GAPTEC® GREEN TECHNOLOGY

6DMW4_1.5 Series

6W - Dual/Single Output - Ultra Wide Input - Isolated & Regulated
1"x 1" Package - DC-DC Converter

DC-DC Converter 6 Watt

- Efficiency up to 88%
- 4:1 wide input voltage range
- 1.5kVDC input/output isolation
- Continuous short circuit protection (SCP)
- No-load power consumption as low as 0.12W
- Operating temperature: -40°C ~ +85°C
- Input under-voltage protection
- Output over-voltage protection
- Output over-current protection
- Meet CISPR22/EN55022 CLASS A
- International standard pin-out
- Meet UL60950 , EN60950 and IEC60950
- Wiring and DIN rail mounting feature anti-reverse connection for input

SHORT CIRCUIT PROTECTED · 100% RoHS compliant 6/6 · c UL us UL-60950-1 (E347551) · CE

The 6DMW4 series products are of 6W output power, wide range of voltage input of 9-36VDC, 18-75VDC, isolation voltage of 1500VDC, output over-voltage protection and output short circuit protection with the bare component in compliance with CISPR22/EN55022 CLASS A; these products are widely used in fields such as Medical care, industrial control, electric power, instruments and communication. These products apply to:

1) Where the voltage of the input power supply is wide range (voltage range ≤4:1);
2) Where isolation is necessary between input and output (isolation ≤1500VDC);
3) Where the regulation of the output voltage and the output ripple noise are demanded.

Common specifications

Short circuit protection:	Continuous, automatic recovery
Cooling:	Free air convection
Operation temperature range: (power derating above 71°C)	-40°C~+85°C
Storage temperature range:	-55°C ~ +125°C
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Maximum case temperature:	105°C (Operating Temperature curve range)
Storage humidity range:	< 95% (non condensing)
Vibration:	10-55Hz, 10G, 30 Min. along X, Y and Z
Switching frequency*:	300KHz TYP (PWM mode)
Case material:	Aluminium alloy
MTBF (M1L-HDBK-217F):	>1,000,000 hours
Weight:	14g/36g (wiring)/56g (DIN rail)
Dimensions:	25.40*25.40*11.70mm 76.00*31.50*21.20mm 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)	• 24VDC input • 48VDC input		301/5 150/4	309/12 154/8	mA mA
Reflected ripple current			20		mA
Input impulse voltage (1sec. max.)	• 24VDC input • 48VDC input	-0.7 -0.7		50 100	VDC VDC
Starting voltage	• 24VDC input • 48VDC input			9 18	VDC VDC
Under-voltage turn-off	• 24VDC input • 48VDC input	5.5 14	6.5 15.5		VDC VDC
Input filter	Pi				
Hot plug	Unavailable				

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

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy			±1	±3	%
Output voltage balance	Dual output, balance load		±0.5	±1.5	%
Line regulation	Full load, Input voltage from low to high • positive output • negative output		 ±0.2 ±0.5	 ±0.5 ±1	 % %
Load regulation	5% to 100% load • positive output • negative output		 ±0.5 ±0.5	 ±1 ±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 • others		 ±5 ±3	 ±8 ±5	 % %
Over voltage protection	Input voltage range	110		160	%Vo
Over current protection	Input voltage range	110	140	190	%Io

* Ripple and noise tested by "parallel cable" method. See DC-DC Converter Application Notes for specific operation.

Example:
6DMW4_2405D1.5
6 = 6Watt; D = DIP; M = series; W4 = wide input (4:1) 9-36Vin; 5Vout; D = Dual Output; 1.5 = 1500VDC

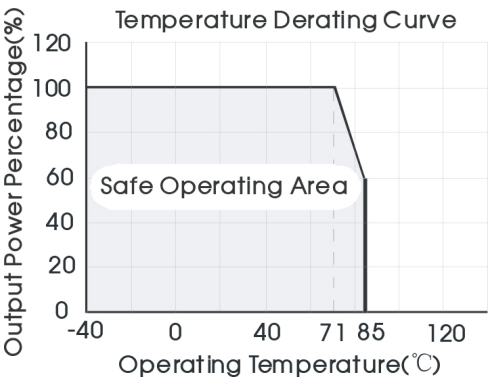
Note:
1. The load shouldn't be less than 10%, otherwise ripple will increase dramatically.
2. Operation under 10% load will not damage the converter; However, they may not meet all specifications listed.
3. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output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

EMC specifications					
EMI	CE	CISPR22/EN55022 CLASS A (without external circuit) CLASS B (see EMC recommended circuit, ②)			
EMI	RE	CISPR22/EN55022 CLASS A (without external circuit) CLASS B (see EMC recommended circuit, ②)			
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B	
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A	
EMS	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B	(see EMC recommended circuit, ①)
EMS	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B	(see EMC recommended circuit, ①)
EMS	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A	
EMS	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B	

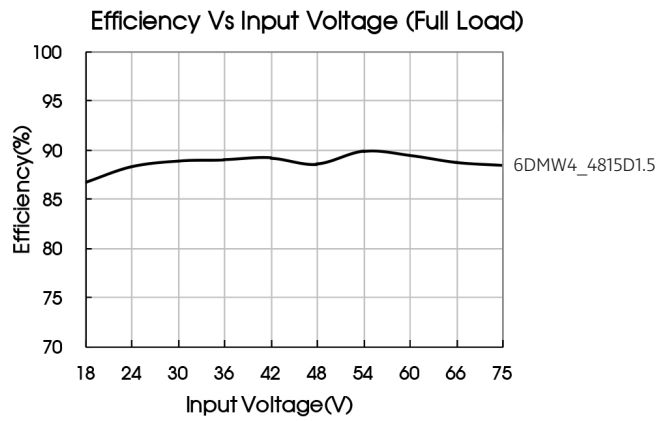
Part Number	Input Voltage [VDC]			Output Voltage [VDC]	Output current [mA]		Capacitive load [µF, Max.]	Efficiency** [%, Typ.]
	Nominal	Range	Max*		Max	Min		
6DMW4_2403S1.5	24	9-36	40	3.3	1500	75	1800	79
6DMW4_2405S1.5	24	9-36	40	5	1200	60	1000	83
6DMW4_2409S1.5	24	9-36	40	9	667	33	680	85
6DMW4_2412S1.5	24	9-36	40	12	500	25	470	87
6DMW4_2415S1.5	24	9-36	40	15	400	20	220	88
6DMW4_2424S1.5	24	9-36	40	15	250	13	100	88
6DMW4_4803S1.5	48	18-75	80	3.3	1500	75	1800	79
6DMW4_4805S1.5	48	18-75	80	5	1200	60	1000	83
6DMW4_4812S1.5	48	18-75	80	12	500	25	470	87
6DMW4_4815S1.5	48	18-75	80	15	400	20	220	88
6DMW4_4824S1.5	48	18-75	80	24	250	13	100	88
6DMW4_2405D1.5	24	9-36	40	±5	±600	±30	470	83
6DMW4_2412D1.5	24	9-36	40	±12	±250	±12	100	87
6DMW4_2415D1.5	24	9-36	40	±15	±200	±10	100	88
6DMW4_2424D1.5	24	9-36	40	±24	±125	±6	100	88
6DMW4_4805S1.5	48	18-75	80	±5	±600	±30	470	83
6DMW4_4812D1.5	48	18-75	80	±12	±250	±12	100	87
6DMW4_4815D1.5	48	18-75	80	±15	±200	±10	100	88
6DMW4_4824D1.5	48	18-75	80	±24	+125	+6	100	88

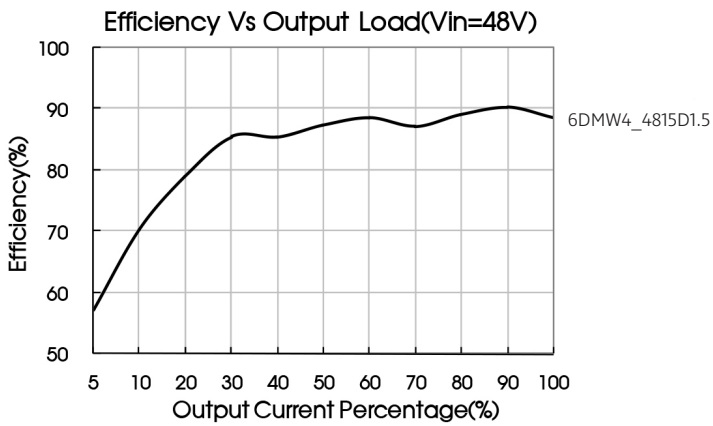
* Input voltage can't exceed this value, or it will cause permanent damage.
** Efficiency is measured In nominal input voltage and rated output load; wiring and rail model due to input reverse polarity protection, minimum efficiency greater than Min.-2 is qualified.

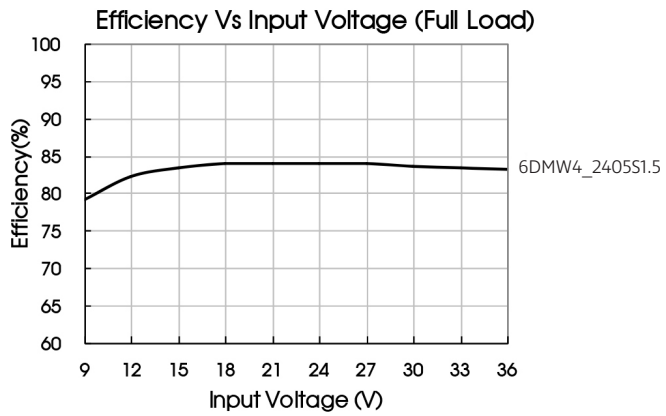
Typical characteristics

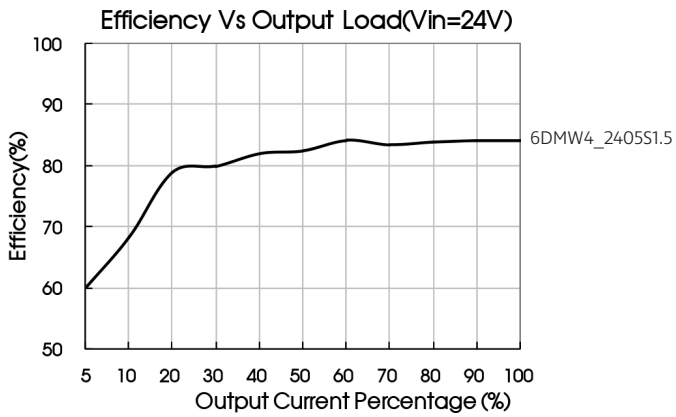


Efficiency





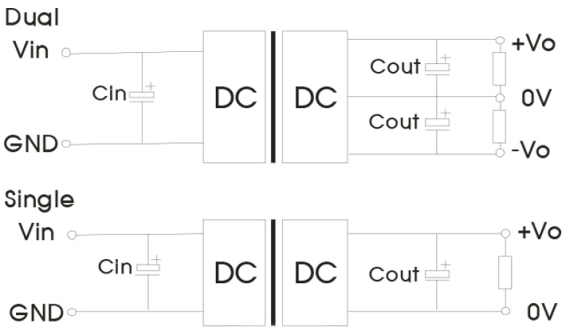




Typical application

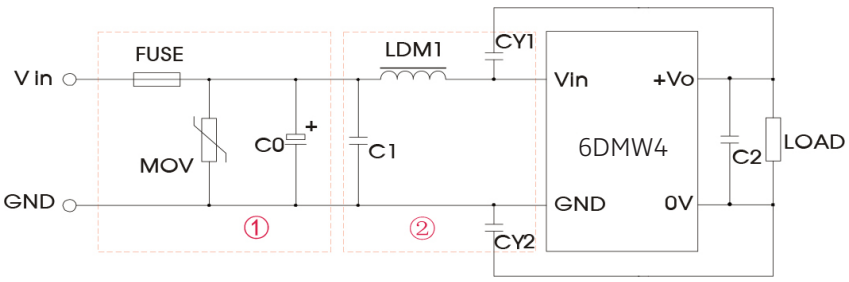
All the DC/DC converters of this series are tested according to the recommended circuit before delivery.
If it is required to further reduce input and output ripple, properly increase the input & output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance provided that the capacitance is no larger than the max. capacitive load of the product.

The product does not support output in parallel with power per liter use.



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

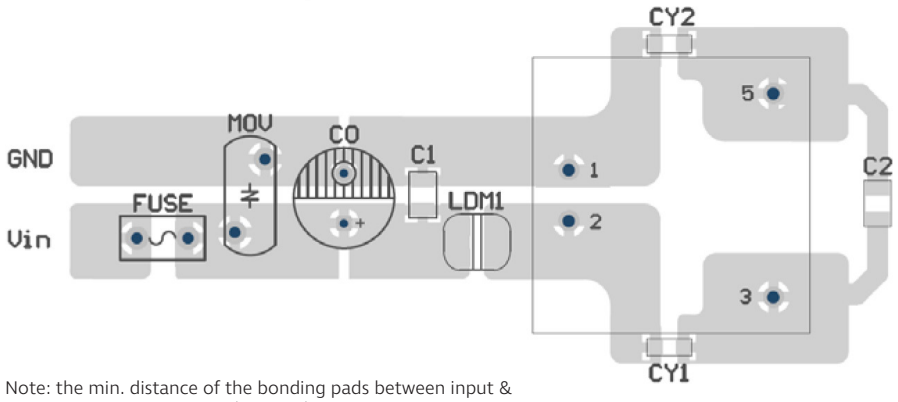
EMC recommended circuit



Parameters	Vin: 24V	Vin: 48V
FUSE	Choose according to actual input current	
MOV	S14K35	S14K60
LDM1	56μH	
C0	330μF/50V	330μF/100V
C1	1μF/50V	1μF/100V
C2	Refer to the Cout in recommended circuit	
LDM1	4.7μH	
CY1/ CY2	1nF/2kV	

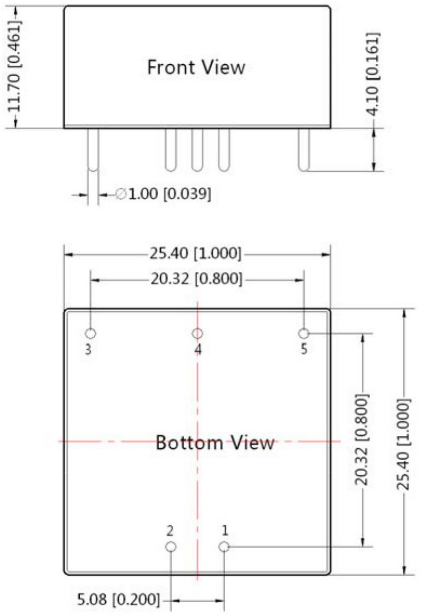
Part ① is for EMS test, part ② is for EMI filtering; part ① can be added based on actual requirement.

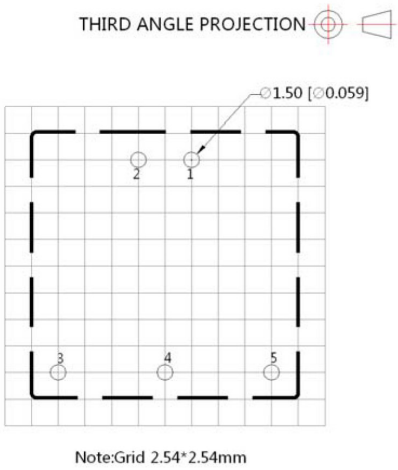
EMC solution-recommended circuit PCB layout



Note: the min. distance of the bonding pads between input & output isolation capacitors (CY1/CY2) shall be ≥ 2mm.

Mechanical dimensions and footprint

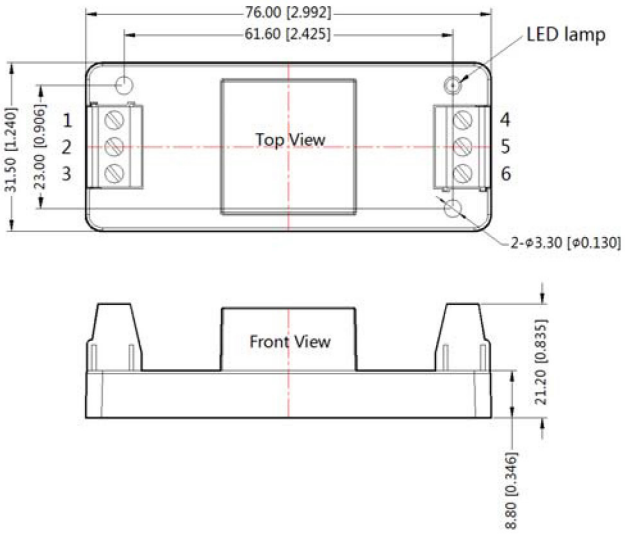




Pin-Out		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10mm [±0.004inch]
General tolerances: ±0.50mm [±0.020inch]

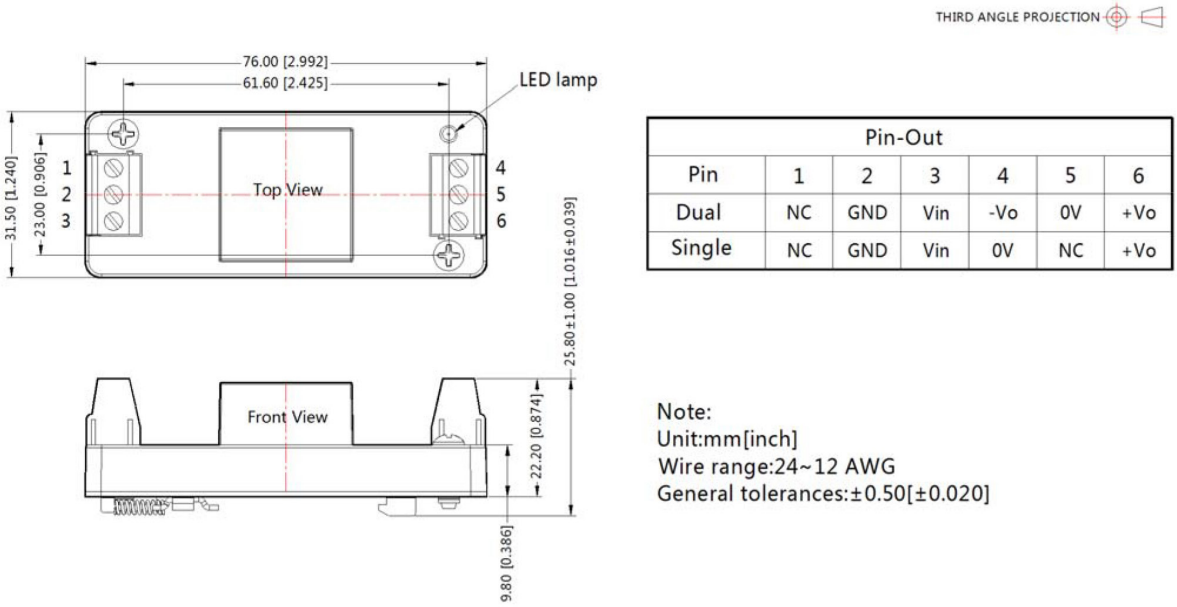
Mechanical dimensions chassis mounting



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
General tolerances:±0.50[±0.020]

Mechanical dimensions DIN Rail mounting



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
General tolerances:±0.50[±0.020]