

## E\_D-1W & F\_D-1W Series

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



#### FEATURES

- High Efficiency up to 80%
- High Density, High Stability
- 3000VDC Isolation
- DIP Package
- Internal SMD construction
- No Heat sink Required
- Temperature Range: -40°C ~ +85°C
- No External Component Required
- Industry Standard Pinout
- RoHS Compliance

#### APPLICATIONS

The E\_D-1W & F\_D-1W Series are 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.

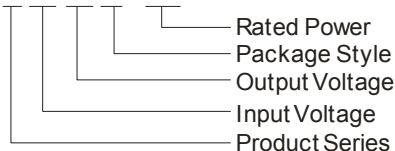
These products apply to:

- 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

E0505D-1W



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#### PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (% Typ.)	Certificate
	Voltage (VDC)		Voltage (VDC)	Current (mA)			
	Nominal	Range		Max.	Min.		
F0305D-1W	3.3	3.0-3.6	5	200	20	74	
E0505D-1W	5	4.5-5.5	±5	±100	±10	71	UL CE
E0509D-1W			±9	±56	±6	77	UL CE
E0512D-1W			±12	±42	±5	77	UL CE
E0515D-1W			±15	±33	±4	79	UL CE
F0503D-1W			3.3	303	30	73	
F0505D-1W			5	200	20	72	UL CE
F0509D-1W			9	111	12	76	UL CE
F0512D-1W			12	83	9	79	UL CE
F0515D-1W			15	67	7	78	UL CE
F0524D-1W			24	42	5	79	
E1205D-1W	12	10.8-13.2	±5	±100	±10	73	UL CE
E1209D-1W			±9	±56	±6	77	UL CE
E1212D-1W			±12	±42	±5	80	UL CE
E1215D-1W			±15	±33	±4	80	UL CE
F1205D-1W			5	200	20	70	UL CE
F1212D-1W			12	83	9	78	UL CE
F1215D-1W			15	67	7	79	UL CE
F1505D-1W	15	13.5-16.5	5	200	20	69	
E2405D-1W	24	21.6-26.4	±5	±100	±10	73	UL CE
E2409D-1W			±9	±56	±6	77	UL CE
E2412D-1W			±12	±42	±5	80	UL CE
E2415D-1W			±15	±33	±4	80	UL CE
F2405D-1W			5	200	20	71	UL CE
F2412D-1W			12	83	9	78	UL CE
F2415D-1W			15	67	7	80	UL CE

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

#### COMMON SPECIFICATIONS

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

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

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

OUTPUT SPECIFICATIONS						
Item	Test conditions	Min	Typ	Max	Units	
Output power		0.1	--	1	W	
Line regulation	For Vin change of ±1%	(3.3V output)	--	--	±1.5	--
		(Others output)	--	--	±1.2	
Load regulation	10% to 100% load	(3.3V output)	--	12	20	%
		(5V output)	--	10	15	
		(9V output)	--	8.3	15	
		(12V output)	--	6.8	15	
		(15V output)	--	6.3	15	
		(24V output)	--	5.0	15	
Output voltage accuracy		See tolerance envelope graph				
Temperature drift	100% full load	--	--	±0.03	%/°C	
Ripple & Noise*	20MHz Bandwidth(EXXXXD-1W)	--	50	--	mVp-p	
	20MHz Bandwidth(FXXXXD-1W)	--	75	--		
Switching frequency	Full load, nominal input	--	100	--	KHz	

\*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.  
Note: Dual output models unbalanced load: ±5%.

## APPLICATION NOTE

### 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.

### 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).

### 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).

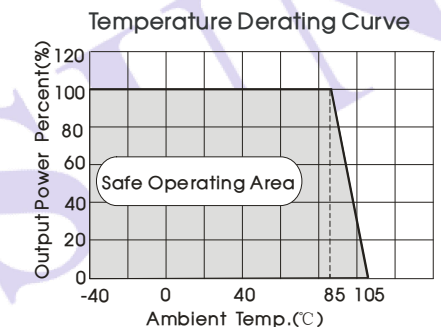
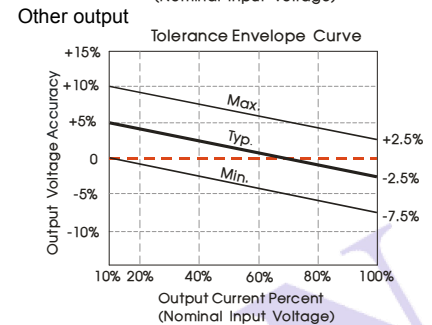
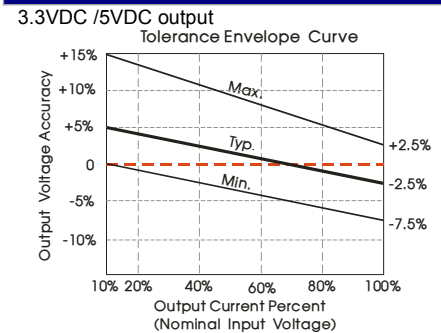
### Overload Protection

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.

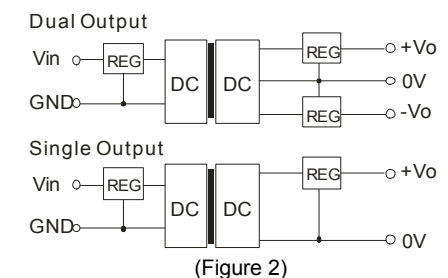
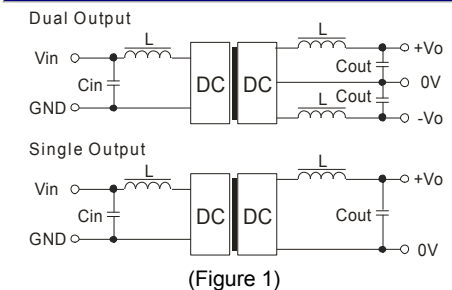
### No parallel connection or plug and play

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## TYPICAL CHARACTERISTICS



## RECOMMENDED CIRCUIT



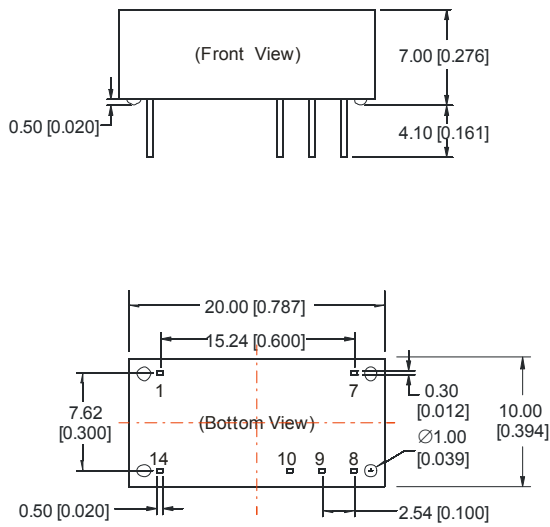
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (uF)	Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cout (uF)
3.3/5	4.7	3.3/5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
15	2.2	12	2.2	±12	1
24	1	15	1	±15	0.47
--	--	24	1	--	--

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

# OUTLINE DIMENSIONS & PIN CONNECTIONS

## MECHANICAL DIMENSIONS



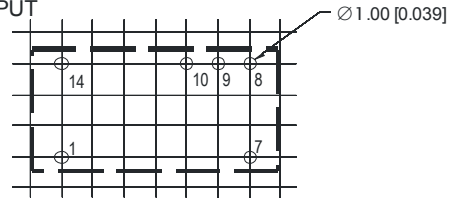
FOOTPRINT DETAILS		
Pin	Single	Dual
1	GND	GND
7	NC	NC
8	+Vo	+Vo
9	No Pin	0V
10	0V	-Vo
14	Vin	Vin

NC: No connection

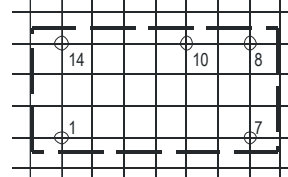
Note:  
 Unit:mm[inch]  
 Pin section tolerances:±0.10mm[±0.004inch]  
 General tolerances:±0.25mm[±0.010inch]

## RECOMMENDED FOOTPRINT

### DUAL OUTPUT

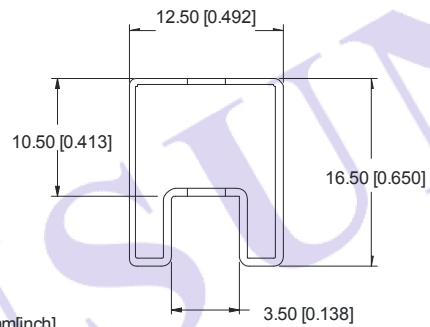


### SINGLE OUTPUT



Note: grid 2.54\*2.54mm.

## TUBE OUTLINE DIMENSIONS



Note:  
 Unit: mm[inch]  
 General tolerances: ±0.50mm[±0.020inch]  
 L=530mm[20.866inch] Tube Quantity: 25pcs  
 L=220mm[8.661inch] Tube Quantity: 10pcs  
 Short tube inner package dimensions: L\*W\*H= 255\*170\*80mm  
 Short tube outer package dimensions(with six inner package boxes):  
 L\*W\*H= 375\*280\*270mm  
 Long tube inner package dimensions: L\*W\*H= 580\*200\*100mm  
 Long tube outer package dimensions(with two inner package boxes):  
 L\*W\*H= 600\*215\*220mm  
 Long tube outer package dimensions(with three inner package boxes):  
 L\*W\*H= 600\*215\*325mm

### Note:

- Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
- All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
- In this datasheet, all the test methods of indications are based on corporate standards.
- Only typical models listed, other models may be different, please contact our technical person for more details.