TPS-HVN10 Series
DC/DC Converter

Product Feature

- Package Type: DIP16
- Input voltage range: 4:1
- Operating temperature range: -40℃ - +85℃
- Isolation voltage: 1500VDC
- High Efficiency: 86% (Type)
- Input undervoltage protection;
- Output short-circuit protection; Overvoltage protection; Overcurrent protection.
- Fields of application： Industry, power, instrumentation, communication, rail transit, etc

Selection Guide

Part No.	Input Voltage (VDC)	Input Current		Output Voltage (VDC)	Output Current (mA)Max./Min.	Full Load Efficiency%(Typ.)	Capacity Load (μF) Max.
	Nominal(Range)	Full load(mA) Typ.	No-live load(mA) Typ.				
TPS-HVN1024S03	24 (9-36)	476	10	3.3	2700/0	80	2600
TPS-HVN1024S05	24 (9-36)	514	10	5	2000/0	83	1300
TPS-HVN1024S5R5	24 (9-36)	514	10	5.5	1818/0	83	1000
TPS-HVN1024S12	24 (9-36)	496	10	12	833/0	86	560
TPS-HVN1024S15	24 (9-36)	496	10	15	666/0	86	560
TPS-HVN1024S24	24 (9-36)	496	10	24	416/0	86	200
TPS-HVN1024D05	24 (9-36)	514	10	±5	±1000/0	83	#560
TPS-HVN1024D12	24 (9-36)	496	10	±12	±416/0	86	#390
TPS-HVN1024D15	24 (9-36)	496	10	±15	±333/0	86	#200
TPS-HVN1048S03	48(18-75)	238	8	3.3	2700/0	80	2600
TPS-HVN1048S05	48(18-75)	257	8	5	2000/0	83	1300
TPS-HVN1048S12	48(18-75)	248	8	12	833/0	86	560
TPS-HVN1048S15	48(18-75)	248	8	15	666/0	86	560
TPS-HVN1048S24	48(18-75)	248	8	24	416/0	86	200
TPS-HVN1048D05	48(18-75)	257	8	±5	±1000/0	83	#560
TPS-HVN1048D12	48(18-75)	248	8	±12	±416/0	86	#390
TPS-HVN1048D15	48(18-75)	248	8	±15	±333/0	86	#200

Each Output

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage (full load/no load)	24VDC nominal input series,nominal input voltage	--	500/10	525/15	mA
	48VDC nominal input series,nominal input voltage	--	251/8	251/8	
Reflected Ripple Current	Nominal input series,nominal input voltage	--	20	--	mA
Impulse Voltage	24VDC Input	-0.7	--	50	VDC
	48VDC Input	-0.7	--	100	
Starting Voltage	24VDC Input	--	--	9	VDC
	48VDC Input	--	--	18	
Input Under Voltage Protection	24VDC Input	5.5	6.5	--	VDC
	48VDC Input	12.0	15.5	--	
Input Filter		PI filter			
Hot Plug		Unavailablle			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	0%- 100% load	Main Road	--	±1	±3	%
		Side Road	--	±3	±5	
Linear Regulation	Input voltage from low limitto high limit, full load	Positive output	--	±0.2	±0.5	%
		Secondary output	--	±0.5	±1	
Load Regulation①	5%- 100% load	Positive output	--	±0.5	±1	%
		Secondary output	--	±0.5	±1.5	
Ripple & Noise②	20MHz bandwidth,5%-100% load		--	60	100	mVp-p
Transient Recovery Time	25% Load Step Change,nominal input voltage		--	300	500	μs
Transient response Deviation	25% Load Step Change, nominalinput voltage	3.3V/5V/±5V Output	--	±5	±8	%
		Other output	--	±3	±5	
Temperature Drift Coefficient	Full Load		--	--	±0.03	%/°C
Overcurrent protection	Input voltage range		110	140	--	%Io
Short-Circuit Protection	Input voltage range		Continuous, Self-Recovery			

Note:

① When tested under 0% -100% load working conditions, the indicator of load regulation rate is ± 5%;

② 0% -5% load ripple&noise less than or equal to 5% Vo.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation 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	--	1000	--	pF
Operating Temperature		-40	--	+82	℃
Storage Temperature		-55	--	+125	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Profile	1.5mm from case for 10 sec	--	--	+300	℃
Switching Frequency		--	300	--	KHz
MTBF	MIL-HDBK-217F@25℃	>800			K Hours

Note:

This series of products adopts frequency reduction technology, and the switching frequency value is the test value at full load. When the load decreases, the switching frequency decreases as the load decreases.

Mechanical Specifications

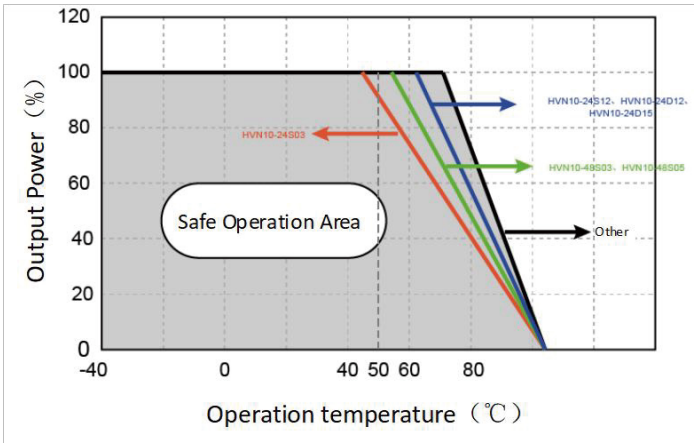
Case Material	Aluminum alloy
Package Dimensions	23.80 x 13.70 x 10.20mm
Weight	6.5g (Typ.)
Cooling Method	Free air convection

EMC Characteristics

EMI	CE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (Recommended circuit diagram 3-②)	
	RE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (Recommended circuit diagram 3-②)	
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV	Perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (Recommended circuit diagram 3-①)	Perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2KV(Recommended circuit diagram 3-①)	Perf. Criteria B
	CS	IEC/EN61000-4-6 3Vr.m.s	Perf. Criteria A

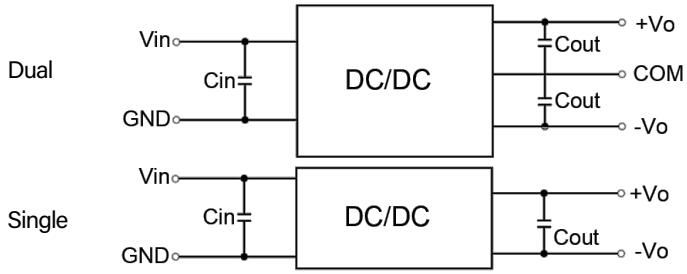
Typical Characteristic Curves

Temperature Derating Curve (Figure 1)



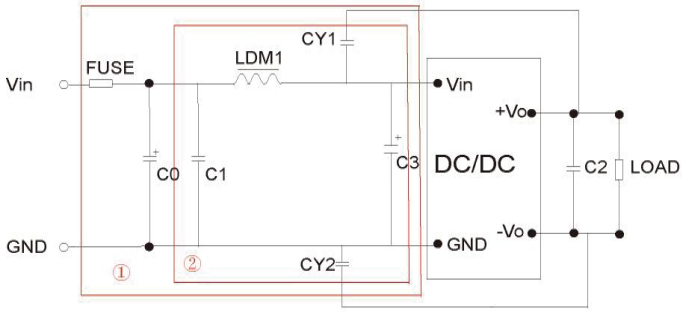
Typical Circuit Design And Application

- Figure2



Recommended Capacitive Load Value Table		
Vin	24VDC	48VDC
Cin	22μF, ESR < 1.0Ω at 100 kHz	
Cout	10μF	10μF

- Figure3

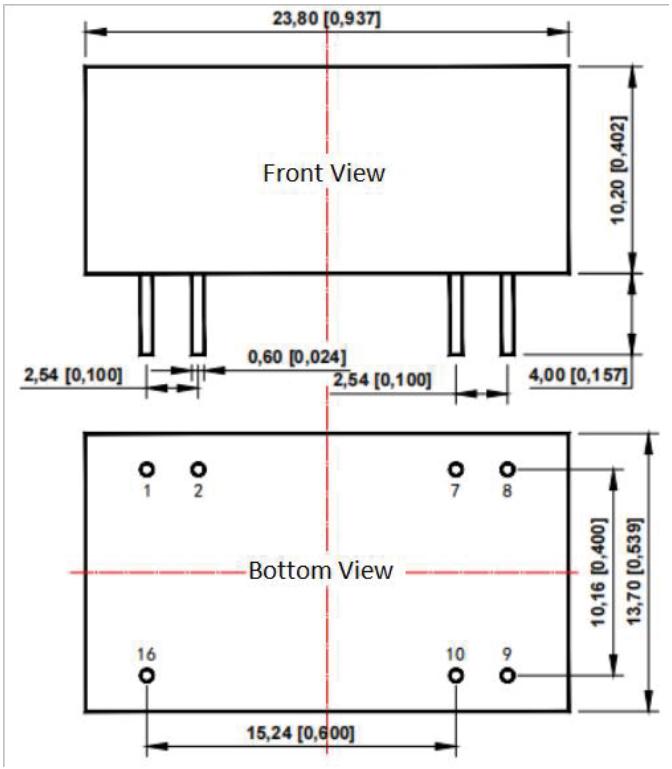


EMI Recommended component parameters		
Vin(VDC)	24V	48V
FUSE	Choose according to actual input current	
C0、C3	330μF/50V	330μF/100V
C1	1F/50V	1μF/100V
C2	Refer to the Cout in Fig.2	
LCM1	4.7μH	
CY1、CY2	1nF/2KV	

Note:
Part ① of Figure 3 is used for EMS testing; Part 2 is used for EMI filtering and can be selected according to requirements.

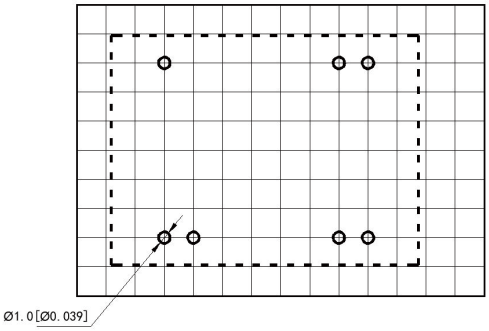
Dimensions and Recommended Layout

- Dimensions



Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

- PCB Printing Layout



The grid distance is 2.54 x 2.54mm

Pin Definition Table

Pin	Single	Function
1	GND	GND
2	NO PIN	NO PIN
7	NC	NC
8	NC	COM
9	+Vo	+Vo
10	-Vo	-Vo
16	+Vin	+Vin

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: ≤ ± 5%. If it exceeds ± 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 Ta=25 °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.