

Standard DIP Package



Size: 1in x 1in x 0.46in (25.4mm x 25.4mm x 11.70mm)

DIP Package with Heatsink ("H" Suffix)



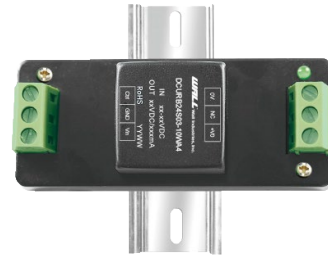
Size: 1in x 1in x 0.64in (25.4mm x 25.4mm x 16.20mm)

Chassis Mount Package ("A2" Suffix)



Size: 2.99in x 1.24in x 0.84in (76mm x 31.5mm x 21.2mm)

DIN Rail Package ("A4" Suffix)



Size: 2.99in x 1.24in x 1.02in (76mm x 31.5mm x 25.8mm)



**OPTIONS**

- Case Type
  - DIP Case
  - Chassis Mount
  - DIN Rail Case

**FEATURES**

- 4:1 Wide Input Voltage Range
- High Efficiency up to 88%
- I/O Isolation Test Voltage: 1500VDC
- DIP Case, Chassis Mount, or DIN Rail Case
- Input Reverse Polarity Protection Available with Chassis (A2S) or 35mm DIN Rail Mounting (A4S)
- Input Under-Voltage Protection
- No Load Power Consumption as Low as 0.12W
- Over Voltage, Over Current, and Short Circuit Protection
- Industry Standard Pin Out
- Cooling by Free Air Convection
- Heatsink Available for DIP Package
- Industry Standard Pin-out
- CISPR32/EN55032 Class A without External Components
- IEC60950-1, UL60950-1, BS EN62368-1 and EN62368-1 Approvals
- Meets EN50155 Railway Standard

**APPLICATIONS**

- Industrial
- Communication
- Railway
- Robotics

**DESCRIPTION**

The DCURB10 series of DC/DC converters offers up to 10 watts of output power in a compact DIP, chassis mount, or DIN Rail case. This series consists of single and dual output models with a wide 4:1 input voltage range. Each model in this series is RoHS compliant, meets EN50155 railway standard, has industry standard pin out, high efficiency, and is cooled by free air convection. This series has input under-voltage, output over voltage, over current, and short circuit protection as well as IEC60950-1, UL60950-1, BS EN62368-1 and EN62368-1 approvals.

**MODEL SELECTION TABLE**

Single Output Models

Model Number <sup>(1)</sup>	Input Voltage Range		Output Voltage	Output Current		Output Power	Maximum Capacitive Load	Efficiency <sup>(4)</sup>		Certification
	Nominal <sup>(2)</sup>	Max. <sup>(3)</sup>		Min	Max			Min.	Typ.	
DCURB24S03-10W	24VDC (9-36)	40VDC	3.3VDC	0mA	2400mA	10W	2200µF	75%	77%	UL/EN/BS EN/IEC
DCURB24S05-10W			5VDC	0mA	2000mA		2200µF	80%	82%	
DCURB24S09-10W			9VDC	0mA	1111mA		680µF	83%	85%	
DCURB24S12-10W			12VDC	0mA	833mA		470µF	84%	86%	
DCURB24S15-10W			15VDC	0mA	667mA		330µF	84%	86%	
DCURB24S24-10W			24VDC	0mA	416mA		100µF	86%	88%	
DCURB48S03-10W*	48VDC (18-75)	80VDC	3.3VDC	0mA	2400mA	10W	2200µF	77%	79%	
DCURB48S05-10W*			5VDC	0mA	2000mA		2200µF	81%	83%	
DCURB48S12-10W*			12VDC	0mA	833mA		470µF	85%	87%	
DCURB48S15-10W*			15VDC	0mA	667mA		330µF	85%	87%	
DCURB48S24-10W*			24VDC	0mA	416mA		100µF	86%	88%	

**MODEL SELECTION TABLE**

Dual Output Models

Model Number <sup>(1)</sup>	Input Voltage Range		Output Voltage	Output Current		Output Power	Maximum Capacitive Load <sup>(5)</sup>	Efficiency <sup>(4)</sup>		Certification
	Nominal <sup>(2)</sup>	Max. <sup>(3)</sup>		Min	Max			Min.	Typ.	
DCURB24D05-10W*	24VDC (9-36)	40VDC	±5VDC	0mA	±1000mA	10W	1000µF	81%	83%	UL/CE/CB
DCURB24D09-10W			±9VDC	0mA	±555mA		680µF	84%	86%	
DCURB24D12-10W*			±12VDC	0mA	±416mA		470µF	85%	87%	
DCURB24D15-10W			±15VDC	0mA	±333mA		330µF	85%	87%	
DCURB24D24-10W*			±24VDC	0mA	±208mA		100µF	85%	87%	
DCURB48D05-10W*	48VDC (18-75)	80VDC	±5VDC	0mA	±1000mA	10W	1000µF	81%	83%	
DCURB48D12-10W*			±12VDC	0mA	±416mA		470µF	85%	87%	
DCURB48D15-10W*			±15VDC	0mA	±333mA		330µF	85%	87%	
DCURB48D24-10W*			±24VDC	0mA	±208mA		100µF	85%	87%	

**SPECIFICATIONS**

All specifications are based on 25°C, Humidity <75%RH, Nominal Input Voltage, and Rated Output Load unless otherwise noted.  
 We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS			Min	Typ	Max	Unit
<b>INPUT SPECIFICATIONS</b>							
Input Voltage Range	24VDC Input			9	24	36	VDC
	48VDC Input			18	48	75	
Input Current	No Load	24VDC Nominal Input	3.3VDC Output		5	12	mA
			Others		5	12	
		48VDC Nominal Input	3.3VDC Output		4	8	
			Others		4	8	
	Full Load	24VDC Nominal Input	3.3VDC Output		429	440	mA
			Others		502	521	
48VDC Nominal Input		3.3VDC Output		190	215		
			Others		251	258	
Reflected Ripple Current	24VDC Input, Nominal Input Voltage				40		mA
	48VDC Input, Nominal Input Voltage				30		
Surge Voltage (1 sec. max.)	24VDC Nominal Input Series			-0.7		50	VDC
	48VDC Nominal Input Series			-0.7		100	
Start Up Voltage	24VDC Nominal Input Series					9	VDC
	48VDC Nominal Input Series					18	
Under-Voltage Protection	24VDC Nominal Input Series			5.5	6.5		VDC
	48VDC Nominal Input Series			12	15.5		
Ctrl <sup>(7)</sup>	Module On			Ctrl Pin Open or Pulled High (3.5-12VDC)			
	Module Off			Ctrl Pin Pulled Low to GND (0-1.2VDC)			
	Input Current When Off				6	10	mA
Input Filter				Pi Filter			
Hot Plug				Unavailable			
<b>OUTPUT SPECIFICATIONS</b>							
Output Voltage				See Table			
Voltage Accuracy <sup>(8)</sup>	0%-100% Load				±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	Vo1		±0.2		±0.5	%
		Vo2		±0.5		±1	
Load Regulation <sup>(9)</sup>	5%-100% Load	Vo1		±0.5		±1	%
		Vo2		±0.5		±1.5	
Output Power				See Table			
Output Current				See Table			
Maximum Capacitive Load	Tested at input voltage range and full load			See Table			
Ripple & Noise <sup>(10)</sup>	20MHz bandwidth, 5%-100% Load				40	80	mVp-p
Transient Response Deviation	25% Load Step Change, Nominal Input Voltage				±3	±5	%
Transient Recovery Time	25% Load Step Change, Nominal Input Voltage				300	500	µs
Temperature Coefficient	Full Load					±0.03	%/°C
Start-Up Time	Nominal input voltage & constant resistance load				10		ms
Cross Regulation	Dual Output, Vo1 Load at 50%, Vo2 Load at Range of 10%-100%					±5	%
<b>PROTECTION</b>							
Short Circuit Protection	Input Voltage Range			Continuous, Self-Recovery			
Over Current Protection	Input Voltage Range			110	140	190	%Io
Over Voltage Protection	Input Voltage Range			110		160	%Vo

**SPECIFICATIONS**

All specifications are based on 25°C, Humidity <75%RH, Nominal Input Voltage, and Rated Output Load unless otherwise noted.  
 We reserve the right to change specifications based on technological advances.

SPECIFICATION		TEST CONDITIONS		Min	Typ	Max	Unit	
<b>ENVIRONMENTAL SPECIFICATIONS</b>								
Operating Temperature	See Fig. 1		-40		+85		°C	
Storage Temperature			-55		+125		°C	
Storage Humidity	Non-Condensing		5		95		%RH	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds				300		°C	
Vibration			IEC/EN61373 – Category 1, Grade B					
MTBF	MIL-HDBK-217F@25°C		1000				K hours	
<b>GENERAL SPECIFICATIONS</b>								
Efficiency			See Table					
Switching Frequency <sup>(11)</sup>	PWM Mode			350			kHz	
Isolation	Input-Output Electric Strength Test for 1 minute with leakage current of 1mA max.		1500				VDC	
Insulation Resistance	Input-Output, Resistance at 500VDC		1000				MΩ	
Isolation Capacitance	Input-Output capacitance at 100KHz/0.1V			1000			pF	
<b>PHYSICAL SPECIFICATIONS</b>								
Weight	DIP Package	Without Heatsink				0.44oz (12.5g)		
		With Heatsink				0.60oz (17g)		
	Chassis Mount					1.27oz (36g)		
		DIN Rail Mount					1.98oz (56g)	
Dimensions (L x W x H)	DIP Package	Without Heatsink				1in x 1in x 0.46in (25.40mm x 25.40mm x 11.70mm)		
		With Heatsink				1in x 1in x 0.64in (25.40mm x 25.40mm x 16.2mm)		
	Chassis Mount						2.99in x 1.24in x 0.83in (76mm x 31.50mm x 21.20mm)	
	DIN Rail Mount						2.99in x 1.24in x 1.02in (76mm x 31.50mm x 25.80mm)	
Case Material						Aluminum Alloy		
Cooling Method						Free Air Convection		
<b>SAFETY CHARACTERISTICS</b>								
Approvals						IEC60950-1, UL60950-1, BS EN62368-1, EN62368-1		
EMI	CE	CISPR32/EN55032				Class A (without extra components)		
						Class B <sup>(13)</sup>		
	RE	CISPR32/EN55032				Class A (without extra components)		
						Class B <sup>(13)</sup>		
Immunity	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 <sup>(12)</sup>				Perf. Criteria B	
	Surge	IEC/EN61000-4-5	Line to Line ±2kV <sup>(12)</sup>				Perf. Criteria B	
	CS	IEC/EN61000-4-6	3 Vr.m.s				Perf. Criteria A	
Voltage Dips, Short Interruption and Voltage Variations Immunity	IEC/EN61000-4-29		0%,70%				Perf. Criteria B	
	Emissions	CE	EN50121-3-2	150kHz-500kHz				99dBuV <sup>(13)</sup>
		RE	EN55016-2-1	500kHz-30MHz				93dBuV <sup>(13)</sup>
	Immunity	ESD	EN50121-3-2	Contact ±6kV/Air ±8kV				Perf. Criteria A
		RS	EN50121-3-2	20V/m				Perf. Criteria A
EFT		EN50121-3-2	±2kV 5/50ns 5kHz <sup>(12)</sup>				Perf. Criteria A	
Surge		EN50121-3-2	Line to line ±1kV (42Ω,0.5μF) <sup>(12)</sup>				Perf. Criteria A	
CS	EN50121-3-2	0.15MHz-80MHz 10Vr.m.s				Perf. Criteria A		
<b>Electromagnetic Compatibility (EN50155)</b>								

**NOTES**

1. Part number with suffix "A2" are chassis mounted, parts with suffix "A4" are DIN Rail mounted, for example DCURB24S05-10WA2 is chassis mounted.  
Part number with "H" suffix has heatsink. Heatsink is only available for standard package models.
2. The A2 and A4 models start-up and minimum input voltages are increased by 1VDC due to input reverse polarity protection circuit.
3. Exceeding the maximum input voltage may cause permanent damage.
4. Efficiency measured at nominal input voltage and rated output load. Efficiency of A2 and A4 models is decreased by 2% due to the input reverse polarity protection circuit.
5. Specified maximum capacitive load value for positive and negative output is identical.
6. Products marked with "\*" need an input capacitor in order to meet conducted specifications of CISPR32/EN55032 Class A.
7. Ctrl pin voltage is referenced to input GND.
8. Output voltage accuracy of  $\pm 5\text{VDC}/\pm 9\text{VDC}$  output converter for 0%-5% load is  $\pm 5\%$  max.
9. Load regulation for 0%-100% load is  $\pm 5\%$
10. Under 0% - 5% load conditions, ripple & noise does not exceed 5%Vo. Parallel cable method is used for Ripple & Noise test. Contact factory for more information.
11. Switching frequency is measured at full load. Module reduces switching frequency for light load (below 50%) efficiency improvement.
12. See Fig.3-① for recommended circuit.
13. See Fig.3-② for recommended circuit..
14. Maximum capacitive load offered were tested at input voltage range and full load.
15. Customization is available
16. Products shall be classified according to ISO14001 and related environmental laws and regulations and should be handled by qualified units.

*\*Due to advances in technology, specifications subject to change without notice.*

**DERATING CURVES**

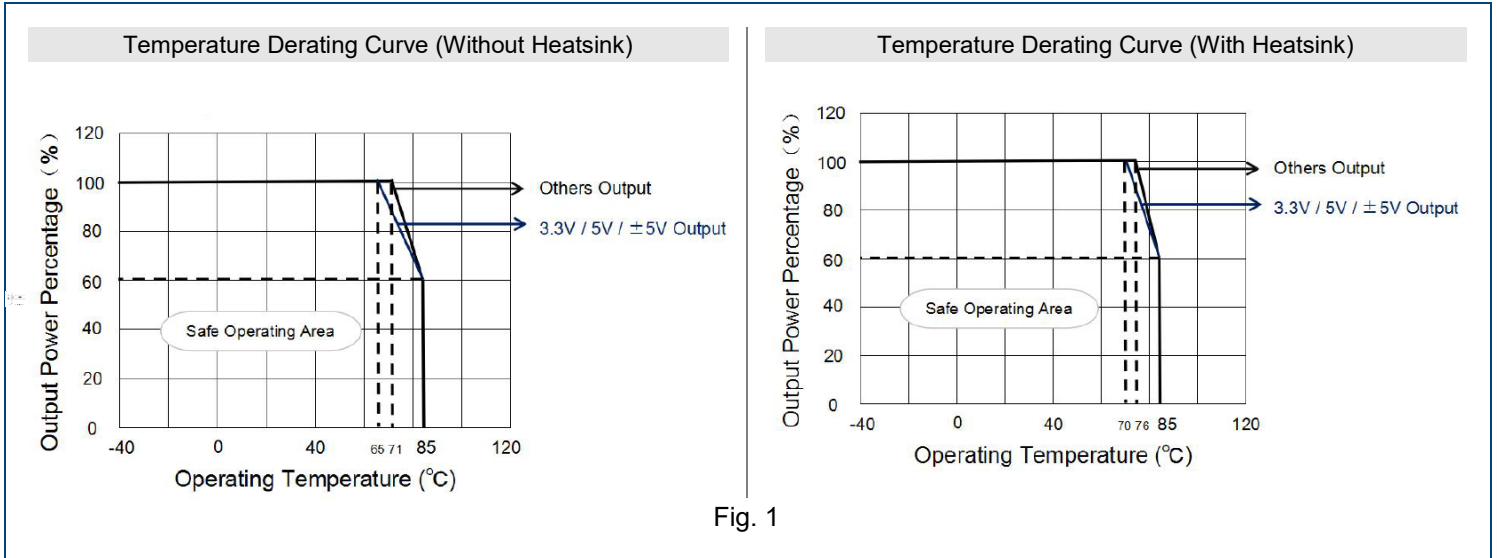
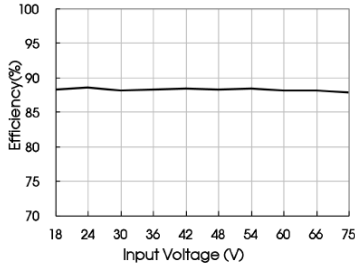


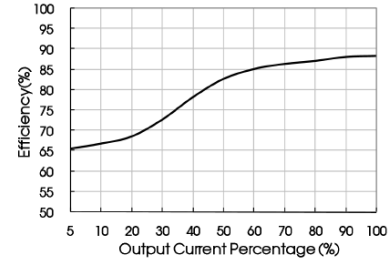
Fig. 1

EFFICIENCY GRAPHS

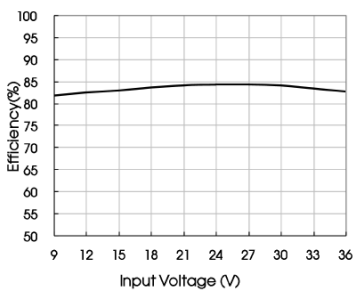
Efficiency vs. Input Voltage (Full Load) DCURB48D15-10W



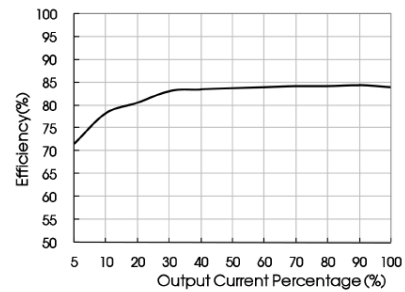
Efficiency VS Output Load (Vin=48V) DCURB48D15-10W



Efficiency vs. Input Voltage (Full Load) DCURB24S05-10W

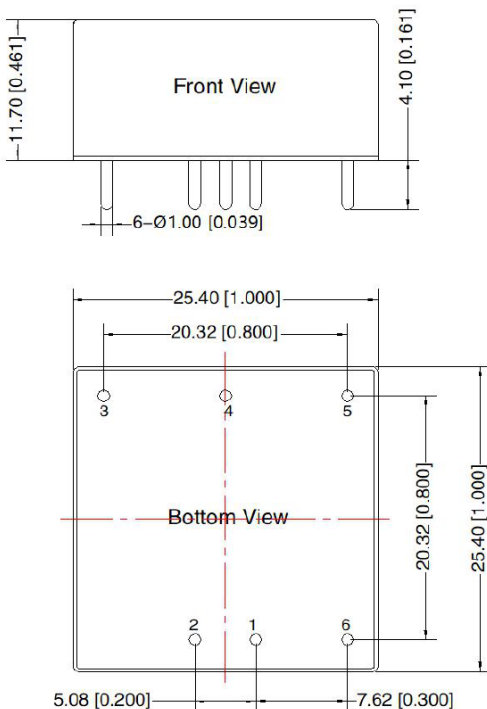


Efficiency VS Output Load (Vin=24V) DCURB24S05-10W

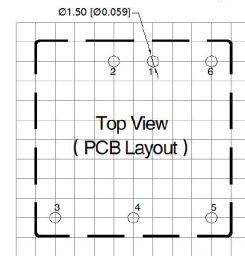


MECHANICAL DRAWINGS

DIP Package (Without Heatsink)



THIRD ANGLE PROJECTION



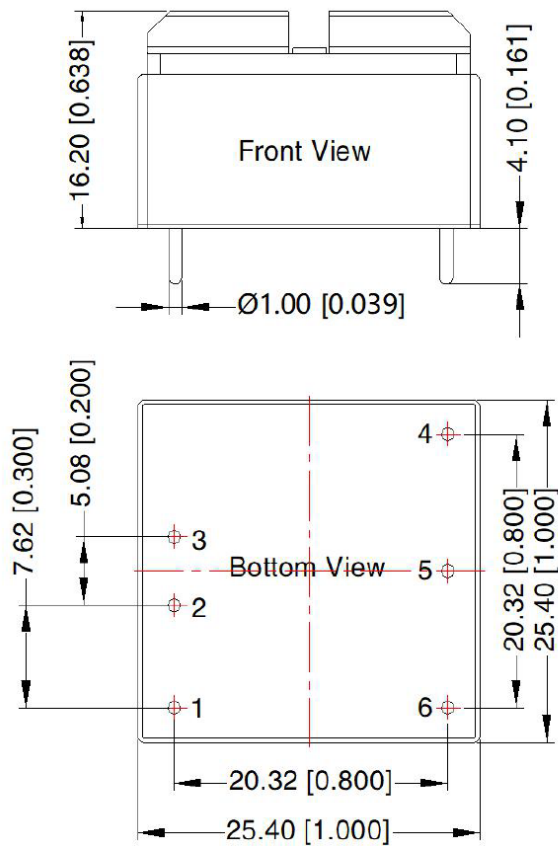
Note: Grid 2.54\*2.54mm

PIN	Pin-Out	
	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo
6	Ctrl	Ctrl

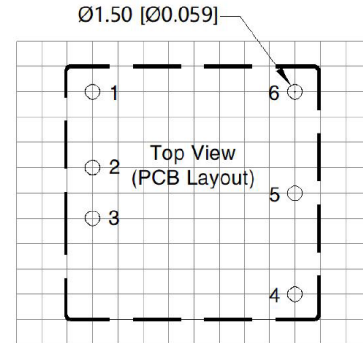
Notes:

Unit: mm [inch]  
Pin 1/2/3/4/5/6:  $\phi 1.0$   
Pin diameter tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]  
General Tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]

DIP Package (With Heatsink, "H" Suffix)



THIRD ANGLE PROJECTION

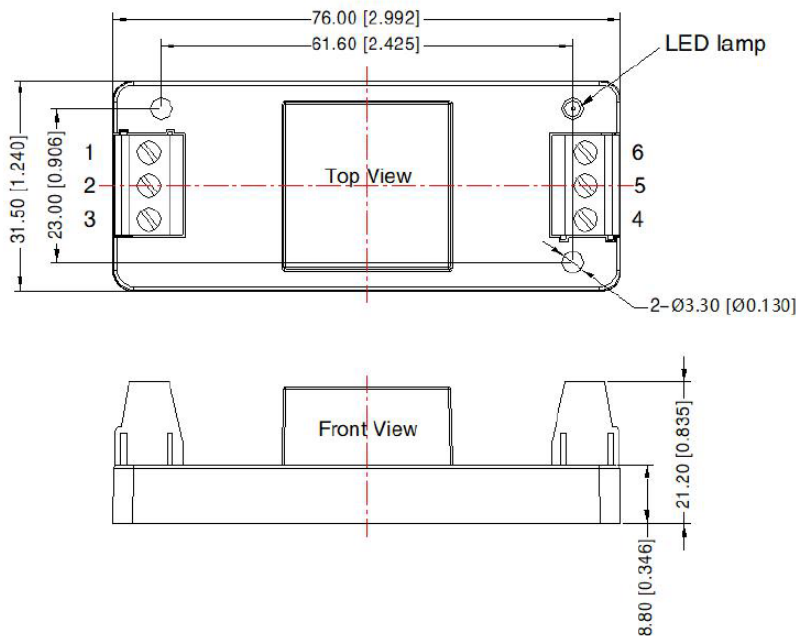


Note: Grid 2.54\*2.54mm

Pin-Out		
PIN	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	No Pin	0V
6	0V	-Vo

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

Chassis Mount Package

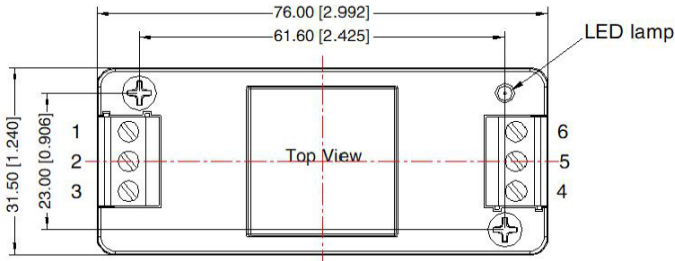


THIRD ANGLE PROJECTION

Pin-Out		
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	NC	0V
6	0V	-Vo

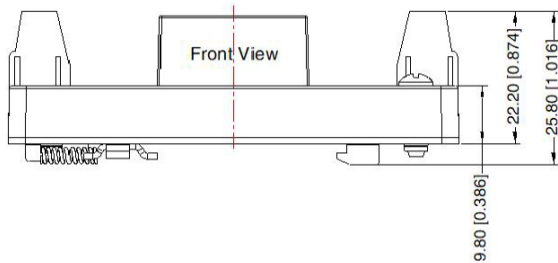
Notes:  
Unit: mm[inch]  
Wire Range: 24-12 AWG  
Tightening Torque: Max 0.4 N·m  
General Tolerances: ±1.00[±0.039]

DIN Rail Mounting ("A4S" Suffix)



THIRD ANGLE PROJECTION

Pin	Pin-Out	
	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	NC	0V
6	0V	-Vo



Notes:  
Unit: mm[inch]  
Mounting Rail: TS35  
Wire Range: 24~12AWG  
Tightening Torque: Max 0.4 N·m  
General Tolerances: ±1.00[±0.039]

DESIGN REFERENCES

1. Typical Application

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. 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 does not exceed the specified max. capacitive load value of the product.

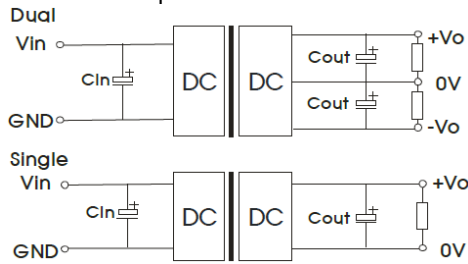


Fig. 2

Vin (VDC)	Vout (VDC)	Cin	Cout
24	3.3/5±5	100µF/50V	10µF/16V
	9/12/15/±9/ ±12/±15		10µF/25V
	24±24		10µF/50V
48	3.3/5±5	10µF- 47µF/100V	10µF/16V
	9/12/15/±9/ ±12/±15		10µF/25V
	24±24		10µF/50V

2. EMC Compliance Circuit

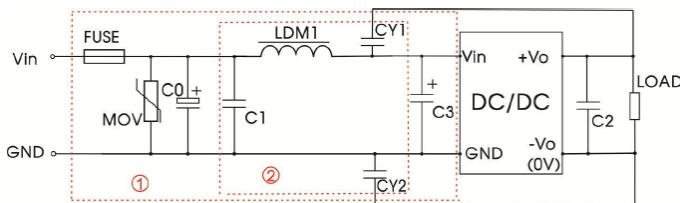


Fig. 3

Note: For EMC tests, Part ① in Fig. 3 is used for immunity and part ② is for emissions test. Select based on needs

Model	Parameter Description	
	Vin:24VDC	Vin:48VDC
Fuse	Choose according to actual input current	
MOV	S20K30	S14K60
C0, C3	330µF/50V	330µF/100V
C1	1µF/50V	1µF/100V
C2	Refer to the Cout in Fig. 2	
LDM1	4.7µH	
CY1, CY2	1nF/2kV	

3. Products do not support parallel connection of their output

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**COMPANY INFORMATION**

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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