

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)	24VDC input				
	• 3.3V output		268/5	275/12	mA
	• Others		301/5	312/12	mA
	48VDC input				
	• 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				
			±0.2	±0.5	%
			±0.5	±1	%
Load regulation**	5% to 100% load				
			±0.5	±1	%
			±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				
			±5	±8	%
			±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.

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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

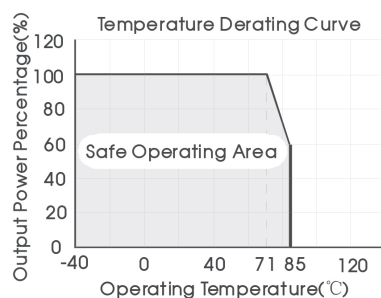
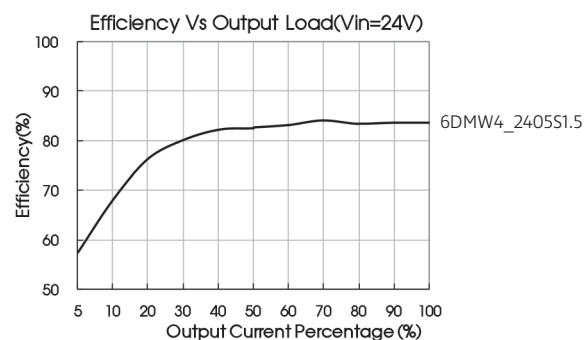
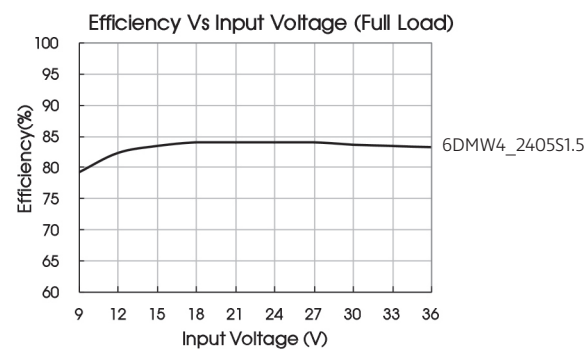
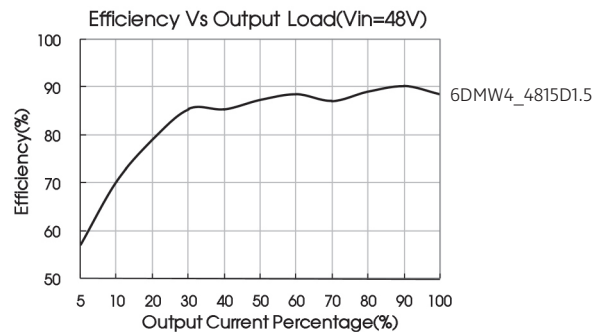
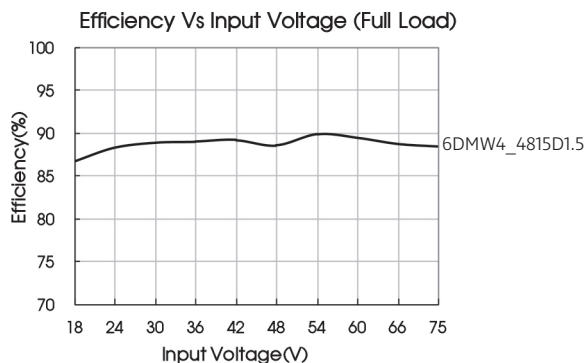


Fig. 1

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.

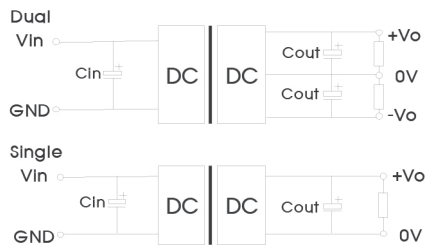


Fig. 2

Vin(VDC)	Cin	Cout
24	S20K30	S14K60
48	680μF/50V	680μF/100V

EMC recommended circuit

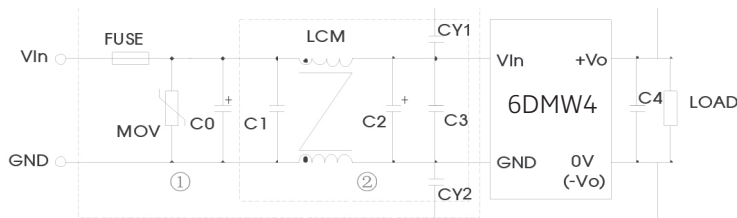


Fig. 3

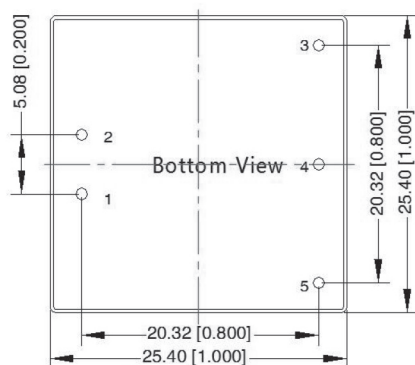
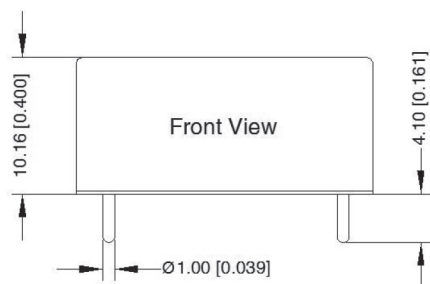
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

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

6DMW4_1.5 series

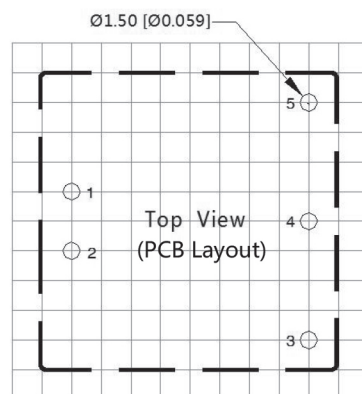
6W isolated DC-DC converter in 1"x1" DIP package with Ultra-wide input and regulated dual/single output

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

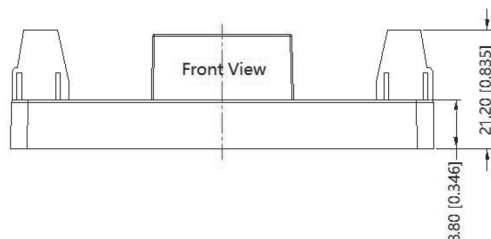
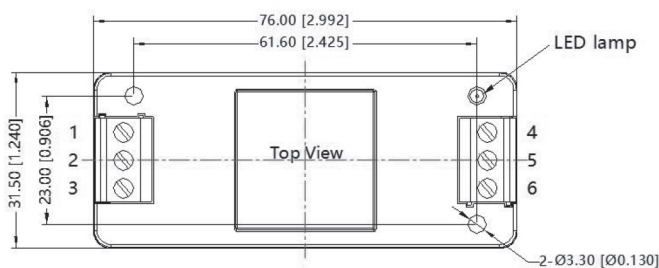


Note: Grid 2.54*2.54mm

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

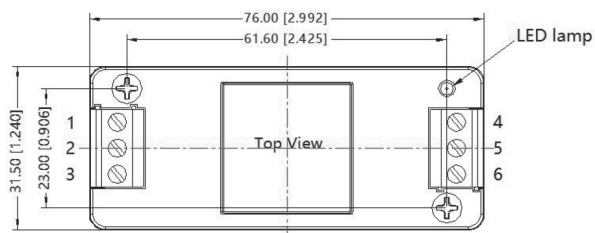
Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: $\pm 1.00 [\pm 0.039]$

6DMW4_1.5 series

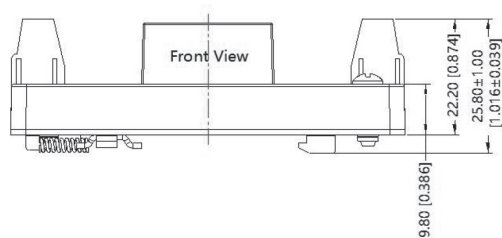
6W isolated DC-DC converter in 1"x1" DIP package with
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Mechanical dimensions DIN Rail mounting

THIRD ANGLE PROJECTION



Pin-Out						
Pin	1	2	3	4	5	6
Dual	NC	GND	V _{in}	-V _o	0V	+V _o
Single	NC	GND	V _{in}	0V	NC	+V _o



Note:

Unit: mm[inch]

Mounting rail: TS35

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N·m

General tolerances: $\pm 1.00 [\pm 0.039]$