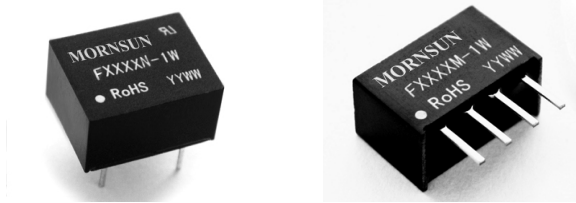


MORNSUN®

F_M-1W & F_N-1W Series 1W, FIXED INPUT, ISOLATED & UNREGULATED SINGLE OUTPUT DC-DC CONVERTER



RoHS

FEATURES

- High Efficiency up to 81%
- 3000VDC Isolation
- Temperature Range: -40°C ~ +85°C
- No Heatsink Required
- No External Component Required
- Internal SMD Construction
- Industry Standard Pinout
- RoHS Compliance

APPLICATIONS

The F_M-1W & F_N-1W series is specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

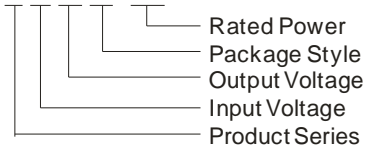
These products apply to:

- 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 $\leq 3000\text{VDC}$);
- 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.

MODEL SELECTION

F0505M-1W



Rated Power
Package Style
Output Voltage
Input Voltage
Product Series

PRODUCT PROGRAM

Model	Input		Output			Efficiency (% Typ.)
	Voltage (VDC)		Voltage (VDC)	Current (mA)		
	Nominal	Range		Max.	Min.	
F0303M -1W	3.3	2.97-3.63	3.3	303	30	68
F0305M -1W			5	200	20	71
F0305N -1W			5	200	20	71
F0503M -1W	5	4.5-5.5	3.3	303	30	68
F0505M -1W			5	200	20	75
F0509M -1W			9	111	12	73
F0512M -1W			12	83	9	74
F0515M -1W			15	67	7	75
F0503N -1W			3.3	303	30	71
F0505N -1W			5	200	20	68
F0509N -1W			9	111	12	76
F0512N -1W			12	83	9	75
F0515N -1W			15	67	7	77
F1203M -1W			12	10.8-13.2	3.3	303
F1205M -1W	5	200			20	71
F1209M -1W	9	111			12	73
F1212M -1W	12	83			9	73
F1215M -1W	15	67			7	74
F1203N -1W	3.3	303			30	72
F1205N -1W	5	200			20	69
F1209N -1W	9	111			12	75
F1212N -1W	12	83			9	77
F1215N -1W	15	67			7	79
F2405N -1W	24 21.6-26.4				5	200
F2412N -1W			12	83	9	78
F2415N -1W			15	67	7	79
F2424N -1W			24	42	3	81
F2405M -1W			5	200	20	71

Note: Models listed with strike-through text have been officially discontinued.

ISOLATION SPECIFICATIONS

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

OUTPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Output power		0.1		1	W
Line regulation	For Vin change of ±1%			±1.5	
	(3.3V output)			±1.2	
Load regulation	10% to 100% load		15	20	%
		(others output)			
		(3.3V output)			
		(5V output)	12.8	15	
		(9V output)	8.3	15	
		(12V output)	6.8	15	
	(15V output)	6.3	15		
	(24V output)	6.0	15		
Output voltage accuracy		See tolerance envelope graph			
Temperature drift	100% full load			±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		100	150	mVp-p
Switching frequency	Full load, nominal input		100		KHz

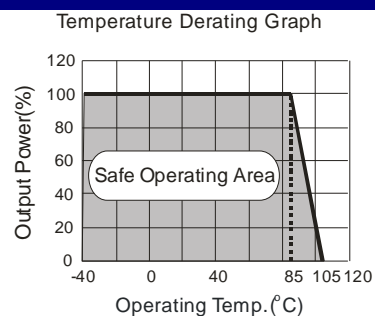
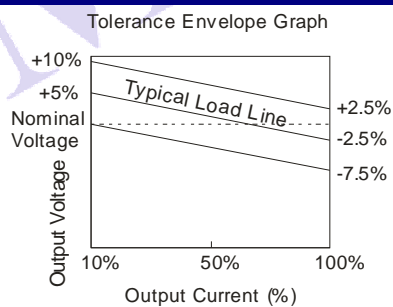
Note:* Ripple and noise tested with "parallel cable" method. See detailed operation instructions at *DC-DC Application Notes*.

COMMON SPECIFICATIONS

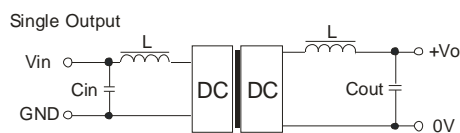
Item	Test conditions	Min.	Typ.	Max.	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Temp. rise at full load			25	30	
Lead temperature	1.5mm from case for 10 seconds			300	
Short circuit protection*				1	s
Cooling		Free air convection			
Case material		Plastic (UL94-V0)			
MTBF		3500			K hours
Weight	F_M-1W series		1.05		g
	F_N-1W series		1.8		

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

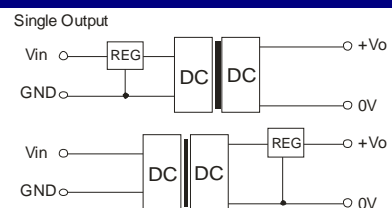
TYPICAL CHARACTERISTICS



RECOMMENDED CIRCUIT



(Figure 1)



(Figure 2)

EXTERNAL CAPACITOR TABLE (TABLE 1)

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

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

APPLICATION NOTE

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be less than 10% of the full 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.

2) 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).

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).

3) 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).

4) Overload Protection

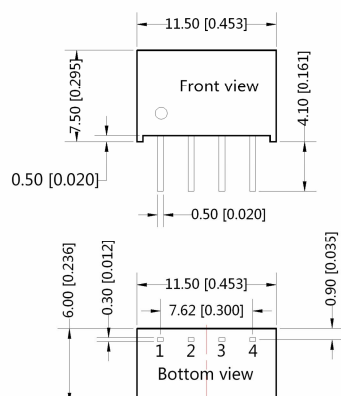
Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

5) No parallel connection or plug and play

OUTLINE DIMENSIONS & PIN CONNECTIONS

F_M-1W

MECHANICAL DIMENSIONS

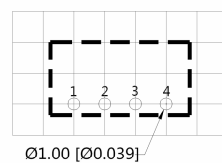


PIN CONNECTION	
Pin	Function
1	GND
2	Vin
3	0V
4	+Vo

Note:
Unit :mm[inch]
Pin section tolerances:±0.1mm[±0.004inch]
General tolerances:±0.25mm[±0.01inch]

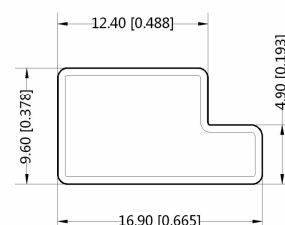


RECOMMENDED FOOTPRINT DETAILS

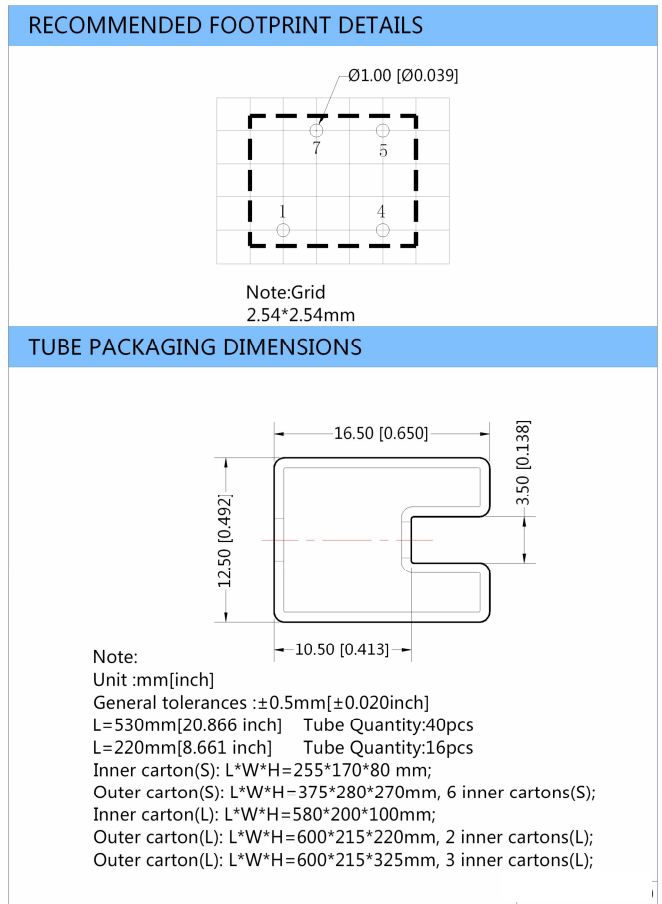
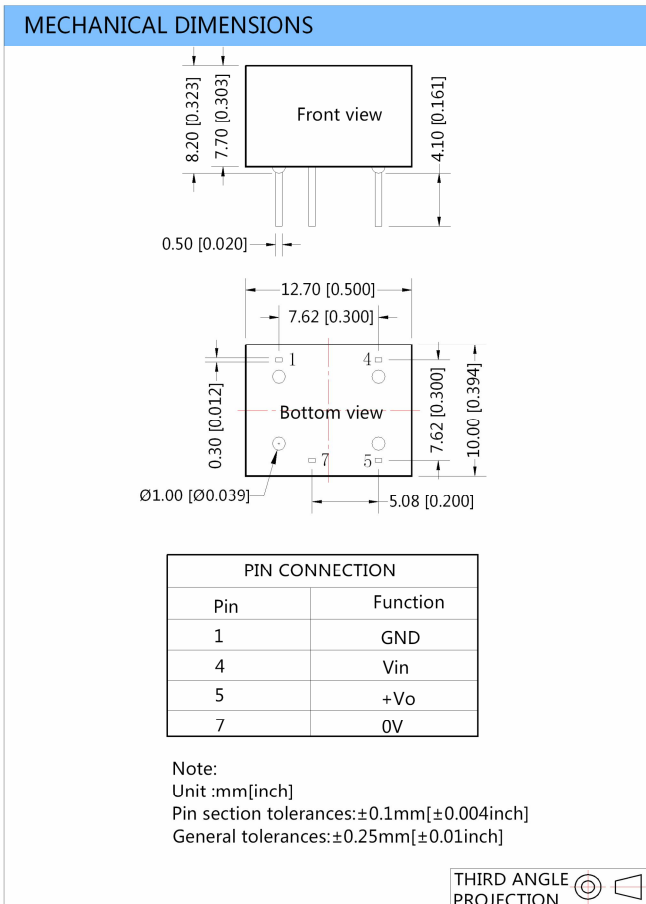


Note:Grid 2.54*2.54mm

TUBE PACKAGING DIMENSIONS



Note:
Unit :mm[inch]
General tolerances :±0.5mm[±0.020inch]
L=530mm[20.866 inch] Tube Quantity: 43pcs
L=220mm[8.661 inch] Tube Quantity: 17pcs
Inner carton(S): L*W*H=255*170*80 mm;
Outer carton(S): L*W*H=375*280*270mm, 6 inner cartons(S);
Inner carton(L): L*W*H=580*200*100mm;
Outer carton(L): L*W*H=600*215*220mm, 2 inner cartons(L);
Outer carton(L): L*W*H=600*215*325mm, 3 inner cartons(L);



Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specifications.
2. Max. Capacitive Load is tested at nominal input voltage and full load.
3. Unless otherwise noted, All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load.
4. In this datasheet, all test methods are based on our corporate standards.
5. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more detail.
6. Please contact our technical support for any specific requirement.
7. Specifications of this product are subject to changes without prior notice.

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