



## 10DMW4\_1.5R series

10W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

### DC-DC Converter 10 Watt

-  1"x1" package style
-  4:1 Input voltage range
-  Operating temperature range: -40°C to +85°C
-  1500VDC Isolation
-  Up to 88% efficiency:
-  Short-circuit protection (SCP)
-  Overcurrent protection

Introducing our new compact DC-DC converter 10DMW4\_1.5R series. Designed in a 1"x1" package style with an ultra-wide 4:1 input voltage range. Engineered for demanding applications, this series offers reliable performance across a wide operating temperature range from -40°C to +85°C. With robust 1500VDC isolation, up to 88% efficiency, and integrated short-circuit and overcurrent protection, these converters deliver both durability and high efficiency - ideal for industrial, communication, and embedded system designs.



Common specifications	
Short circuit protection	Input voltage range, continuous, self-recovery
Over current protection	Input voltage range, 110 (min.) 140 (typ.) %
Switching frequency	300 kHz (typ.) PWM
Operation temperature	-40°C ~+85°C (with derating)
Storage temperature	-55°C ~+125°C
Soldering profile	+300°C (1.5mm from case for 10 sec)
Storage humidity	5-95% RH (non-condensing)
MTBF: (MIL-HDBK-217F@25°C)	1,000,000 hours
Input filter	PI filter
Hot plug	Unavailable
Vibration	IEC/EN 61373 vehicle body 1 Class B
Case material	Aluminum alloy
Weight	15g (typ.)
Package dimensions	25.40 x 25.40 x 12.00 mm
Cooling	Free air convection

Output specifications						
Item	Test condition	Min	Typ	Max	Units	
Output voltage accuracy	5%-100% load					
	Vo1		±1	±3		%
	Vo2		±3	±5		
Linear regulation	Input voltage from low limit to high limit, full load					
	Vo1		±0.2	±0.5		%
	Vo2		±0.5	±1		
Load regulation	5%-100% load					
	Vo1		±0.5	±1		%
	Vo2		±0.5	±1.5		
Ripple & noise	20MHz bandwidth, 100% load		80	120		mVp-p
Cross adjustment rate	Dual output, with 50% load on the main circuit and 10% -100% load on the secondary circuit			±5		%
Transient recovery time	25% load step Change, nominal input voltage		300	500		µs
Transient response deviation	25% load step change, nominal input voltage		±3	±5		%
Temperature coefficient	Full load			±0.03		%/°C

Input specifications						
Item	Test condition	Min	Typ	Max	Units	
Input current (full load/ no-load)	<b>24VDC nominal input</b>					
			429/5	440/12		
			502/5	521/12		mA
	<b>48VDC nominal input</b>					
		190/4	215/8			
		251/4	258/8			
Reflected ripple current	24VDC nominal input		40			mA
	48VDC nominal input		30			
Impulse voltage	24VDC nominal input	-0.7		50		VDC
	48VDC nominal input	-0.7		100		
Starting voltage	24VDC nominal input			9		VDC
	48VDC nominal input			18		
Input undervoltage protection	24VDC nominal input	5.5	6.5			VDC
	48VDC nominal input	12	15.5			
Start time	Nominal input and constant resistance load		10			ms
Ctrl	Turn on module	No connected or (3.5-12V)				
	Turn off module	Connected GND or (0-1.2V)				

Isolation specifications						
Item	Test condition	Min	Typ	Max	Units	
Isolation voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500				VDC
Isolation resistance	Input-output, insulated voltage 500VDC	1000				MΩ
Isolation capacitance	Input-output, 100kHz/0.1V		1000			pF

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
- Suggested dual output module load imbalance:  $\leq \pm 5\%$ . If it exceeds  $\pm 5\%$ , it cannot be guaranteed that the product performance meets all performance indicators in this manual;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at  $T_a = 25^\circ\text{C}$ , humidity  $< 75\% \text{ RH}$ , nominal input voltage, and output rated load;
- All indicator testing methods in this datasheet are based on our corporate standards;
- Product specifications are subject to change without prior notice.

**Example:**  
**10DMW4\_2405S1.5R**  
 10 = 10Watt; D = DIP; M = Series; W4 = Wide input; 24 = 24Vin; 05 = 5Vout;  
 S = Single Output; 1.5 = 1500VDC isolation; R = Revised version

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EMC specifications					
EMC	EMI	CE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (Recommended circuit diagram 3-2)		
EMC	EMI	RE	CISPR32/EN55032 CLASS A (without extra components)/ CLASS B (Recommended circuit diagram 3-2)		
EMC	EMS	ESD	IEC/EN61000-4-2	Contact $\pm 4\text{kV}$ /Air $\pm 4\text{kV}$	Perf. Criteria B
EMC	EMS	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
EMC	EMS	EFT	IEC/EN61000-4-4	$\pm 2\text{kV}$ (recommended circuit diagram 3-1)	Perf. Criteria B
EMC	EMS	Surge	IEC/EN61000-4-5	line to line $\pm 2\text{kV}$ (recommended circuit diagram 3-1)	Perf. Criteria B
EMC	EMS	CS	IEC/EN61000-4-6	3Vr.m.s	Perf. Criteria A

## Product Selection Guide - Single output

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage max. (VDC)	Output Voltage (VDC)	Output Current (mA) max./min.	Efficiency (%) full load, (typ.)	Max. Capacitive Load ( $\mu\text{F}$ ) max.
	10DMW4_2403S1.5R	24 (9-36)	40	3.3	2400/0	77	2200
	10DMW4_2405S1.5R	24 (9-36)	40	5	2000/0	82	2200
	10DMW4_2409S1.5R	24 (9-36)	40	9	1111/0	85	680
	10DMW4_2412S1.5R	24 (9-36)	40	12	833/0	86	470
	10DMW4_2415S1.5R	24 (9-36)	40	15	667/0	86	330
	10DMW4_2424S1.5R	24 (9-36)	40	24	416/0	88	100
	10DMW4_4803S1.5R	48 (18-75)	80	3.3	2400/0	79	2200
	10DMW4_4805S1.5R	48 (18-75)	80	5	2000/0	83	2200
	10DMW4_4812S1.5R	48 (18-75)	80	12	833/0	87	470
	10DMW4_4815S1.5R	48 (18-75)	80	15	667/0	87	330
	10DMW4_4824S1.5R	48 (18-75)	80	24	416/0	88	100

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage max. (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%) full load, (typ.)	Max. Capacitive Load ( $\mu\text{F}$ ) max.
	10DMW4_2405D1.5R	24 (9-36)	40	$\pm 5$	$\pm 1000/0$	83	1000
	10DMW4_2409D1.5R	24 (9-36)	40	$\pm 9$	$\pm 555/0$	86	680
	10DMW4_2412D1.5R	24 (9-36)	40	$\pm 12$	$\pm 416/0$	87	470
	10DMW4_2415D1.5R	24 (9-36)	40	$\pm 15$	$\pm 333/0$	87	330
	10DMW4_2424D1.5R	24 (9-36)	40	$\pm 24$	$\pm 208/0$	87	100
	10DMW4_4805D1.5R	48 (18-75)	80	$\pm 5$	$\pm 1000/0$	83	1000
	10DMW4_4812D1.5R	48 (18-75)	80	$\pm 12$	$\pm 416/0$	87	470
	10DMW4_4815D1.5R	48 (18-75)	80	$\pm 15$	$\pm 333/0$	87	330
	10DMW4_4824D1.5R	48 (18-75)	80	$\pm 24$	$\pm 208/0$	87	100

Note:

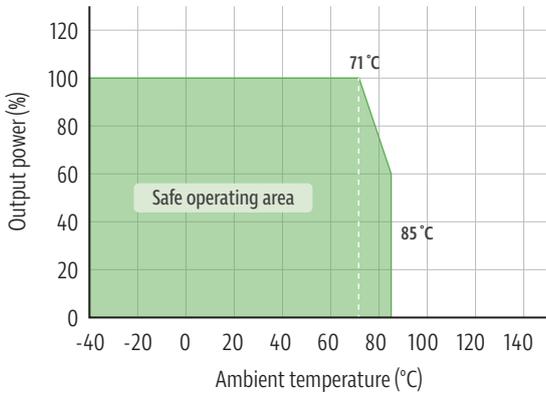
1. Please use suffix „/CM“ for the chassis mounting option or suffix „/DR“ for the DIN rail mounting option (i.e. 10DMW4\_4824D1.5R/DR)
2. The input end of the extended package is equipped with anti-reverse protection function, and its full load efficiency will be reduced by 2%;
3. The maximum capacitive load „#“ means that the positive and negative outputs are connected to the same capacitance.

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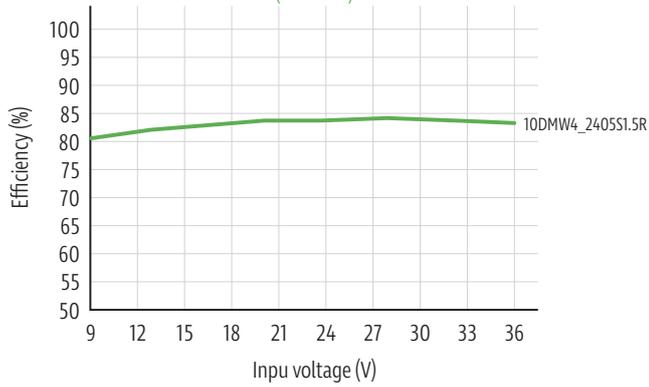
## Typical characteristics

### Temperature derating graph



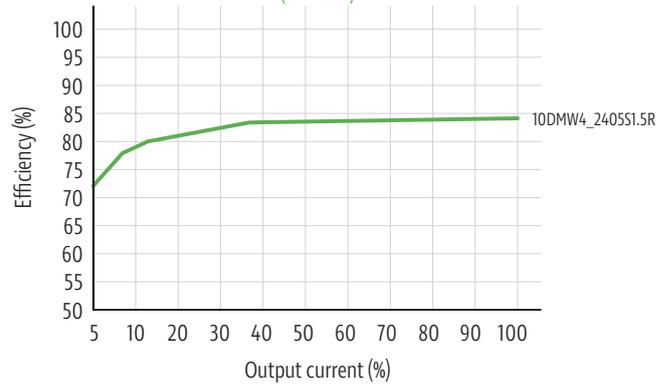
### Efficiency vs input voltage

(Full load)



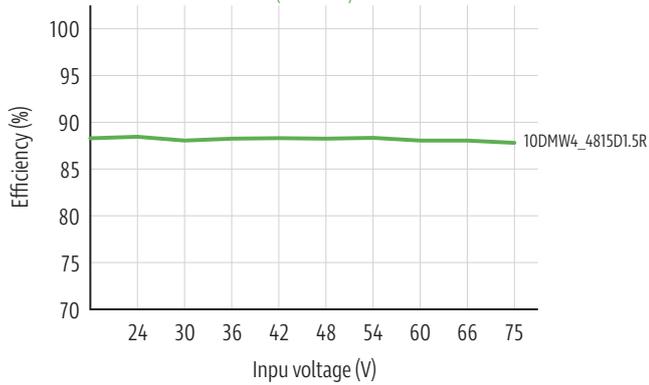
### Efficiency vs output load

(Vin=24V)



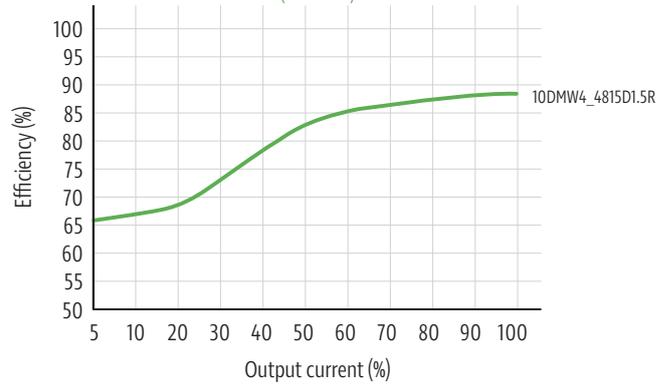
### Efficiency vs input voltage

(Full load)



### Efficiency vs output load

(Vin=48V)



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### Typical circuit design and application

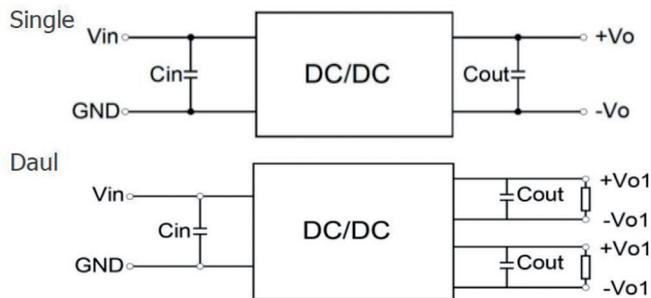


Figure2

Recommended component parameters

Vin (VDC)	Cin (uF)	Cout (uF)
24	100uF	10uF
48	10-47uF	10uF

### EMI recommended component parameters

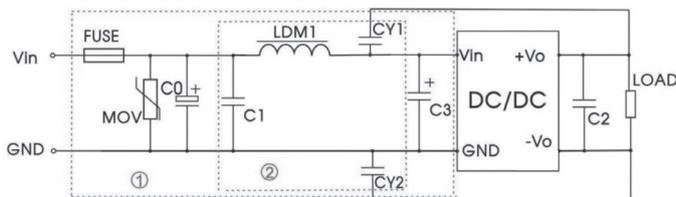


Fig 3

EMI recommended component parameters

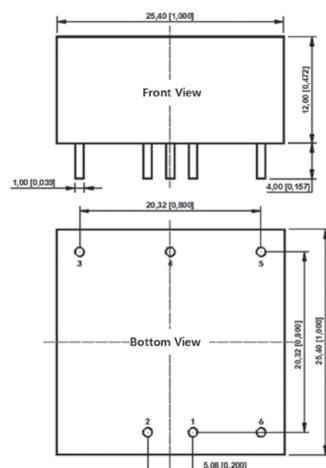
Vin	24VDC	48VDC
FUSE	Choose according to actual input current	
MOV	20D470K	
C0,C3	330uF/50V	
C1	1uF/50V	
C2	Refer to the Cout in Fig.2	
LDM1	4.7uH	
CY1,CY2	1nF/2KV	

Note: Part 1 of Figure 3 is used for EMS testing; Part 2 is used for EMI filtering and can be selected according to requirements.

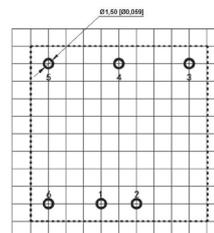
#### Application Circuit Description:

- All 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 Cin and Cout 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.
- The products do not support parallel connection of their output.

### Mechanical dimensions



Note:  
Unit: mm [inch]  
Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]  
General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]



Note: The grid distance is 2.54\*2.54mm

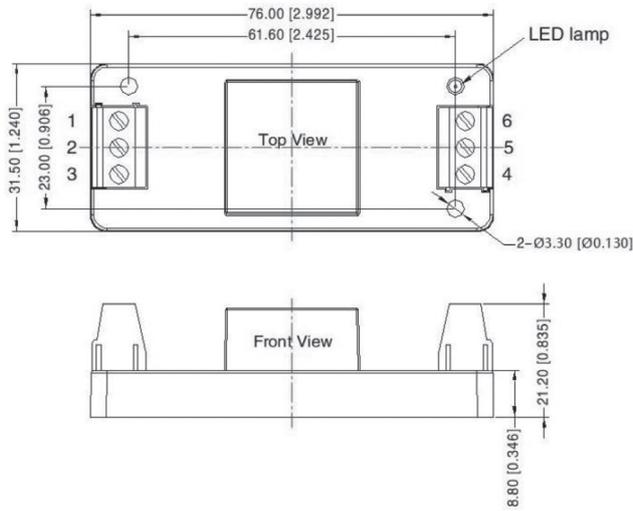
Pin definition table

Pin	Single	Duale
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	COM
5	-Vo	-Vo
6	CTRL	CTRL

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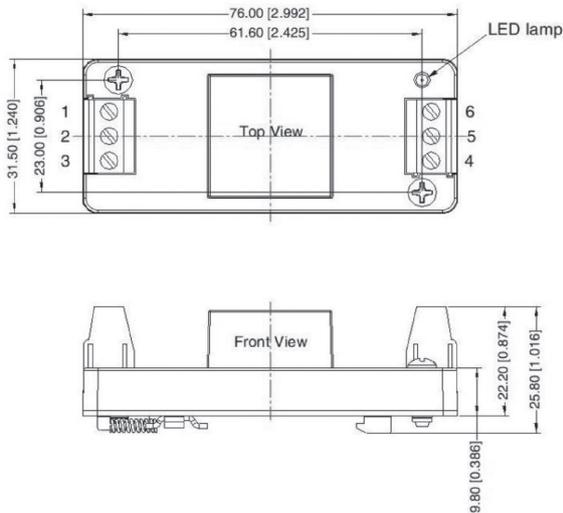
## Chassis mounting dimensions



Pin definition table		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	COM
5	-Vo	-Vo
6	CTRL	CTRL

Note:  
 Unit: mm [inch]  
 Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]  
 General tolerances:  $\pm 0.50$  [ $\pm 0.020$ ]

## DIN rail mounting dimensions



Pin definition table		
Pin	Single	Dual
1	Ctrl	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	NC	COM
6	-Vo	-Vo

Note:  
 Unit: mm [inch]  
 Mounting rail: TS35  
 Wire range: 24-12 AWG  
 Tightening torque: Max 0.4 N·m  
 General tolerances:  $\pm 1.00$  [ $\pm 0.039$ ]