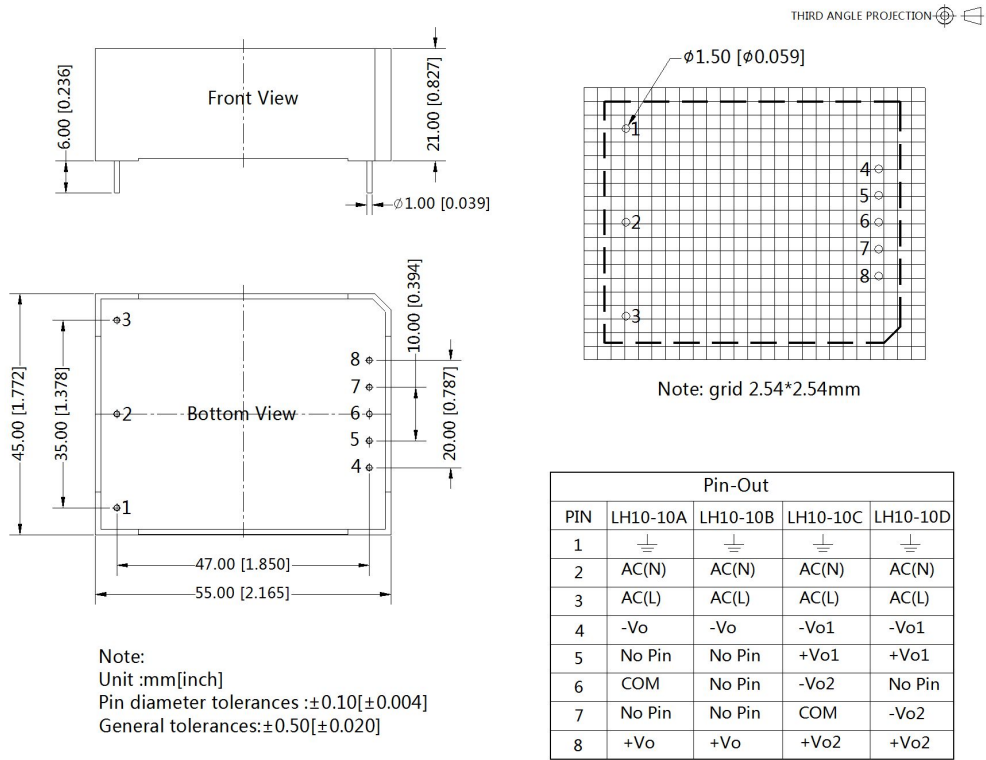


Fig. 5: EMC Recommended circuit with higher requirements

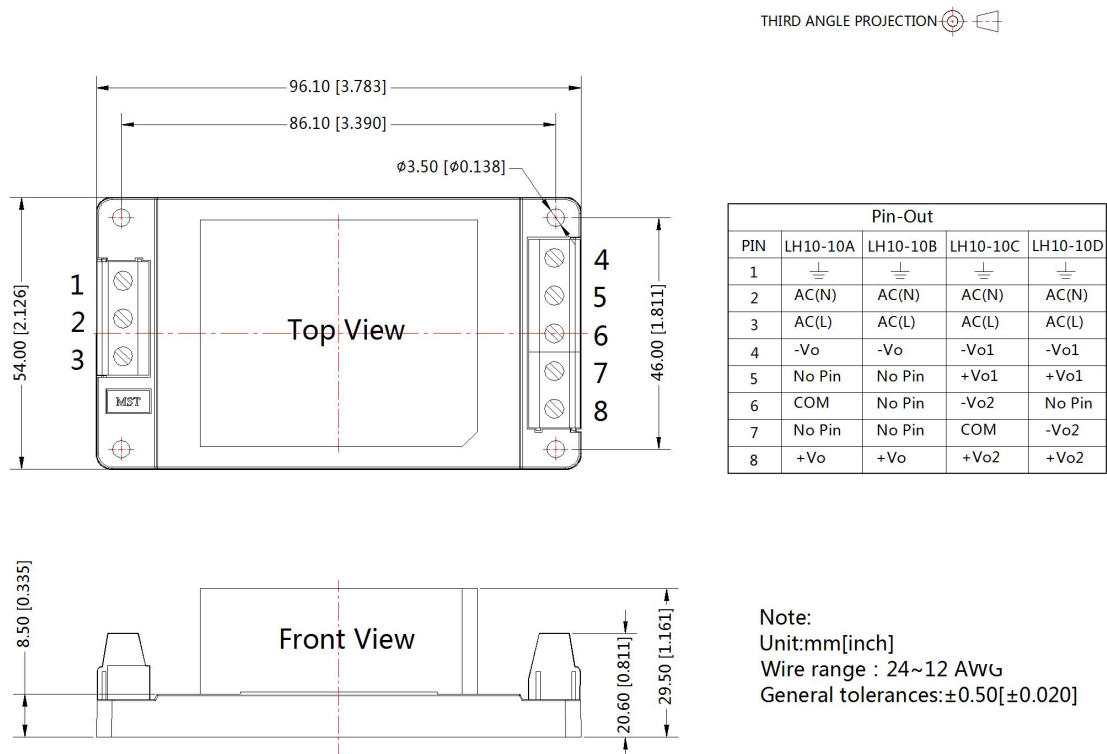
| Element model | Recommended value | Element model | Recommended value |
|---------------|--|---------------|--------------------------------|
| MOV1 | S14K300 | FC-LX1D | 2KV/4KV EMC filter |
| CY1, CY2 | 1000pF/400VAC | LDM | 4.7μH/2A |
| CX | 0.1μF/275VAC | FUSE | 2A/250V slow fusing, necessary |
| LCM | 10mH, recommended to use MORNSUN's FL2D-Z5-103 | | |

3. For more information about Mornsun EMC Filter products, please visit www.mornsun-power.com to download the Selection Guide of EMC Filter

Dimensions and Recommended Layout

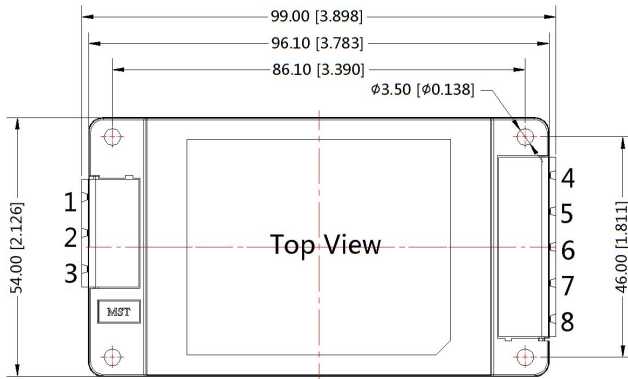


LHXXA2 Dimensions

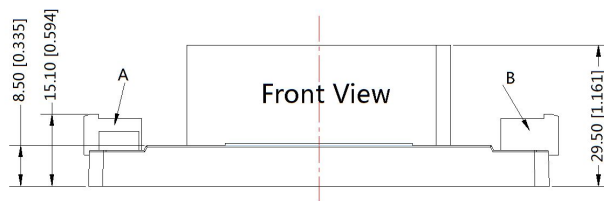


LHXXA3 Dimensions

THIRD ANGLE PROJECTION



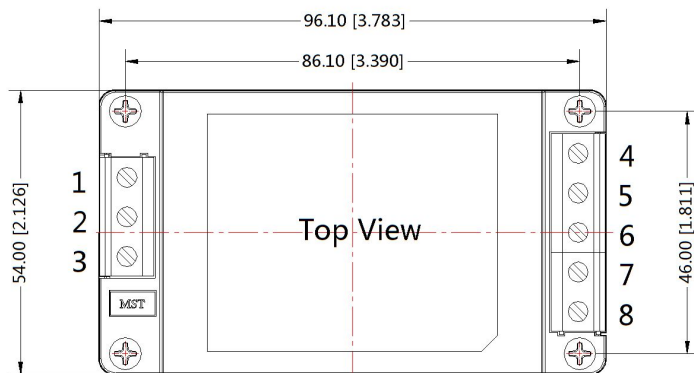
| PIN | Pin-Out | | | |
|-----|----------|----------|----------|----------|
| | LH10-10A | LH10-10B | LH10-10C | LH10-10D |
| 1 | ⏏ | ⏏ | ⏏ | ⏏ |
| 2 | AC(N) | AC(N) | AC(N) | AC(N) |
| 3 | AC(L) | AC(L) | AC(L) | AC(L) |
| 4 | -Vo | -Vo | -Vo1 | -Vo1 |
| 5 | No Pin | No Pin | +Vo1 | +Vo1 |
| 6 | COM | No Pin | -Vo2 | No Pin |
| 7 | No Pin | No Pin | COM | -Vo2 |
| 8 | +Vo | +Vo | +Vo2 | +Vo2 |



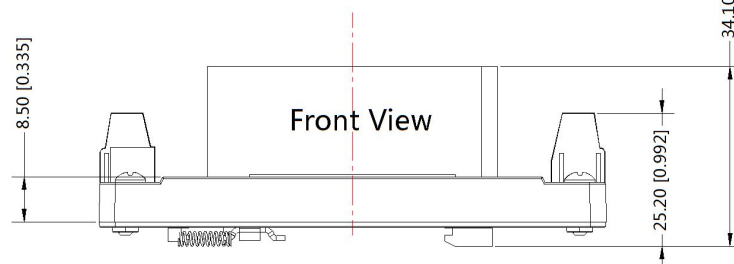
Note:
Unit:mm[inch]
General tolerances:±0.50[±0.020]
A:DEGSON P/N:
2EDGRC-7.5-03P-14-100A (H)
B:DEGSON P/N:
2EDGRC-7.5-05P-14-100A (H)

LHXXA4 Dimensions

THIRD ANGLE PROJECTION



| PIN | Pin-Out | | | |
|-----|----------|----------|----------|----------|
| | LH10-10A | LH10-10B | LH10-10C | LH10-10D |
| 1 | ⏏ | ⏏ | ⏏ | ⏏ |
| 2 | AC(N) | AC(N) | AC(N) | AC(N) |
| 3 | AC(L) | AC(L) | AC(L) | AC(L) |
| 4 | -Vo | -Vo | -Vo1 | -Vo1 |
| 5 | No Pin | No Pin | +Vo1 | +Vo1 |
| 6 | COM | No Pin | -Vo2 | No Pin |
| 7 | No Pin | No Pin | COM | -Vo2 |
| 8 | +Vo | +Vo | +Vo2 | +Vo2 |



Note:
Unit:mm[inch]
Installed on DIN ra
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number of Horizontal package : 58220006, the Packing bag number of A2/A3/A4 package:58220010;
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 $T_a=25\text{ }^\circ\text{C}$, humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
6. We can provide product customization service;
7. Specifications are subject to change without prior notice.

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