



Size: 1in x 1in x 0.4in (25.4mm x 25.4mm x 10.2mm)

**OPTIONS**

- Input Voltage Range
- Output Voltage

**FEATURES**

- Wide 2:1 Input Voltage Range (9~18V, 18~36V, 36~75V)
- High Power Density
- Lead Free Design
- Useful where isolated, tightly regulated voltages and compact size are required
- Fixed Switching Frequency
- Custom Designs Available
- Over Load, Short Circuit, and Over Voltage Protection
- Wide Operating Temperature Range: -55°C to +95°C
- Industry Standard Pinout
- Shielded Metal Case with Insulated Baseplate
- RoHS compliant
- Designed to meet IEC/EN60950-1 Safety Standards

**APPLICATIONS**

- Battery Operated Equipment
- Measurement Equipment
- Telecom
- Wireless Network
- Industry Control System

**DESCRIPTION**

The DCMRD5 series of isolated DC DC converters offers 5 watts of output power in a compact 1" x 1" x 0.4" frame. This series consists of single and dual outputs with wide 2:1 input voltage range (9~18V, 18~36V, 36~75V) and output voltages of 5VDC, 12VDC, and ±15VDC. Each model is RoHS compliant and meets IEC/EN60950-1 safety standards. The series is protected against over load, short circuit, and over voltage conditions and has high power density.

**MODEL SELECTION TABLE**

Model Number	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise	Input Current		Output Power	Maximum Capacitive Load <sup>(3)</sup>	Efficiency <sup>(2)</sup>
			Min Load <sup>(1)</sup>	Max Load		No Load	Full Load			
DCMRD5-12S05	9~18V Nominal: 12VDC	5	0mA	1000mA	75mVp-p Max.	17	555	5 Watts	1000µF	79%
DCMRD5-12S12		12	0mA	416mA		21	527		220µF	83%
DCMRD5-12D15		±15	0mA	±167mA		27	543		47µF	81%
DCMRD5-24S05	18~36V Nominal: 24VDC	5	0mA	1000mA	75mVp-p Max.	9	278	5 Watts	1000µF	79%
DCMRD5-24S12		12	0mA	416mA		12	267		200µF	82%
DCMRD5-24D15		±15	0mA	±167mA		15	268		47µF	82%
DCMRD5-48S05	36~75V Nominal: 48VDC	5	0mA	1000mA	75mVp-p Max.	5	139	5 Watts	1000µF	79%
DCMRD5-48S12		12	0mA	416mA		7	134		133µF	82%
DCMRD5-48D15		±15	0mA	±167mA		8	134		47µF	82%

**SPECIFICATIONS**

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

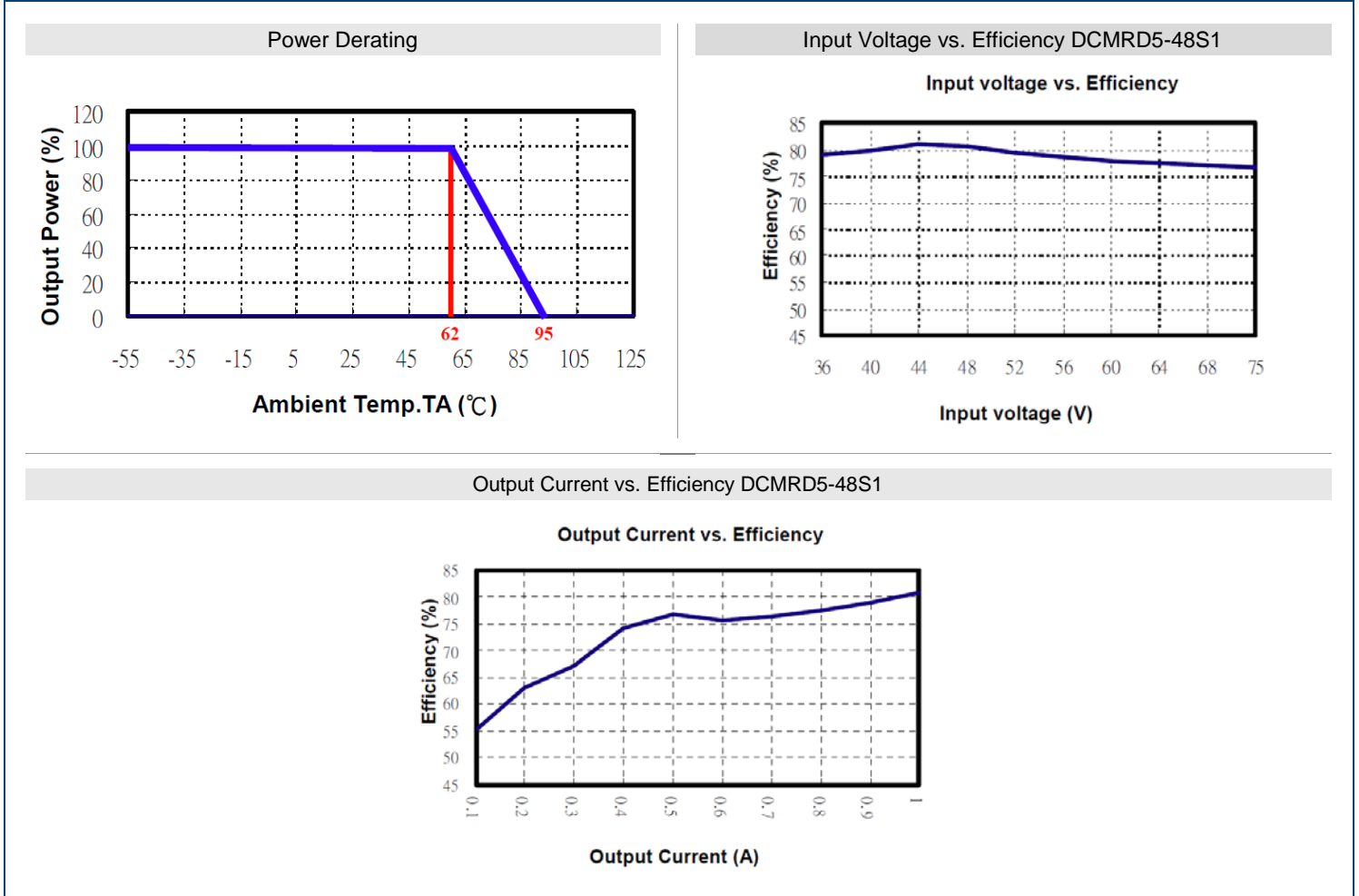
SPECIFICATION	TEST CONDITIONS	Min	Typ	Max	Unit
<b>INPUT SPECIFICATIONS</b>					
Input Voltage Range	12V nominal input	9		18	V
	24V nominal input	18		36	
	48V nominal input	36		75	
Input Surge Voltage (100ms max.)	12V nominal input		25		V
	24V nominal input		50		
	48V nominal input		100		
Input Reflected Ripple Current	Nominal Vin and Full Load		70		mAp-p
Input Filter		Pi Type			
Reverse Voltage Protection				1.0	A
<b>OUTPUT SPECIFICATIONS</b>					
Output Voltage		See Table			
Voltage Accuracy	Full Load and Nominal Vin	-1		+1	%
Line Regulation	LL to HL at full load	-0.8		+0.8	%
Load Regulation	25% load to full load	-1.0	Single	+1.0	%
	Balanced Load		Dual	+1.0	
	Unbalanced load 25% to 100% full load	-5		+5	
Output Power				5	W
Output Current		See Table			
Minimum Load		0			A
Maximum Capacitive Load		See Table			
Ripple & Noise (20MHz bandwidth)				75	mVp-p
Transient Response Settling Time	50% load step change		1300		us
Transient Response Over Shoot	di/dt=0.8A/μs	≤ ±5% of Vo			
Start-Up Time	Nominal Vin and constant resistive load		1300		ms
Temperature Coefficient		-0.02		+0.02	%/°C
<b>PROTECTION</b>					
Short Circuit Protection		Continuous, Automatic Recovery			
Over Load Protection	% of Full Load at Nominal Input		150		%
Over Voltage Protection	Zener Diode Clamp	5Vout		6.2	V
		12Vout		15	
		15Vout		18	
<b>ENVIRONMENTAL SPECIFICATIONS</b>					
Operating Ambient Temperature	With derating	-55		+95	°C
Maximum Case Temperature				+100	°C
Storage Temperature		-55		+125	°C
Relative Humidity		5		95	% RH
Reliability, calculated MTBF		1.19 x 10 <sup>6</sup> Hours			
<b>GENERAL SPECIFICATIONS</b>					
Efficiency	Nominal Input	See Table			
Switching Frequency	Pulse width modulation (PWM)		300		kHz
Isolation Voltage	Input to Output		1500		VDC
Isolation Resistance	500VDC	10 <sup>9</sup>			Ω
Isolation Capacitance			580		pF
<b>PHYSICAL SPECIFICATIONS</b>					
Weight		0.62oz (17.4g) typ.			
Dimensions (L x W x H)		1in x 1in x 0.4in (25.4mm x 25.4mm x 10.2mm)			
Case Material		Nickel-Coated Copper			
Base Material		Non-Conductive Black Plastic			
Potting Material		Silicon rubber (UL94V-0)			
Shielding		Shielded Metal Case with Insulated Baseplate			
<b>SAFETY &amp; EMC CHARACTERISTICS</b>					
Safety Standards		Designed to meet IEC/EN60950-1			

**NOTES**

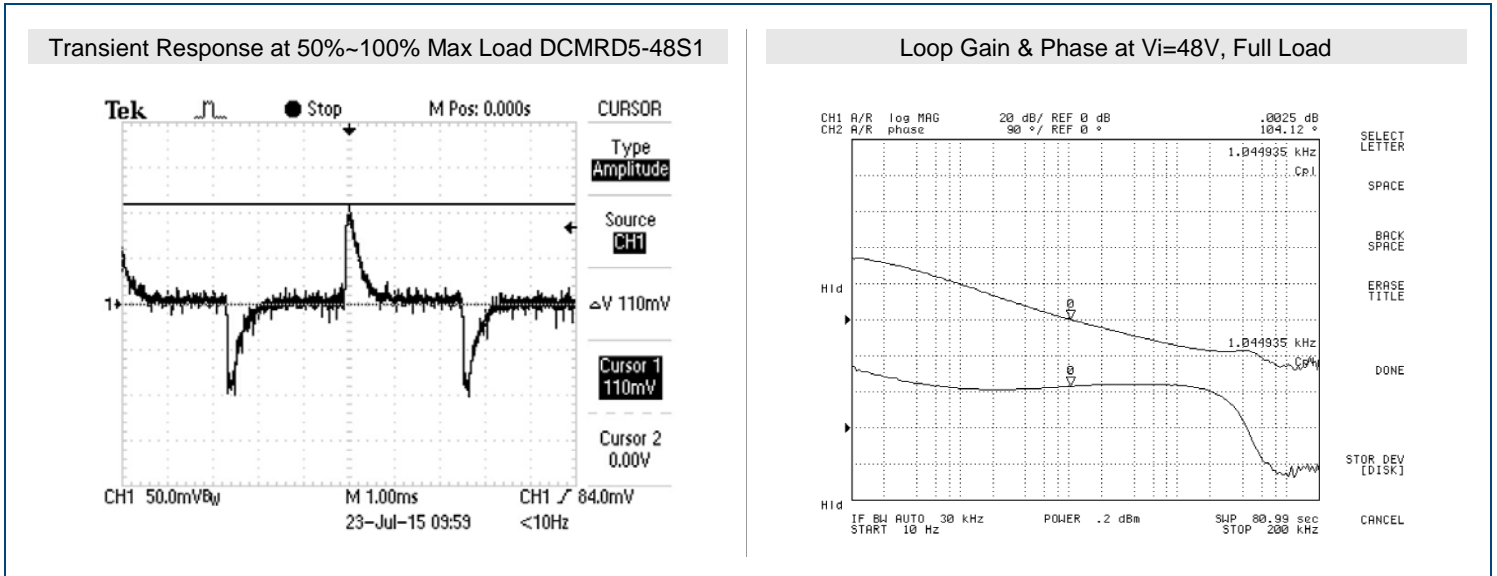
- (1) Io below this value will not damage these converters, however, they may not meet all listed specification.
- (2) Typical value, tested at nominal input and full load.
- (3) For each output.

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

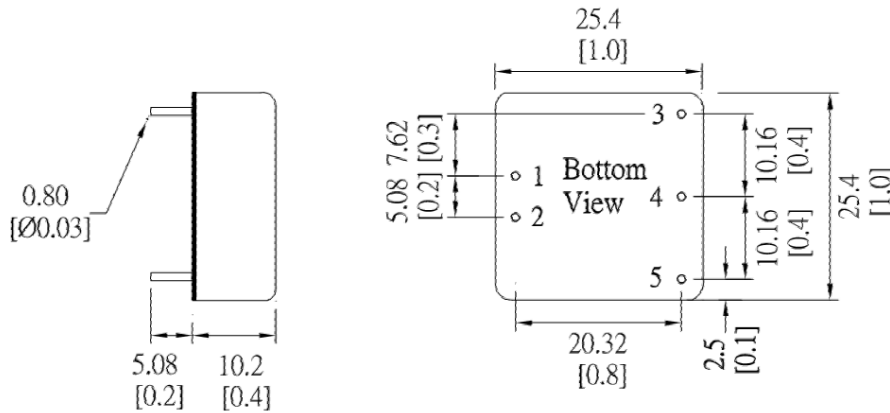
DERATING CURVES



GRAPHS



MECHANICAL DRAWINGS

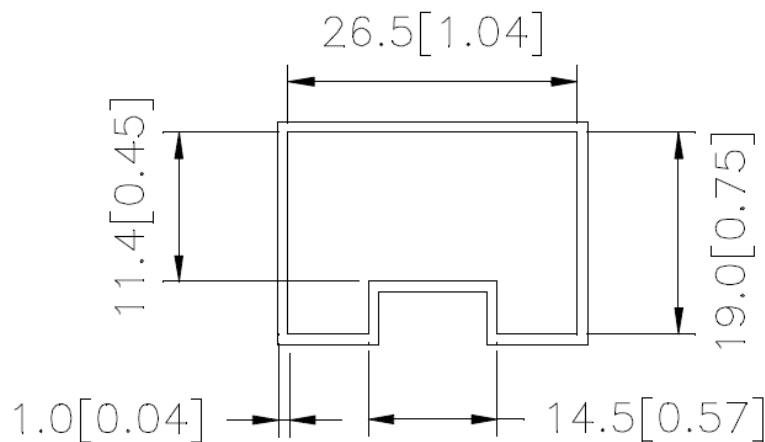


Pin Assignment		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Pin	Common
5	-Vout	-Vout

Unit: mm [inch]  
Tolerance: ±0.5 [0.02]

\*Specifications subject to change without notice

Package Information

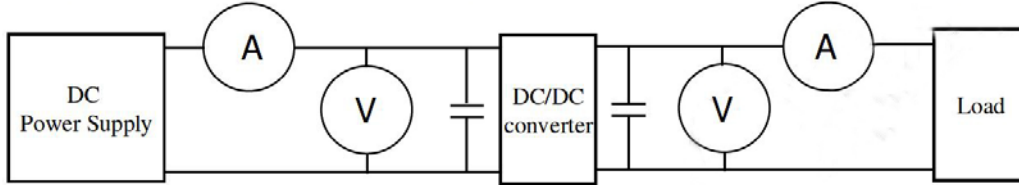


PS:  
Unit: mm [inch]  
L= 285 mm [11.22 inch] ; ONE TUBE = 10 PCS

**APPLICATION NOTE**

**Test Configurations**

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.  
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DC Power Supply: offers a wide voltage and current range precisely.

Current Meter (A): Accuracy → 200μA~200mA 4 ranges ±(0.2% rdg + 2 digits)  
2000mA~20A 2 ranges ±(0.3% rdg + 2 digits)

Voltage Meter (V): Accuracy → ±(0.3% rdg + 4 digits)

Load: At Full Load

Wires: The resistance of the wires must be small.

**1. Input Voltage Range:** Narrow input voltage range (±10%); Wide input voltage range (2:1 and 4:1)

Ex: Narrow input voltage range (±10%)

- 5VDC nominal input → 4.5~5.5VDC
- 12VDC nominal input → 10.8~13.2VDC
- 24VDC nominal input → 21.6~26.4VDC

Wide input voltage range 2:1

- 5VDC nominal input → 4.5~9VDC
- 12VDC nominal input → 9~18VDC
- 24VDC nominal input → 18~36VDC
- 48VDC nominal input → 36~75VDC

Wide input voltage range 4:1 (W)

- 24VDC nominal input → 9~36VDC
- 48VDC nominal input → 18~75VDC

**2. Input Power:**

$$P_{in} = V_{in} \times I_{in}$$

$V_{in}$ : Input voltage  
 $I_{in}$ : Input current

**3. Output Power:**

$$P_{out} = V_{out} \times I_{out}$$

$V_{out}$ : Output Voltage  
 $I_{out}$ : Output Current

**4. Efficiency:**

$$\text{Efficiency} = \frac{P_{out}}{P_{in}} \times 100\%$$

$P_{out}$ : Output Power  
 $P_{in}$ : Input Power

**5. Voltage Accuracy:**

$$\frac{|V_{out} - V_{out(Nominal)}|}{V_{out}} \times 100\%$$

$V_{out}$ : Output Voltage  
 $V_{out(Nominal)}$ : Nominal output voltage

**6. Line Regulation:**

(1) Wide input voltage range and regulated output voltage series

$$\frac{|V_{out(LL)} - V_{out(HL)}|}{V_{out(LL)}} \times 100\%$$

LL: Low Line Input Voltage  
HL: High Line Input Voltage

(2) Narrow input voltage range (±10%) and unregulated output voltage series

$$\text{Line Regulation} = \left| \frac{\Delta V_{out}}{\Delta V_{in}} \right|$$

$$\Delta V_{out} = \frac{V_{in(+10\%)} - V_{in(-10\%)}}{V_{in(Nominal)}} \times 100\%$$

- $V_{out(+10\%)}$ : Output Voltage at  $V_{in} = 1.1 \times V_{in(nominal)}$  & Full Load
- $V_{out(-10\%)}$ : Output Voltage at  $V_{in} = 0.9 \times V_{in(nominal)}$  & Full Load
- $V_{out}$ : Output Voltage at  $V_{in} = V_{in(nominal)}$  & Full Load

$$\Delta V_{in} = \frac{V_{in(+10\%)} - V_{out(-10\%)}}{V_{in(nominal)}} \times 100\%$$

V<sub>in(+10%)</sub>: Input Voltage=1.1 x V<sub>in(nominal)</sub>

V<sub>in(-10%)</sub>: Input Voltage=0.9 x V<sub>in(nominal)</sub>

V<sub>in(nominal)</sub>: Nominal Input Voltage

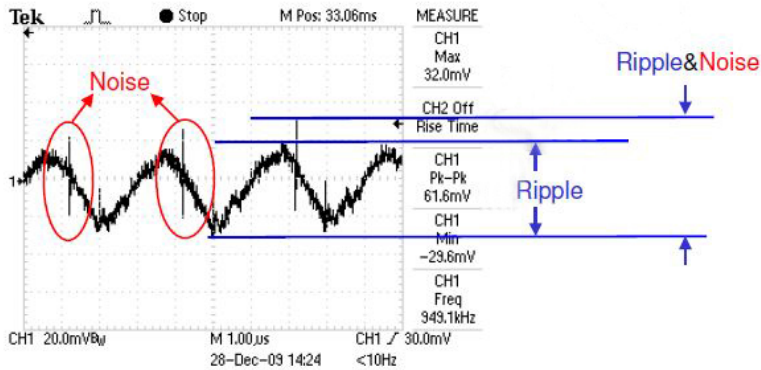
**7. Load Regulation:**

$$\frac{|V_{out(FL)} - V_{out(NL)}|}{V_{out(FL)}} \times 100\%$$

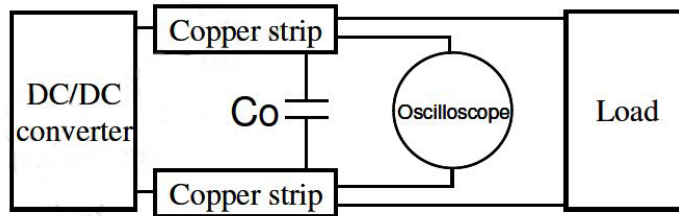
V<sub>out(FL)</sub>: Output voltage at Full Load

V<sub>out(NL)</sub>: Output voltage at 25% Full Load or 10% Full Load

**8. Ripple and Noise:** as shown below. The bandwidth is 0-2MHz

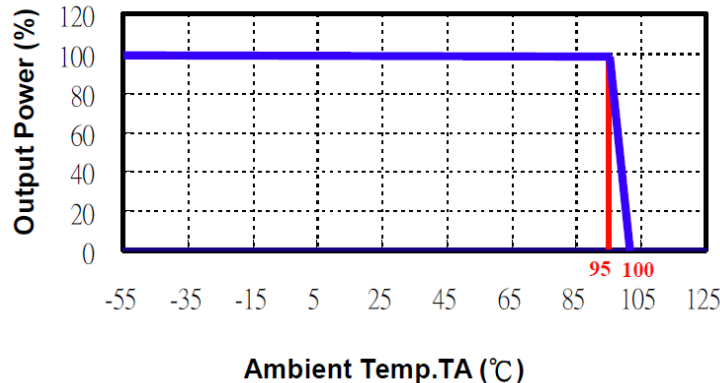


Output Ripple & Noise measurement test circuit: as shown below



Co: usually 0.47µF.

**9. Temperature Derating Curve:** The DC/DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



**10. Switching Frequency:** The nominal operating frequency of the DC/DC converters.

**11. Input to Output Isolation:** The dielectric breakdown strength test between input and output circuits. This is the isolation voltage the device is capable of withstanding for a specified time, usually 1 second or 1 minute.

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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 ISO9001-2008 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.

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