1W, Fixed input voltage, isolated & unregulated single output


Patent Protection RoHS

## FEATURES

- Efficiency up to 79%
- Isolation voltage: 3K VDC
- Operating temperature range: -40℃ to +85℃
- SMD package
- Internal surface mounted design
- International standard pin-out

*F_XT-1W series is specially designed for applications where an isolated voltage is required in a distributed power supply system. It is suitable for*

*1.Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);*

*2.Where isolation is necessary between input and output (isolation voltage ≤3000VDC);*

*3.Where do not has high requirement of line regulation , load regulation and the ripple & noise of the output voltage;*

*Such as: pure digital circuits, low frequency analog circuits, and IGBT power device driving circuits.*

## Selection Guide

| Part No. | Input Voltage (VDC) | Output | | Efficiency (%,Min./Typ.) @ Full Load | Max. Capacitive Load (μF) |
|---|---|---|---|---|---|
| | Nominal (Range) | Output Voltage (VDC) | Output Current (mA)(Max./Min.) | | |
| F0303XT-1W | 3.3 (2.97-3.63) | 3.3 | 303/31 | 69/73 | 220 |
| F0305XT-1W | | 5 | 200/20 | 70/74 | |
| F0505XT-1W | 5 (4.5-5.5) | 5 | 200/20 | 73/77 | |
| F0512XT-1W | | 12 | 83/9 | 75/79 | |
| F0515XT-1W | | 15 | 67/7 | 74/78 | |
| F1205XT-1W | 12 (10.8-13.2) | 5 | 200/20 | 65/69 | |

## Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input Current (full load / no-load) | 3.3V input | -- | 415/40 | -- | mA |
| | 5V input | -- | 278/25 | -- | |
| | 12V input | -- | 121/15 | -- | |
| Surge Voltage (1sec. max.) | 3.3V input | -0.7 | -- | 5 | VDC |
| | 5V input | -0.7 | -- | 9 | |
| | 12V input | -0.7 | -- | 18 | |
| Input Filter | | Capacitor filter | | | |

## Output Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output Voltage Accuracy | | | See tolerance envelope graph (Fig. 1) | | | |
| Line Regulation | Input voltage change: ±1% | | -- | -- | ±1.2 | -- |
| Load Regulation | 10%-100% load | 3.3VDC output | -- | 15 | 20 | % |
| | | 5VDC output | -- | 12.5 | 15 | |
| | | 12VDC output | -- | 6.8 | 10 | |
| | | 15VDC output | -- | 6.3 | 10 | |
| Ripple & Noise* | 20MHz bandwidth | | -- | 75 | 100 | mVp-p |
| Temperature Drift Coefficient | 100% load | | -- | -- | ±0.03 | %/℃ |
| Output Short Circuit Protection** | | | -- | -- | 1 | s |

Note: 1. * Ripple and noise tested with "parallel cable" method, please see *DC-DC Converter Application Notes* for specific operation methods.
2. ** Supply voltage must be discontinued at the end of short circuit duration.

## General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Isolation Voltage | Input-output, with the test time of 1 minute and the leak current lower than 1mA | 3000 | -- | -- | VDC |
| Isolation Resistance | Input-output, isolation voltage 500VDC | 1000 | -- | -- | MΩ |
| Isolation Capacitance | Input-output, 100KHz/0.1V | -- | 20 | -- | pF |
| Operating Temperature | Derating if the temperature ≥85℃, (see Fig. 2) | -40 | -- | 85 | ℃ |
| Storage Temperature | | -55 | -- | 125 | |
| Casing Temperature Rise | Ta=25℃ | -- | 15 | 25 | |
| Pin Welding Resistance Temperature | Welding spot is 1.5mm away from the casing, 10 seconds | -- | -- | 260 | |
| Reflow Soldering Temperature | | Peak temp.≤245℃, maximum duration time≤60s at 217℃. For actual application, please refer to IPC/JEDEC J-STD-020D.1. | | | |
| Storage Humidity | Non-condensing | -- | -- | 95 | % |
| Switching Frequency | 100% load, nominal input voltage | -- | 100 | -- | KHz |
| MTBF | MIL-HDFK-217F@25° C | 3500 | -- | -- | K hours |

## Physical Specifications

| | |
|---|---|
| Casing Material | Black flame-retardant heat-proof epoxy resin (UL94-V0) |
| Package Dimensions | 12.70*11.20*6.25 mm |
| Weight | 1.4g (Typ.) |
| Cooling Method | Free air convection |

## Product Characteristic Curve

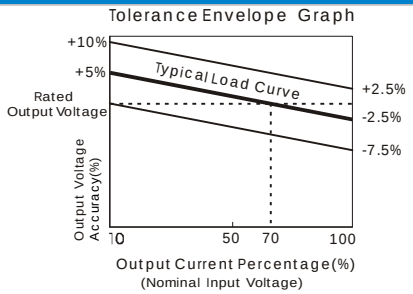



Fig. 1

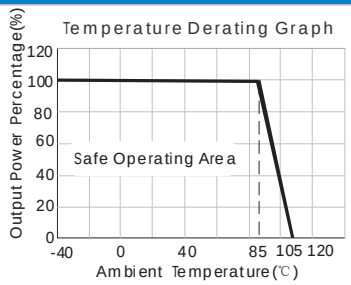



Fig. 2

## Design Reference

### 1. Typical application

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 3).

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 4).

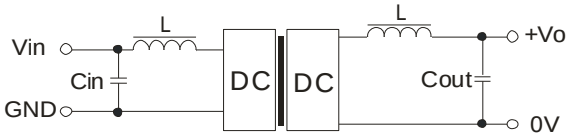



Fig.3

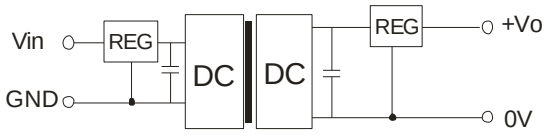



Fig.4

Recommended capacitive load value table (Table 1)

| Vin (VDC) | Cin (μF) | Vout (VDC) | Cout (μF) |
|---|---|---|---|
| 3.3/5 | 4.7 | 3.3/5 | 10 |
| 12 | 2.2 | 12 | 2.2 |
| -- | -- | 15 | 1 |

It is not recommended to connect any external capacitor when output power is less than 0.5W.

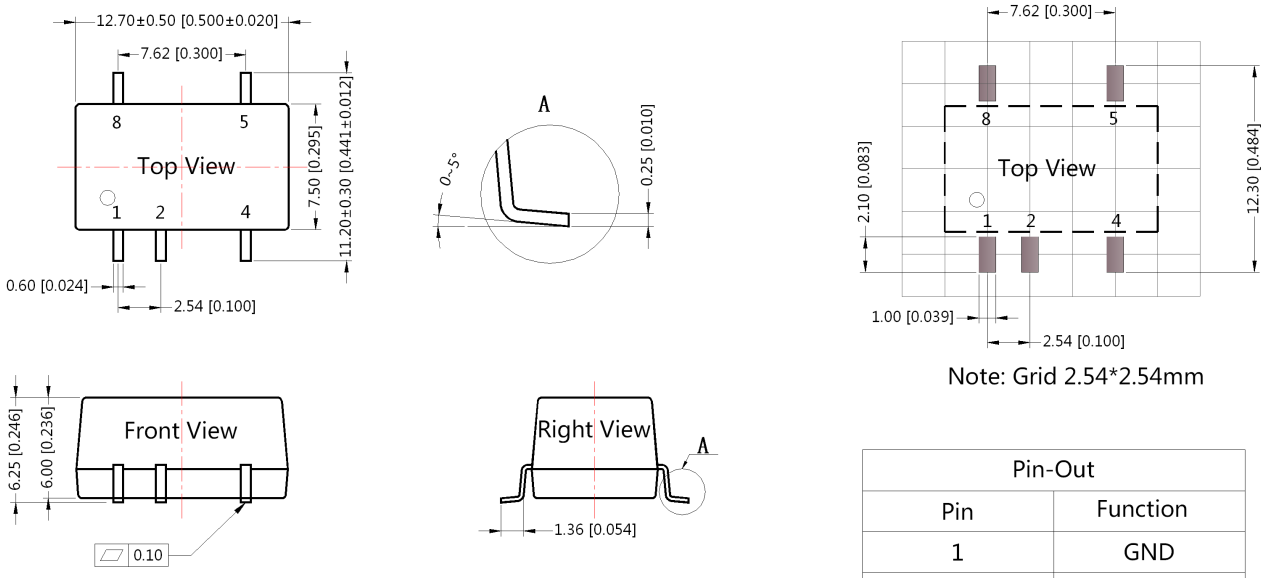
## 2. Output load requirements

To ensure the module work efficiently and reliably, during the operation, the min. output load should be no less than 10% of the full load. If the actual output power is low, please connect a resister to the output terminal in parallel, with a recommenced resistance which is 10% of the rated power, and derating is required during operation.

## 3. For more information Please find the application notes on www.mornsun-power.com

## Dimensions and Recommended Layout

THIRD ANGLE PROJECTION




Note: Grid 2.54*2.54mm

| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | GND |
| 2 | Vin |
| 4 | 0V |
| 5 | +Vo |
| 8 | NC |

NC: No Connection

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Notes:

1. Packing Information please refer to 'Product Packing Information'. Packing bag number: 58210023;
2. If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in this datasheet;
3. The max. capacitive load should be tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25° C, humidity<75% when inputting nominal voltage and outputting rated load;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
6. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technicians for specific information;
7. We can provide product customization service;
8. Specifications of this product are subject to changes without prior notice.

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