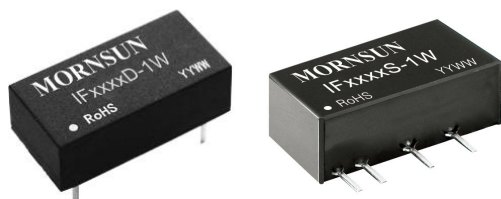


# MORNSUN®

## IF\_S-1W & IF\_D-1W Series

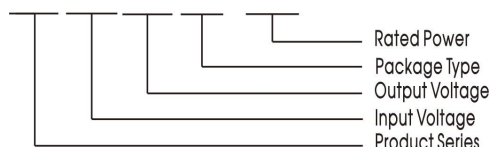
1W isolated DC-DC converter with Fixed Input Voltage and Regulated Single Output



CE Patent Protection RoHS

### MODEL SELECTION

## IF0505S-1W



### FEATURES

- Compact size
- SIP/DIP Package
- I/O isolation test voltage 3k VDC
- Operating ambient temperature range -40°C to +85°C
- Excellent thermal characteristic
- Internal surface mounted design
- No external components required
- Industry standard pin-out
- RoHS Compliant
- EN60950 Approval

### APPLICATIONS

The IF\_S-1W & IF\_D-1W Series are especially designed for use in on-board distributed power supply systems and applications with high input to output isolation requirements with the following characteristics:

- 1) The voltage of the input power supply is within a range of  $\pm 5\%$  max;
- 2) High input to output isolation of up to 3000VDC is required;
- 3) Applications requiring tight line and load regulation and/or low ripple and noise.

### MODEL SELECTION

Certification	Model	Input Voltage (VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current, typical (mA)		Full Load Efficiency (%)	
		Nominal	Range		Max.	Min.	Full Load	No Load	Min.	Typ.
CE	IF0505S-1W	5	4.75-5.25	5	200	20	303	30	62	66
	IF0512S-1W			12	83	9	278		68	72
--	IF0505D-1W			5	200	20	303		62	66
CE	IF1205S-1W	12	11.4-12.6	5	200	20	124	15	63	67
	IF1212S-1W			12	83	9	114		69	73
CE	IF2405S-1W	24	22.8-25.2	5	200	20	62	8	63	67
	IF2412S-1W			12	83	9	57		69	73
	IF2415S-1W			15	67	7	56		70	74
--	IF2405D-1W			5	200	20	62		63	67

### OUTPUT SPECIFICATIONS

Item	Test condition	Min.	Typ.	Max.	Unit
Linear Regulation	Input voltage change: $\pm 1\%$	--	--	$\pm 0.25$	%
Load Regulation	10% to 100% load change	--	$\pm 1$	$\pm 2$	
Voltage Accuracy	100% load	--	--	$\pm 3$	
Temperature Coefficient	100% load	--	--	$\pm 0.03$	%/°C
Ripple*	20MHz Bandwidth	--	10	20	mVp-p
Noise*	20MHz Bandwidth	--	50	100	

Note: \* The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

### GENERAL SPECIFICATION

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%RH
Operating Temperature		-40	--	85	°C

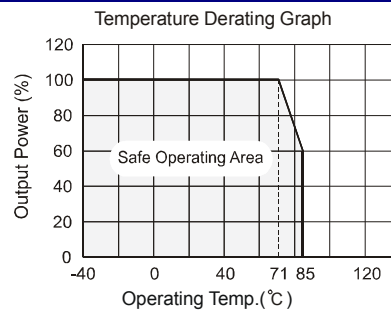
Storage Temperature		-55	--	125	°C
Case Temperature Rise	Ta=25°C	--	15	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm from case for 10 seconds	--	--	300	
Cooling Method		Free air convection			
Case Material		Black plastic; flame-retardant and heat-resistant (UL94 V-0)			
Short-circuit Protection	IFx05S/D-1W/IF24xS/D-1W*	--	--	1	S
	Others	Continuous			
Switching Frequency	100% load, Input voltage range	--	120	300	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours
Weight	IF_S-1W	--	2.1	--	g
	IF_D-1W	--	2.4	--	g

Note:\* At the end of the short circuit duration, the supply voltage must be disconnected from specified modules.

## ISOLATION

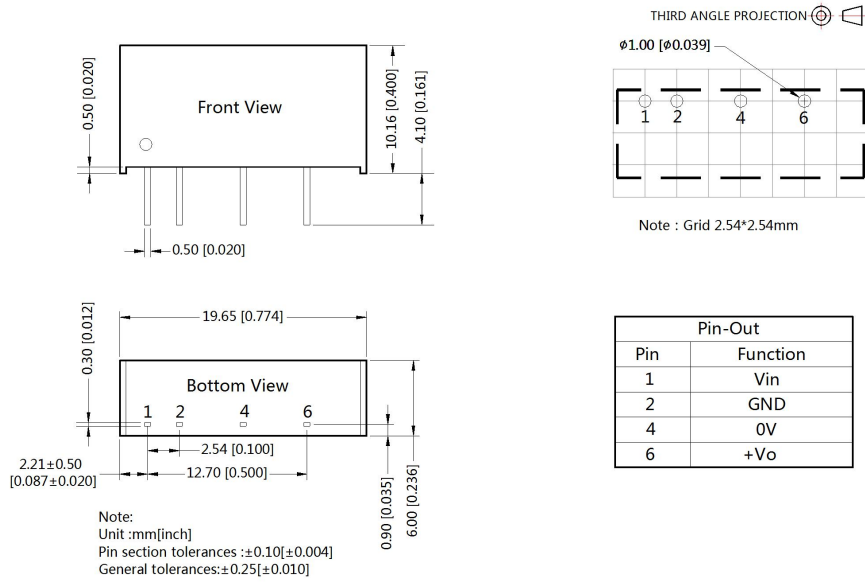
Item	Test condition	Min.	Typ.	Max.	Unit
Isolation	Input-Output Electric strength Test for 1 minute with a leakage current of 1 mA max.	3000	--	--	VDC
Insulation resistance	Input-Output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output capacitance at 100kHz/0.1V	--	60	--	pF

## TYPICAL CHARACTERISTICS CURVE

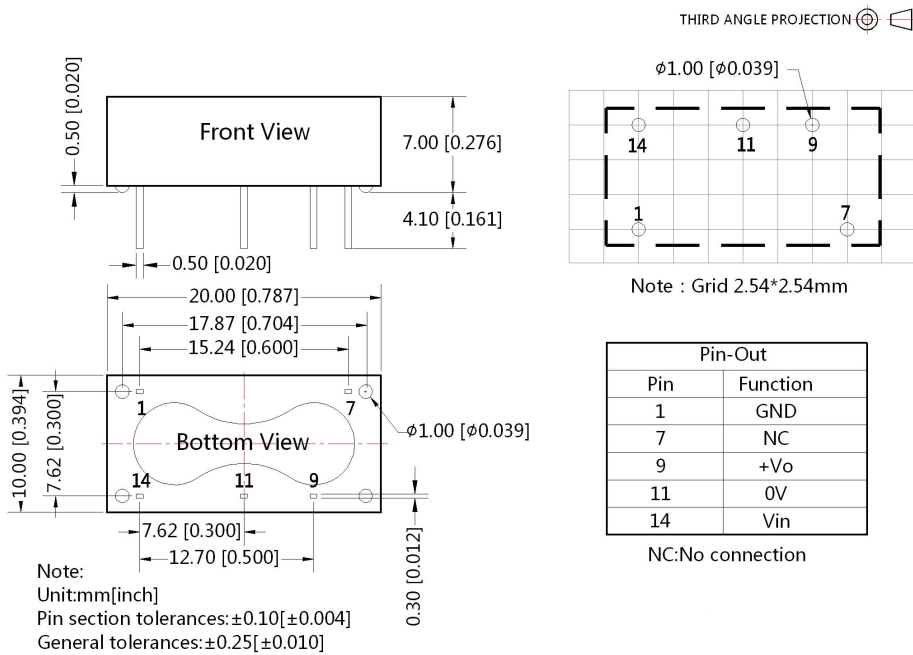


# DIMENSIONS AND RECOMMENDED LAYOUT

## IF\_S-1W



## IF\_D-1W



## APPLICATION NOTE

### 1) Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be below 10% of the rated output load. If the total required output power is less than 10%, a parallel bleeding resistor is required, ensuring that the sum of the power consumption is always maintained at 10% minimum.

### 2) Recommended circuit for Ripple Reduction

Input and/or output ripple can be further reduced by connecting "LC" filters to the input and/or output terminals of the DC-DC converter as shown in Figure 1.

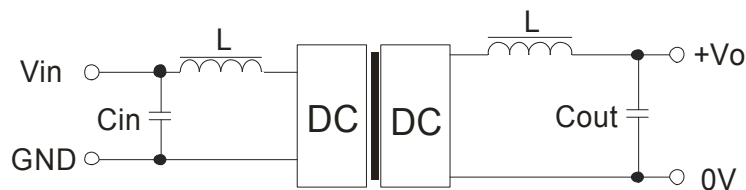


Figure 1

Note: To avoid mutual interference/oscillation the inductance and the frequency of the "LC" filter network should be staggered with the DC-DC converters frequency. Also, the capacitance of the output filter capacitor must be properly selected. If the capacitor value that is too high, the converter may not be able to properly start up. To ensure safe and reliable operation, the specified filter capacitor value in Table 1 must not be exceeded.

TABLE 1: RECOMMENDED EXTERNAL CAPACITOR VALUES

Vin (VDC)	Cin ( $\mu$ F)	Vout (VDC)	Cout ( $\mu$ F)
5	4.7	5	10
12	2.2	-	4.7
24	1	12	2.2
-	-	15	1

It is not recommended to use external capacitors for applications where the actual output power is less than 0.5W

### 3) Overload Protection

This family of DC-DC converter products does not incorporate any protection against overcurrent and/or short circuit. The best approach for protection the device is to add a self-recovery fuse or a circuit breaker in series to the input.

### 4) Input Overvoltage Protection Circuit

For input overvoltage protection, simply use a linear voltage regulator with overtemperature protection in front of the DC-DC converter as shown in Figure 2.

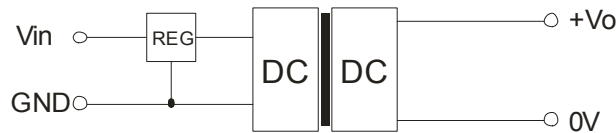


Figure 2

5) The total output power of the device has to be reduced to 60% or less of the rated output power at ambient temperatures above 71° C.

6) These products are not hot-swappable and do not support parallel connection of their outputs. We recommended the use of a converter with higher output power capability to cover applications with higher power requirements.

#### Note:

1. 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;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75%RH 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. Non-standard models may have slightly different characteristics than the standard models listed. For details, please contact technical support;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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