



## H\_RN-2W & H\_LT-2W Series

2W, FIXED INPUT, 6000V ISOLATED & UNREGULATED SINGLE OUTPUT DC-DC CONVERTER

### FEATURES

- High Efficiency up to 80%
- DIP/SMD Package
- 6kVDC Isolation
- Temperature Range: -40°C ~ +85°C
- Internal SMD Construction
- No Heatsink Required
- No External Component Required
- Continuous Short Circuit Protection
- Industry Standard Pinout
- RoHS Compliance

### APPLICATIONS

The H\_RN-2W&H\_LT-2W 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.

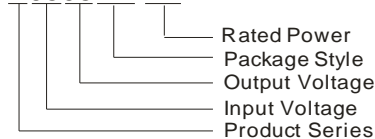
These products apply to:

- 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  $\leq 6000\text{VDC}$ );
- 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

#### H0505RN-2W



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### PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (% , Typ.)	Certificate*		
	Voltage (VDC)		Voltage (VDC)	Current (mA)					
	Nominal	Range		Max.	Min.				
H0503RN-2W	5	4.5-5.5	3.3	606	60	71			
H0505RN-2W			5	400	40	76	CE		
H0509RN-2W			9	223	22	78	CE		
H0512RN-2W			12	167	17	79	CE		
H0515RN-2W			15	133	13	78	CE		
H0505LT-2W			5	400	40	76	CE		
H0509LT-2W			9	223	22	78	CE		
H0512LT-2W			12	167	17	79	CE		
H0515LT-2W			15	133	13	78	CE		
H1205RN-2W			12	10.8-13.2	5	400	40	76	CE
H1209RN-2W	9	223			22	79	CE		
H1212RN-2W	12	167			17	80	CE		
H1215RN-2W	15	133			13	79	CE		
H1205LT-2W	5	400			40	76	CE		
H1209LT-2W	9	223			22	79	CE		
H1212LT-2W	12	167			17	80	CE		
H1215LT-2W	15	133			13	79	CE		
H2405RN-2W	24	21.6-26.4			5	400	40	77	CE
H2409RN-2W					9	223	22	77	CE
H2412RN-2W			12	167	17	80	CE		
H2415RN-2W			15	133	13	78	CE		
H2403LT-2W			3.3	400	40	71			
H2405LT-2W			5	400	40	77	CE		
H2409LT-2W			9	223	22	77	CE		
H2412LT-2W			12	167	17	80	CE		
H2415LT-2W			15	133	13	78	CE		

\*CE Certificate:EN60601

### 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			15	25	
Lead temperature	1.5mm from case for 10 seconds			300	
Cooling		Free air convection			
Package material		Epoxy Resin (UL94-V0)			
Short circuit protection		Continuous, automatic recovery			
MTBF		3500			k hours
Weight			3.8		g

### ISOLATION SPECIFICATIONS

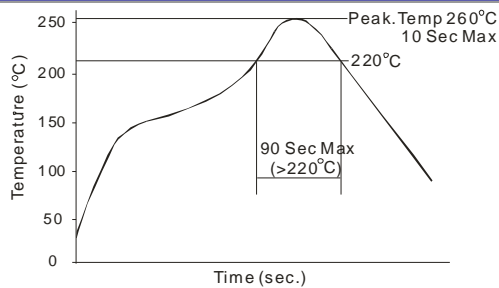
Item	Test Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Tested for 1 minute and 1mA max	6000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance			10		pF

## OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Output power		0.2		2	W
Line regulation	For Vin change of $\pm 1\%$			$\pm 1.2$	
Load regulation	10% to 100% load (5V output)		12.8	15	%
	10% to 100% load (9V output)		8.3	15	
	10% to 100% load (12V output)		6.8	15	
	10% to 100% load (15V output)		6.3	15	
Output voltage accuracy		See tolerance envelope graph			
Temperature drift	100% full load			$\pm 0.03$	%/°C
Ripple & Noise*	20MHz Bandwidth		150	200	mVp-p
Switching frequency	Full load, nominal input		50		kHz

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

## RECOMMENDED REFLOW SOLDERING PROFILE



Remark: The curve applies only to the hot air reflow soldering

## APPLICATION NOTE

### 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 **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 testing and application 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

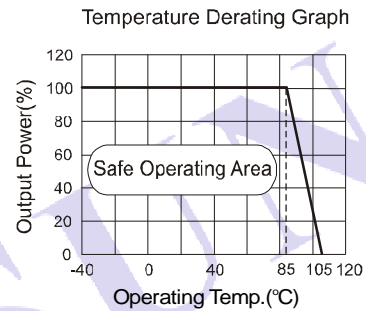
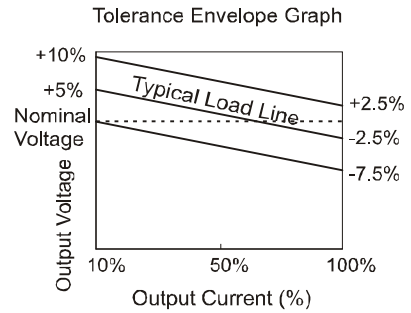
The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).

### 4) Overload Protection

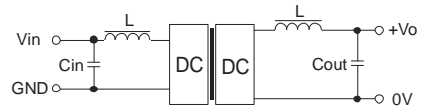
Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

### 5) No parallel connection or plug and play

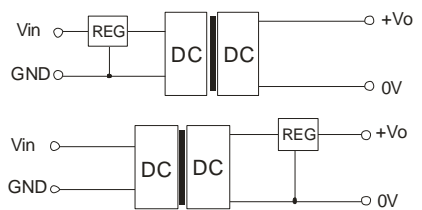
## TYPICAL CHARACTERISTICS



## RECOMMENDED CIRCUIT



(Figure 1)



(Figure 2)

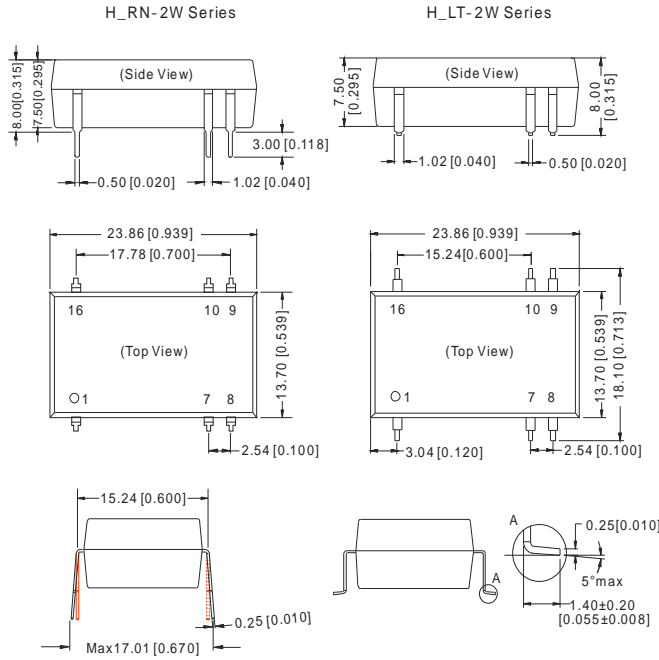
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)
5	4.7	5	10
12	2.2	9	4.7
24	1	12	2.2
--	--	15	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	Function
1	GND
7	NC
8	NC
9	+Vo
10	0V
16	Vin

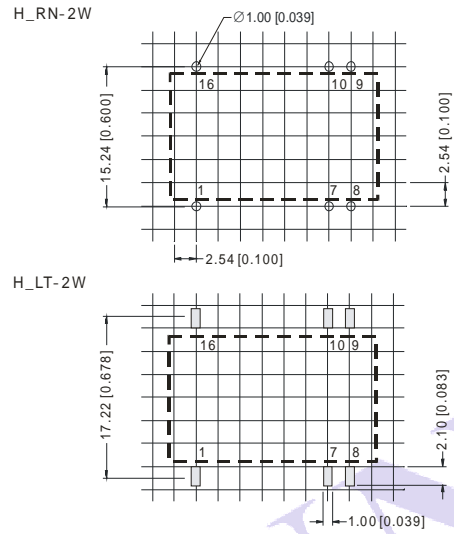
NC:No connection

Note:  
Unit:mm[inch]  
Pin section tolerances:  $\pm 0.10\text{mm}$  [  $\pm 0.004\text{inch}$  ]  
General tolerances:  $\pm 0.25\text{mm}$  [  $\pm 0.010\text{inch}$  ]

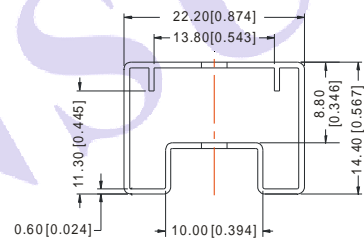
FOOTPRINT DETAILS	
Pin	Function
1	GND
7	NC
8	NC
9	+Vo
10	0V
16	Vin

NC:No connection

## RECOMMENDED FOOTPRINT



## TUBE OUTLINE DIMENSIONS



Note:  
Unit:mm[inch]  
General tolerances:  $\pm 0.50\text{mm}$  [  $\pm 0.020\text{inch}$  ]  
L=530mm [ 20.866inch ] pcs/tube: 21  
L=220mm [ 8.661inch ] pcs/tube: 8

### Note:

1. 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.
2. All specifications measured at  $T_a=25^\circ\text{C}$ , humidity<75%, nominal input voltage and rated output load unless otherwise specified.
3. Only typical models listed, other models may be different, please contact our technical person for more details.
4. In this datasheet, all the test methods of indications are based on corporate standards.