RDH260-48S250 DC-DC Converters

Input 36V-75V, Output 250V/1.05A, Industry Standard Half Brick

Contents

RoHS 2002/95/EC

Features

- Standard Half Brick（61.0mm×57.9mm×12.7mm）
- Input Under Voltage Protection（30 to 36.0Vdc Turn off）
- Positive Logic Control（3.5V to 15V or floating Turn on）
- Output Voltage Adjust Range: ±10% of the rated output voltage
- Output Short-circuit Protection, automatic recovery
- High Efficiency up to 93%（48V, full load）
- 1500Vdc Isolation Voltage
- Operation Ambient Temperature -40℃ to +85℃
- 110℃ Typ. Over Temperature Protection
- Baseplate Temperature :-40℃ to +100℃
- Applications:Telecom/ datacom system equipments, bus ,metro, tram and Railway & Rail transit ,Industrial control equipments and Instrument
- Compliance with EN50155 railway standard

Ordering Information

See Contents for individual product ordering numbers.

Suffix	Description	Ordering No.
--	Positive Logic Control:	RDH260-48S250
N	Negative Logic Control	RDH260-48S250N
B	Equipped with metal baseplate. A heatsink can be installed on the baseplate.	RDH260-48S250B
BC	Equipped with plastic case	RDH260-48S250BC
NBC	Negative Logic Control. Equipped with metal baseplate and plastic case	RDH260-48S250NBC

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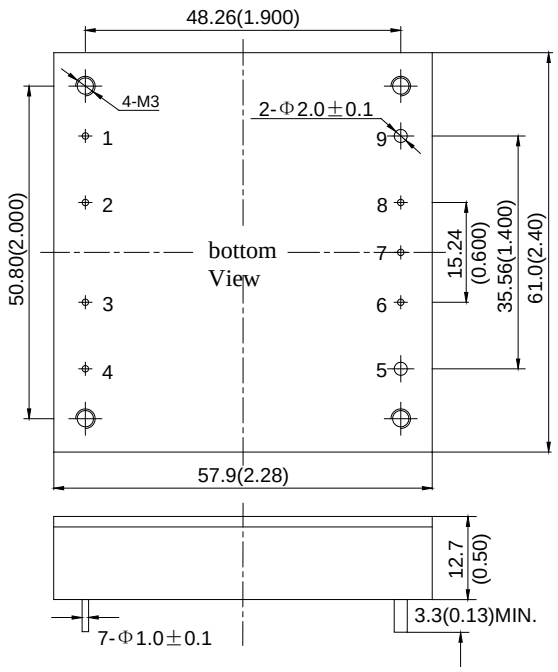
Outline Diagram



Pin	Symbol	Function
1	-Vin	Negative Input
2	NP	No Pin
3	CNT	Remote Control Pin
4	+Vin	Positive Input
5	+Vo	Positive output
6	+S	Positive Remote Sense
7	TRIM	Output voltage adjust
8	-S	Negative Remote Sense
9	-Vo	Negative Output
Notes:all dimensions in mm(inches) Tolerances:X.X±0.5mm(X.XX±0.02) X.XX±0.25mm(X.XXX±0.010)		

Specification

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}	36	48	75	Vdc	—
Input Current		I_{in}	–	–	6.1	A	V_{in}=18Vdc, I_O=8.4A
Positive Logic Remote Control	ON	–	3.5	–	15	V	Refer to $-V_{in}$ Also turn on when CNT floating.
	OFF	–	-0.7	–	1.5	V	Refer to $-V_{in}$
	Current	–	–	–	1.0	mA	—
Start-up Delay Time		T_{delay}	–	40	–	ms	—
Under Voltage Threshold		V_{UVLO}	30.0	–	35.0	Vdc	50% load test
Under Voltage Protection Hysteresis		$\triangle V_{UVLO}$	–	1.5	–	Vdc	—

Output	Symbol	Min	Typ	Max	Unit	Conditions
Output Voltage	V_O	247.5	250.0	252.5	Vdc	V_{intyp}， Io,nom
Output Current	$I_{O,nom}$	–	1.05	–	A	—
Line Regulation	S_V	–	–	±0.3	% V_O	V_{in}: 18～75Vdc, I_O=8.4A
Load Regulation	S_I	–	–	±0.5	% V_O	V_{in}=V_{intyp}， I_O: 0A～8.4A

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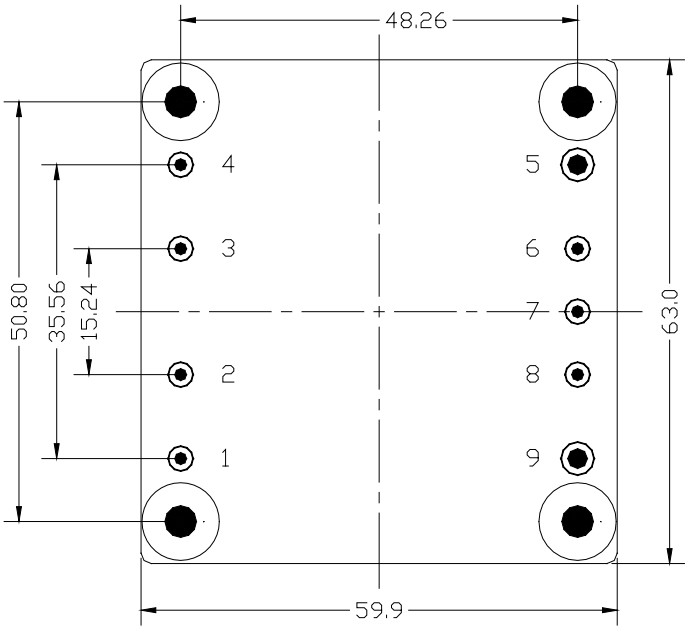
Continue

Output	Symbol	Min	Typ	Max	Unit	Conditions
Output Over Current Protection Range	$I_{O,lim}$	110	-	170	%Io	$V_{in}=V_{intyp}$
Output Short-circuit Protection	automatic recovery					$V_{in}=V_{intyp}$
Peak to Peak Ripple and Noise	$\triangle V_{pp}$	–	1000	2500	mV	$V_{in}=V_{intyp}$, Io,nom , 20MHz bandwidth, a 10μF Tantalum capacitor and a 1μF ceramic capacitor applied at output
Output Overshoot	V_{TO}	0	–	25	Vdc	$V_{in}=V_{intyp}$,$I_{O,nom}$， pure resistiveload
Capacitive Load	C_O	0	–	400	μF	pure resistive load

General		Symbol	Min	Typ	Max	Unit	Conditions
Load Transient	Recovery Time	$\triangle V_{tr}$	—	±1250	—	mV	25%～50%～25%Io,nom or 50%～75%～50%Io,nom; 0.1A/μs
	Voltage Deviation	t_{tr}	—	200	—	μs	
Efficiency		η	90	92.5	–	%	$V_{in}=V_{intyp}$， Io,nom
Switching Frequency		f_s	–	240	–	kHz	—
Isolation Resistance		R_{iso}	50	–	–	MΩ	—
Isolation Voltage		V_{iso}	1500	–	–	Vdc	Input to output Leak Current: 1mA
			1050	–	–	Vdc	Input to case Leak Current: 1mA
			500	–	–	Vdc	Output to case Leak Current: 1mA
MTBF		—	—	2×10^6	—	h	BELLCORE TR-332,
Operating Ambient Temperature		—	-40	–	+85	℃	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

Recommended Layout



NO.	Recommendation & Notes
Pad Design	5、9 Pad holes: 2.5mm,pad diameter including hole:5.0mm; 1-4、6-8 Pad holes: 1.5mm，pad diameter including hole:3.3mm; the fixed holes at the four corners are metallized, with diameter of 4.1mm and pad diameter including hole of 8.5mm is keepout layer.
Safety	Isolated Converters,care to the spacing between input and output, input and protective ground、output and protective ground.
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.

Input Voltage Range

The input voltage range of the DC/DC converter is 36V to 75V。The input impedance of the converter looks like a negative resistor, which can interact with the reactance of the power bus (including any filter elements that have been added to the input of the converter), causes an unstable condition. Depending on the internal transformer's impedance, the external impedance usually should not exceed the 10% of the internal. So, the source impedance of the Power bus should be kept as low as possible.

The method to determine whether the impedance of the power bus too high or not is to decrease the converter's input voltage from higher to lower gradually, if the output voltage decreases (unstable sometime) with the lower input

External Capacitance

Unless special purpose (i.e. prolonging hold-up time, input impedance matching), the recommended input filter's capacitance ranges 100μF-220μF, which not only offers a stable system, and reduces the cost, but also lessens the inrush current when the power supplies.

When larger capacitance is required, a circuit of suppressing the inrush current is recommended when the regulator start-up and a discharge circuit is recommended when the output dropped, ensuring the reliability and safety of other equipments in the system.

Safety Consideration

The converter, as a component for the end user, should be installed into the equipment, and all the safety considerations are achieved under certain condition. It is required to meet safety requirements in system design. The converter output is considered SELV, and the expected input is considered TNV2, the primary to secondary is basic insulation to EN60950.The maximum operating temperature for PCB is 170 ℃.

To avoid fire and be protected when short circuit occurred, it is recommended that a fast blow fuse with rating 2.5 to 3 times of converter's continuous input peak current is used at the input terminal.

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. For the case that there is no external current sharing circuit, but power needs to be increased, please use Trim pin to adjust each converter's output voltage, to load the current as equal as possible in operating (When the load changes in a wide range, the method will not work).

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.

ESD Control

The converters are processed and manufactured in an ESD controlled environment and supplied in conductive packaging to prevent ESD damage from occurring before or during shipping. It is essential that they are unpacked and handled using an ESD control procedures. Failure to do so affects the lifetime of the converter.

Quality Statement

The converters are manufactured in accordance with GJB 9001C system requirements, and are monitored 100% by auto-testing system, 100% burn in.

The warranty for the converters is 5-year.

Contact Information

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