



Size: 2in x 1in x 0.47in (50.8mm x 25.4mm x 11.8mm)

**FEATURES**

- Wide 2:1 Input Voltage Range
- High Efficiency
- RoHS Compliant
- Regulated Outputs
- Six-Sided Metal Shielded Package
- Output Short Circuit, Over Voltage, and Over Current Protection
- I/O Isolation Voltage of 1.5kVDC
- Meets CISPR32/EN55032 Class A EMI without Extra Components

**DESCRIPTION**

The DCRLD30 series of DC/DC converters offers up to 30 watts of output power in a 2" x 1" x 0.47" through hole package. This series consists of regulated single output models with a wide 2:1 input range and high efficiency. Features of this series include short circuit, over voltage, and over current protection, as well as isolation voltage of 1.5kVDC. This series meets CISPR32/EN55032 Class A EMI without extra components and is RoHS compliant.

**MODEL SELECTION TABLE**

Single Output Models

Model Number	Input Voltage Range		Output Voltage	Output Current		Efficiency <sup>(2)</sup>		Max. Capacitive Load <sup>(3)</sup>	Output Power
	Nominal (Range)	Max. <sup>(1)</sup>		Min. Load	Max. Load	Min.	Typ.		
DCRLD30-24S03	24VDC (18-36VDC)	40VDC	3.3VDC	0mA	6000mA	83%	85%	10000µF	30W
DCRLD30-24S05			5VDC	0mA	6000mA	86%	88%	10000µF	
DCRLD30-24S09			9VDC	0mA	3333mA	84%	86%	4700µF	
DCRLD30-24S12			12VDC	0mA	2500mA	86%	88%	2700µF	
DCRLD30-24S15			15VDC	0mA	2000mA	88%	90%	1680µF	
DCRLD30-24S24			24VDC	0mA	1250mA	88%	90%	680µF	
DCRLD30-48S03	48VDC (36-75VDC)	80VDC	3.3VDC	0mA	6000mA	84%	86%	10000µF	30W
DCRLD30-48S05			5VDC	0mA	6000mA	86%	88%	10000µF	
DCRLD30-48S12			12VDC	0mA	2500mA	86%	88%	2700µF	
DCRLD30-48S15			15VDC	0mA	2000mA	87%	89%	1680µF	
DCRLD30-48S24			24VDC	0mA	1250mA	87%	89%	680µF	

**SPECIFICATIONS**

All specifications are based on 25°C, Humidity <75%, 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
	INPUT SPECIFICATIONS						
Input Voltage Range				See Table			
Input Current	Full Load	24VDC Nominal Input, Nominal Input Voltage	3.3VDC Output		1471	1507	mA
			5VDC Output		1421	1453	
			Others		1389	1489	
		48VDC Nominal Input, Nominal Input Voltage	3.3VDC Output		727	745	
	No Load	24VDC Nominal Input, Nominal Input Voltage	5VDC Output		711	727	
			Others		711	727	
			3.3VDC Output		60	100	
		48VDC Nominal Input, Nominal Input Voltage	5VDC Output		60	100	
Others			6	12			
3.3VDC Output			20	30			
Surge Voltage (1 sec. max.)	24VDC Nominal Input		-0.7		50	VDC	
	48VDC Nominal Input		-0.7		100		
Reflected Ripple Current	Nominal Input Voltage				40		mA
Start Up Voltage	24VDC Nominal Input					18	VDC
	48VDC Nominal Input					36	
Input Filter				Pi Filter			
Hot Plug				Unavailable			

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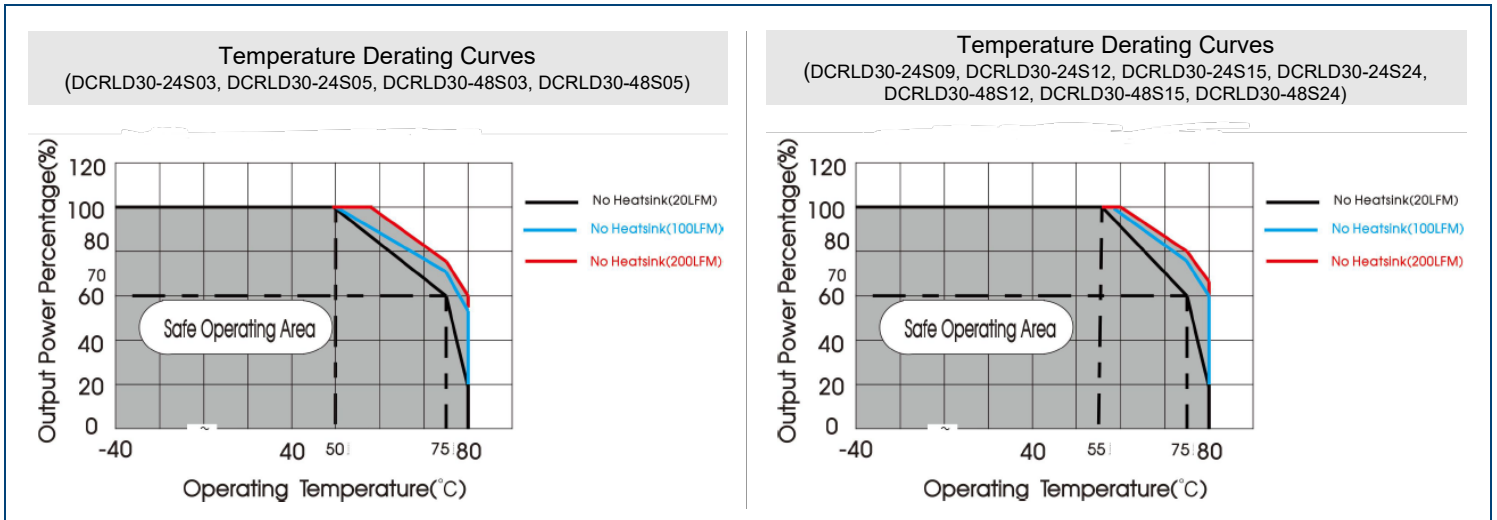
SPECIFICATION	TEST CONDITIONS	Min	Typ	Max	Unit
<b>OUTPUT SPECIFICATIONS</b>					
Output Voltage			See Table		
Voltage Accuracy	5%-100% Load		±1	±3	%
	0%-5% Load		±1	±5	
Linear Regulation	Input Voltage Variation from Low to High at Full Load		±0.2	±0.5	%
Load Regulation <sup>(3)</sup>	5%-100% Load		±0.5	±1	%
Output Power		See Table			
Output Current		See Table			
Maximum Capacitive Load		See Table			
Ripple & Noise <sup>(4)</sup>	20MHz Bandwidth, Nominal Input Voltage, 100% Load		50	100	mVp-p
Temperature Coefficient	Full Load			±0.03	%/°C
Transient Recovery Time	25% Load Step Change, Nominal Input Voltage		300	500	µs
Transient Response Deviation	25% Load Step Change, Nominal Input Voltage		±5	±8	%
	3.3VDC/5VDC Output Others		±3	±5	
Start Up Time	Nominal Input Voltage & Constant Resistance Load		10		ms
Trim			±10		%Vo
<b>CTRL<sup>(5)</sup></b>					
Module On		Ctrl Pin Open or Pulled High (3.5-12VDC)			
Module Off		Ctrl Pin Pulled Low or GND (0-1.2VDC)			
Input Current When Off			5	8	mA
<b>PROTECTION</b>					
Short Circuit Protection	Input Voltage Range	Hiccup, Continuous, Self-Recovery			
Over Voltage Protection	Input Voltage Range	110		160	%Vo
Over Current Protection	Input Voltage Range	110		190	%Io
<b>ENVIRONMENTAL SPECIFICATIONS</b>					
Operating Temperature	See Derating Curves	-40		80	°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		10-550Hz, 2G, 30 Min. along X, Y, Z			
MTBF	MIL-HDFK-217F@25°C	1000			K Hours
<b>GENERAL SPECIFICATIONS</b>					
Efficiency <sup>(2)</sup>		See Table			
Switching Frequency <sup>(6)</sup>	PWM Mode		300		KHz
Isolation	Input-Output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500			VDC
Insulation Resistance	Input-Output, Resistance at 500VDC/60Sec.	1000			MΩ
Isolation Capacitance	Input-Output Capacitance at 100KHz/0.1V		2000		pF
<b>PHYSICAL SPECIFICATIONS</b>					
Weight		0.98oz (27.8g)			
Dimensions (L x W x H)	SIP Package	2in x 1in x 0.47in (50.8mm x 25.4mm x 11.8mm)			
Case Material		Aluminum Alloy			
Cooling		Free Air Convection			
<b>SAFETY CHARACTERISTICS</b>					
Emissions	CE	CISPR22/EN55032			Class A <sup>(7)</sup> /Class B <sup>(8)</sup> Class A <sup>(7)</sup> /Class B <sup>(8)</sup>
	RE	CISPR32/EN55032			
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>(9)</sup>		Perf. Criteria B
	Surge	IEC/EN61000-4-5	Line to line ±2KV <sup>(9)</sup>		Perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s		Perf. Criteria A

**NOTES**

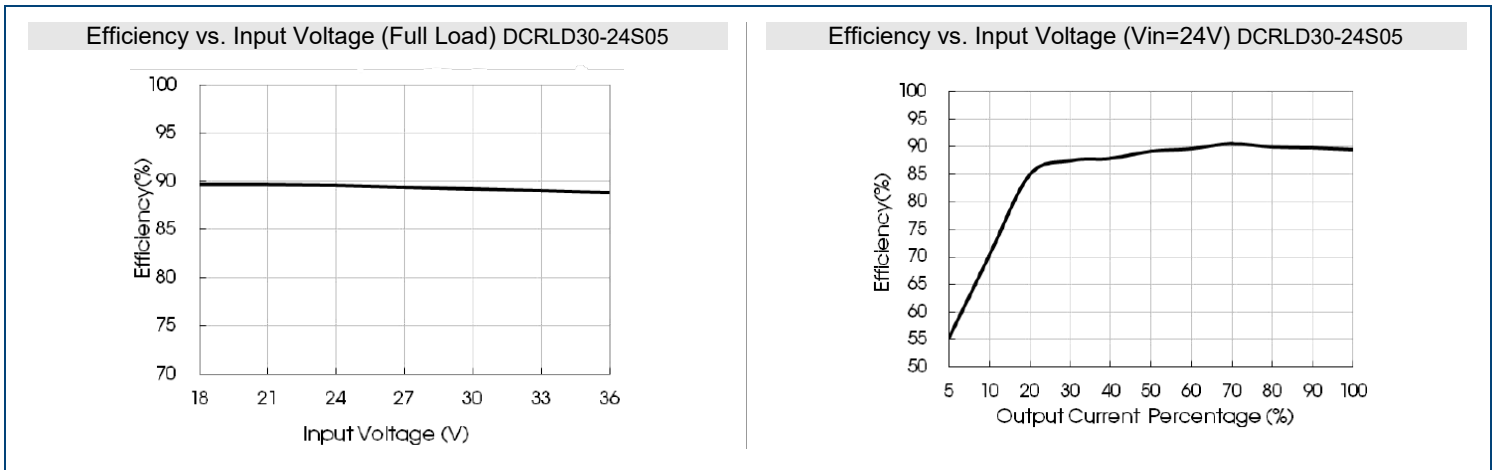
1. Exceeding maximum input voltage may cause permanent damage
2. Efficiency is measured in nominal input voltage and rated output load
3. Load regulation for 0%-100% load is  $\pm 5\%$
4. The "parallel cable" method is used for ripple and noise test. Contact factory for more information.
5. Ctrl pin voltage is referenced to input GND.
6. Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.
7. Without External Components
8. See Fig. 2 - ② for recommended circuit
9. See Fig. 2 - ① for recommended circuit
10. Maximum capacitive load offered were tested at input voltage range and full load.
11. Customization is available. Please contact factory for more information.
12. Product 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.*

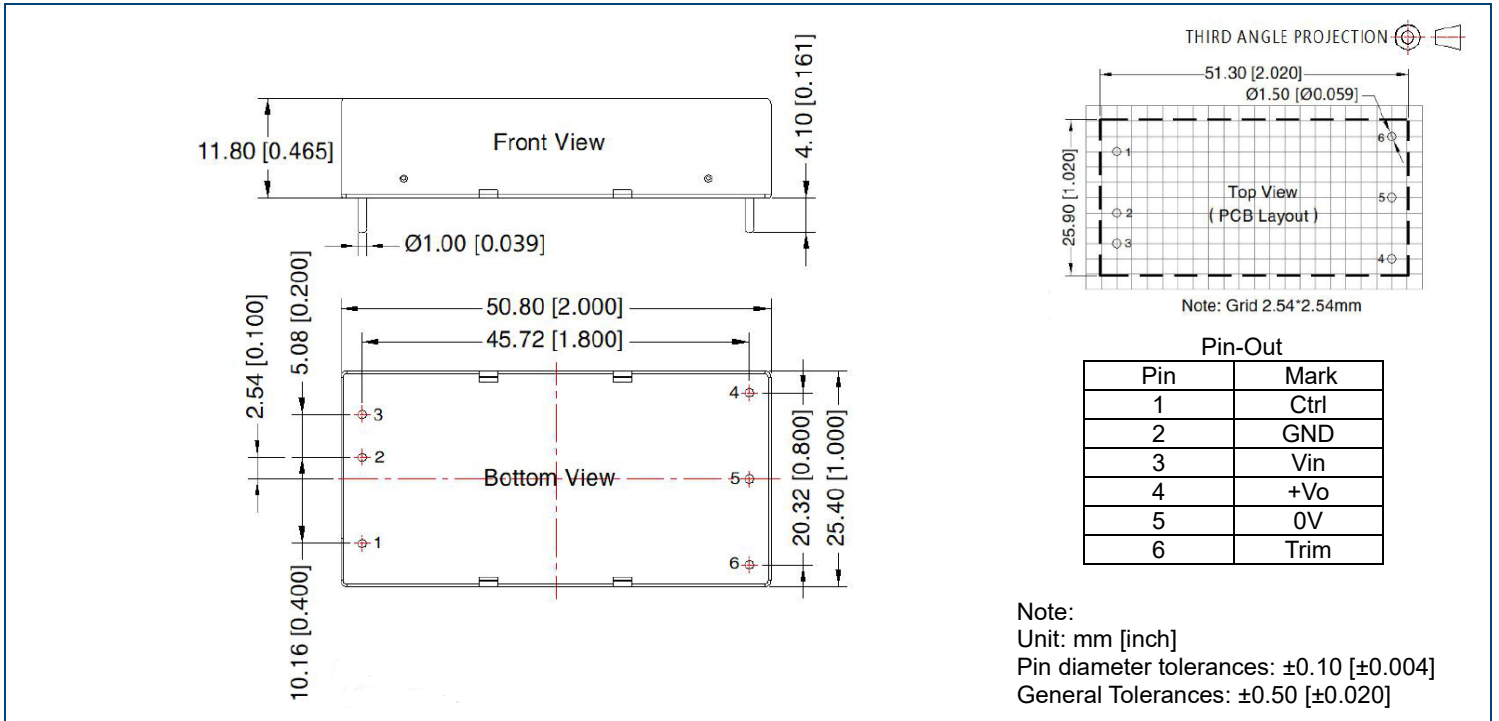
**DERATING CURVES**



**EFFICIENCY CURVES**



MECHANICAL DRAWINGS

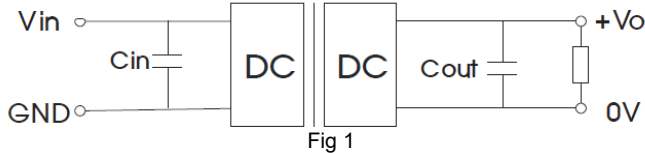


DESIGN REFERENCE

1. Typical Application Circuit

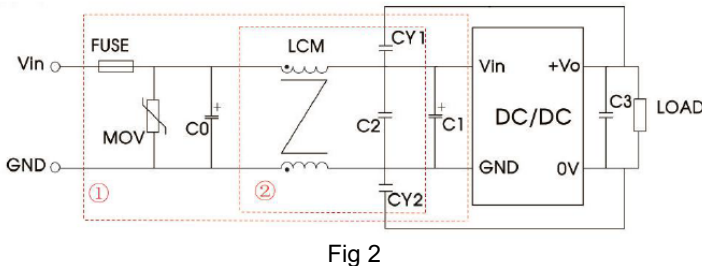
All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 1.

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 is not exceeding the specified max. capacitive load value of the product.



Output Voltage (VDC)	$C_{out}$ ( $\mu$ F)	$C_{in}$ ( $\mu$ F)
3.3/5/9	220	100
12/15/24	100	

2. EMC Compliance Circuit

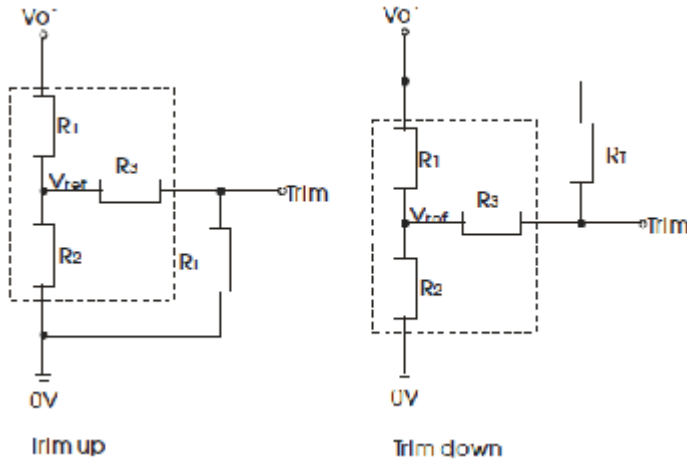


Note: For EMC tests we use Part ① in Fig. 2 for immunity and part ② for emissions test.

Parameter Description

Model	Vin: 24V	Vin: 48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680 $\mu$ F/50V	330 $\mu$ F/100V
C1	330 $\mu$ F/50V	330 $\mu$ F/100V
C2	4.7 $\mu$ F/50V	2.2 $\mu$ F/100V
C3	Refer to $C_{out}$ in Fig. 1	
LCM	1mH, contact factory for recommendation	
CY1, CY2	1nF/2kV	

3. Trim Function for Output Voltage Adjustment (Open if Unused)



Calculating Trim Resistor Values:

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V'_o - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V'_o - V_{ref}}{V_{ref}} \cdot R_2$$

$R_T$  = Trim Resistance  
 $a$  = self – defined parameter  
 $V'_o$  = Desired Output Voltage

TRIM Resistor Connection (Dashed Line Shows Internal Resistor Network)

Vout (VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	4.801	2.87	12.4	1.24
5	2.883	2.87	10	2.5
9	7.500	2.87	15	2.5
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	17.8	2.5

4. Products do not support parallel connection of their output

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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