



Product Feature

- Package Type: 2"X 1"
- Input voltage range: 4:1
- Operating temperature range: -40°C - +105°C
- Isolation voltage: 1600VDC
- High efficiency up: 93%(Typ.)
- Input undervoltage protection, output short circuit, over current, and over voltage protection mechanisms.
- Product Applications: Industrial, Power, Instrumentation, Communication, Rail Transit, etc

Selection Guide

Part No.	Input Voltage (VDC)		Output Voltage (VDC)	Output Current (mA)Max.	Full Load Efficiency (%)Typ.	Capacity load (μF) Max.
	Nominal(Range)	Max.				
TPS-HVR6024S05	24(9-36)	40	5	12000	91	20000
TPS-HVR6024S12	24 (9-36)	40	12	5000	92	5000
TPS-HVR6024S15	24(9-36)	40	15	4000	93	3500
TPS-HVR6024S24	24(9-36)	40	24	2500	93	2000
TPS-HVR6024S28	24(9-36)	40	28	2140	94	2000
TPS-HVR6048S05	48(18-75)	80	5	12000	92	20000
TPS-HVR6048S12	48(18-75)	80	12	5000	93	5000
TPS-HVR6048S15	48(18-75)	80	15	4000	93	3500
TPS-HVR6048S24	48(18-75)	80	24	2500	93	2000
TPS-HVR6048S28	48(18-75)	80	28	2143	94	1500

Note:

1. Suffix plus "H" means plus heat sink package, plus "CW" for extended wiring package, suffix plus "CR" for extended rail type package;
2. The input end of the extended package is equipped with anti-reverse protection function, and its full load efficiency will be reduced by 2%;
3. The maximum Capacities load "#" means that the positive and negative outputs are connected to the same capacitance.

Input Specifications

Item	Operating Conditions	Min .	Typ.	Max .	Unit
Input voltage (full load/no load)	24VDCnominal input series	--	2717/25	2778/50	mA
	48VDC nominal input series	--	1939/25	1389/30	
Reflected Ripple Current	Rated input voltage	--	--	60	mA
Impulse Voltage	24VDC nominal input series	-0.7	--	50	VDC
	48VDC nominal input series	-0.7	--	100	
Starting Voltage	24VDC nominal input series	--	--	9	VDC
	48VDC nominal input series	--	--	18	
Input Under voltage Protection	24VDC nominal input series	5.5	6.5	--	VDC
	48VDC nominal input series	12.0	15.5	--	
Start time	Nominal input and constant resistance load	--	10	150	ms
Remote shutdown function	turn off module	Connected GND or (0-1.2V)			
	turn on module	No connected or (3.5-12V)			
Input Filter		PI filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5%-100% load	--	±1	±3	%
Linear Regulation	Vin=Min. to Max. @Full Load	--	±0.2	±0.5	
Load Regulation	5%-100% load	--	±0.5	±1.0	
Ripple & Noise	20MHz bandwidth, nominal input voltage, 5% -100% load	--	100	200	mVp-p
Transient Recovery Time	25% Load Step Change,nominal input voltage	--	250	500	µs
Transient Response Deviation	25% load step change nominal input voltage	5VDC Output	±3	±10	%
		Other Output	±3	±5	
Overvoltage Protection	input voltage range	110	--	180	%
Overcurrent Protection	input voltage range	110	140	--	%
Short-circuit Protection	input voltage range	Continuous, Self-Recovery			

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1600	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	2000	--	pF
Operating Temperature	See Fig 1	-40	--	+105	°C
Storage Temperature		-55	--	+125	°C
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Profile	1.5mm from case for 10 sec	--	--	300	°C
Switching Frequency	PWM	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K Hours

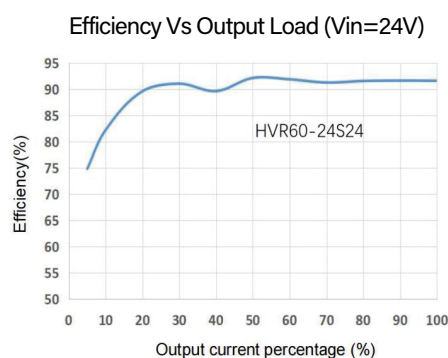
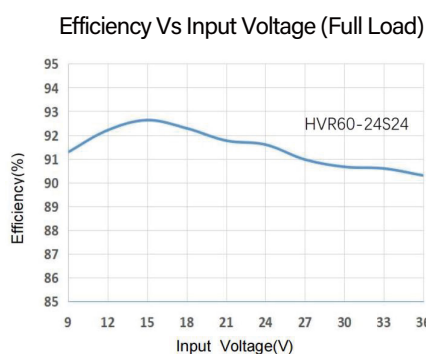
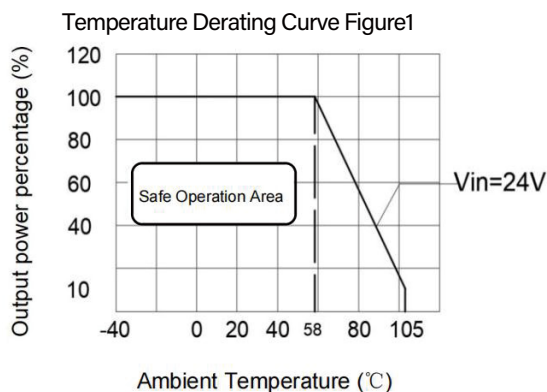
Mechanical Specifications

Case Material	Aluminum alloy, black anodized coating
Package Dimensions	50.80 x 25.40 x 12.00mm
Weight	41.0g (Typ.)
Cooling Method	Free air convection

EMC Characteristics

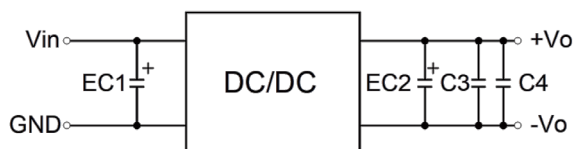
EMI	CE	CISPR32/EN55032	CLASS A/CLASS B
	RE	CISPR32/EN55032	CLASS A/CLASS B
EMS	ESD	EN61000-4-2 Air ±8kV, Contact ±6kV	Perf. Criteria B
	RS	EN61000-4-3 10V/m	Perf. Criteria A
	EFT	EN61000-4-4 ±2kV	Perf. Criteria A
	Surge	EN61000-4-5 ±2kV	Perf. Criteria A
	CS	EN61000-4-6 10Vrms	Perf. Criteria A

Typical Characteristic Curves



Typical Circuit Design And Application

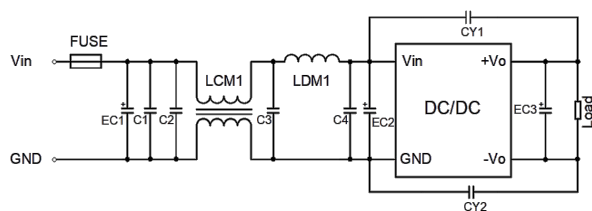
- Application Circuit (Figure 2)



Recommended Capacity Load Value Table

Vout(VDC)	EC1(μF)	EC2(μF)	C3(μF)	C4(μF)
5	680μF	330μF/35V	10μF/16V	0.1μF/16V
12/15	680μF	150μF/35V	10μF/25V	0.1μF/25V
24/28	680μF	100μF/50V	10μF/50V	0.1μF/50V

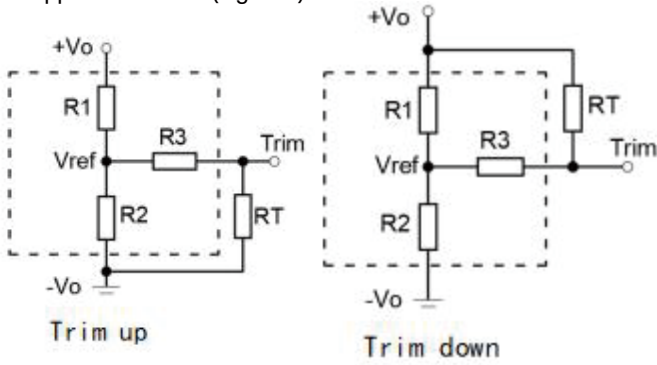
- EMC Recommended Circuit (Figure 3)



EMI Recommended Component Parameters

Device	Parameter specifications
FUSE	Choose according to actual input current
EC1	1000μF/100V
EC2	470μF/100V
EC3	330μF/50V
C1、C2	4.7μF/100V
C3、C4	20μF/100V
LCM1	10mH MIN
LDM1	2.2μH
CY1/CY2	2.2μF/3000VDC

• Application Circuit (Figure 4)



Trim resistor connections
(dashed line shows internal resistor network)

Trim Recommended Component Parameters

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	2.4	2.344	13.622	2.5
6	10	6.982	16.322	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
24	10	1.158	10.714	2.5

$$\text{Up: } R_t = \frac{nR_2}{R_2 - n} - R_3 \quad n = \frac{V_{ref}}{V_o - V_{ref}} * R_1$$

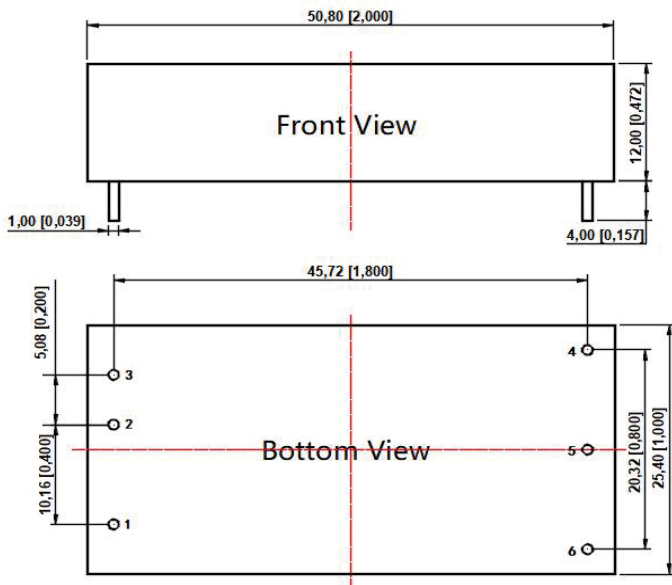
$$\text{Down: } R_t = \frac{nR_1}{R_1 - n} - R_3 \quad n = \frac{V_o - V_{ref}}{V_{ref}} * R_2$$

Note

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 3. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product. The product does not support output parallel power boosting.

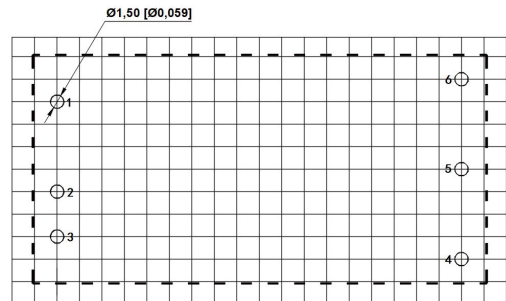
Dimensions and Recommended Layout

• Dimensions



Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10 [\pm 0.004]$
General tolerances: $\pm 0.50 [\pm 0.020]$

• PCB Printing Layout

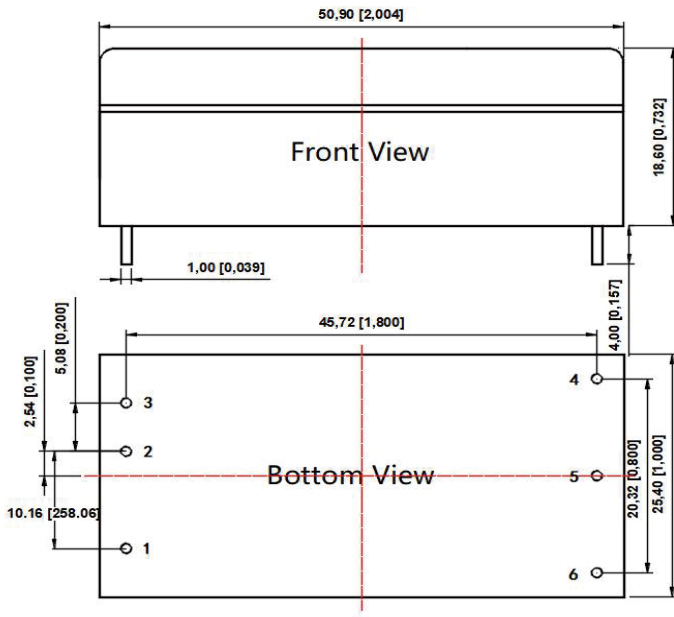


The grid distance is 2.54 x 2.54mm

Pin Definition Table

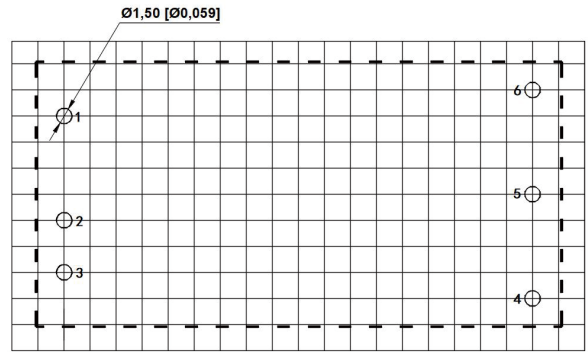
Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	-Vo
6	Trim

• HVR60-xxSxxH Dimensions



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

• PCB Printing Layout

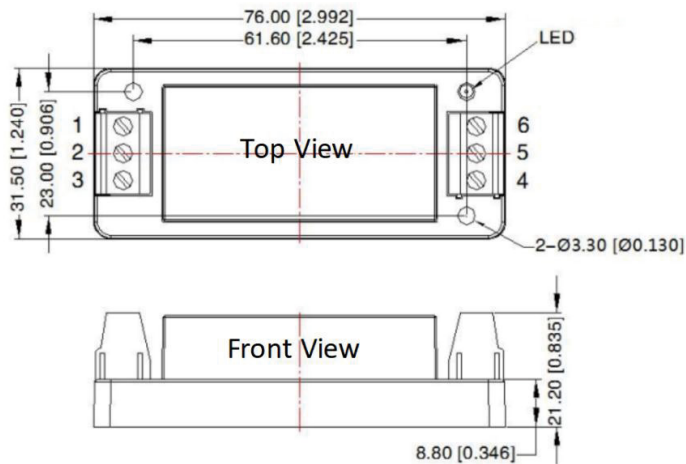


The grid distance is 2.54 x 2.54mm

Pin Definition Table

Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	-Vo
6	Trim

• HVR60-xxSxxCW Dimensions

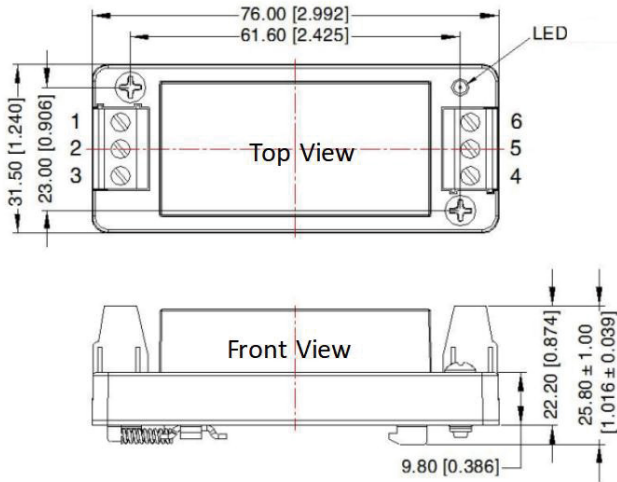


Pin Definition Table

Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	-Vo
6	Trim

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N · m
General tolerances: ± 1.00 [± 0.039]

• HVR60-xxSxxCR Dimensions



Pin Definition Table

Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	-Vo
6	Trim

Note:

Unit: mm[inch]

Mounting rail: TS35

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N · m

General tolerances: $\pm 1.00 [\pm 0.039]$

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;
- 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.