Product Manual

P_HS-1W

Data Sheet

Constant voltage input,isolated no-regulated single output



UL 60601-1 IEC 60601-1

UL File Number：E542321

Product Series

Product Series	Temperature Range	Isolated Voltage	Package
P_HS-1W	-40℃～+105℃	5000VAC 6000VDC	SIP

Features

- Efficiency up to 87%
- Strengthen insulation,isolated voltage 5000VAC or 6000VDC
- Electrical clearance and creepage distance>5 mm
- Low leakage current＜2μA
- Passed IEC60601-1 medical safety certification (2xMOPP/2xMOOP)
- Sustainable short circuit
- The shell meet the UL94 V-0 standard
- Package is pin-to-pin compatible with international and domestic similar product
- Unsuitable for the occasion where the fluctuation range of input voltage is greater than ±10%

Applications

- Medical equipment
- Power equipment
- Digital and analog signal isolation
- DCS systems,instruments and meters
- ……

Product Model

Part Number	Certification	Input Nominal Voltage (Voltage Range) (VDC)	Output			Full Load Efficiency (%,Min/Typ)	Maximum Capacitive Load (μF)
			Nominal Voltage (VDC)	Min Current (mA)	Max Current (mA)		
P0505HS-1W	UL/IEC	5 (4.5-5.5)	5	20	200	76/79	1800
P0512HS-1W			12	8	83	80/82	330
P0515HS-1W			15	7	67	83/86	330
P0524HS-1W			24	4	42	85/87	33
P1205HS-1W		12 (10.8-13.2)	5	20	200	76/78	1800
P1212HS-1W			12	8	83	78/82	330
P1215HS-1W			15	7	67	78/81	330
P1224HS-1W			24	4	42	77/80	33
P2405HS-1W	--	24 (21.6-26.4)	5	20	200	80/83	1800
P2412HS-1W	UL/IEC		12	8	83	77/80	330
P2415HS-1W			15	7	67	78/81	330
P2424HS-1W	--		24	4	42	77/80	33

Limit Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Input Surge Voltage (1s，max)	5VDC input	-0.7	--	9	VDC
	12VDC input	-0.7	--	18	
	24VDC input	-0.7	--	30	
Lead Soldering Temperature	1.5mm from case,10s	--	--	300	℃
Hot Plug		Unavailable			

Input Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
No Load/Full Load Input Current	5VDC input	--	15/238	25/258	mA
	12VDC input	--	6/100	15/110	
	24VDC input	--	5/52	10/55	
Input Filter		Capacitor filter			

Output Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Line Regulation	Input voltage changes within ±1%	--	±1.2	±1.5	--
Load Regulation	Load is from 10% to 100%	--	5	20	%
Temperature Drift Coefficient	100% load	--	--	±0.03	%/℃
Output Ripple& Noise	20MHz bandwidth	--	70	200	mVp-p
Output Voltage Accuracy		See output voltage and load curve			
Output Short-Circuit Protection		Sustainable short circuit, self-recovery			

General Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Isolation Voltage	Input-output, time 1 minute, leakage current less than 1mA	5000	--	--	VAC
		6000	--	--	VDC
Leakage Current	250VAC,50/60Hz	--	--	2	μA
Isolation Resistance	Input-output,isolation voltage 500VDC	1	--	--	GΩ
Isolation Capacitance	Input-output,100kHz,0.1V	--	4	12	pF
Switching Frequency	Nominal input voltage, 100% load	--	270	350	kHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	k hours
Package Size	--	19.50×9.80×12.50			mm
Package Material	--	Black flame retardant plastic shell, comply with UL94V-0 standard			

Environmental Characteristics

Parameter	Conditions	Min	Typ	Max	Unit
Operating Temperature	See the ambient temperature derating curve for details	-40	--	+105	℃
Storage Temperature	--	-55	--	+125	
Casing Temperature Rise	Ta=25℃	--	15	45	
Storage Humidity	No condensation	--	--	95	%
Cooling Method		Natural air cooling			
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			

EMC Characteristics

EMI	CE	CISPR32/EN55032 CLASS B (See Figure 2)	
	RE	CISPR32/EN55032 CLASS B (See Figure 2)	
EMS	ESD	IEC/EN61000-4-2 Contact±8kV Air±15kV	Perf.Criteria B

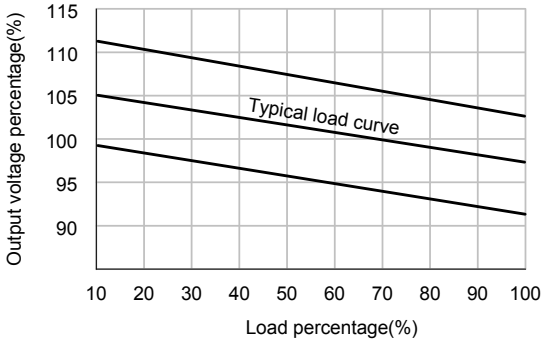
Notes:(1) The input voltage cannot exceed the specified range, otherwise it may cause permanent and irreversible damage.

(2)Output ripple & noise tested by direct-probe method.

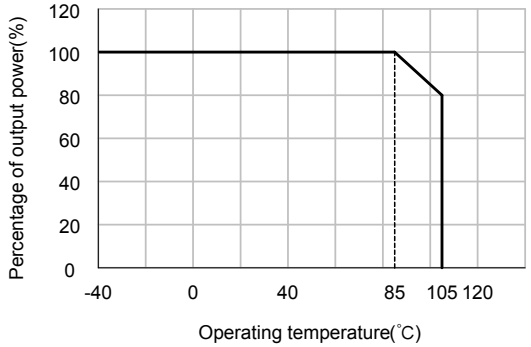
(3)Leakage current and reinforced insulation are based on 250VAC, 50/60Hz system input voltage.

(4)Unless specified specially, parameters in this manual are measured under the conditions of 25℃, 40%~75% humidity, input nominal voltage and rated output load.

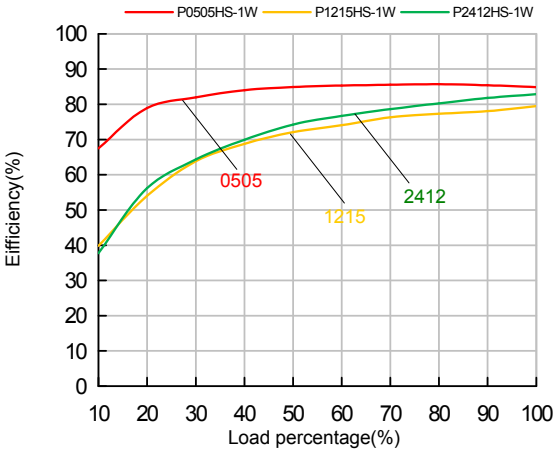
Product Characteristic Graph



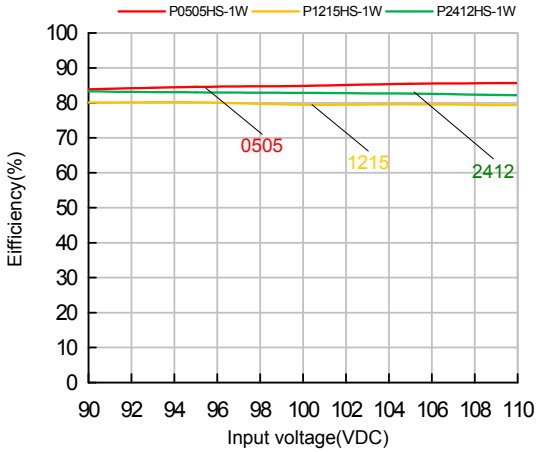
Output voltage VS load graph
(nominal input voltage)



Curve of relationship between output power and working temperature

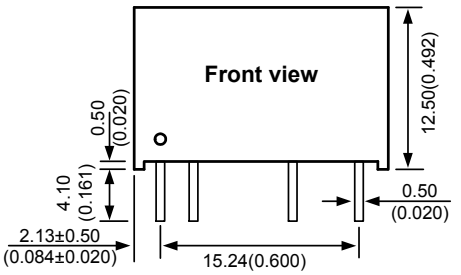


Efficiency VS load(Nominal input voltage)

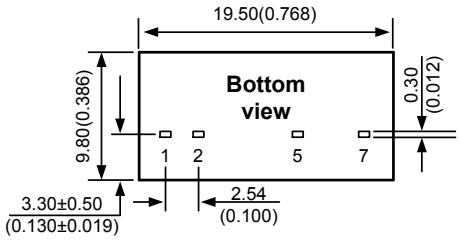


Eifficiency VS input voltage(Full load)

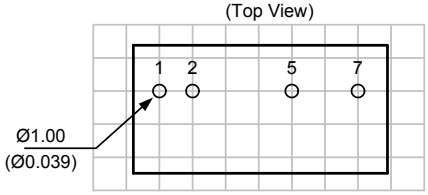
Outline and Footprint Dimensions



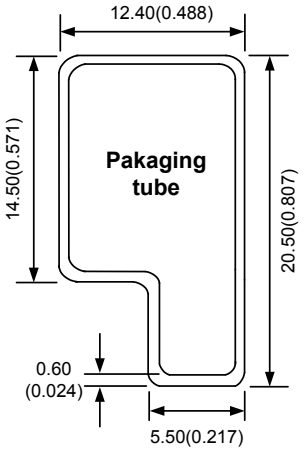
Pin	Function
1	Vin
2	GND
5	0V
7	+Vo



PCB Silkscreen Diagram
(Top View)



Notes：
Unit：mm(inch)
Unlabeled tolerance：±0.25(±0.010)
Grid distance：2.54×2.54mm



Notes：
Size：mm(inch)
Unlabeled tolerance:±0.50(±0.020)
L=282(11.102)，13pieces/pallet
Carton Size：304×120×40mm
234pieces/carton

Circuit Design and Application

1. Recommended circuit

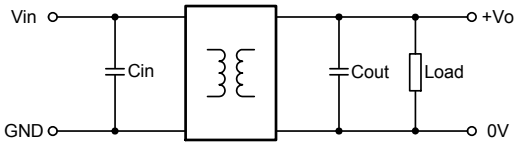


Figure 1　Recommended circuit

2. Filter capacitor

For the selection of filter capacitor, please refer to values in Table 1. If the ESR is less than 1 Ω (when the frequency is 100KHz), the ceramic or electrolytic capacitor is recommended to use, and the tantalum capacitor is not recommended to use. The value of input and output filter capacitor can not be too large, The selected input capacitance must be less than the maximum capacitive load of the preceding power supply system, and the selected output capacitance must be less than the maximum capacitive load of this product.otherwise it may cause startup problem.

Table 1　The reference value of the external capacitor

Vin(VDC)	Cin(μF)	Vo(VDC)	Cout(μF)
5	4.7	5	4.7
12	2.2	12/15	2.2
24	1	24	1

3. EMC typical recommended circuit(CLASS B)

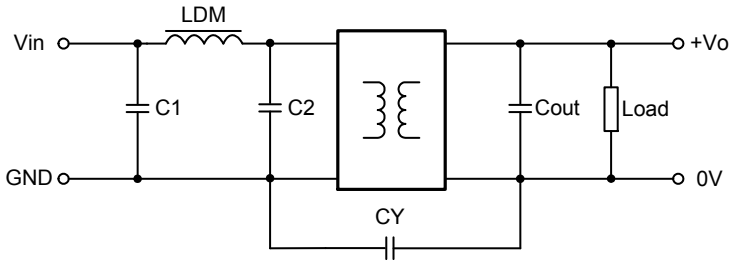


Figure 2 EMC recommended circuit diagram

Table 2 EMC recommended circuit external parameter values

EMC	Vin(VDC)	C1/C2(μF)	CY	LDM(μH)	Cout(μF)
EMI	5/12/24	4.7	1nF/6KVDC	6.8	Refer to table 1
Note： 1.The withstand voltage values of capacitors C1 and C2 are selected according to "input impulse voltage". 2.The maximum current of inductance LDM is selected according to the actual input current, and it is recommended to select 1.5 times the actual current. 3.It is recommended that the circuit wiring should not be long and be as close as possible to the module.					

4. Load requirements

In order to ensure efficient and reliable operation of the module, it is recommended that the output load should be between 10% and 100% of the rated power. It is not recommended to run for a long time in the case of the load is less than 10%, otherwise part of the product performance can't conform to the performance index of this manual. If the output load is too light, place a dummy load resistance on output terminal in parallel. The sum of the fake load resistance power plus the actual load power is greater than 10% of the load.

5. Protection function

Under normal conditions, this series of power modules have no over-current protection function.An overcurrent protector can be added at the input terminal. The simplest way to protect the output from over voltage and over current is to connect a linear regulator with over current protection at the output.

Guangzhou ZHIYUAN Electronics Co.,Ltd.
Service Hotline: 400-888-4005
E-mail：power.sales@zlg.cn
Website：http://www.zlg.cn
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