
Size: 0.46in x 0.40in x 0.30in
(11.7mm x 10.1mm x 7.5mm)

FEATURES

- 1A Output Current
- Single Outputs
- 1.5 to 15 Watts Output Power
- Wide Input Voltage Range
- High Efficiency up to 95.5%
- Small Package
- Low Standby Current
- Short Circuit, Over Current, and Over Temperature Protection
- Horizontal or Vertical Mounting Options
- Positive to Negative Output Application
- No Min. Load Required
- RoHS & REACH Compliant
- Meets IEC/EN/UL62368-1 Safety Standards

APPLICATIONS

- Automation
- Datacom
- IPC
- Industrial
- Measurement
- Telecom

DESCRIPTION

The DCNSR series consists of high performance non-isolated DC/DC converters that can deliver 1A of output current in a small 0.46" x 0.40" x 0.30" 3-Pin SIP package. This series features a wide operating temperature range of -40°C to +100°C, efficiency up to 95.5%, and low ripple and noise. These converters are also protected against over current, over temperature, and short circuit conditions. These converters can also be used to convert a positive voltage into a negative voltage. The DCNSR series is RoHS and REACH compliant and has IEC/EN/UL62368-1 safety approvals. These converters are suitable for use in automation, datacom, telecom, IPC, industrial, and measurement applications. The DCNSR series also has two pin types available.

MODEL SELECTION TABLE

Positive Output Application

Model Number ⁽¹⁾	Input Voltage		Output Voltage	Output Current		Switching Frequency	No Load Input Current	Output Power	Maximum Capacitive Load	Efficiency	
	Range	Nominal		Min Load	Max Load					Min Vin	Max Vin
DCNSR-12S1.2	4.6~36VDC	12VDC	1.2VDC	0A	1A	300KHz	1mA	1.2W	470µF	73.0%	62.0%
DCNSR-12S1.5	4.6~36VDC	12VDC	1.5VDC	0A	1A	300KHz	1mA	1.5W	470µF	77.0%	66.5%
DCNSR-12S1.8	4.6~36VDC	12VDC	1.8VDC	0A	1A	300KHz	1mA	1.8W	470µF	80.5%	70.0%
DCNSR-12S2.5	4.6~36VDC	12VDC	2.5VDC	0A	1A	300KHz	1mA	2.5W	470µF	83.5%	75.5%
DCNSR-12S3.0	4.6~36VDC	12VDC	3.0VDC	0A	1A	300KHz	1.5mA	3W	470µF	86.5%	78.5%
DCNSR-12S3.3	4.6~36VDC	12VDC	3.3VDC	0A	1A	300KHz	1.5mA	3.3W	470µF	87.5%	79.5%
DCNSR-12S05	6.5~36VDC	12VDC	5VDC	0A	1A	580KHz	2.5mA	5W	470µF	91.5%	83.0%
DCNSR-12S6.5	8.0~36VDC	12VDC	6.5VDC	0A	1A	580KHz	3mA	6.5W	470µF	93.0%	86.0%
DCNSR-12S09	10.5~36VDC	12VDC	9VDC	0A	1A	580KHz	3.5mA	9W	470µF	94.5%	88.5%
DCNSR-24S12	13.5~36VDC	24VDC	12VDC	0A	1A	580KHz	2.5mA	12W	470µF	95.0%	91.5%
DCNSR-24S15	16.5~36VDC	24VDC	15VDC	0A	1A	580KHz	3.5mA	15W	470µF	95.5%	92.5%

MODEL SELECTION TABLE

Negative Output Application⁽²⁾

Model Number ⁽¹⁾	Input Voltage		Output Voltage	Output Current		Switching Frequency	No Load Input Current	Output Power	Maximum Capacitive Load	Efficiency	
	Range	Nominal		Min Load	Max Load					Min Vin	Max Vin
DCNSR-12S1.2	4.6~32VDC	12VDC	-1.2VDC	0A	-0.6A	300KHz	1mA	1.2W	470µF	62.0%	61.0%
DCNSR-12S1.5	4.6~32VDC	12VDC	-1.5VDC	0A	-0.6A	300KHz	1mA	1.5W	470µF	69.5%	64.5%
DCNSR-12S1.8	4.6~32VDC	12VDC	-1.8VDC	0A	-0.6A	300KHz	1mA	1.8W	470µF	72.0%	67.5%
DCNSR-12S2.5	4.6~32VDC	12VDC	-2.5VDC	0A	-0.6A	300KHz	1mA	2.5W	470µF	72.0%	74.0%
DCNSR-12S3.0	4.6~32VDC	12VDC	-3.0VDC	0A	-0.6A	300KHz	2mA	3W	470µF	73.0%	76.5%
DCNSR-12S3.3	4.6~32VDC	12VDC	-3.3VDC	0A	-0.6A	300KHz	2mA	3.3W	470µF	74.0%	77.5%
DCNSR-12S05	4.6~31VDC	12VDC	-5VDC	0A	-0.4A	580KHz	3mA	5W	470µF	79.5%	78.5%
DCNSR-12S6.5	7.0~29VDC	12VDC	-6.5VDC	0A	-0.3A	580KHz	4mA	6.5W	470µF	84.5%	80.0%
DCNSR-12S09	7.0~27VDC	12VDC	-9VDC	0A	-0.3A	580KHz	7mA	9W	470µF	85.0%	82.0%
DCNSR-24S12	7.0~24VDC	12VDC	-12VDC	0A	-0.3A	580KHz	8mA	12W	470µF	85.0%	85.5%
DCNSR-24S15	7.0~21VDC	12VDC	-15VDC	0A	-0.2A	580KHz	10mA	15W	470µF	85.5%	84.5%

SPECIFICATIONS

All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS			Min	Typ	Max	Unit
INPUT SPECIFICATIONS							
Operating Input Voltage Range				See Table			
Input Filter				Capacitor Type			
Input Reflected Ripple Current					100		mAp-p
OUTPUT SPECIFICATIONS							
Output Voltage				See Table			
Voltage Accuracy				-2.0		+2.0	%
Line Regulation	Low Line to High Line at Full Load			-0.2		+0.2	%
Load Regulation	10% to 100% of Full Load	Vertical Mounting	1.5Vout	-0.6		+0.6	%
			Others	-0.4		+0.4	
		Horizontal Mounting	1.5Vout, 1.8Vout	-1.2		+1.2	
			Others	-0.4		+0.4	
Output Power				See Table			
Output Current				See Table			
Dynamic Load Response	50% Load Step Change	Peak Deviation			150	250	mV
		Recovery			250	350	µs
Maximum Capacitive Load				See Table			
Ripple & Noise	Measured by 20MHz bandwidth	Vout ≤ 6.5VDC			50		mVp-p
		Vout ≥ 9.0VDC			75		
Start Up Time	Constant Resistive Load	Power Up			5		ms
Output Start-Up Overshoot						+1	%
Rise Time	Time for Vout rises from 10% to 90% of Vout				3.5		ms
Temperature Coefficient				-0.015		+0.015	%/°C
PROTECTION							
Short Circuit Protection				Continuous, Automatic Recovery			
Over Load Protection					2		A
Over Temperature Protection	Internal IC Junction				170		°C
ENVIRONMENTAL SPECIFICATIONS							
Operating Ambient Temperature	With Derating			-40		+100	°C
Storage Temperature				-55		+125	°C
Relative Humidity				5		95	%RH
Thermal Shock				MIL-STD-810F			
Shock				MIL-STD-810F			
Vibration				MIL-STD-810F			
MTBF	MIL-HDBK-217F, Full Load				2.009x10 ⁷		Hours
GENERAL SPECIFICATIONS							
Efficiency				See Table			
Switching Frequency	Vout ≤ 3.3VDC			240	300	360	kHz
	Vout ≥ 5VDC			464	580	696	
PHYSICAL SPECIFICATIONS							
Weight				0.067oz (1.9g)			
Dimensions (L x W x H)				0.46in x 0.40in x 0.30in (11.7mm x 10.1mm x 7.5mm)			
Case Material				Non-Conductive Black Plastic			
Potting Material				Silicone (UL94 V-0)			
SAFETY CHARACTERISTICS							
Safety Approvals				IEC/EN/UL62368-1			

NOTES

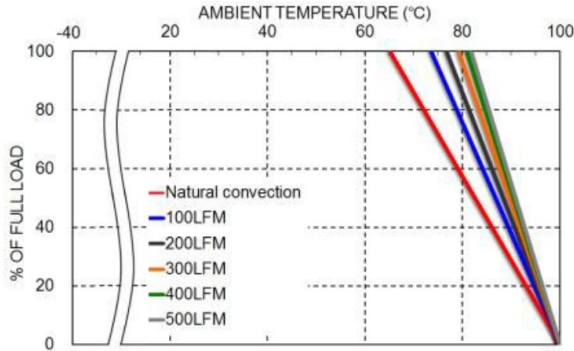
- Add "A" suffix to model number to indicate horizontally mounted pins.
- The DCNSR series converters can be used to convert a positive voltage into a negative voltage.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

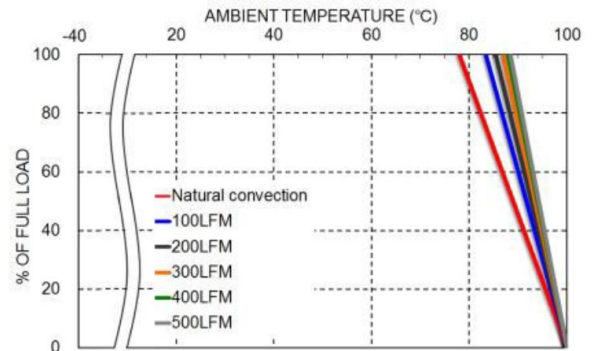
**Due to advances in technology, specifications subject to change without notice.*

DERATING CURVES

Derating Curve Positive Application
DCNSR-12S05

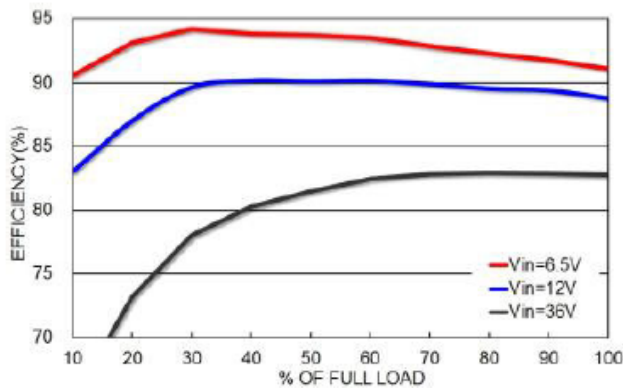


Derating Curve Negative Application
DCNSR-12S05

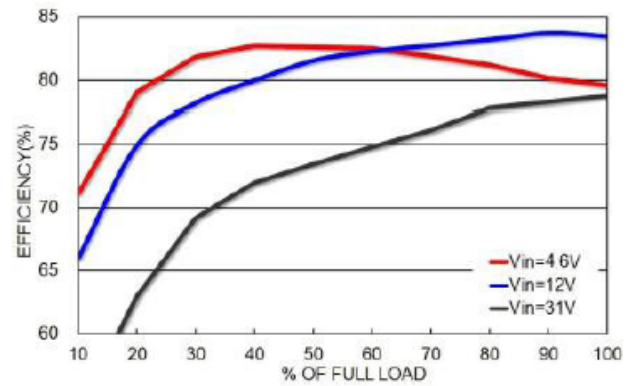


EFFICIENCY CURVES

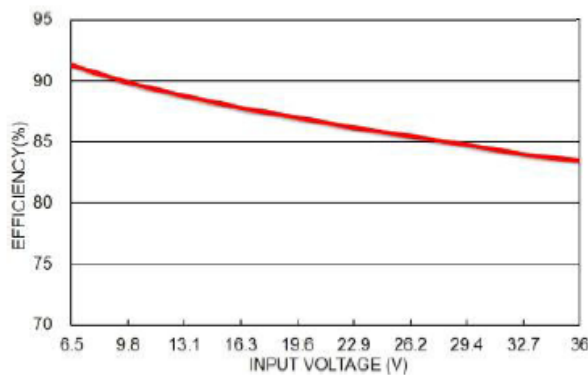
Efficiency vs Load Positive Application
DCNSR-12S05



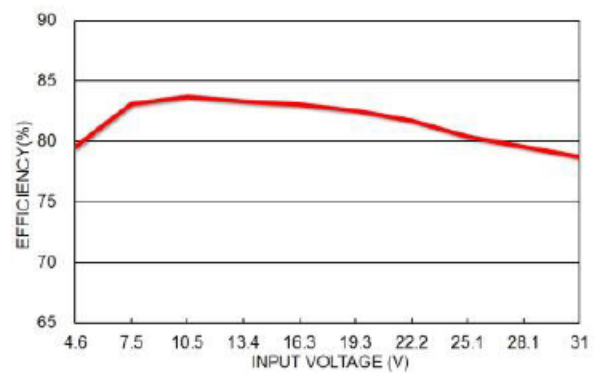
Efficiency vs Load Negative Application
DCNSR-12S05



Efficiency vs. Line Positive Application
DCNSR-12S05

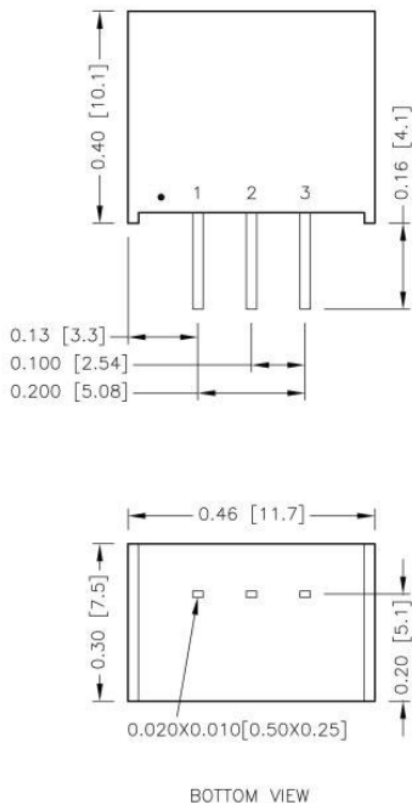


Efficiency vs Line Negative Application
DCNSR-12S05

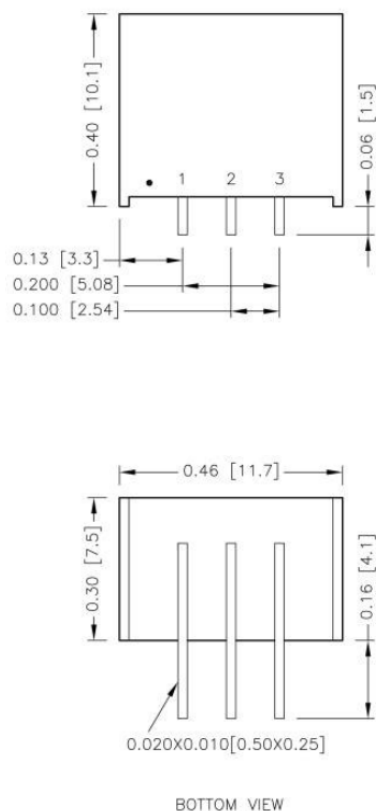


MECHANICAL DRAWINGS

Standard Type (Vertical Mounting)



"A" Suffix (Horizontal Mounting)



PIN Connection

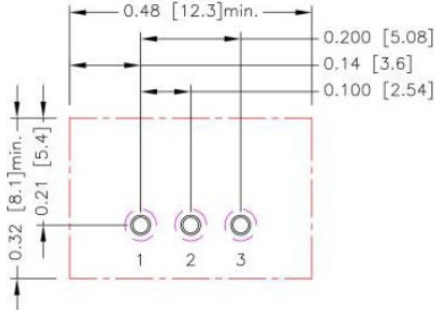
PIN CONNECTION

PIN	DEFINE
1	+Vin
2	GND
3	+Vout

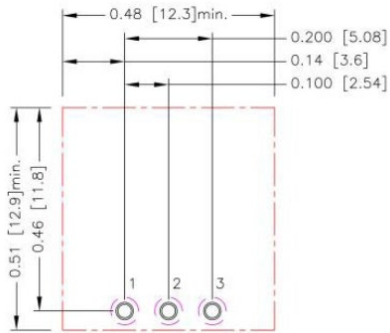
1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
x.xxx±0.01 [x.xx±0.25]
3. Pin dimension tolerance ±0.004 [0.10]

RECOMMENDED PAD LAYOUT

Standard Type (Vertical Mounting)



"A" Suffix (Horizontal Mounting)



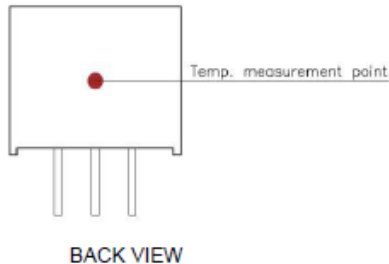
All dimensions in inch [mm]
Pad size (lead free recommended)
Through Hole 1.2.3: $\varnothing 0.03$ [0.80]
Top view pad 1.2.3: $\varnothing 0.039$ [1.00]
Bottom view pad 1.2.3: $\varnothing 0.063$ [1.60]

THERMAL CONSIDERATIONS

The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point shown in the figure below. The temperature at this location should not exceed 100°C. When operating, adequate cooling must be provided to maintain the test point temperature at or below 100°C. Although the maximum point temperature of the power modules is 100°C, you can limit this temperature to a lower value for extremely high reliability.

The unit will shutdown if the internal IC junction exceeds 170°C (typical), but the thermal shutdown is not intended as a guarantee that the unit will survive temperature beyond its rating. The module will automatically restart after it cools down.

- Thermal test condition with vertical direction by natural convection (20LFM).



FUSE CONSIDERATIONS

This power module is not internally fused. An input line fuse must always be used.

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

To maximize flexibility, internal fusing is not included, however, to achieve maximum safety and system protection, always use an input line fuse.

The input fuse suggestion is below:

Model	Fuse Rating (A)	Fuse Type
DCNSR-12S05	2.0	Slow-Blow

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low VIN

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 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:

Phone: ☎(603)778-2300
Toll Free: ☎(888)597-9255
Fax: ☎(603)778-9797
E-mail: sales@wallindustries.com
Web: www.wallindustries.com
Address: 37 Industrial Drive
Exeter, NH 03833

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