30DMW4_1.5 series

30W - Single Output - Wide Input - Isolated & Regulated
DIP DC-DC Converter

Single Output Version

DC-DC Converter 30 Watt

- **High efficiency up to 88%**
- **4:1 wide input voltage range**
- **I/O Isolation 1500VDC**
- **Short circuit protection (SCP)**
- **Operating temperature range: -40°C to +85°C**
- **Input under-voltage, over-current, over voltage protection**
- **Industry standard pinout**
- **UL62368-1, IEC62368 approved**

The 30DMW4_1.5 series offers 30W of output, 4:1 wide input voltage of 18-75VDC and features 1500VDC isolation, converter safety operate ambient temperature of -40°C to +85°C, input under voltage protection as well as over current, over voltage and short circuit protection.

They are ideally and widely used in applications such as industrial control, electric power, instruments and communications.

SHORT CIRCUIT PROTECTED

100% RoHS compliant 6/6

c UL us
UL-62368-1 approved

Common specifications

Cooling:	Free air convection
Short circuit protection:	Continuous, hiccup, automatic recovery
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-55°C~+125°C
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Vibration:	10-150Hz, 5G, 0.75mm. along X, Y and Z
Switching frequency* (PWM mode):	270kHz TYP
Storage humidity range:	5% MIN, 95% MAX
Case material:	Aluminium alloy
MTBF (MIL-HDBK-217F @25°C):	>1000Khours
Dimensions:	25.40 × 25.40 × 11.70 mm
Weight:	18.4g

* Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current	full load/no load		710/8	735/15	mA
Reflected ripple current*	Nominal input		40		mA
Surge voltage	Nominal input	-0.7		100	VDC
Startup voltage	Nominal input			18	VDC
Input under voltage protection	Nominal input	12	15.5		VDC
Input filter			PI		
Start-up time	Nominal input & constant resistance load		10		ms
Ctrl*	• Module on • Module off	Ctrl pin open or pulled high (TTL 3.5-12VDC) Ctrl pin pulled low to GND (0-1.2VDC)			
	• Input current when off		2	7	mA

* The control pin voltage is referenced to input GND.

Example:
30DMW4_4815S1.5
30 = 30Watt; D = DIP; M = series; W4 = very wide input (4:1);
48 = 18-75Vin; 15 = 15Vout; S = Single output;
1.5 = 1500VDC isolation

Output specifications

Item	Test condition	Min	Typ	Max	Units
Voltage accuracy			±1	±3	%
Line regulation	Full load, low to high		±0.2	±0.5	%
Load regulation	5% to 100% load		±0.5	±1	%
Transient recovery time	25% load step change nominal input		250	500	us
Transient response deviation	25% load step change • 5V output • Others		 ±3 ±3	 ±8 ±5	 % %
Temperature drift	100% full load			±0.03	%/°C
Ripple and noise	20MHz Bandwidth • 5V/12V/15V output • 24V output		 60 60	 120 150	 mV mV
Trim		90		110	%Vo
Over voltage protection	Input voltage range	110		160	%Vo
Over current protection	Input voltage range	110	170	260	%Io

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		2000		pF

EMC specifications

EMI	CE	CISPR22/EN55032 (see EMC rec. circuit, ②)		CLASS B
EMI	RE	CISPR22/EN55032 (see EMC rec. circuit, ②)		CLASS B
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria B
EMS	EFT	IEC/EN61000-4-4 (see EMC rec. circuit, ①)	±2KV	perf. Criteria B
EMS	Surge	IEC/EN61000-4-5 (see EMC rec. circuit, ①)	line to line ±2KV	perf. Criteria B
EMS	CS	IEC/EN61000-4-6	3 V.r.m.s	perf. Criteria B

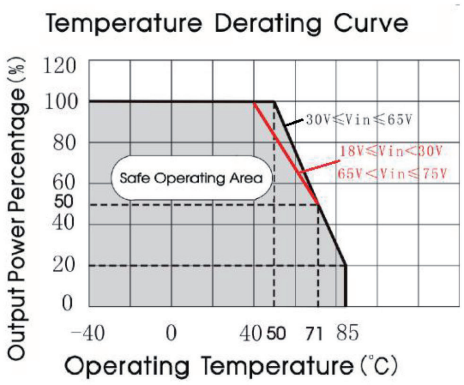
GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

Product Selection Guide

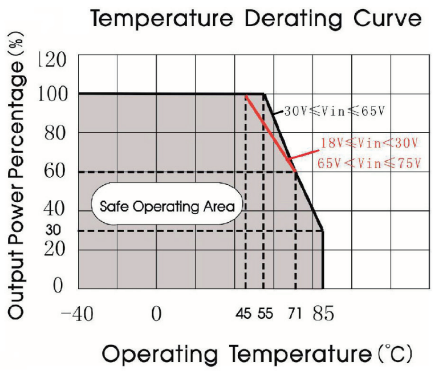
Part Number	Input Voltage [VDC] Nominal	Input Voltage [VDC] Range	Output Voltage [VDC]	Output Current [mA] Max	Output Current [mA] Min	Efficiency [%, Typ.]	Capacitor load [µF, Max]
30DMW4_4805S1.5	48	18-75	5	6000	0	88	7200
30DMW4_4812S1.5	48	18-75	12	2500	0	88	2000
30DMW4_4815S1.5	48	18-75	15	2000	0	88	1500
30DMW4_4824S1.5	48	18-75	24	1250	0	88	470

Typical characteristics

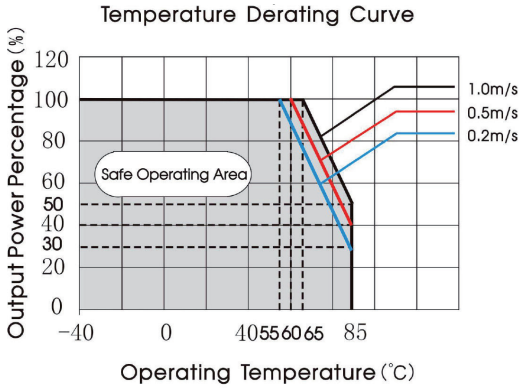
30DMW4_xxyyS1.5 [5Vout]



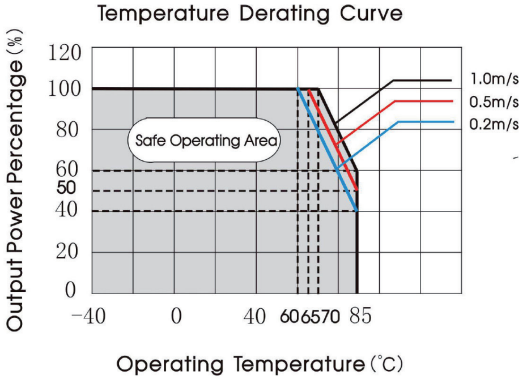
30DMW4_xxyyS1.5 [12; 15; 24Vout]



30DMW4_xxyyS1.5 [5Vout]



30DMW4_xxyyS1.5 [12; 15; 24Vout]



Typical application

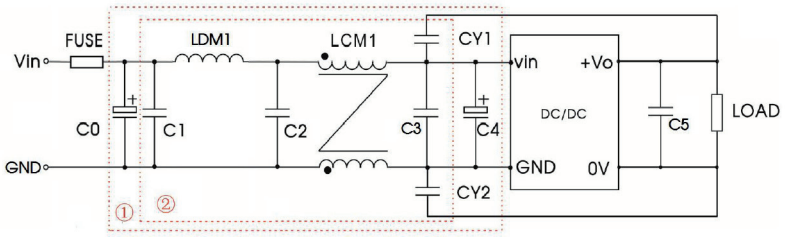
All DC-DC converters of this series are tested before delivery using the recommended circuit shown on the right.

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.

Vout	Cin (µF)	Cout (µF)
5/12/15	100	100
24	100	47

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

EMC compliance circuit

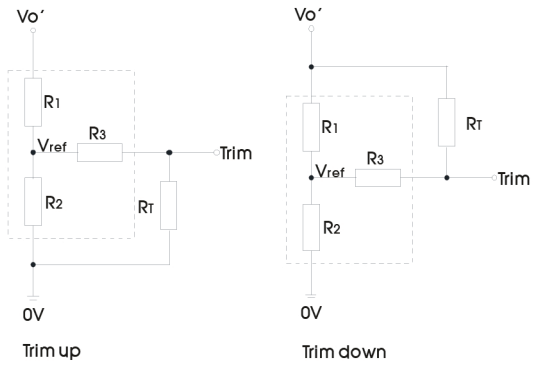


We use Part ① in Fig. 3 for Immunity tests and Part ② for Emissions test.
Selecting based on needs.

CY1, CY2Model	Vin: 48V
FUSE	Choose according to actual input current
C0, C4	470μF/100V
C1	10μF/100V
LDM1	22uH/3A
C2	22uF/100V
LCM1	1.4mH/3A
C3	22uF/100V
C5	Refer to the Cout, typical application
CY1, CY2	1nF/2KV

Trim

Trim function for output voltage adjustment (open if unused)



Calculating Trim resistor values:

$$up:\ R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{Vref}{Vo' - Vref} \cdot R_1$$

$$down:\ R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{Vo' - Vref}{Vref} \cdot R_2$$

R_T is Trim resistance

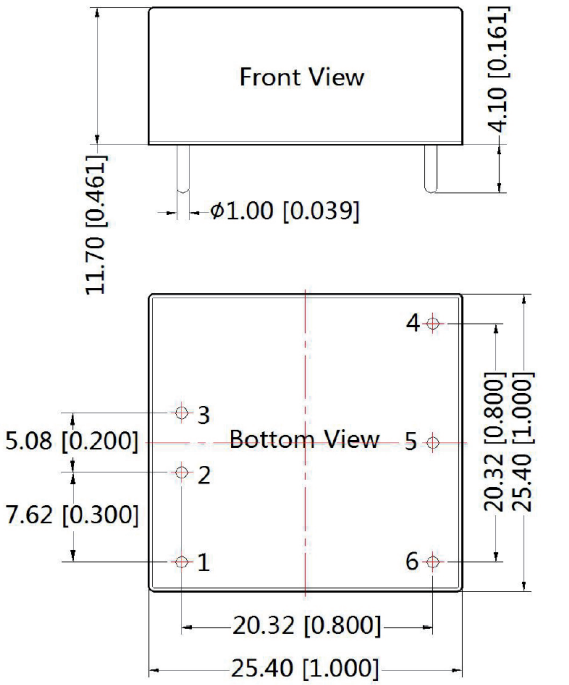
a is a self-defined parameter, with no real meaning.

TRIM resistor connection
(dashed line shows internal resistor network)

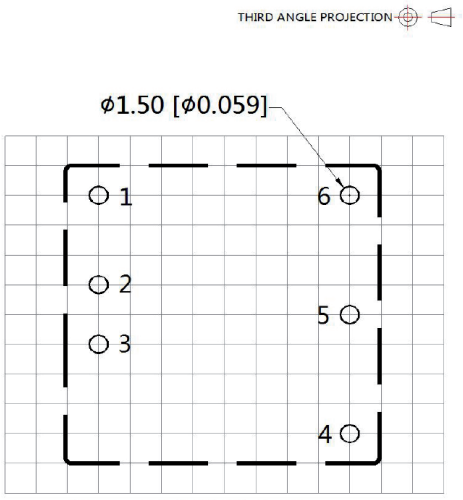
Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
5	8.832	2.87	10	1.24
12	11.00	2.87	8.2	2.5
15	14.40	2.87	10	2.5
24	24.87	2.87	7.5	2.5

The products do not support parallel connection of their output.

Mechanical dimensions (no heatsink)



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



Note:Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	Trim
6	0V

Note:
1. All specifications measured at Ta = 25°C, humidity <75%, nominal input voltage and rated output load unless otherwise specified.
2. In this datasheet, all the test methods of indications are based on corporate standards.
3. Only typical models listed, other models may be different, please contact our technical person for more details.
4. Specifications subject to change without notice.

GAPTEC

30DMW4_1.5 series

30W - Single Output - Wide Input - Isolated & Regulated
DIP DC-DC Converter

Dual Output Version — DC-DC Converter — 30 Watt

- **Ultra-wide 4:1 input voltage range**
- **High efficiency up to 88%**
- **I/O isolation test voltage 1.5kVDC**
- **Operating ambient temp. range: -40°C to +85°C**
- **Input under-voltage protection, output short circuit, over-current, over–voltage protection**
- **Industry standard pin-out**
- **Meet EN62368 standards**

SHORT CIRCUIT PROTECTED · 100% RoHS compliant 6/6 · c UL us — UL-62368-1 approved

The 30DMW4_1.5 series of isolated 30W DC-DC converter products with an ultra-wide 4:1 input voltage range. They feature efficiencies up to 88%, input to output isolation is tested with 1500VDC and the converter safety operate ambient temperature of -40℃ to +85℃, input under-voltage protection, output over-voltage, over-current, short-circuit protection. They are widely used in applications such as industrial control, electric power, instruments and communications.

Common specifications

Short circuit protection:	Continuous, self-recovery
Operation temperature range:	-40°C~+85°C (See Fig. 1)
Storage temperature range:	-55°C~+125°C
Storage humidity range:	5% MIN, 95% MAX (Non-condensing)
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Vibration:	10-150Hz, 5G, 0.75mm. along X, Y and Z
MTBF (MIL-HDBK-217F @25°C):	>1000Khours
Case material:	Aluminium alloy
Cooling:	Free air convection
Dimensions:	25.40 × 25.40 × 11.70 mm
Weight:	17.2g

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current	full load/no load, Nominal input		711/4	727/12	mA
Reflected ripple current	Nominal input		80		mA
Surge voltage		-0.7		100	VDC
Startup voltage				18	VDC
Input under voltage protection		12	15.5		VDC
Start-up time	Nominal input, constant resistance load		10		ms
Input filter	Capacitance filter				
Hot Plug	Unavailable				
Ctrl*	• Module on	Ctrl pin open or pulled high (TTL 3.5-12VDC)			
	• Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
	• Input current when off		2	7	mA

* The control pin voltage is referenced to input GND.

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Input-output Electric Strength Test for 1 min. leakage current 1mA max.	1500			VDC
	Input/output-case Electric Strength Test for 1 min. leakage current 1mA max.	1000			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
Voltage accuracy[1]	5%-100% load		±1	±3	%
Line regulation	Full load, low to high Vo1 Vo2		 ±0.2 ±0.2	 ±0.5 ±1	 % %
Load regulation[2]	5% to 100% load		±0.5	±1	%
Cross Regulatio	Vo1 load at 50%, Vo2 load at range of 10% - 100%			±5	%
Transient recovery time	25% load step change nominal input		300	500	us
Transient response deviation	25% load step change nominal input		±3	±5	%
Temperature Coefficient	full load			±0.03	%/°C
Ripple and noise[3]	20MHz bandwidth, nominal input voltage, 5%-100% load		100	150	mVp-p
Switching Frequency[4]	PWM mode		300		KHz
Over voltage protection	Input voltage range	110		160	%Vo
Over current protection	Input voltage range	110	150	260	%Io

1. Output voltage accuracy for 0%-5% load is ±4% max.;
2. Load regulation for 0% -100% load increases to ±5%;
3. The "Tip and barrel" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information. Ripple & Noise at <5% load is 5%Vo max.
4. Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Example:
30DMW4_4815S1.5
30 = 30Watt; D = DIP; M = series; W4 = Very wide input range (4:1);
48 = 18-75Vin; 15 = 15Vout; S = Single output;
1.5 = 1500VDC isolation

EMC specifications

EMI	CE	CISPR32/EN55032 CLASS B (see Fig.3-② for recommended circuit)		
EMI	RE	CISPR32/EN55032 CLASS B (see Fig.3-② for recommended circuit)		
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
EMS	EFT	IEC/EN61000-4-4 (see EMC rec. circuit)	±2KV	perf. Criteria B
EMS	Surge	IEC/EN61000-4-5 (see EMC rec. circuit)	line to line ±2KV	perf. Criteria B
EMS	CS	IEC/EN61000-4-6	V.r.m.s	perf. Criteria A

GAPTEC-Electronic GmbH & Co. KG
sales@gaptec-electronic.com – www.gaptec-electronic.com

30DMW4_1.5 series

30W - Single and Output - Wide Input - Isolated & Regulated
DIP DC-DC Converter

Product Selection Guide

Part Number	Input Voltage [VDC] Nominal	Range	Max[1]	Output Voltage [VDC]	Output Current [mA, Max /Min]	Full Load Efficiency[2] [%, Min/Typ.]	Capacitor load[3] [µF, Max]
30DMW4_4812D1.5	48	18-75	80	±12	±1250	86/88	2000
30DMW4_4815D1.5	48	18-75	80	±15	±1000	86/88	1500
30DMW4_4824D1.5	48	18-75	80	±24	±650	86/88	470

Notes:
1. Exceeding the maximum input voltage may cause permanent damage;
2. Efficiency is measured in nominal input voltage and rated output load;
3. The specified maximum capacitive load value for Vo1 and Vo2 output is identical.

Typical characteristics

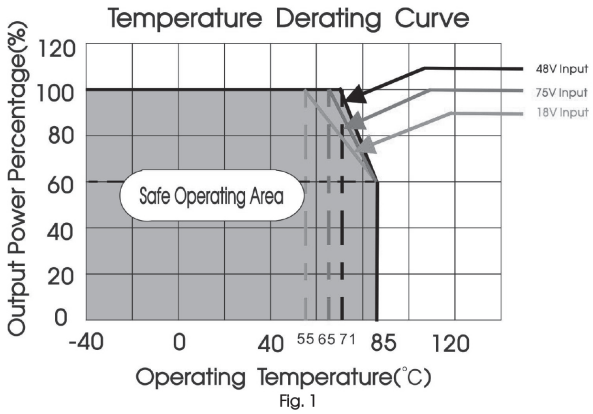
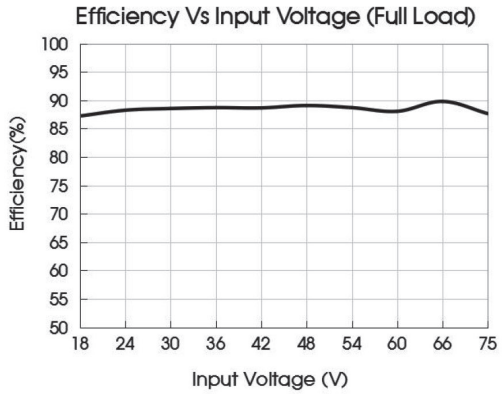
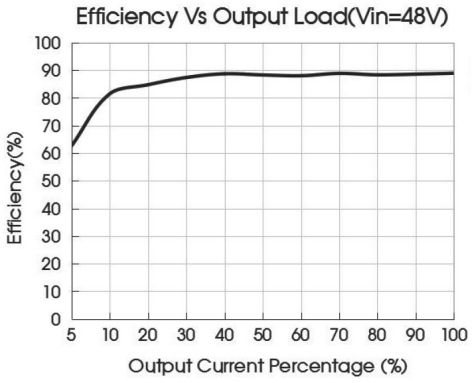


Fig. 1

Note: The temperature derating curve is tested at free air convection.

Efficiency





Typical application

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.

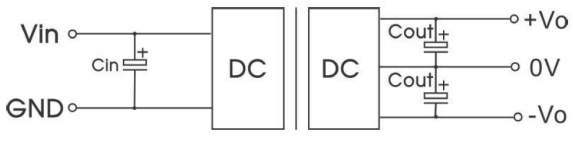


Fig.2

Vout	Cin (µF)	Cout (µF)
12/15	100uF/100V	100uF/50V
24	100uF/100V	47uF/50V

EMC compliance circuit

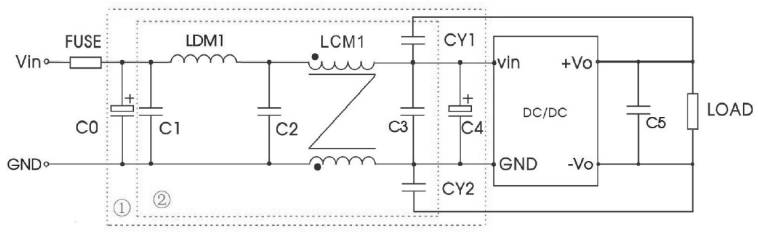


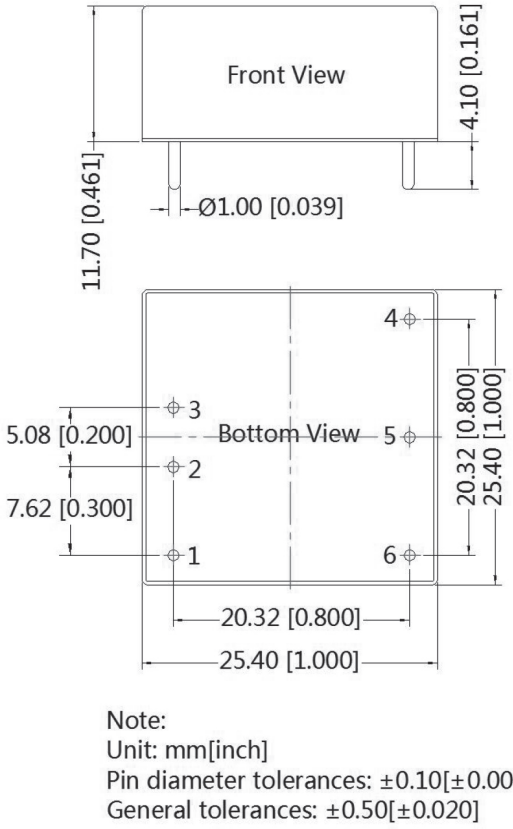
Fig. 3

Notes: We use Part ① in Fig. 3 for Immunity tests and Part ② for Emissions test. Selecting based on needs.

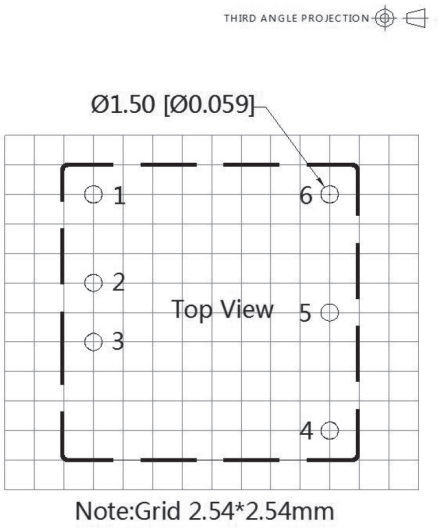
Parameter description:

Model	Vin: 48V
FUSE	Choose according to actual input current
C0, C4	470μF/100V
C1, C2, C3	4.7μF/100V
LDM1	6.8uH/3A
LCM1	1.0mH/3A
C3	22uF/100V
C5	Refer to the Cout, typical application
CY1, CY2	1nF/2KV

Mechanical dimensions



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



Note:Grid 2.54*2.54mm

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

Note:
1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta = 25°C, humidity <75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see „Features" and „EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.