



## 12DMW4\_1.5 series

12W - Single Output DC-DC Converter - Ultra Wide Input - Isolated & Regulated

### DC-DC Converter

12 Watt

- ⊕ Wide input voltage range (4:1)
- ⊕ Output power 12W
- ⊕ Transfer efficiency up to 89%
- ⊕ Stand-by power consumption as low as 0.1W
- ⊕ Output super-fast start up
- ⊕ Continuous short circuit protection, self-recovery
- ⊕ Operating temperature: -40°C to +85°C
- ⊕ Switching frequency 350kHz
- ⊕ Input under voltage, output over voltage, short circuit, over current protection
- ⊕ Isolation voltage 1500VDC
- ⊕ Good EMI performance, bare board meet CISPR32/EN55032 CLASS A
- ⊕ International standard pin-out

Introducing our new power 12DMW4\_1.5 series featuring a wide input voltage range (4:1), delivering 12W of output power with a transfer efficiency of up to 89%. Its stand-by power consumption is as low as 0.1W, and it supports super-fast start up. The module includes continuous short circuit protection with self-recovery and operates within a temperature range of -40°C to +85°C. With a switching frequency of 350kHz, it offers input under voltage, output over voltage, short circuit, and over current protection. It has an isolation voltage of 1500VDC and boasts good EMI performance, meeting CISPR32/EN55032 CLASS A standards with a bare board. The module uses an international standard pin-out for easy integration.



#### Common specifications

Short circuit protection	Continuous, self-recovery
Over load protection	110%~220%Io
Over voltage protection	120%~200%Vo
Switching frequency	350 kHz (typ.)
Operation temperature	-40°C ~+85°C (with derating)
Storage temperature	-55°C ~+125°C
Max case temperature	+105°C (within operating curve)
Humidity	5~95% RH (non condensing)
MTBF: (MIL-HDBK-217F@25°C)	2 x 10 <sup>5</sup> hours
Case material	Aluminum metal case
Dimensions	25.4 x 25.4 x 10.6 mm
Weight	15g
Cooling	Free air convection

#### Input specifications

Item	Test condition	Min	Typ	Max	Units
Stand-by consumption			0.1		W
Input filter	Pi filter				
Input under-voltage protection	12DMW4_24xxS1.5 Input	5		9	VDC
	12DMW4_48xxS1.5 Input	11		18	
CTRL*	Module turn-on - CTRL suspended or TTL high level (3.5-12VDC) Module turn-off - CTRL connect to GND or low level (0-1.2VDC) Input current when switched off: 5mA (typ.)				

Note: \*The voltage of CTRL pin is relative to GND pin.

#### Example:

**12DMW4\_2405S1.5**  
12 = 12Watt; D = DIP; M = Series; W4 = Ultra wide input; 24 = 9-36Vin;  
05 = 5Vout; S = Single Output; 1.5 = 1500VDC isolation

#### Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage accuracy	Full voltage full load - Vo		±2.0		%
Line regulation	Nominal load, full voltage range - Vo		±0.5		%
Load regulation	10% ~ 100% nominal load Vo		±1.0		%
Ripple & noise*	≤15% load		5Vo		mVp-p
	≥15% load		50	100	
Dynamic response**	3.3V/5V output		±3%	±8%	500us
	Other output		±83%	±5%	
Voltage regulation	Not available				
Turn-on delay time			150		ms
Turn-on overshoot voltage			≤10%		Vo

Note:\*Nominal load, nominal voltage, twisted pair method, 20MHz bandwidth;

\*\* 25% nominal load step change  $\Delta Vo/\Delta t$

#### Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input / Output			1500VDC ≤ 0.5mA / 1min	

- The product should be used under the specification range, otherwise it will cause permanent damage to it.
- If the product worked beyond the load range or below the minimum load, we cannot ensure that the performance of product is in accordance with all the indexes in this manual;
- Unless otherwise specified, data in this datasheet should be tested under conditions of Ta = 25°C, humidity <75% when inputting nominal voltage and outputting rated load (pure resistance load);
- All index testing methods in this datasheet are based on our company's corporate standards
- The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
- We can provide customized product service;
- The product specification may be changed at any time without prior notice.

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EMC specifications					
EMC	EMI	CE	CISPR22/EN55032	1. CLASS A bare board 2. CLASS B (see recommended circuit photo 2)	
EMC	EMI	RE	CISPR22/EN55032	1. CLASS A bare board 2. CLASS B (see recommended circuit photo 2)	
EMC	EMS	RS	IEC/EN61000-4-3	10V/m	Perf.Criteria B (see recommended circuit photo 2)
EMC	EMS	CS	IEC/EN61000-4-6	3Vr.m.s	Perf.Criteria B (see recommended circuit photo 2)
EMC	EMS	ESD	IEC/EN61000-4-2	±4KV	Perf.Criteria B
EMC	EMS	Surge	IEC/EN61000-4-5	±2KV	Perf.Criteria B (see recommended circuit photo 1)
EMC	EMS	EFT	IEC/EN61000-4-4	±2KV	Perf.Criteria B (see recommended circuit photo 1)
EMC	EMS	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%~70%	Perf.Criteria B

## Product Selection Guide

Approval	Model	Input Voltage Nominal (VDC)	Input Voltage Range (VDC)	Output Voltage (VDC)	Output Current (mA) Max./Min.	Input Current(mA) Nominal Voltage Full load (typ.)	Input Current(mA) Nominal Voltage No load (typ.)	Max. Capacitive Load (uF)	Ripple & Noise Typ./Max. (mVp-p)	Efficiency (%)@ full load, nominal input voltage (Min.)	Efficiency (%)@ full load, nominal input voltage (Typ.)
UL	12DMW4_2403S1.5	24	9-36	3.3	2400/0	407	2	6000	50/100	79	81
UL	12DMW4_2405S1.5	24	9-36	5	2000/0	502	2	3000	50/100	81	83
UL	12DMW4_2409S1.5	24	9-36	9	1333/0	588	2	2000	50/100	83	85
UL	12DMW4_2412S1.5	24	9-36	12	1000/0	575	2	2000	50/100	85	87
UL	12DMW4_2415S1.5	24	9-36	15	800/0	568	2	1500	50/100	86	88
UL	12DMW4_2424S1.5	24	9-36	24	500/0	568	2	600	50/100	86	88
	12DMW4_4803S1.5	48	18-75	3.3	2400/0	211	2	6000	50/100	76	78
	12DMW4_4805S1.5	48	18-75	5	2000/0	251	2	3000	50/100	81	83
	12DMW4_4809S1.5	48	18-75	9	1333/0	291	2	2000	50/100	84	86
	12DMW4_4812S1.5	48	18-75	12	1000/0	287	2	2000	50/100	85	87
	12DMW4_4815S1.5	48	18-75	15	800/0	281	2	1500	50/100	87	89
	12DMW4_4824S1.5	48	18-75	24	500/0	284	2	800	50/100	86	88

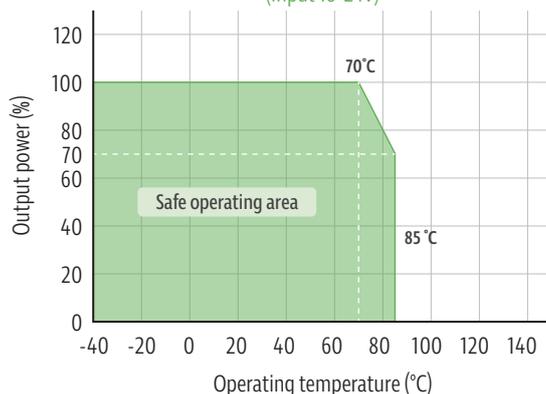
Note:

- Suffix /C is for control function; use suffix /HS for heatsink option; use suffix /CM for chassis mounting; use suffix /DR for DIN-Rail mounting; DIN-Rail width is: 35mm; Example: 12DMW4\_4824S1.5/CM/HS
- Max capacitive load is, when the power supply is fully loaded, the max capacity could be connected to output, if exceed, the power supply cannot start-up;
- To reduce no load power consumption and improve efficiency of light-load, IC will be filter frequency under no-load and light-load operating, output cannot be no load, at least with 10% load or above 470uF high frequency low resistance electrolytic capacitor, otherwise the output ripple will rise;

## Typical characteristics

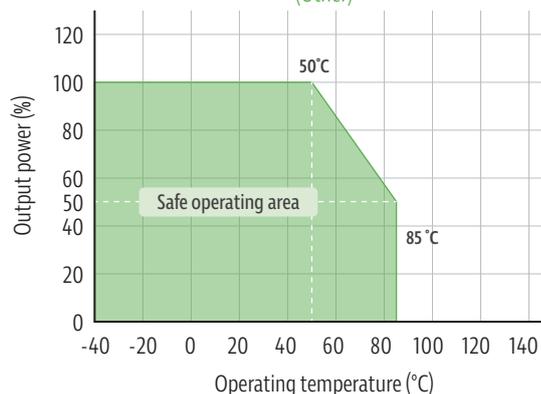
Temperature derating graph

(Input 18-24V)



Temperature derating graph

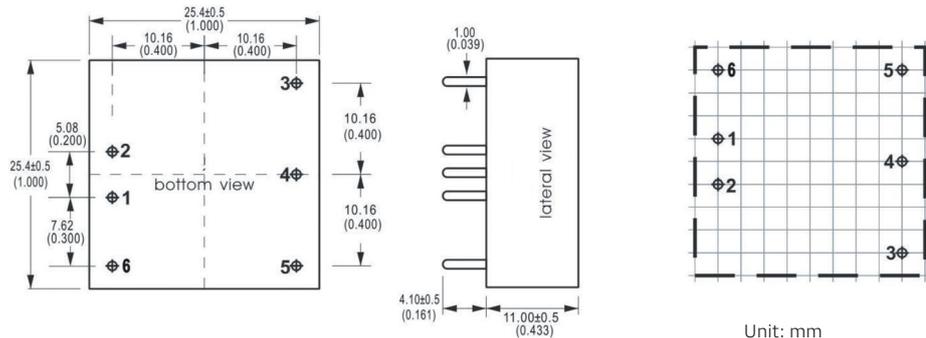
(Other)



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### Standard packing dimensions

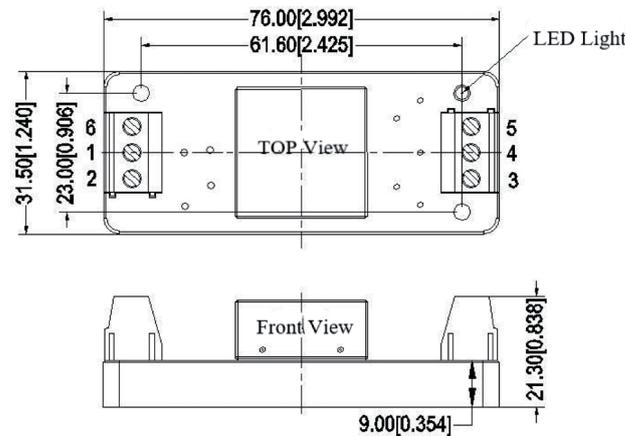


Unit: mm  
 Printed board vertical view  
 Grid: 2.54(0.1inch)  
 Unit: mm[inch]  
 General tolerance: ±0.50mm  
 Pin tolerance: ±0.10mm

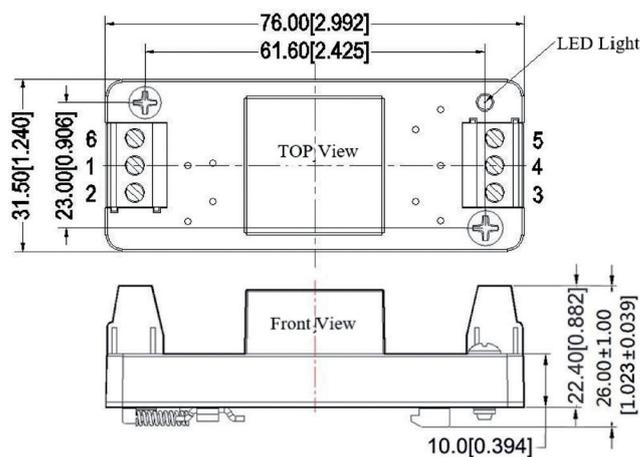
Pin	1	2	3	4	5	6
Control function	-Vin	+Vin	+Vout	NP	GND	CTRL
No control function	-Vin	+Vin	+Vout	NP	GND	NP

Note: If the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

### Chassis mounting packing dimensions



### DIN rail mounting packing dimensions



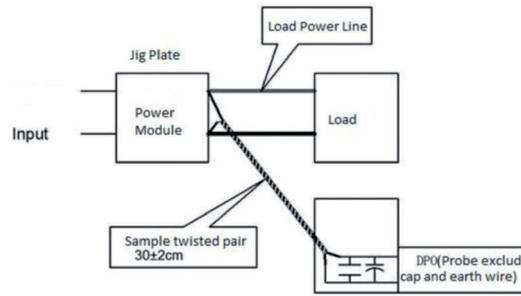
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### Ripple & noise test: (twisted pair method 20MHz bandwidth)

Test Method:

- 12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 10uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.
- Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.



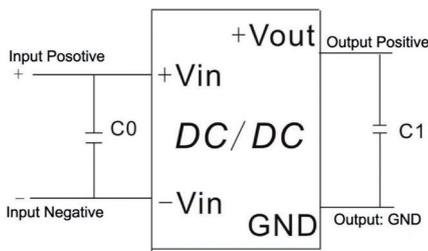
Application Reference:

- The recommended minimum load is 10% or above 470uF high frequency low resistance electrolytic capacitor, or output ripple will rise;
- Recommend the unbalance loads of dual output to be  $\leq \pm 5\%$ ;
- The maximum capacitive load is tested under pure resistance and full load condition;
- Our company could provide whole power supply solution, or customized made items

### Recommended circuit

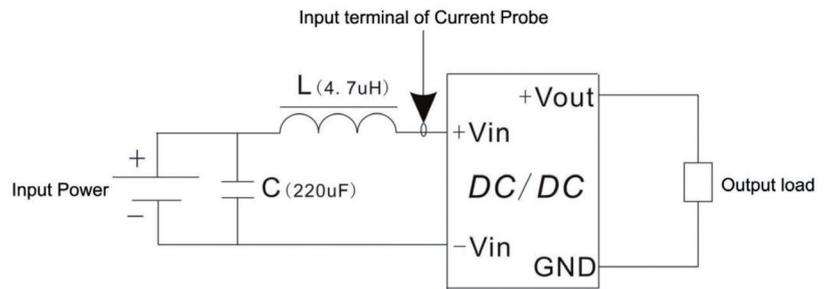
1. DC-DC test circuit:

Normal recommended capacitors: C0:47-100uF; C1:470uF.

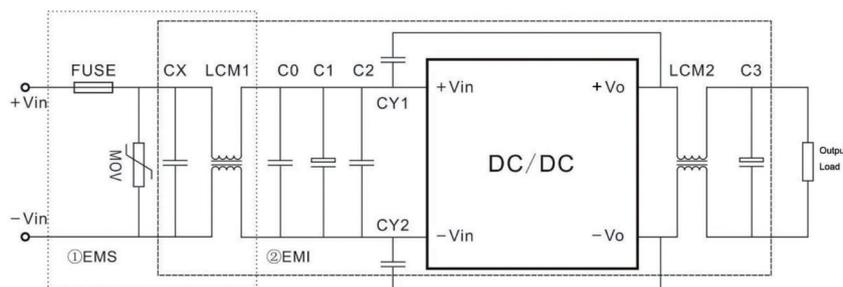


2. Input reflecting ripple current test circuit:

Capacitor C choose low ESR ones, withstand voltage value should be bigger than max input voltage;



### EMC external recommended circuit



Component	12DMW4_24XXS1.5	12DMW4_48XXS1.5
FUSE	According to customer's request	
MOV	14D560K	14D101K
CX	0.47uF	0.47uF
LCM1	10mH	10mH
C0	0.1uF/250V	0.1uF/250V
C1	220uF/100V	220uF/100V
C2	0.1uF/250V	0.1uF/250V
LCM2	30uH	30uH
C3	47uF/50V	47uF/50V
CY1,CY2	2.2nF/2000V	2.2nF/2000V