



## 6DMW4\_1.5 series

6W isolated DC-DC converter in 1"x1" DIP package with Ultra-wide input and regulated dual/single output

## DC-DC Converter 6 Watt

- ⊕ Ultra-wide 4:1 input voltage range
- ⊕ High efficiency up to 88%
- ⊕ No-load power consumption as low as 0.12W
- ⊕ I/O test isolation: 1.5kVDC
- ⊕ Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- ⊕ Operating ambient temp. range: -40°C to +85°C
- ⊕ Meet CISPR32/EN55032 CLASS A, without extra components
- ⊕ Input reverse polarity protection available with Chassis or Din-Rail mounting
- ⊕ Industry standard pin-out



The 6DMW4\_1.5 series of isolated 6W DC-DC converter with 4:1 input voltage with efficiencies of up to 88%, 1500VDC input to output isolation and the converter safely operate ambient temperature of -40°C to +85°C, input under-voltage protection, output over-voltage, over-current, short-circuit protection.

They meet CLASS A of CISPR32/EN55032 EMI standards without external components, optional packages are offered for chassis or DIN-rail mounting (/CM -or /DR), adding additional input reverse polarity protection, which make them widely applied in medical care, industrial control, electric power, instruments and communication and railway fields.

### Common specifications

Short circuit protection:	Continuous, automatic recovery
Operation temperature:	-40°C~+85°C (See Fig. 1)
Storage temperature:	-55°C ~ +125°C
Storage humidity:	5 - 95%RH (non condensing)
Lead temperature:	+300°C MAX, 1.5mm from case for 10 sec
Vibration:	IEC/EN61373 - Category 1, Grade B
Switching frequency*:	300KHz TYP (PWM mode)
MTBF:	>1,000khours (MIL-HDBK-217F@25°C)
Case material:	Aluminium alloy
Cooling:	Free air convection
Weight:	Horizontal package 12.5g typ. Chassis mounting 36g typ. DIN-Rail mounting 56g typ.
Dimensions:	Horizontal package 25.40 × 25.40 × 11.70mm Chassis mounting 76.00 × 31.50 × 21.20mm DIN-Rail mounting 76.00 × 31.50 × 25.80mm

\* This series of products using reduced frequency technology, the switching frequency is test value of full load, When the load is reduced to below 50%, the switching frequency decreases with decreasing load.

### Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current (full load/no load, Nominal input)	<b>24VDC input</b>				
	• 3.3V output		268/5	275/12	mA
	• Others		301/5	312/12	mA
	<b>48VDC input</b>				
	• 3.3V output		130/4	134/8	mA
	• Others		150/4	155/8	mA
Reflected ripple current	Nominal input		20		mA
Input impulse voltage (1sec. max. )	Nominal input				
	• 24VDC input	-0.7		50	VDC
	• 48VDC input	-0.7		100	VDC
Starting voltage (nominal input)	• 24VDC input			9	VDC
	• 48VDC input			18	VDC
Under-voltage turn-off (nominal input)	• 24VDC input	5.5	6.5		VDC
	• 48VDC input	14	15.5		VDC
Input filter	Pi filter				
Hot plug	Unavailable				

### Example:

**6DMW4\_2405D1.5**  
**6 = 6Watt; D = DIP; M = series; W4 = wide input (4:1) 9-36Vin;**  
**24 = 24Vin; 05 = 5Vout; D = Dual Output; 1.5 = 1500VDC isolation**

### Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage accuracy*	0% - 100% load		±1	±3	%
Line regulation	Full load, Input voltage from low to high				
		• Vo1	±0.2	±0.5	%
	• Vo2	±0.5	±1	%	
Load regulation**	5% to 100% load				
		• Vo1	±0.5	±1	%
	• Vo2	±0.5	±1.5	%	
Cross regulation	Dual output, main circuit with 50% load, auxiliary circuit with 10%-100% load			±5	%
Temperature drift	100% full load			±0.03	%/°C
Ripple&Noise***	20MHz Bandwidth		60	85	mVp-p
Transient recovery time	25% load step change		300	500	µs
Transient response deviation	25% load step change				
		• 3.3V, 5V, ±5V output	±5	±8	%
	• others	±3	±5	%	
Over voltage protection	Input voltage range	110		160	%Vo
Over current protection	Input voltage range	110	140	190	%Io

\* Voltage accuracy of ±5VDC/±9VDC output converter for 0%-5% load is ±5% max;

\*\*Load regulation for 0%-100% load is ±5%;

\*\*\*Ripple & Noise at ≤ 5% load is 5%Vo Max. The "parallel cable" method is used for ripple and noise test.

### Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output 100KHz/0.1V		1000		pF

### Note:

- The load shouldn't be less than 10%, otherwise ripple will increase dramatically.
- Operation under 10% load will not damage the converter; However, they may not meet all specifications listed.
- All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
- In this datasheet, all the test methods of indications are based on corporate standards.
- Only typical models listed, other models may be different, please contact our technical person for more details.

## 6DMW4\_1.5 series

6W isolated DC-DC converter in 1"x1" DIP package with Ultra-wide input and regulated dual/single output

EMC specifications				
Emissions	CE	CISPR32/EN55032 CLASS A (without external circuit) CLASS B (see EMC recommended circuit, ②)		
Emissions	RE	CISPR32/EN55032 CLASS A (without external circuit) CLASS B (see EMC recommended circuit, ②)		
Immunity	ESD	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B
Immunity	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
Immunity	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B (see EMC recommended circuit, ①)
Immunity	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B (see EMC recommended circuit, ①)
Immunity	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
Immunity	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B

## Product Selection Guide

Part Number	Input Voltage [VDC]			Output Voltage [VDC]	Output current [mA, Max/Min]	Efficiency** [%, Min/Typ.]	Capacitive load [μF, Max.]
	Nominal	Range	Max*				
6DMW4_2403S1.5	24	9-36	40	3.3	1500/0	75/77	1800
6DMW4_2405S1.5	24	9-36	40	5	1200/0	80/83	1000
6DMW4_2409S1.5	24	9-36	40	9	667/0	82/84	680
6DMW4_2412S1.5	24	9-36	40	12	500/0	83/85	470
6DMW4_2415S1.5	24	9-36	40	15	400/0	84/86	220
6DMW4_2424S1.5	24	9-36	40	24	250/0	84/86	100
6DMW4_4803S1.5	48	18-75	80	3.3	1500/0	77/79	1800
6DMW4_4805S1.5	48	18-75	80	5	1200/0	81/83	1000
6DMW4_4812S1.5	48	18-75	80	12	500/0	85/87	470
6DMW4_4815S1.5	48	18-75	80	15	400/0	86/88	220
6DMW4_4824S1.5	48	18-75	80	24	250/0	86/88	100

Part Number	Input Voltage [VDC]			Output Voltage [VDC]	Output current [mA, Max/Min]	Efficiency** [%, Min/Typ.]	Capacitive load [μF, Max.]
	Nominal	Range	Max*				
6DMW4_2405D1.5	24	9-36	40	±5	±600/0	81/83	470
6DMW4_2412D1.5	24	9-36	40	±12	±250/0	84/87	100
6DMW4_2415D1.5	24	9-36	40	±15	±200/0	83/85	100
6DMW4_2424D1.5	24	9-36	40	±24	±125/0	85/87	100
6DMW4_4805S1.5	48	18-75	80	±5	±600/0	81/83	470
6DMW4_4812D1.5	48	18-75	80	±12	±250/0	85/87	100
6DMW4_4815D1.5	48	18-75	80	±15	±200/0	86/88	100

- 1.The Chassis mounting and DIN-rail mounting Model's start-up and minimum input voltages are increased by 1VDC due to the input reverse polarity protection circuit;
- 2.Exceeding the maximum input voltage may cause permanent damage;
- 3.Efficiency is measured at nominal input voltage and rated output load; efficiencies for Chassis mounting and DIN-rail mounting Model's is decreased by 2% due to the input reverse polarity protection circuit;
- 4.The specified maximum capacitive load value for Vo1 and Vo2 output is identical.

## Typical characteristics

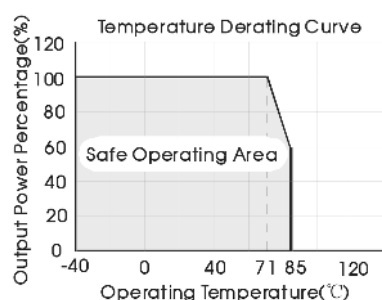
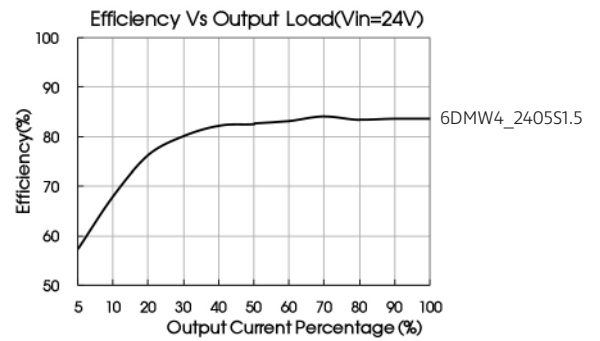
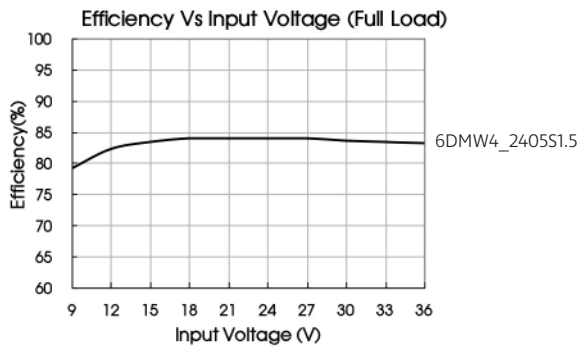
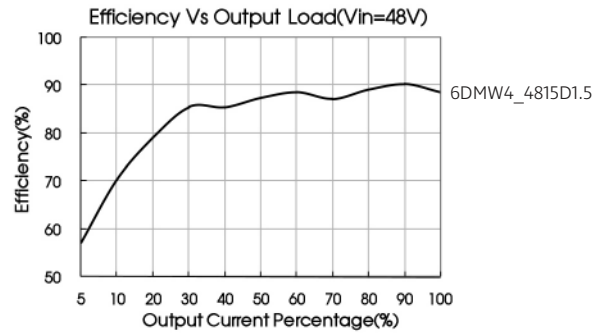
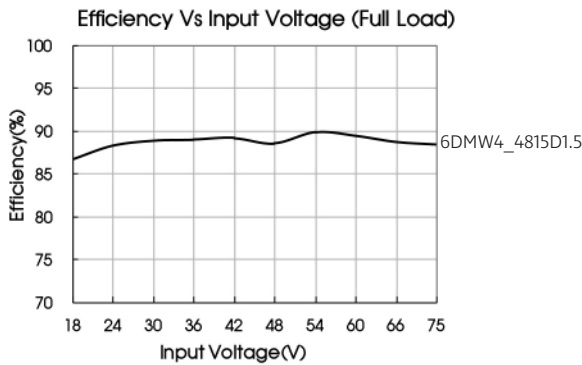


Fig. 1

## 6DMW4\_1.5 series

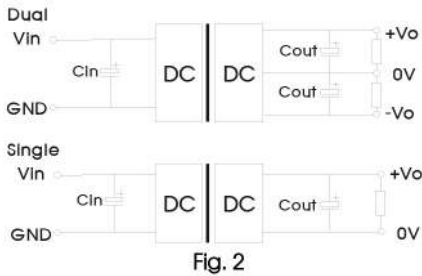
6W isolated DC-DC converter in 1"x1" DIP package with Ultra-wide input and regulated dual/single output

### Efficiency



### Typical application

All the 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  $C_{in}$  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.



Vin(VDC)	Cin	Cout
24	S20K30	S14K60
48	680 $\mu$ F/50V	680 $\mu$ F/100V

### EMC recommended circuit

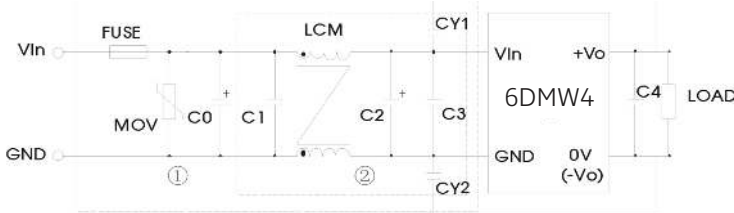


Fig. 3

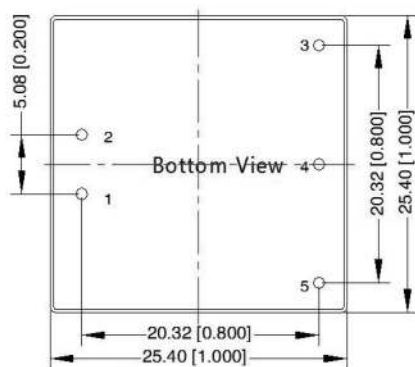
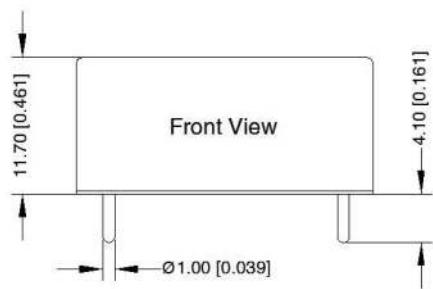
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Parameters	Vin: 24V	Vin: 48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0	680 $\mu$ F/50V	680 $\mu$ F/100V
C1	1 $\mu$ F/50V	1 $\mu$ F/50V
C2	330 $\mu$ F/50V	330 $\mu$ F/100V
C3	4.7 $\mu$ F/50V	4.7 $\mu$ F/100V
C4	Refer to the $C_{out}$ in Fig.2	
LCM	4.7mH	
CY1/ CY2	1nF/2kV	

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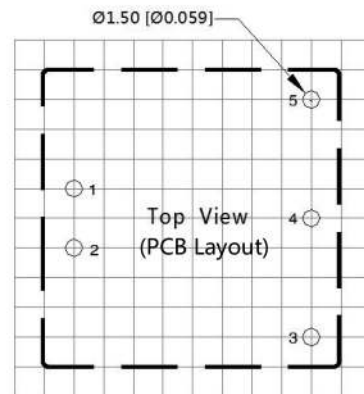
6W isolated DC-DC converter in 1"x1" DIP package with Ultra-wide input and regulated dual/single output

### Mechanical dimensions



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

THIRD ANGLE PROJECTION

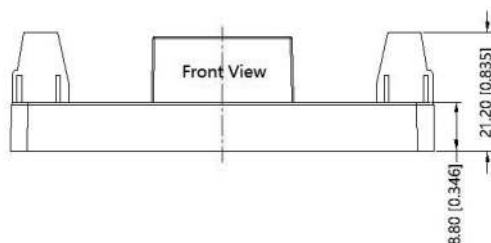
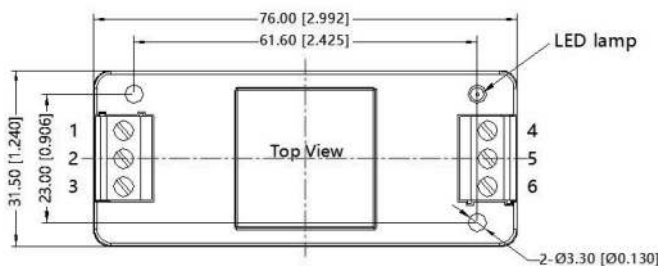


Note: Grid 2.54\*2.54mm

Pin-Out		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo

### Mechanical dimensions chassis mounting

THIRD ANGLE PROJECTION



Pin-Out						
Pin	1	2	3	4	5	6
Dual	NC	GND	Vin	-Vo	0V	+Vo
Single	NC	GND	Vin	0V	NC	+Vo

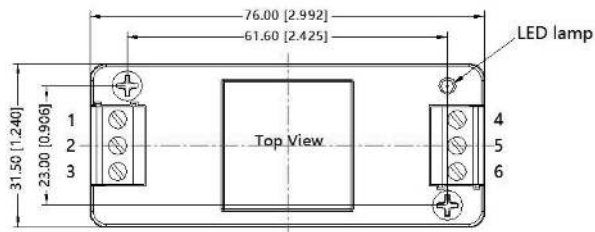
Note:  
Unit: mm[inch]  
Wire range: 24-12 AWG  
Tightening torque: Max 0.4 N·m  
General tolerances:  $\pm 1.00$  [ $\pm 0.039$ ]

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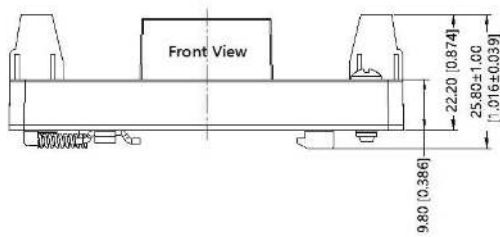
6W isolated DC-DC converter in 1"x1" DIP package with Ultra-wide input and regulated dual/single output

### Mechanical dimensions DIN Rail mounting

THIRD ANGLE PROJECTION 



Pin	Pin-Out					
	Dual	NC	GND	V <sub>in</sub>	-V <sub>o</sub>	0V
Single	NC	GND	V <sub>in</sub>	0V	NC	+V <sub>o</sub>



**Note:**

Unit: mm[inch]

Mounting rail: TS35

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N·m

General tolerances: ±1.00[±0.039]