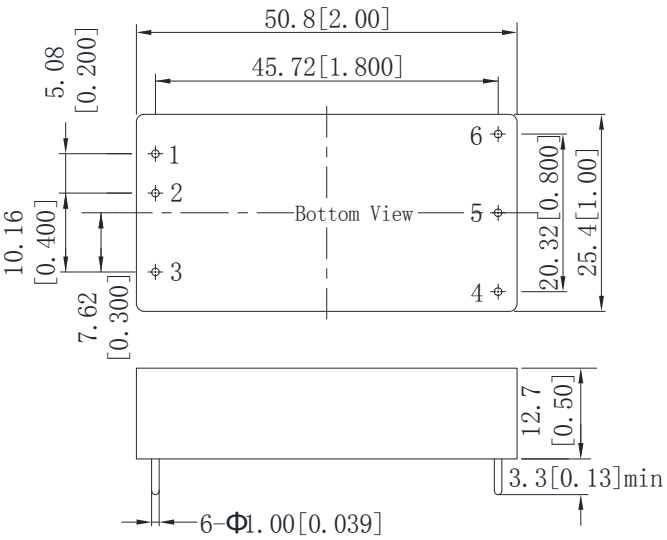
DC/DC RDK40-110BS24

Input 40～160V Output 24V/1.67A　1×2inch

Features

- *1in.×2in.Standard Size*
- *Wide input voltage*
- *Input Under Voltage Protection（36 to 40Vdc Turn off）*
- *Positive Logic Control（3.0V to 15V or floating Turn on）*
- *Output Over Voltage Protection（30V to 36V）*
- *Output Voltage Adjust Range:* ***+20%****/-10% of the rated output voltage*
- *High Efficiency up to 90%（110V，full load）*
- ***3000Vdc I/o Isolation Voltage***
- *Operating Case Temperature :-40 ℃ to +105 ℃*
- *110 ℃Typ. Over Temperature Protection*
- *Output Short-circuit Protection, hiccup, auto-recovery*
- *Meets requirements of Standard EN50155*
- *Applications:Telecommunication equipments data exchange servers and distributed power,Industry system ,rail transit and railway etc.*

Outline Diagram



Pin	Sign	Function
1	+Vin	Positive Input Voltage
2	-Vin	Negative Input Voltage
3	CNT	Remote Control Pin
4	TRIM	Output voltage adjust
5	-Vo	Negative Output Voltage
6	+Vo	Positive Output Voltage

Case material: Aluminum, black;
Pin: copper with gold plating
Notes: all dimensions in mm(inches)
Tolerance: x.x mm:±0.5（x.xx:±0.020)
x.xx mm:±0.25（x.xxx:±0.010)

Specifications

Unless otherwise specified, all values are given at: 25℃, one standard atmosphere pressure, pure resistive load and basic connection.

Input		Symbol	Min	Typ	Max	Unit	Conditions
Input Voltage		V_{in}	40	110	160	Vdc	—
Input Current		I_{in}	–	–	404	mA	V_{in}=110V，I_O=1.67A
Positive Logic Remote Control	ON	–	3.0	–	15	V	Refer to $-V_{in}$ Also turn on when CNT floating.
	OFF	–	0	–	1.2	V	Refer to $-V_{in}$
	Current	–	–	–	0.5	mA	—
Start-up Delay Time		T_{delay}	–	–	20	ms	—
Under Voltage Threshold		V_{UVLO}	36.0	–	40.0	Vdc	50% load test
Under Voltage Protection Hysteresis		$\triangle V_{UVLO}$	–	1.0	–	Vdc	—

Quiescent Input Current	–	–	–	10	mA	Io=0A

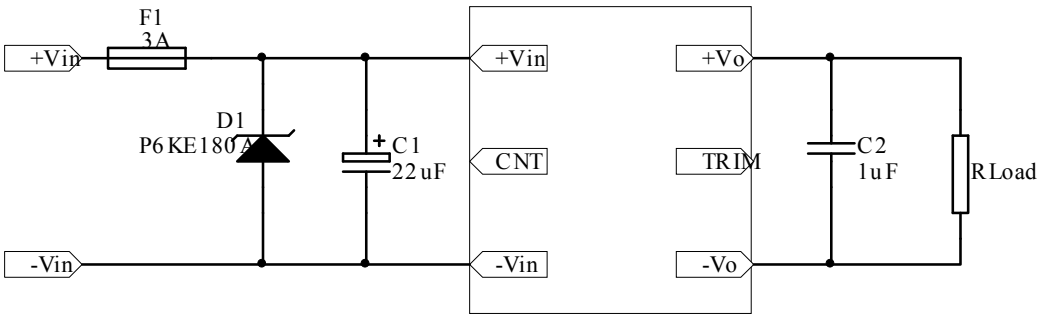
Output		Symbol	Min	Typ	Max	Unit	Conditions
Output Voltage		V_O	23.76	24.00	24.24	Vdc	V_{intyp}， Io,nom
Output Current		$I_{O,nom}$	–	1.67	–	A	—
Output Voltage Adjust Range		V_{trim}	21.6	–	28.8	Vdc	Io≤1.67A Po≤40W
Line Regulation		S_V	–	–	±0.2	% V_O	V_{in}: 40～160Vdc, I_O=1.67A
Load Regulation		S_I	–	–	±0.5	% V_O	V_{in}=110Vdc， I_O: 0A～1.67A
Output Over Voltage Protection Set Point		$V_{ov,set}$	30	–	36	Vdc	V_{in}=110Vdc
Output Over Current Protection Range		$I_{O,lim}$	1.8	–	2.85	A	—
Output Short-circuit Protection		automatic recovery					—
Peak to Peak Ripple and Noise		$\triangle V_{pp}$	–	–	200	mV	V_{in}=110Vdc, Io,nom , 20MHz bandwidth, a 1μF ceramic capacitor applied at output
Rise Time		T_{rise}	–	30	–	ms	V_{in}=110Vdc,$I_{O,nom}$， pure resistive load
Output Overshoot		V_{TO}	0	–	2.4	Vdc	V_{in}=V_{intyp},$I_{O,nom}$，pure resistiveload
Capacitive Load		C_O	0	–	1300	μF	pure resistive load
Load Transient	Voltage Deviation	$\triangle V_{tr}$	–	–	±960	mV	25%～50%～25%Io,nom or 50%～75%～50%Io,nom; 0.1A/μs
	Recovery Time	t_{tr}	–	–	250	μs	

General	Symbol	Min	Typ	Max	Unit	Conditions
Efficiency	η	89	90	–	–	V_{in}=V_{intyp}， Io,nom
Switching Frequency	f_s	–	250	–	–	—
Isolation Resistance	R_{iso}	1500	–	–	MΩ	—
Isolation Voltage	V_{iso}	3000	–	–	Vdc	Input to output Leak Current: 1mA
		1600	–	–	Vdc	Input to case Leak Current: 1mA
		1600	–	–	Vdc	Output to case Leak Current: 1mA
MTBF	–	–	2×10^6	–	h	BELLCORE TR-332,
Operating Case Temperature	–	-40	–	+105	℃	See the derating curve
Storage Temperature	–	-55	–	+125	℃	—
Temperature Coefficient	S_T	–	–	±0.02	%/℃	—

Relative Humidity	–	10	–	90	%	No condensing，40℃±2℃
Over Temperature Protection Reference Point	T_{ref}	105	110	115	℃	See Over Temperature Protection consideration
Over Temperature Protection Hysteresis	$\triangle T_{ref}$	–	10	–	℃	
Hand Soldering	Maximum soldering Temperature < 425℃， and duration < 5s					
Wave Soldering	Maximum soldering Temperature < 255℃， and duration < 10s					

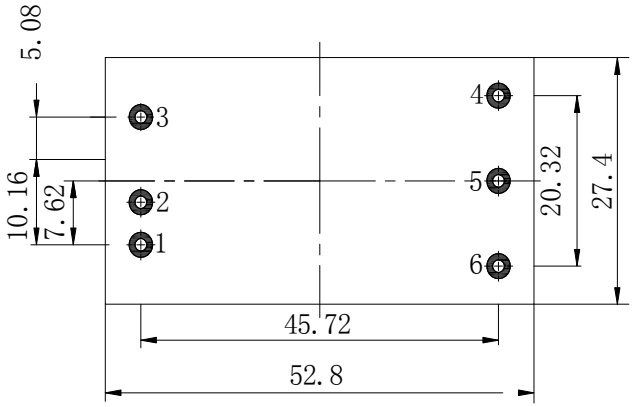
Design Considerations

Basic Connection



Notes: Please see the application information followed for the further information.

Recommended Layout



NO.	Recommendation & Notes
Pad Design	Pad holes 1～6:1.2mm，pad diameter including hole:2.5mm
Mounting Direction	heatsink face up, for natural convection
Safety	Isolated Converters, care to the spacing between input and output
Electrical	The Vin(-) and Vo(-) planes should be placed under of the converter separately. Avoid routing sensitive signal or high disturbance AC signal under the converter

Thermal Consideration

The converters operate in a variety of thermal environments; however, sufficient cooling should be

provided to ensure reliable operation of the unit. Heat is removed by conduction, convection and radiation to the surrounding environment.

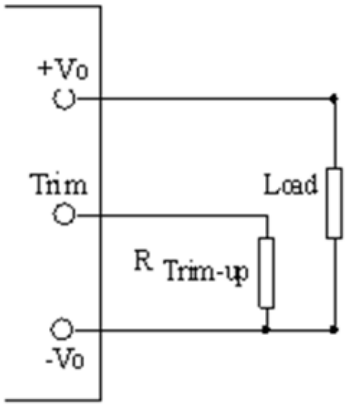
When ambient temperature is higher than the permitted operating, the derating curves should be referred or external heat dissipation measures. Forced air cooling or heatsink, should be used. The air tunnel should be considered for forced air cooling, to avoid heated air be hindered or forming swirl; when heatsink used, it should be attached the converter closely, through double-side thermal conductivity
insulation adhesive or thermal conductivity silicone for heat exchange.

Output Voltage Adjust

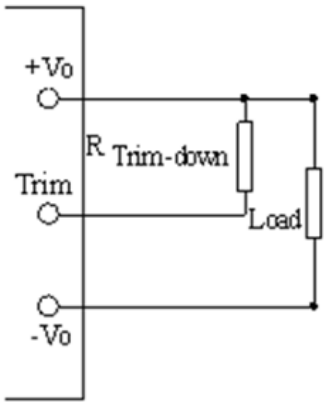
The converters have an Output Voltage adjust pin (Trim). This pin can be used to adjust the output voltage above or below Output voltage initial setting. When increasing the output voltage, the voltage at the output pins (including any remote sense offset) must be kept below the maximum output adjust range, or the characteristics will not be assured in compliant with the specification, even the over voltage protection may be triggered. Also note that at increased output voltages the maximum power rating of the converter 40W remains the same, and the output current capability will decrease correspondingly, at decrease output voltages the maximum current should not exceed 1.67A. When the trim pins are not used, they should be floated.

External circuit is connected as the figure shown, the resistance is calculated as the formula below, please note that the formula will be invalid when $R_{Trim-up}$、$R_{Trim-down}$ are used simultaneously, users adjust the value based on the resistance applied.

Resistance for trimming up ： Resistance for trimming down：



Trim up



Trim down

Resistance for trimming up ： $R_{Trim-up} = \left(\frac{13.1 \times 100(\%)}{\Delta(\%)} - 3.32 \right) (k\Omega)$

Resistance for trimming down： $R_{Trim-down} = \left(\frac{9 \times 100(\%)}{\Delta(\%)} - 25.42 \right) (k\Omega)$

Vo：rated output voltage，24V；

$R_{Trim-up}$、$R_{Trim-down}$ ：Resistance for trimming up or down， kΩ；

△（%）：Change rate, divide output voltage by rated output voltage

For example, trimmed down voltage to 22V，then △（%）=【(24-22）/24】×100%=8.33%；

RTrim-down=9×100%/8.33%-25.42=82.62(kΩ), it can be taken as 82kΩ。

Safety Consideration

The module, as one component for the end user, should be installed into the equipment. It is required to meet safety requirements in the system design.

To avoiding fire and be protected when short circuit occurred, it is recommended that a fast blow fuse with

rating 1.5 to 2.5 times of converter's continuous input peak current is used in series at the input terminal.(Inrush current suppression circuit is required for greater filter capacitance at input terminal, or it will result in the misoperation of the fuse).

Series and Parallel Operation

The converters should not be paralleled directly to increase power, but they can be paralleled each other through o-ring switches or diodes. Make sure that every converter's maximum load current should not exceed the rated current at anytime if they are paralleled without using external current sharing circuits. The converters can operate in series. To prevent against start-up failure due to start up time difference, SBD with low voltage difference can be paralleled at the output pins(SBD negative terminal connect to the positive pin of the output) for each converter.

Cleaning Notice

The converter case is not a hermetically-sealed construction, a sufficient drying process is required after the converter cleaning, make sure the liquid congregated is removed, or it will damage the converter or degradation of performance
After surface treatment, the appearance of the converter may be affected by the organic solvent, protection measures should be taken before cleaning when appearance is concerned.

Quality Statement

The converters are manufactured in accordance with ISO 9001 system requirements, in compliant with YD/T1376-2005, and are monitored 100% by auto-testing system, 100% burn in.
The warranty for the converters is 5-year.

Contact Information

Anhui Hesion Trading Co.,Ltd.
& Beijing WiENPower Technology Co.,Ltd.

TEL:+86-551-65369069,65369067
Email: alecz@ahhesion.com
Backup:alecz@126.com

www.ahhesionpower.com