Descriptions

30W isolated, DC-DC Converter



RoHS

Report EN62368-1

Report BS EN62368-1

Features

- Ultra-Wide 4:1 input voltage range
- High efficiency up to 90%
- No-load power consumption as low as 0.096W
- I/O isolation test voltage 1.5K VDC
- Input under-voltage protection, output short circuit, over-current, over-voltage, over-temperature protection
- Operating ambient temperature range: -40℃ to +105℃
- Industry standard pin-out
- Components are 100% domestic (DWMD30-B24xx series only)

Applications

- Industrial Control
- Electric Power
- Instrumentation
- Communication

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current(mA) Max./Min.		
--	DWMD30-B2405	24 (9-36)	40	5	6000/0	86/88	10000
	DWMD30-B2412			12	2500/0	88/90	1500
	DWMD30-B2415			15	2000/0	88/90	1000
	DWMD30-B2424			24	1250/0	88/90	750
	DWMD30-B2428			28	1071/0	88/90	750
EN/BS EN	DWMD30-B4805	48 (18-75)	80	5	6000/0	86/88	7200
	DWMD30-B4812			12	2500/0	86/88	2000
	DWMD30-B4815			15	2000/0	86/88	1500
	DWMD30-B4824			24	1250/0	86/88	470

Note:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured in nominal input voltage and rated output load;
③Product images are for reference only; the actual product shall prevail.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	Nominal input voltage	DWMD30-B48xx	--	710/8	735/15	mA
			DWMD30-B2405	--	1420/4	1453/12	
			DWMD30-B2412/15/24/28	--	1388/4	1420/12	
	Reflected Ripple Current		DWMD30-B48xx	--	40	--	
			DWMD30-B24xx	--	100	--	
	Surge Voltage (1sec. max.)		DWMD30-B48xx	-0.7	--	100	VDC
			DWMD30-B24xx	-0.7	--	50	
	Start-up Voltage		DWMD30-B48xx	--	--	18	
			DWMD30-B24xx	--	--	9	
	Input under-voltage protection		DWMD30-B48xx	12	15.5	--	
			DWMD30-B24xx	5.5	7.5	--	
	Start-up Time	Nominal input voltage & constant resistance load	DWMD30-B48xx	--	10	--	ms
			DWMD30-B24xx	--	30	100	
	Input Filter			Capacitance filter			
	Hot Plug			Unavailable			
	Ctrl①	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
Output Specifications	Voltage Accuracy②	5%-100% load		--	±1	±3	%
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation③	5%-100% load		--	±0.5	±1	
	Transient Recovery Time	25% load step change, nominal input voltage		--	250	500	μs
	Transient Response Deviation	25% load step change, input voltage range	DWMD30-B4805	--	±3	±8	%
			DWMD30-B4812/15/24	--	±3	±5	
			DWMD30-B24xx	--	±5	±8	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise④	20MHz bandwidth, nominal input voltage, 5%-100% load	DWMD30-B4805/12/15	--	60	120	mV p-p
			DWMD30-B4824	--	60	150	
			DWMD30-B24xx	--	100	150	
	Trim	Input voltage range		90	--	110	%Vo
	Over-temperature Protection	Max. Case Temperature (Only DWMD30-B24xx)		--	125	--	℃
	Over-voltage Protection	Input voltage range	DWMD30-B48xx	110	--	160	%Vo
			DWMD30-B24xx	110	140	160	
	Over-current Protection	Input voltage range	DWMD30-B48xx	110	170	260	%Io

			DWMD30-B24xx	110	160	300	
	Short circuit Protection	Input voltage range		Continuous, self-recovery			
General Specifications	Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.		1500	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	DWMD30-B48xx	--	2000	--	pF
			DWMD30-B24xx	--	10	--	nF
	Operating Temperature	See Fig. 2	DWMD30-B48xx	-40	--	+85	℃
		See Fig. 1	DWMD30-B24xx	-40	--	+105	
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Pin Soldering Resistance Temperature⑤	Soldering spot is 1.5mm away from the case, 10 seconds max.		--	--	+300	℃
		Wave soldering, maximum 10 seconds		255	260	265	
	Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency⑥	PWM mode	DWMD30-B48xx	--	270	--	kHz
			DWMD30-B24xx	--	400	--	
	MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours
Mechanical Specifications	Case Material	Aluminum alloy					
	Dimensions	Horizontal package	DWMD30-B48xx	25.40 × 25.40 × 11.70 mm			
		DIP package	DWMD30-B24xx				
	Weight	Horizontal package	DWMD30-B48xx	18.4 g			
		DIP package	DWMD30-B24xx	20.0G(Typ.)			
	Cooling method	Free air convection					

Note:
①The Ctrl pin voltage is referenced to input GND;
②Output voltage accuracy for 0%-5% load is ±5% max;
③Load regulation for 0% -100% load increases to ±3%;
④0% -5% load ripple&noise less than or equal to 300mV/5% Vo; The testing method for ripple and noise adopts parallel line testing method;
⑤The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper solder joints. The actual temperature set by the customer should be determined comprehensively based on factors such as PCB thickness, copper coverage, soldering iron power, and soldering iron tip selection;
⑥Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

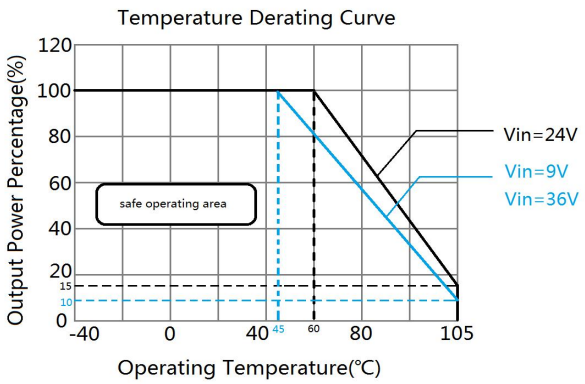
Electromagnetic Compatibility (EMC)

Emissions	CE	DWMD30-B48xx	CISPR32/EN55032 CLASS B (see Fig.4-② for recommended circuit)/CLASS A (see Fig.5 for recommended circuit)	
		DWMD30-B24xx	CISPR32/EN55032 CLASS B (see Fig.6-② for recommended circuit)	
	RE	DWMD30-B48xx	CISPR32/EN55032 CLASS B (see Fig.4-② for recommended circuit)/CLASS A (see Fig.5 for recommended circuit)	
		DWMD30-B24xx	CISPR32/EN55032 CLASS B (see Fig.6-② for recommended circuit)	
Immunity	ESD		IEC/EN61000-4-2 Contact ±6KV	perf. Criteria B
	RS	DWMD30-B48xx	IEC/EN61000-4-3 10V/m	perf. Criteria B
		DWMD30-B24xx	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	DWMD30-B48xx	IEC/EN61000-4-4 ±2KV (see Fig.4-① for recommended circuit)	perf. Criteria B
		DWMD30-B24xx	IEC/EN61000-4-4 ±2kV (see Fig.6-① for recommended circuit)	perf. Criteria A
	Surge	DWMD30-B48xx	IEC/EN61000-4-5 line to line ±2KV (see Fig.4-① for recommended circuit)	perf. Criteria B

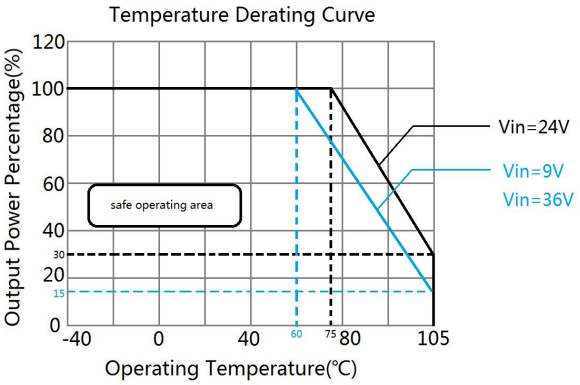
		DWMD30-B24xx	IEC/EN61000-4-5 circuit)	line to line ±2kV (see Fig.6-① for recommended	perf. Criteria A
	CS	DWMD30-B48xx	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria B
		DWMD30-B24xx	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Characteristic Curve

5V Output



12V/15V Output



24V/28V Output

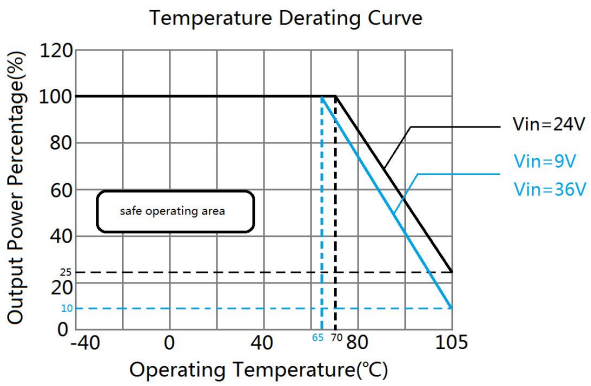
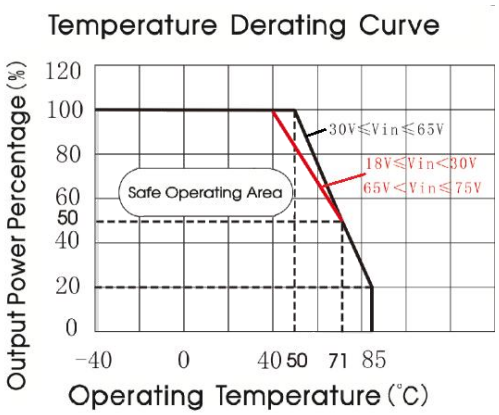


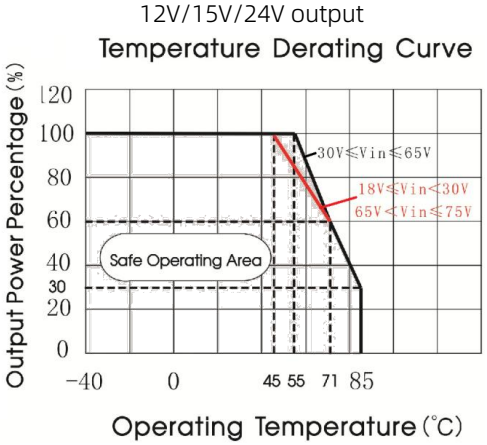
Fig. 1 DWMD30-B24xx characteristic curve

Noted: Test PCB: 160x50mm, 2oz, triple layer

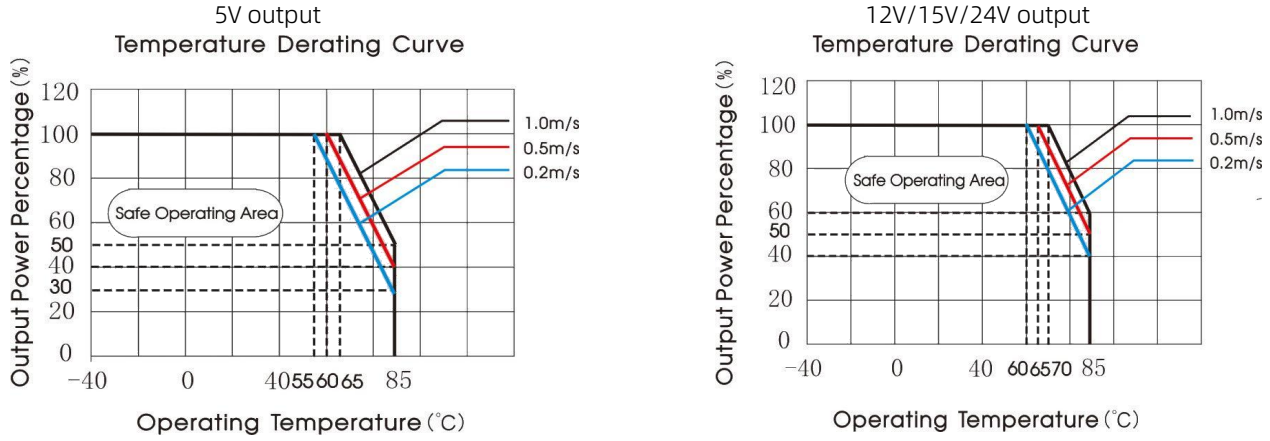
5V output



12V/15V/24V output

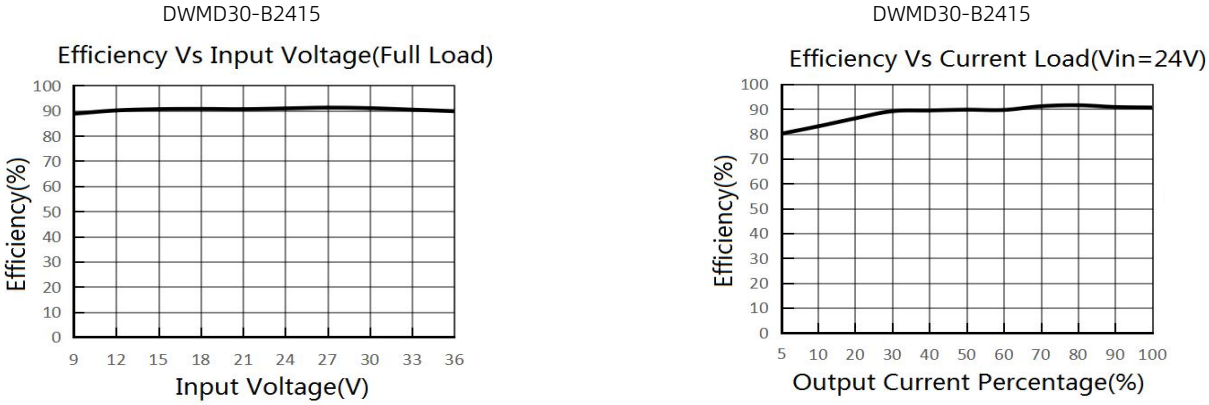


Note: No wind speed temperature derating curve chart.



Note: Wind speed and temperature derating curve chart.

Fig. 2 DWMD30-B48xx characteristic curve



Design Reference

1. Typical application

①All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 3.

②Input 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.

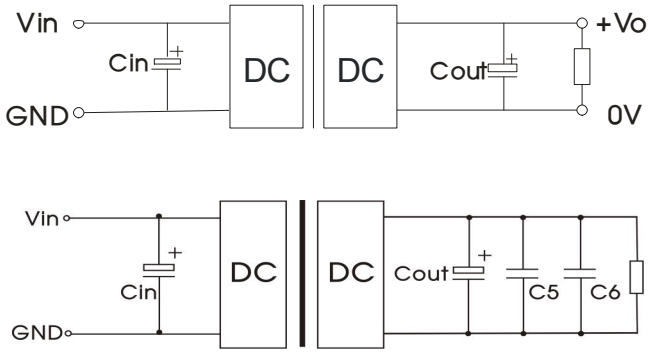


Fig. 3

Model	Vout (VDC)	Cin (μF)	Cout (μF)	C5/C6
DWMD30-B24xx	5	100uF/50V	470uF/50V	10uF/16V
	12/15			10uF/25V
	24/28			10uF/50V
DWMD30-B48xx	5/12/15	100	100	--
	24		47	--

2. EMC compliance circuit

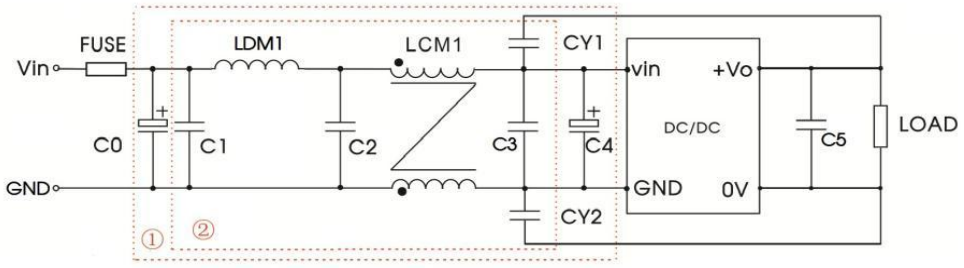


Fig. 4

Notes: We use Part ① in Fig. 4 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	10μF/100V
LDM1	22uH/3A
C2	22uF/100V
LCM1	10mH
C3	22uF/100V
C5	Refer to the Cout in Fig.3
CY1, CY2	1nF/2KV

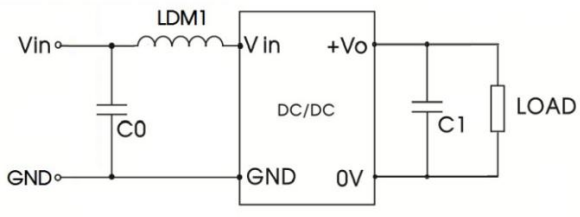


Fig. 5

Parameter description:

Model	Vin:48V
C0	4.7μF/100V
LDM1	22uH/3A
C1	Refer to the Cout in Fig.3

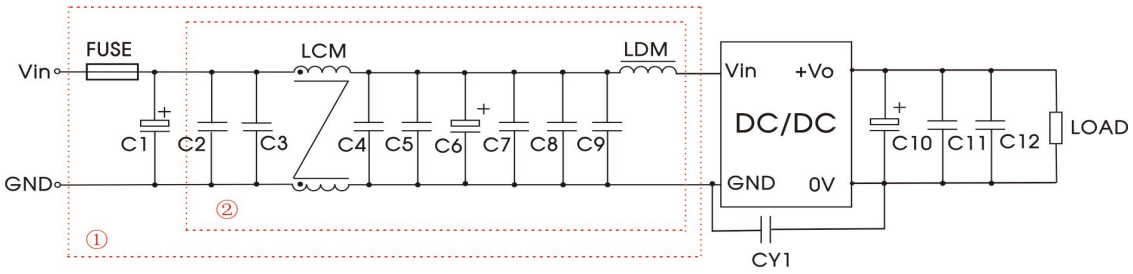


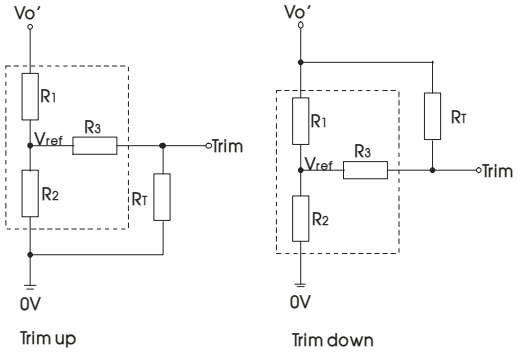
Fig. 6

Notes: We use Part ① in Fig. 6 for Immunity tests and Part ② for Emissions test. Selecting based on needs.

Parameter description:

Components	Vin: 24VDC
FUSE	Choose according to actual input current
C1	1000uF/50V
C2/C3/C4/C5/ C7/C8/C9	4.7uF/50V
LCM	350uH*2
C6	220uF/50V
LDM	2.2uH
C10	Refer to the Cout in Fig.3
C11/C12	Refer to the C5, C6 in Fig.3
CY1	Y2/222K/250VAC
Note: The Part ② of the circuit can be simplified, and ClassA can be satisfied by removing the LCM.	

3. Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

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

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

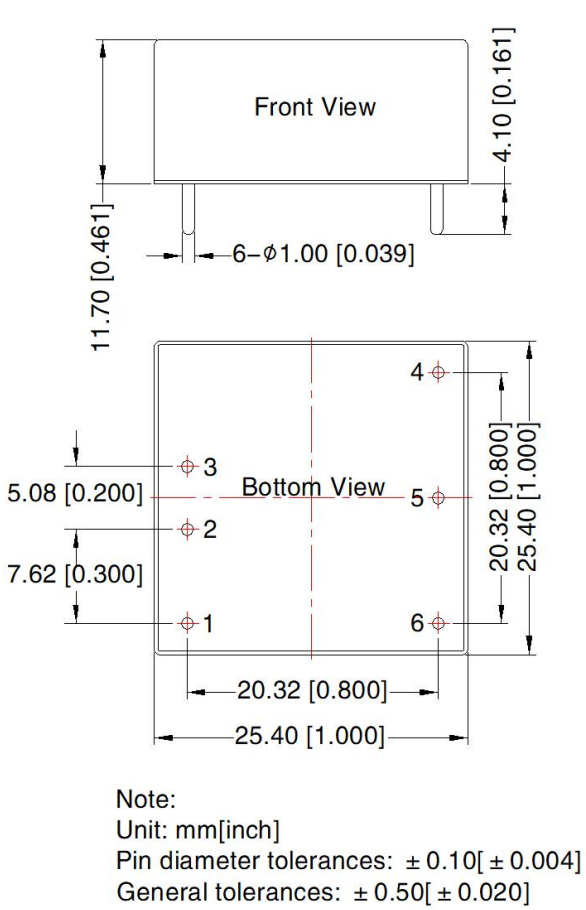
R_T is Trim resistance

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

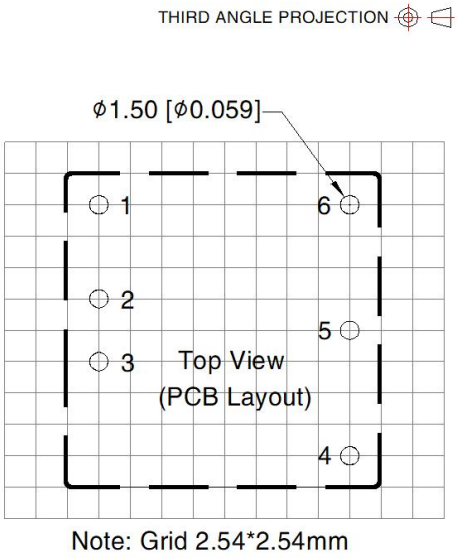
Model	Vout(V)	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
DWMD30-B24xx	5	2.87	2.87	5.6	2.5
	12	10.91	2.87	15	2.5
	15	14.35	2.87	15	2.5
	24	24.77	2.87	17.4	2.5
	28	29.41	2.87	17.4	2.5
DWMD30-B48xx	5	8.832	2.87	10	1.24
	12	11.00	2.87	8.2	2.5
	15	14.40	2.87	10	2.5
	24	24.87	2.87	7.5	2.5

4. The products do not support parallel connection of their output

Dimensions and Recommended Layout



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	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	Trim
6	0V

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℃, 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;
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.