Features

1. Rated power:20W Max

2. Input voltage 8.5...160VDC

3. Regulated output

4. High efficiency up to 83%

5. Isolation voltage 3000VAC

6. Low ripple and noise

7. Remote On/Off control

8. Operating temperature range:-40～+85℃

9. RoHS compliant

10. Standard 2"x1"package

11. Under voltage, over voltage,over current, and short circuit protection

12. Meet IEC/EN62368-1,EN50155 standards

13. Designed for railway apps

14. 3 year warranty

Selection Guide

Model Number	Input Voltage [VDC]			VOUT [VDC]	Output Current [mA]		Efficiency [%]Typ.	Capacitive Load [uF]Max.
	Nominal	Range	*Max.		Max.	Min.		
ATWH1D12ALD-20W	72	8.5~160	170	±12	±833	0	83	±560
ATWH1D15ALD-20W				±15	±667	0	83	±330
ATWH1D24ALD-20W				±24	±417	0	85	±200
ATWH1D05BLD-20W				5	4000	0	80	3300
ATWH1D12BLD-20W				12	1670	0	83	2200
ATWH1D15BLD-20W				15	1330	0	83	1800
ATWH1D24BLD-20W*				24	833	0	83	1500
ATWH1D48BLD-20W*				48	415	0	83	1000

Note [1]: This is a custom-made unit.*underdevelopment

Note [2]:To indicate optional configurations, please add suffixes to the model numbers: "H" for an heatsink, "CT" or "CR" for a chassis with terminal blocks. For example, ATWH1D24BLD-20W-HCT for a unit equipped with both the optional heatsink and the "CT" chassis.

Note [3]: Units equipped with an optional chassis include an input reverse polarity protection circuit, which results in the following changes: the start-up voltage and minimum input voltage increase by 1VDC and efficiency decrease by 2%,

Note [4]: Exceeding the maximum input voltage may cause permanent damage.

Input & Output Specification

Unless otherwise indicated,specifications are measured at TA=25℃,nominal input voltage,full load after warm up.

Parameters	Conditions	Min.	Typ.	Max.	Unit
Input currentt	Full load No load	-	315 30	350 50	mA
Input voltage surge 1 second max		-0.7	-	180	VDC
Startup input voltage	Full load	-	-	8	VDC
Startup time	Resistive load	-	20	120	mS
Remote On/Off control	Logic high	3.5	-	12	VDC
"Ctrl"pin open or logic high [0N]	Logic low	0	-	1.2	VDC
"Ctr"pin grounded or logic low [0FF]	Ctrl pin current	-	6	12	mA
Output voltage accuracy I_{OUT}=0% to 100%	Main output Other output	-	±1 ±2	±3 ±5	%
Line regulation Full load,V_{IN}=$V_{IN,Min}$ to $V_{IN,Max}$	Main output Other output	-	±0.2 ±0.5	±0.5 ±1.0	%
Load regulation I_{OUT}=5%to 100%	Main output Other output	-	±0.5 ±0.5	±1.0 ±1.5	%
Output ripple and noise [4]	I_{OUT}=5% to 100% of I_{OUT}, rated	-	150	240	mVp-p
Temperature coefficiency	Full load		-	0.03	%/℃
Dynamic load response I_{OUT}=25%~50%~75% of I_{OUT},rated	Peak deviation Recovery time	-	±3 300	±5 500	%V_{OUT} uS
Output voltage trim	Trim range	-	-	±10	%V_{OUT}
Output over voltage protection		110	-	160	%V_{OUT}
Output over current protection		110	140	-	%I_{OUT}
Output short circuit protection		Continuous,automatic recovery			
Input filter		PI Filter			
Hot plug		None			

Note [4] :Ripple and noise measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor. Operating with less than 5% of rated load will not cause damage to the converters, but the ripple and noise performances data may not fall into the specifications.

General Specifications

| Parameters	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage 1 minute,leakage current 1mA max	I/P to O/P	3000		-	VAC
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-		M ohm
Isolation capacitance 100KHz,0.1V	I/P to O/P	-	20	-	pF
Switching frequency	Full load	-	120		KHz
Operating temperature	See"Derating Curve"	-40	-	85	°C
Storage temperature		-55		+125	°C
Storage humidity	None condensing	5	-	95	%RH
Pin soldering temperature		-	-	300	°C
Case material		Aluminum alloy			
Cooling method		Free air convection			
Vibration	IEC/EN 61373	Category 1, Grade B			
MTBF	MIL-HDBK-217F	>1,000,000 Hours,TA=25°C			
Safety standards		EN/IEC 62368-1			
EMC standards	CISPR32,EN55032	Class A*with External Circuit [3]			
ESD	EC/EN61000-4-2	Contact±6kV,perf.Criteria B			
Radiated	EC/EN61000-4-3	10V/m,perf.Criteria A			
EFT,Burst	IEC/EN61000-4-4	±2kV,perf.Criteria B[3]			
Surge	IEC/EN61000-4-5	Line to Line±2kV,perf.Criteria B[3]			
Conducted	IEC/EN61000-4-6	3Vrms,perf.Criteria A			
Size,and Weight	No Suffix, Default Options Suffix "CT" Suffix "CR" Suffix "H" Suffix "HCT" Suffix "HCR"	50.8x25.4x11.8mm, 22g 76.0x31.5x21.2mm, 42g 76.0x31.5x25.8mm, 62g 50.8x25.4x18.6mm, 36g 76.0x31.5x27.4mm, 56g 76.0x31.5x32mm, 76g			
Packing	Default & Suffix "H" Others	19 PCS / Tube – MPQ 28 PCS / Tray - MPQ			

Characteristic Curves

Derating Curve

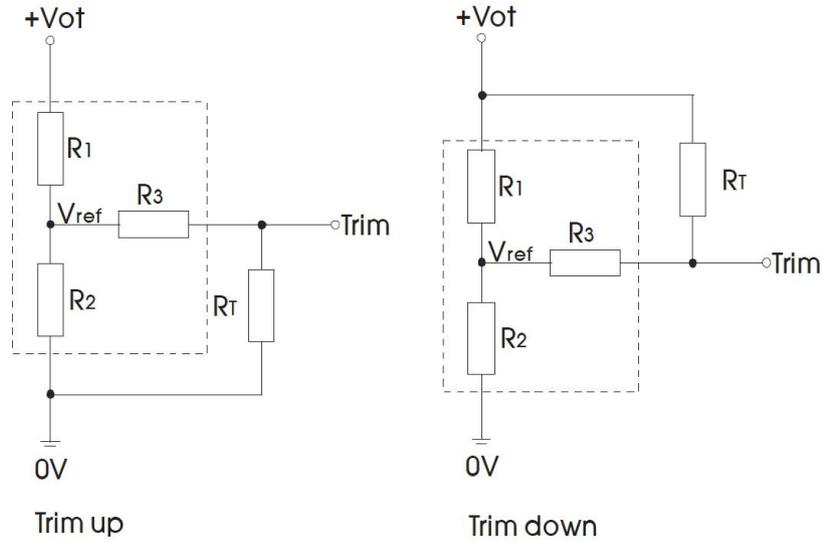**Output vs Ambient Temperature**

V_{IN}=72VDC
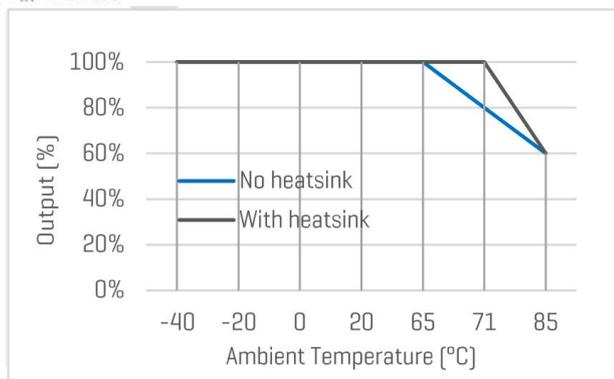
Output vs Input Voltage
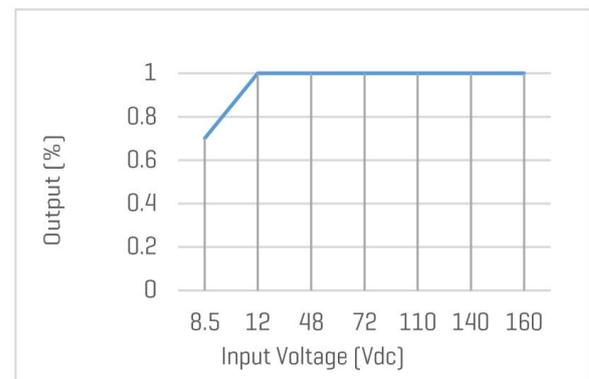
Trim Function for Output Voltage Adjustment (open if unused)

Trim up

Trim down

Calculating Trim resistor values:

$$up : R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{Vref}{Vo'-Verf} \bullet R_1$$

$$down : R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{Vo'-Verf}{Verf} \bullet R_2$$

R_T = Trim Resistor value;
a = self-defined parameter

Vout(V)	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
3.3	4.772	2.87	10	1.25
5	2.883	2.87	10	2.5
12	11.000	2.87	15	2.5
15	14.384	2.87	15	2.5
24	24.872	2.87	17.8	2.5

Mechanical Specifications
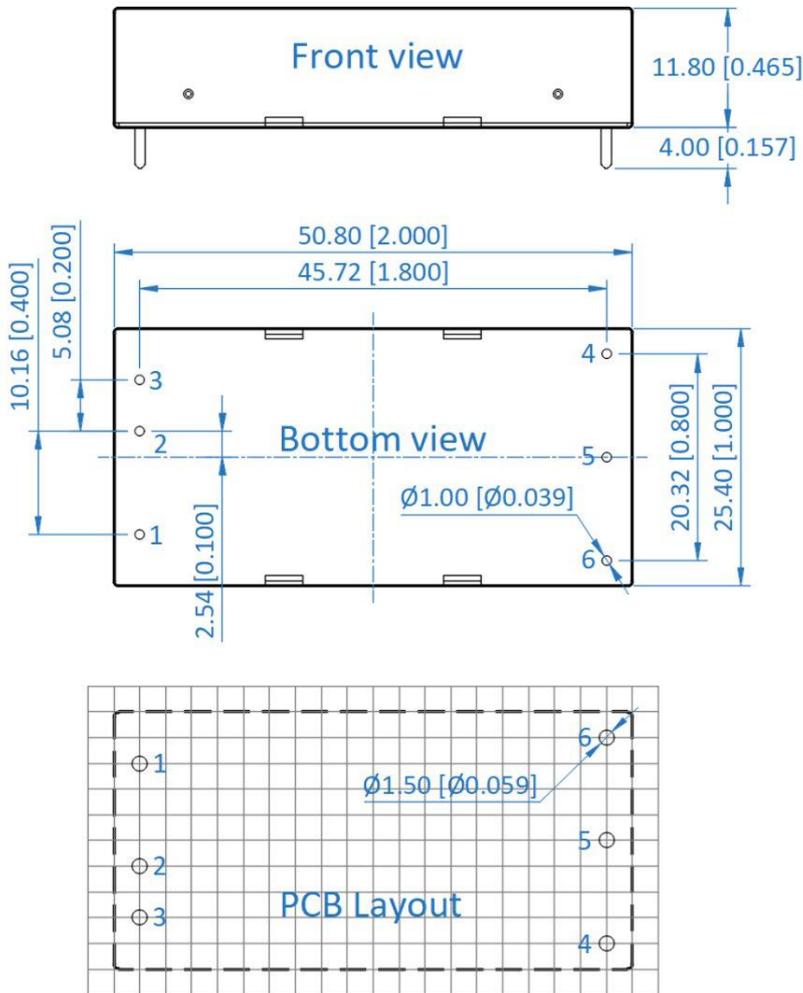
Front view
11.80 [0.465]
4.00 [0.157]

50.80 [2.000]
45.72 [1.800]
10.16 [0.400]
5.08 [0.200]
2.54 [0.100]

Bottom view

Ø1.00 [Ø0.039]

20.32 [0.800]
25.40 [1.000]

PCB Layout
Ø1.50 [Ø0.059]

Pin Definition

Pin#	Single Out	Dual Out
1	Ctrl	Ctrl
2	$-V_{IN}$	$-V_{IN}$
3	$+V_{IN}$	$+V_{IN}$
4	$+V_{OUT}$	$+V_{OUT}$
5	TRIM	COM
6	$-V_{OUT}$	$-V_{OUT}$

Unless otherwise specified unit: mm [inch]
General tolerance: ±0.50 [±0.020]
Pin thickness: ±0.10 [±0.004]
Footprint grid 2.54 x 2.54 mm

Mechanical Specifications

Suffix "H" for Optional Heatsink
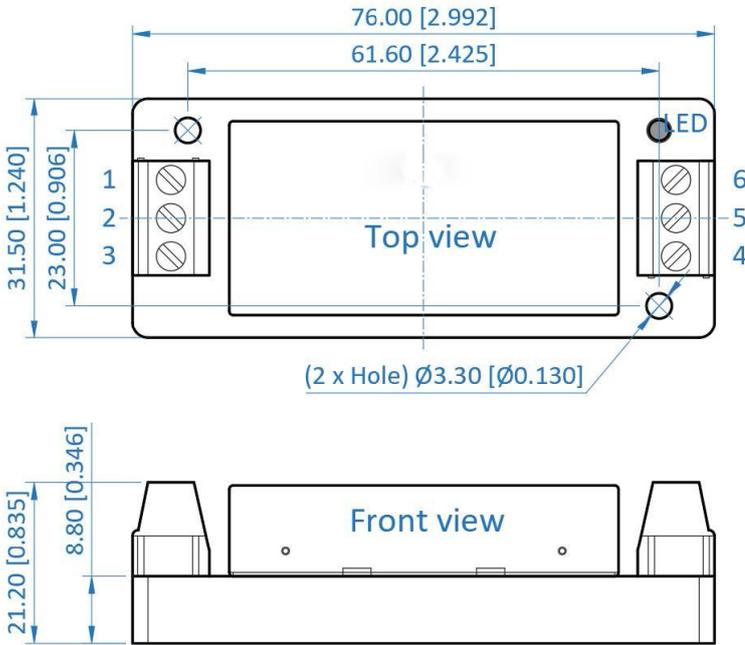Add suffix "H" to the model numbers for an optional heatsink.
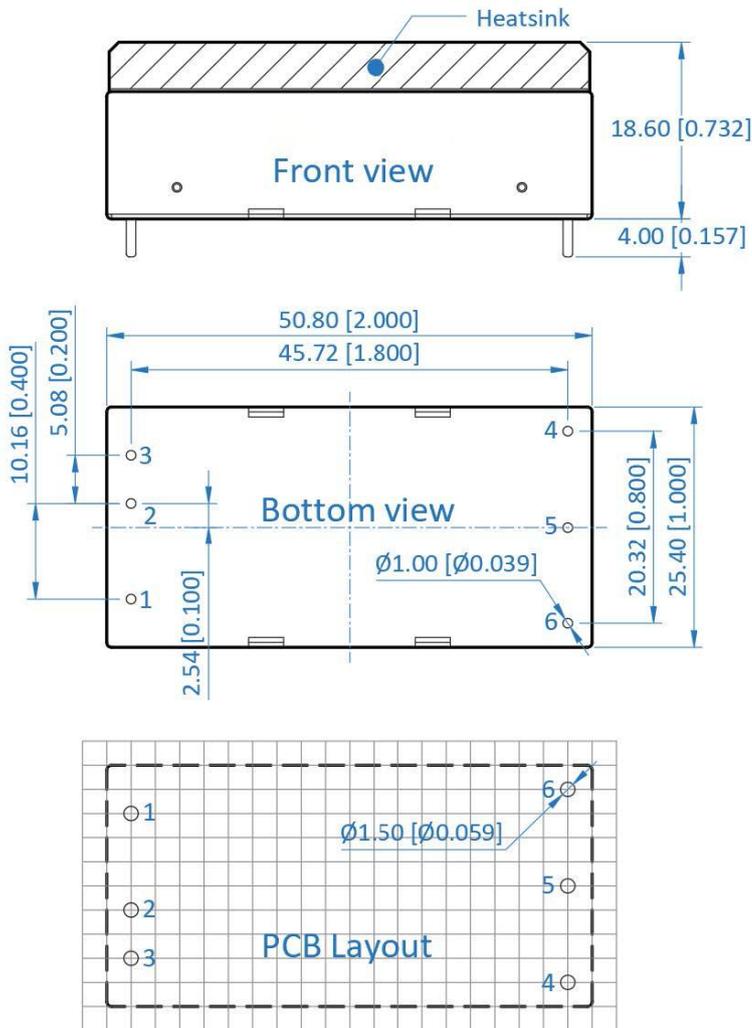
Pin Definition

Pin#	Single Out	Dual Out
1	Ctrl	Ctrl
2	$-V_{IN}$	$-V_{IN}$
3	$+V_{IN}$	$+V_{IN}$
4	$+V_{OUT}$	$+V_{OUT}$
5	TRIM	COM
6	$-V_{OUT}$	$-V_{OUT}$

Unless otherwise specified unit: mm [inch]
General tolerance: ±0.50 [±0.020]
Pin thickness: ±0.10 [±0.004]
Footprint grid 2.54 x 2.54 mm

Mechanical Specifications

Suffix "CT" for Chassis Installation
Add suffix "CT" to the model numbers for an optional chassis equipped for chassis installation.

Pin Definition

Pin#	Single Out	Dual Out
1	Ctrl	Ctrl
2	$-V_{IN}$	$-V_{IN}$
3	$+V_{IN}$	$+V_{IN}$
4	$+V_{OUT}$	$+V_{OUT}$
5	TRIM	COM
6	$-V_{OUT}$	$-V_{OUT}$

Unless otherwise specified unit: mm [inch]
General tolerance: ±1.00 [±0.040]
Tightening torque: 0.4 Nm Max.
Wire gauge to chassis: 12~24 AWG

Suffix "CR" for DIN Rail Installation
Add suffix "CR" to the model numbers for an optional chassis equipped for DIN Rail installation.
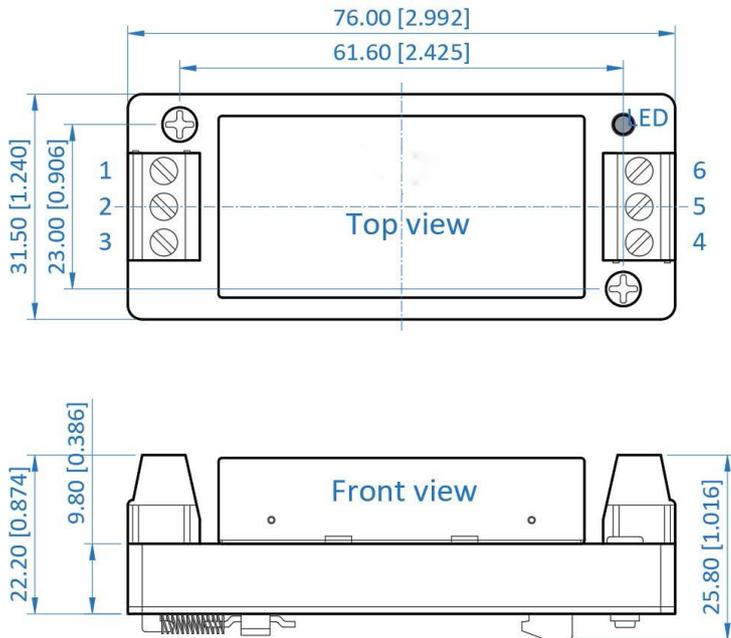
Pin Definition

Pin#	Single Out	Dual Out
1	Ctrl	Ctrl
2	$-V_{IN}$	$-V_{IN}$
3	$+V_{IN}$	$+V_{IN}$
4	$+V_{OUT}$	$+V_{OUT}$
5	TRIM	COM
6	$-V_{OUT}$	$-V_{OUT}$

Unless otherwise specified unit: mm [inch]
General tolerance: ±1.00 [±0.040]
Tightening torque: 0.4 Nm Max.
Wire gauge to chassis: 12~24 AWG

Note:
1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at Ta=25°C, humidity <75%RH, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;

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