MORNSUN
Industrial DC&AC converter professional

# F_AS-1W Series

## *1W, FIXED INPUT ISOLATED & UNREGULATED SINGLE OUTPUT DC-DC CONVERTER*




multi-country patent protection **RoHS**

### FEATURES

Efficiency up to 80%
SIP Package
Single Output Voltage
3kVDC Isolation
Temperature Range: -40°C to +85°C
Internal SMD construction
Industry Standard Pinout
No Heat sink Required
No External Component Required
RoHS Compliance

### APPLICATIONS

The F_AS-1W Series are specially designed for applications where a single power supply is highly isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

1) Where the voltage of the input power supply is fixed (voltage variation ≤±10%);
2) Where isolation is necessary between input and output (isolation voltage ≤3000VDC);
3) Where the regulation of the output voltage and the output ripple and noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits and IGBT power device driven circuits, etc.

### MODEL SELECTION

F0505AS-1W

- Rate Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

### PRODUCT PROGRAM

| Part Number | Input | | Output | | | Efficiency (%, Typ) |
|---|---|---|---|---|---|---|
| | Voltage (VDC) | | Voltage (VDC) | Current (mA) | | |
| | Nominal | Range | | Max | Min | |
| F0305AS-1W | 3.3 | 3.0-3.6 | 5 | 200 | 20 | 74 |
| F0503AS-1W | 5 | 4.5-5.5 | 3.3 | 303 | 30 | 73 |
| F0505AS-1W | | | 5 | 200 | 20 | 72 |
| F0509AS-1W | | | 9 | 111 | 12 | 76 |
| F0512AS-1W | | | 12 | 83 | 9 | 79 |
| F0515AS-1W | | | 15 | 67 | 7 | 78 |
| F1205AS-1W | 12 | 10.8-13.2 | 5 | 200 | 20 | 70 |
| F1209AS-1W | | | 9 | 111 | 12 | 75 |
| F1212AS-1W | | | 12 | 83 | 9 | 78 |
| F1215AS-1W | | | 15 | 67 | 7 | 79 |
| F1505AS-1W | 15 | 13.5-16.5 | 5 | 200 | 20 | 69 |
| F2405AS-1W | 24 | 21.6-26.4 | 5 | 200 | 20 | 71 |
| F2409AS-1W | | | 9 | 111 | 12 | 76 |
| F2412AS-1W | | | 12 | 83 | 9 | 78 |
| F2415AS-1W | | | 15 | 67 | 7 | 80 |

### ISOLATION SPECIFICATIONS

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Isolation voltage | Tested for 1 minute and 1mA max | 3000 | | | VDC |
| Isolation resistance | Test at 500VDC | 1000 | | | MΩ |
| Isolation capacitance | | | 60 | | pF |

### OUTPUT SPECIFICATIONS

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Output power | | 0.1 | | 1 | W |
| Line regulation | For Vin change of 1%(3.3V output) | | | ±1.5 | % |
| | For Vin change of 1%(others) | | | ±1.2 | |
| Load regulation | 10% to 100% full load(3.3V output) | | 12 | 20 | |
| | 10% to 100% full load(5V output) | | 10 | 15 | |
| | 10% to 100% full load(9V output) | | 8.3 | 15 | |
| | 10% to 100% full load(12V output) | | 6.8 | 15 | |
| | 10% to 100% full load(15V output) | | 6.3 | 15 | |
| Output voltage accuracy | | See tolerance envelope graph | | | |
| Temperature drift | 100% full load | | | 0.03 | %/°C |
| Ripple & Noise* | 20MHz bandwidth | | 50 | 100 | mVp-p |
| Switching frequency | Full load, nominal input voltage | | 100 | | KHz |

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

Note:
1. All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.

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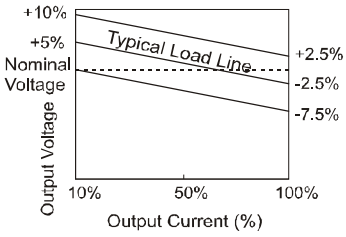
## COMMON SPECIFICATION

| Item | Test condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Storage humidity | | | | 95 | % |
| Operating temperature | | -40 | | 85 | ℃ |
| Storage temperature | | -55 | | 125 | |
| Temp. rise at full load | | | 15 | 25 | |
| Lead temperature | 1.5mm from case for 10 seconds | | | 300 | |
| Short circuit protection* | | | | 1 | s |
| Cooling | | Free air convection | | | |
| Case material | | Plastic (UL94-V0) | | | |
| MTBF | | 3500 | | | K hours |
| Weight | | | 2.1 | | g |

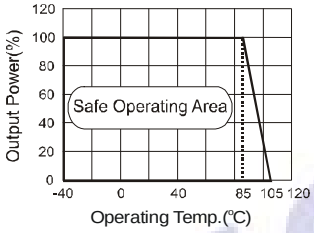
*Supply voltage must be discontinued at the end of short circuit duration.

## TYPICAL CHARECTERISTICS

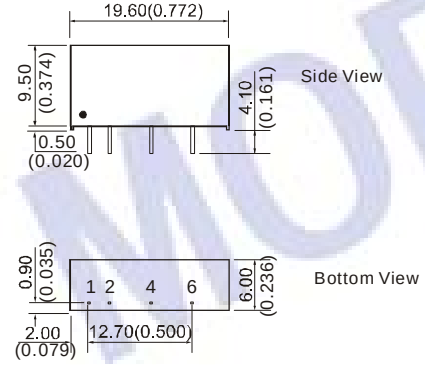
Tolerance Envelope Graph




Temperature Derating Graph

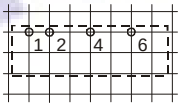



## OUTLINE DIMENSIONS & FOOTPRINT DETAILS




*First Angle Projection*

RECOMMENDED FOOTPRINT
*Top view,grid:2.54*2.54mm(0.1*0.1inch), diameter:1.00mm(0.039inch)*




FOOTPRINT DETAILS

| Pin | Function |
|---|---|
| 1 | Vin |
| 2 | GND |
| 4 | 0V |
| 6 | +Vo |

Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin section tolerances:±0.10mm(±0.004inch)
General tolerances:±0.25mm(±0.010inch)

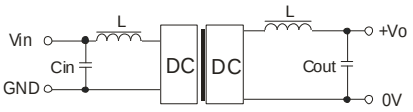
## APPLICATION NOTE

**Requirement On Output Load**

To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum output load is **not less than 10%** of the full load, and that this product should never be operated under no load! If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power.

**Recommended circuit**

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 1).




(Figure 1)

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. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).

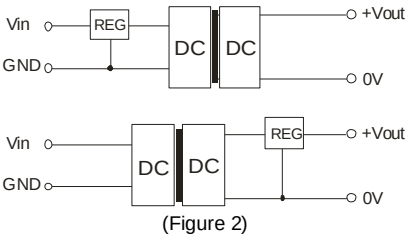
EXTERNAL CAPACITOR TABLE (Table 1)

| Vin (VDC) | Cin (uF) | Single Vout (VDC) | Cout (uF) |
|---|---|---|---|
| 3.3/5 | 4.7 | 3.3/5 | 10 |
| 12 | 2.2 | 9 | 4.7 |
| 15 | 2.2 | 12 | 2.2 |
| 24 | 1 | 15 | 1 |

It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

**Output Voltage Regulation and Over-voltage Protection Circuit**

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 (Figure 2).




(Figure 2)

**Overload Protection**

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

**No parallel connection or plug and play.**

Стандарт Электрон Связь

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