



### Product Feature

- Package Type: DIP7
- Operating temperature range: -40°C - +105°C
- Isolation voltage: 1500VDC
- High efficiency up to: 89%(Type)
- Compliant with standard: International standard pin method
- Fields of application: Power, Industrial control, Communication, Internet of Things, Automotive

### Selection Guide

Part No.	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)Max.	Full Load Efficiency%(Typ.)	Capacity Load (μF) Max.
	Nominal(Range)				
TPS-HCP105S03	5(4.5-5.5)	3.3	303	83	2400
TPS-HCP105S05	5(4.5-5.5)	5	200	86	2400
TPS-HCP105S09	5(4.5-5.5)	9	111	86	1000
TPS-HCP105S12	5(4.5-5.5)	12	84	88	560
TPS-HCP105S15	5(4.5-5.5)	15	67	88	560
TPS-HCP105S24	5(4.5-5.5)	24	42	89	220
TPS-HCP112S03	12 (10.8-13.2)	3.3	303	84	2400
TPS-HCP112S05	12 (10.8-13.2)	5	200	86	2400
TPS-HCP112S09	12 (10.8-13.2)	9	111	87	1000
TPS-HCP112S12	12 (10.8-13.2)	12	84	87	560
TPS-HCP112S15	12 (10.8-13.2)	15	67	88	560
TPS-HCP112S24	12 (10.8-13.2)	24	42	89	220

### Input Specifications

Item	Operating Conditions	Min .	Typ.	Max .	Unit
Input Current (full load / no load)	5VDC Input	--	230/3	260/15	mA
	12VDC Input	--	99/3	105/15	
Reflected Ripple Current	12VDC Input	--	15	--	
Impulse Voltage	5VDC Input	-0.7	--	9	VDC
	12VDC Input	-0.7	--	18	
Input Filter		Capacitance Filter			
Hot Plug		Unavailable			

Output Specifications						
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See Figure1			
Linear Regulation	Input voltage variation	3.3VDC Output	--	±1.5	--	%
		Other Output	--	±1.2	--	
Load Regulation	10% -100% load	3.3VDC Output	--	15	20	%
		5VDC Output	--	10	15	
		Other	--	7	10	
Ripple & Noise	20 MHz bandwidth		--	45	100	mV
Temperature Coefficient	Full Load		--	±0.03	--	%/°C
Short-circuit Protection			Continuous, Self-Recovery			

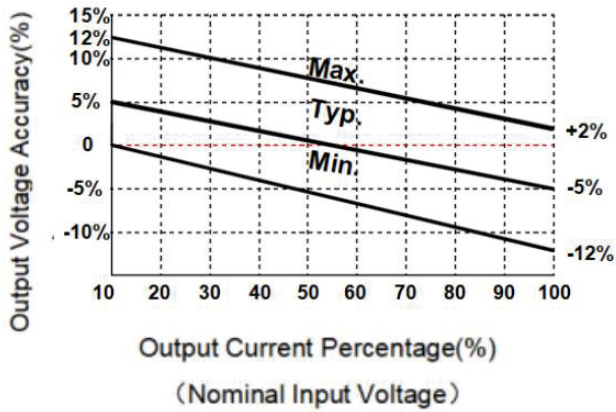
General Specifications						
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, test time 1 minute, leakage current less than 1mA		1500	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC		1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V		--	20	--	pF
Operating Temperature	Derating when operating temperature ≥85°C(See Figure 2)		-40	--	105	°C
Storage Temperature			-55	--	125	°C
Storage Humidity	Non-condensing		--	--	--	°C
Heating of the casing during operation	Ta=25°C, Input nominal, output full load		--	25	95	%RH
Pin welding can withstand the highest temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	°C
Switching Frequency	Full Load, Nominal Input Voltage		--	220	--	KHz
MTBF	MIL-HDBK-217F@25°C		>3500Kh			

Mechanical Specifications	
Case Material	Black plastic; flame-retardant and heat-resistant(UL 94V-0 rated)
Package Dimensions	12.70 x 10.15 x 7.80 mm
Weight	1.65g(Typ.)
Cooling Method	Free air convection

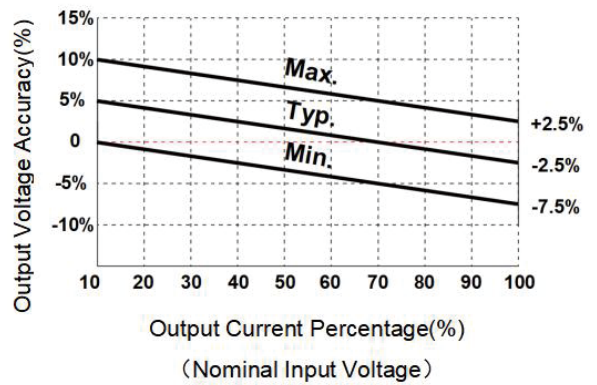
EMC Characteristics		
EMI	CE	CISPR32/EN55032 CLASS B (Application circuit 4)
	RE	CISPR32/EN55032 CLASS B (Application circuit 4)
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV Perf. Criteria B

**Typical Characteristic Curves**

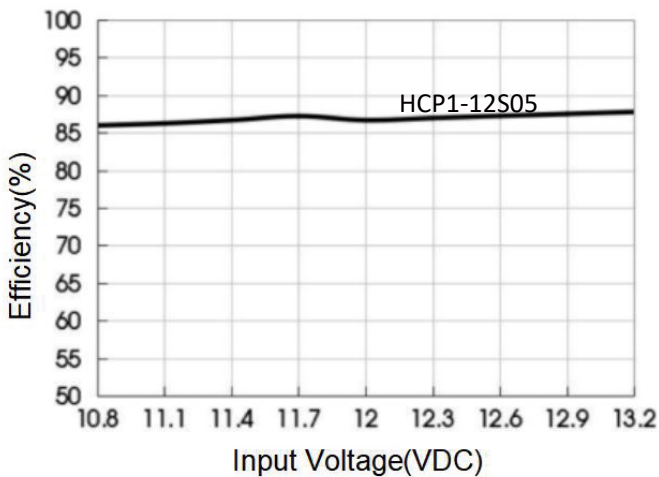
Output Regulation Curve 3.3VDC output (Figure1-1)



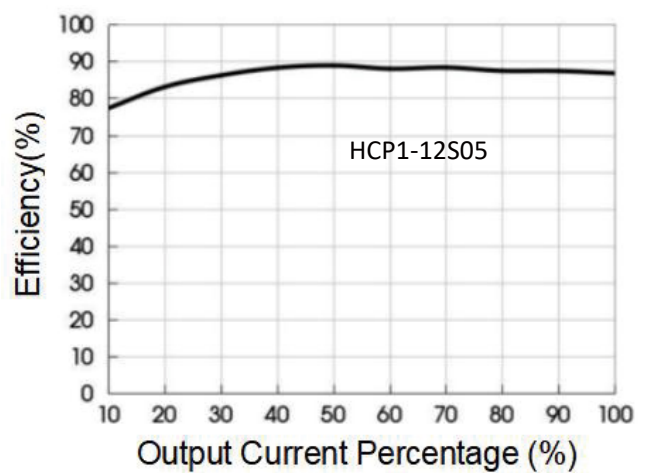
Output Regulation Curve(Figure1-2)



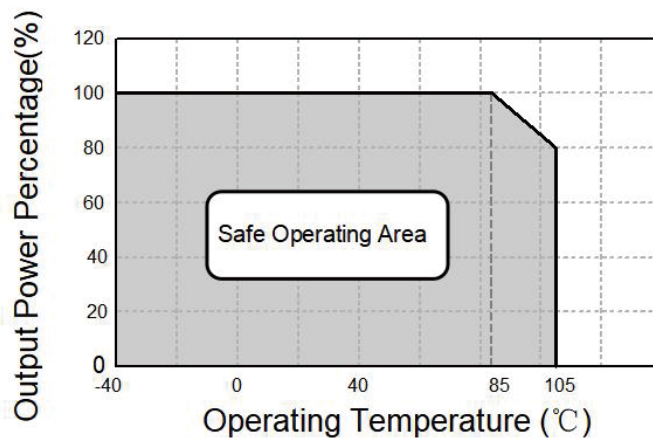
Efficiency VS Input voltage (full load)



Efficiency VS Output load (Vin=12V)

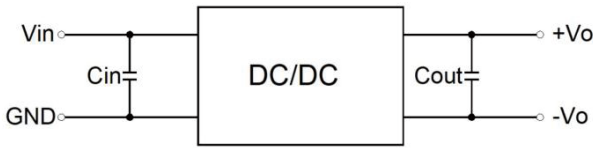


Temperature Derating Curve (Figure 2)



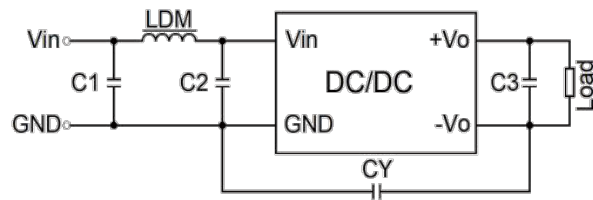
**Circuit Design and Application**

• Figure 3



Recommended component parameters			
Vin	Cin	Vo	Cout
3.3/5VDC	10µF/16V	3.3, 5VDC	10µF/16V
12VDC	2.2µF/25V	9, 12VDC	2.2µF/25V
--	--	15VDC	1µF/50V
--	--	24VDC	0.47µF/50V

• Figure 4



EMI Recommended Parameter Table		
EMI	C1	4.7µF/50V
	C2	4.7µF/50V
	C3	Refer to the Cout parameter in Figure 3
	CY	270pF/2kV
	LDM	6.8µH

• 1. Typical application

If further reduction of input and output ripple is required, a capacitor filtering network can be connected at the input and output terminals, and the application circuit is shown in Figure 3.

However, attention should be paid to selecting appropriate filtering capacitors. If the capacitance is too large, it is likely to cause startup problems. For each output, while ensuring safe and reliable operation, the recommended capacitive load values are detailed in the table.

• 2. EMC typical recommended circuit

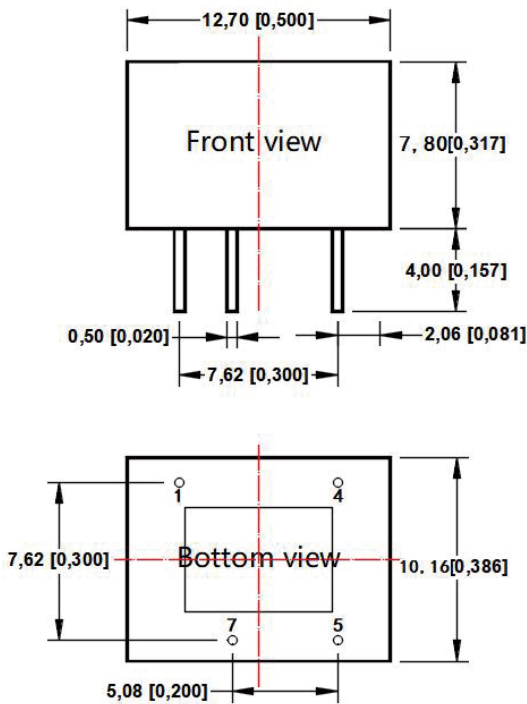
See Figure 4.

• 3. Output load requirements.

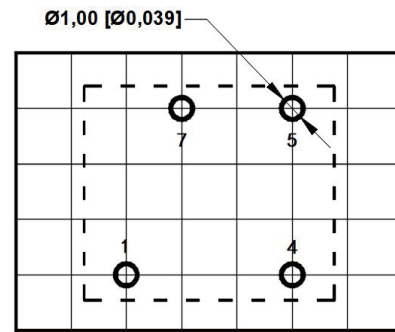
To ensure the efficient and reliable operation of the module, its minimum output load should not be less than 10% of the rated load when in use. If your required power is indeed small, please connect a resistor in parallel at the output end (the sum of the power consumed by the resistor and the actual power used is greater than or equal to 10% of the rated power).

### Dimensions and Recommended Layout

#### • Dimensions



#### • PCB Printing Layout



The grid distance is 2.54mm x2.54mm

#### Pin Definition Table

Pin	Function
1	GND
4	V <sub>in</sub>
5	+V <sub>o</sub>
7	-V <sub>o</sub>

Note:

Unit: mm[inch]

Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]

General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]

### Note

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
- Suggested dual output module load imbalance:  $\leq \pm 5\%$ . If it exceeds  $\pm 5\%$ , it cannot be guaranteed that the product performance meets all performance indicators in this manual;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at  $T_a=25^\circ\text{C}$ , humidity $<75\%$  RH, nominal input voltage, and output rated load;
- All indicator testing methods in this manual are based on our company's corporate standards;
- Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
- Product specifications are subject to change without prior notice.