

# SF\_T-W5 Series

**FIXED INPUT ISOLATED & UNREGULATED**

**0.5W OUTPUT**

**SINGLE OUTPUT**

**ULTRAMINIATURE SMD PACKAGE**

**SCHMID-M**  
DC/DC - Converter



## FEATURES

- High Efficiency up to 70%
- Single Voltage Output
- Small Footprint
- SMD Package Styles
- Industry Standard Pinout
- UL94-V0 Package
- No Heat sink Required
- 3KVDC Isolation
- High Power Density
- Temperature Range: -40°C~+85°C
- No External Component Required
- Low Cost
- Custom Service Available

## APPLICATIONS

The SF\_T-W5 Series are specially designed for applications where a single power supply is 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  $\leq \pm 10\%$ );
- 2) Where isolation is necessary between input and output (isolation voltage = 3000VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding.

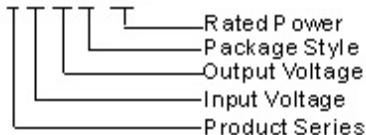
Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits.

These products don't apply to:

- 1) Where the input supply voltage varied (variation  $\geq \pm 10\%$ ), otherwise our company's SWRA series is recommended;
- 2) Circuits in which the output voltage regulation is demanding, otherwise our company's IB Series or WRB Series are recommended.

## MODEL SELECTION

SF0505T-W5



## PRODUCT PROGRAM

| Part Number | Input         |           | Output        |              |     | Efficiency (% Typ) | Package Style |
|-------------|---------------|-----------|---------------|--------------|-----|--------------------|---------------|
|             | Voltage (VDC) |           | Voltage (VDC) | Current (mA) |     |                    |               |
|             | Nominal       | Range     |               | Max          | Min |                    |               |
| SF0505T-W5  | 5             | 4.5~5.5   | 5             | 100          | 10  | 65                 | SMD           |
| SF0509T-W5  | 5             | 4.5~5.5   | 9             | 55           | 5   | 66                 | SMD           |
| SF0512T-W5  | 5             | 4.5~5.5   | 12            | 40           | 4   | 68                 | SMD           |
| SF0515T-W5  | 5             | 4.5~5.5   | 15            | 33           | 3   | 69                 | SMD           |
| SF1205T-W5  | 12            | 10.8~13.2 | 5             | 100          | 10  | 66                 | SMD           |
| SF1209T-W5  | 12            | 10.8~13.2 | 9             | 55           | 5   | 67                 | SMD           |
| SF1212T-W5  | 12            | 10.8~13.2 | 12            | 40           | 4   | 69                 | SMD           |
| SF1215T-W5  | 12            | 10.8~13.2 | 15            | 33           | 3   | 70                 | SMD           |

## COMMON SPECIFICATIONS

|                               |  |
|-------------------------------|--|
| Short circuit protection      | 1 second                               |
| Temperature rise at full load | 25°C MAX, 15°C TYP                     |
| Cooling                       | Free air convection                    |
| Operating temperature range   | -40°C~+85°C                            |
| Storage temperature range     | -55°C ~+125°C                          |
| Lead temperature              | 300°C (1.5mm from case for 10 seconds) |
| Storage humidity range        | $\leq 95\%$                            |
| Case material                 | Plastic (UL94-V0)                      |
| MTBF                          | >3,500,000 hours                       |

## ISOLATION SPECIFICATIONS

| Item                 | Test conditions     | Min  | Typ | Max | Units |
|----------------------|---------------------|------|-----|-----|-------|
| Isolation voltage    | Tested for 1 minute | 3000 |     |     | VDC   |
| Isolation resistance | Test at 500VDC      | 1000 |     |     | MΩ    |

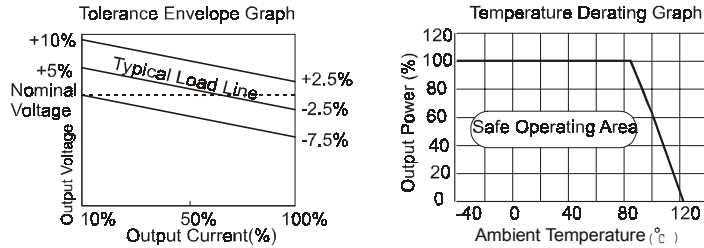
## OUTPUT SPECIFICATIONS

| Item                | Test conditions               | MIN  | TYP  | MAX  | Units |
|---------------------|-------------------------------|------|------|------|-------|
| Output power        |                               | 0.05 |      | 0.5  | W     |
| Line regulation     | For $V_{in}$ change of 1%     |      |      | 1.2  | %     |
| Load regulation     | 10% to 100% load (5V output)  |      | 12.8 | 15   | %     |
|                     | 10% to 100% load (9V output)  |      | 8.3  | 9.0  |       |
|                     | 10% to 100% load (12V output) |      | 6.8  | 7.5  |       |
|                     | 10% to 100% load (15V output) |      | 6.3  | 7.0  |       |
| Output voltage      | See tolerance envelope graph  |      |      |      |       |
| Temperature drift   | 100% full load                |      |      | 0.03 | %/°C  |
| Output ripple       | 20MHz Bandwidth               |      | 75   |      | mVp-p |
| Switching frequency | Full load, nominal input      | 80   | 100  | 200  | KHz   |

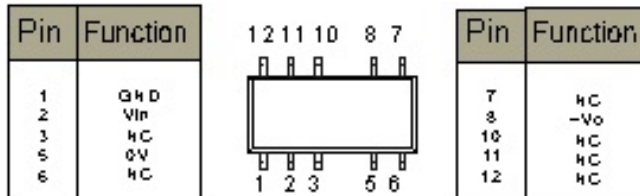
Note:

1. All specifications measured at  $T_A = 25^\circ\text{C}$ , humidity < 75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.

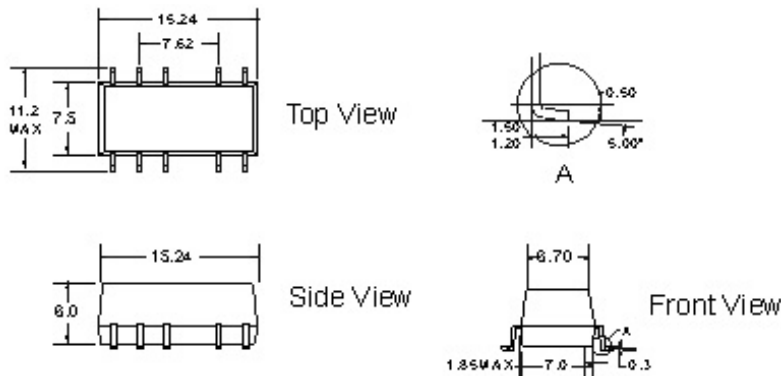
## TYPICAL CHARACTERISTICS



## PIN CONNECTIONS



## OUTLINE DIMENSIONS & RECOMMENDED FOOTPRINT DETAILS



Note: All Pins on a 2.54mm pitch; all pin diameters are 0.50mm; all dimensions in mm.

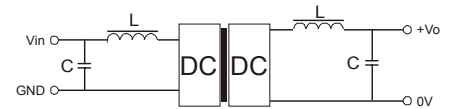
## APPLICATION NOTE

### Filtering

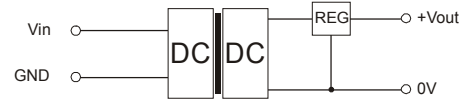
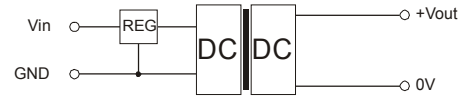
In some circuits which are sensitive to noise and ripple, a filtering capacitor may be added to the DC/DC output end and input end to reduce the noise and ripple. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees the external capacitor table. To get an extremely low ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, which may produce a more significant filtering effect. 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 (see figure 1).

### 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.



<Figure 1>



<Figure 2>

### Overload Protection

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

### 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 (see Figure 2).

### External Capacitor Table

| V <sub>in</sub> | External capacitor | V <sub>out</sub> | External capacitor |
|-----------------|--------------------|------------------|--------------------|
| 5VDC            | 4.7uF              | 5VDC             | 4.7uF              |
| 12VDC           | 2.2uF              | 9VDC             | 2.2uF              |
| 24VDC           | 1uF                | 12VDC            | 1uF                |
| --              | --                 | 15VDC            | 0.47uF             |

### Recommended Reflow Soldering

