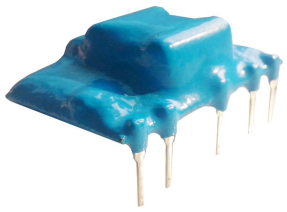
MORNSUN®

# LS03-05B05S-FPT

## HIGH VOLTAGE DC-DC(AC-DC) CONVERTER



RoHS

LS03-05B05S-FPT----- high efficiency green power modules with miniature packaging provided by Mornsun. The features of this series are: wide input voltage, DC and AC all in one, high efficiency, high reliability, low loss, safety isolation etc. They are widely used in industrial, office and civil equipments, as well as applications where no special requirement for EMC performance. For harsh EMC environment, this series of products must use the refered application circuit.

### PRODUCT FEATURES

1. Wide input voltage:100 ~ 400VDC(85 ~ 264VAC)
2. Over temperature protection and short circuit protection
3. High efficiency, high density
4. Low loss, green power
5. Multiple models available
6. Industrial level specifications

### PART NUMBER SYSTEM

LS03-05B05S-FPT

- Special Mark
- Output Voltage
- Output Style
- Input Voltage
- Isolation Voltage
- Output Power
- Package Style
- Product Series

### SELECTION GUIDE

| Model | Power | Output (Vo/Io) | Ripple and Noise | Efficiency (%)(typ.) |
|---|---|---|---|---|
| LS03-05B05S-FPT | 2.5W | 5V/500mA | 50mV | 70 |

### INPUT SPECIFICATIONS

| Item | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input voltage range | DC Input | 100 | -- | 400 | V |
| | AC Input | 85 | -- | 264 | |
| Input current | 230VAC | -- | -- | 40 | mA |

### OUTPUT SPECIFICATIONS

| Item | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Voltage set accuracy | 85~264VAC | -- | ±2 | -- | % |
| Input variation | Full Load | -- | ±0.5 | -- | |
| Load variation | 10%~100% Load | -- | ±1 | -- | |
| Ripple& Noise | (20MHz Bandwidth) (p-p) | -- | 50 | 100 | mV |
| Short circuit protection | | Continuous, automatic resume | | | |
| Over temperature protection | | -- | -- | 150 | ℃ |

### COMMON SPECIFICATIONS

| Item | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Operating | | | -40 | -- | +85 | ℃ |
| Storage | | | -40 | -- | +105 | |
| Case temperature | | | -- | -- | +90 | |
| Humidity | | | -- | -- | 85 | %RH |
| Temperature coefficient | | | -- | 0.02 | -- | %/℃ |
| Power derating | 55℃～85℃ | | 1.33 | -- | -- | |
| | -40℃～-20℃ | | 2 | -- | -- | |
| Switching frequency | | | -- | 100 | -- | KHz |
| I/O-isolation voltage | Input and Output | Tested for 1 minute | 2000 | -- | -- | VAC |
| Weight | | | -- | -- | 10 | g |
| Case material | | | UL94V-0 | | | |
| Install | | | PCB | | | |
| MTBF | | | >300,000h @25℃ | | | |

Note: 1.External electrolytic capacitor are required to models, more details refer to typical applications;
2. Ripple and Noise measuring refer to “ripple and noise measure figure”;
3.All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified;
4.In this datasheet, all the test methods of indications are based on corporate standards.

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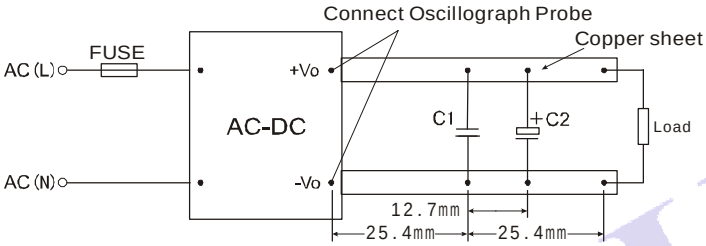
## EMC SPECIFICATIONS

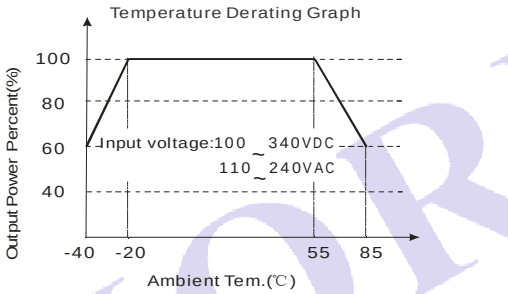
| | | | | |
|---|---|---|---|---|
| EMC | EMI | CE | CISPR22/EN55022 CLASS B (Recommended Circuit Refer to Figure 3) | |
| | | RE | CISPR22/EN55022 CLASS B (Recommended Circuit Refer to Figure 3) | |
| | EMS | ESD | IEC/EN61000-4-2 Contact ±2KV | perf. Criteria B |
| | | RS | IEC/EN61000-4-3 10V/m (Recommended Circuit Refer to Figure 3) | perf. Criteria A |
| | | EFT | IEC/EN61000-4-4 ±2KV (Typical Application Circuit Refer to Figure1) | perf. Criteria B |
| | | | IEC/EN61000-4-4 ±4KV (Recommended Circuit Refer to Figure 3) | perf. Criteria B |
| | | Surge | IEC/EN61000-4-5 ±2KV/±4KV (Recommended Circuit Refer to Figure 3) | perf. Criteria B |
| | | CS | IEC/EN61000-4-6 10 Vr.m.s | perf. Criteria A |
| | | PFM | IEC/EN61000-4-8 10A/m | perf. Criteria A |
| | | Voltage dips, short and interruptions immunity | IEC/EN61000-4-29 0%-70% | perf. Criteria B |

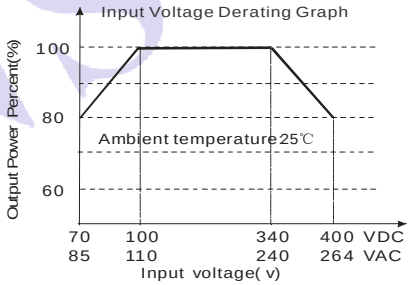
## RIPPLE AND NOISE MEASURE FIGURE RIPPLE



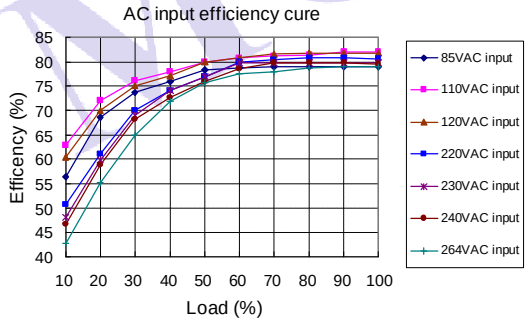

Note: C1: 1μF (Ceramic capacitor) C2: 10μF (Electrolytic capacitor)

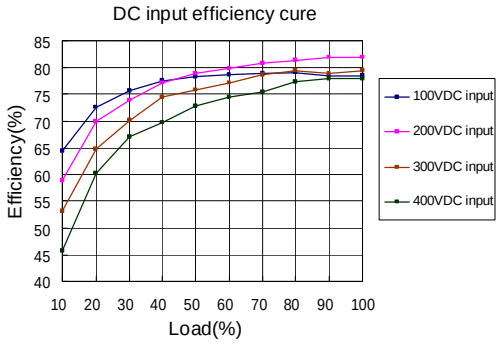
## PRODUCT TYPICAL CURVE

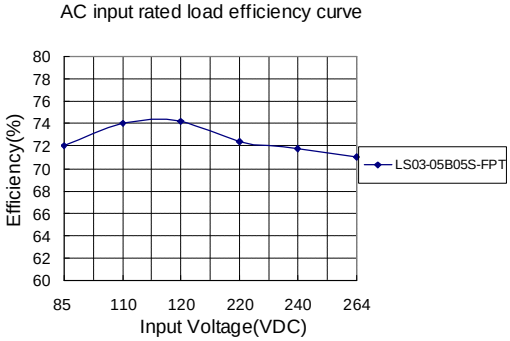


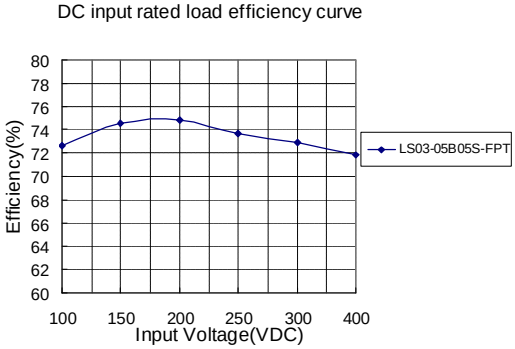




Note: When input 85~110VAC /240~264VAC, it need to be voltage derated on basis of temperature derating.

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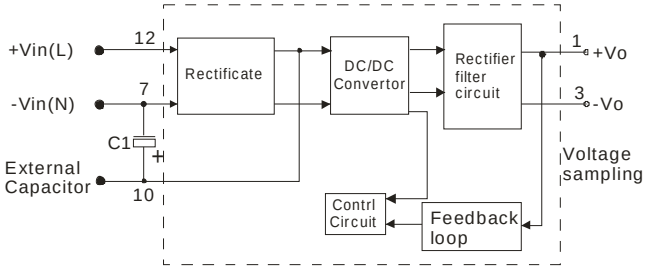
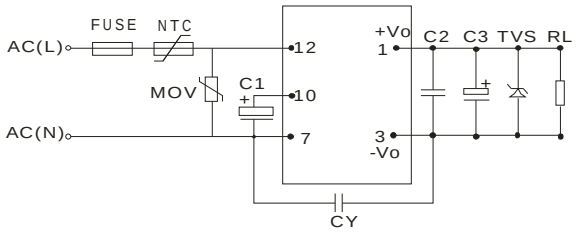
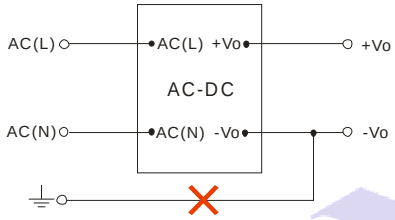
## STRUCTURE FIGURE




## TYPICAL APPLICATIONS

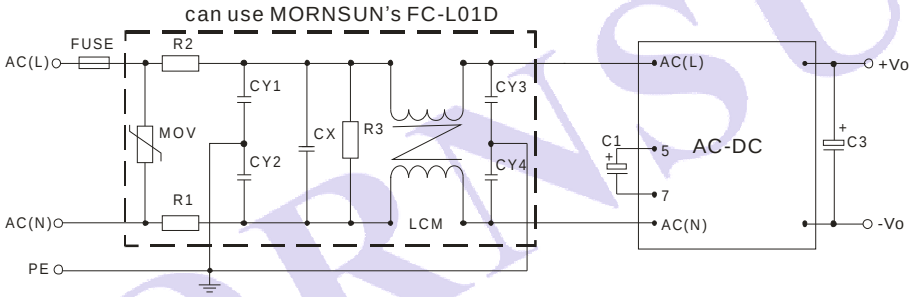



(Figure 1): Typical application circuit




(Figure 2): This application is not available for this series.
Note: If you have such application, please consult to our FAE department

## EMC RECOMMENDED CIRCUIT




(Figure 3):Recommended circuit for applications which require higher EMC standard (external circuit output is the same as figure 1)

## EMC RECOMMENDED CIRCUIT PCB LAYOUT

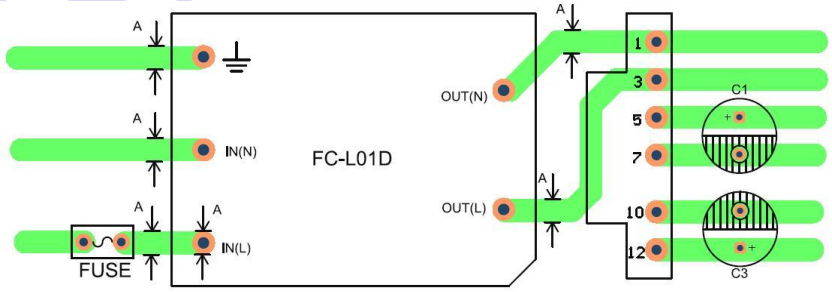



Figure 4：EMC application circuit PCB layout
Safety and recommend wiring: linewidth A≥3mm,C≥9mm

| EXTERNAL CAPACITORS TYPICAL VALUE | | | | | |
|---|---|---|---|---|---|
| Output Voltage | C1 | C2 | C3 | FUSE | TVS |
| 5V | 10μF/400V | 1μF/50V (Ceramic apacitor) | 150μF/25V | 1A/250V | SMBJ7.0A |

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Note:

1. C1:AC input, is filtering electrolytic capacitor (which is required), when input voltage is below 100VAC, and the value of C1 is 22μF/400V.

DC input, is a filtering capacitor in EMC Filter, the value of C1 is 10μF/400V(when input voltage is above 370VDC, and the value of C1 is 10μF/450V), If EMC performance is not required,C1 could not need.

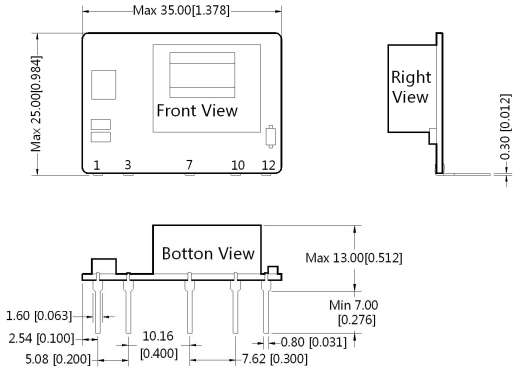
2. C2 is ceramic capacitor, it is used to filter high frequency noise. Output filtering capacitor C3 (which is required when AC input or DC input) is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80% or above. TVS is a recommended component to protect post-circuits (if converter fails).

2. For standard EMC requirement, please refer to figure 1.If higher EMC requirement ,please refer to figure 3, recommended parameters are shown in the table below.

| Recommend Parameter For Higher EMC Standard Circuit | |
|---|---|
| Components | Recommend Parameter |
| MOV | S14K350 |
| CY1,CY2,CY3,CY4 | 102M/400VAC |
| CX | 0.22μF/275VAC |
| R1,R2 | 2Ω/3W Winding resistor |
| R3 | 1MΩ/2W |
| LCM | 10mH, recommended to use MORNSUN's FL2D-Z5-103 |
| FC-L01D | MORNSUN's 2KV/4KV Surge protector |
| FUSE | 1A/250V, slow blow, it must be connected to FUSE |

## DIMENSIONS, RECOMMENDED FOOTPRINT&PACKAGING

### MECHANICA DIMENSIONS

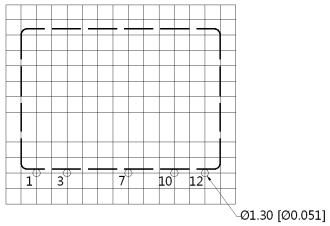



| PIN CONNECTION | |
|---|---|
| Pin | Function |
| 1 | +Vo |
| 3 | -Vo |
| 7 | -Vin(N) |
| 10 | CAP |
| 12 | +Vin(L) |

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

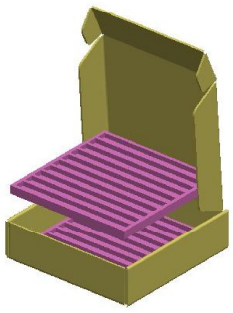
THIRD ANGLE PROJECTION

### RECOMMENDED FOOTPRINT DETAILS




Note:Grid 2.54*2.54mm

### PACKAGE DIAGRAM



Note:
Inner carton dimensions: L*W*H=365*350*105mm Packaging quantity : 360PCS
Outer carton dimensions : L*W*H=390*360*245mm Packaging quantity: 720PCS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