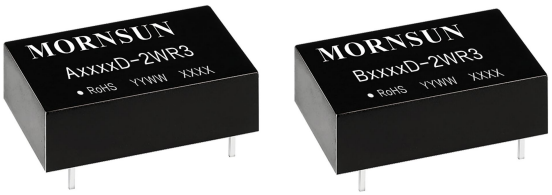
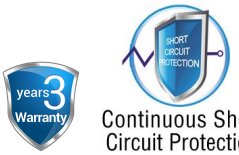
DC/DC Converter

A_D-2WR3 & B_D-2WR3 series

2W isolated DC-DC converter

Fixed input voltage, unregulated dual or single output





Continuous Short Circuit Protection

CE Report EN 62368-1 UKCA Report BS EN 62368-1 Patent Protection RoHS

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 88%
- High power density
- I/O isolation test voltage: 1.5kVDC
- Industry standard pin-out

A_D-2WR3 & B_D-2WR3 series are specially designed for applications where an (two) isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load*(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	B0303D-2WR3	3.3 (2.97-3.63)	3.3	400/40	74/78	2400
	B0305D-2WR3		5	400/40	74/78	2400
	A0503D-2WR3	5 (4.5-5.5)	±3.3	±303/±30	74/78	1200
	A0505D-2WR3		±5	±200/±20	80/84	1200
	A05X7D-2WR3		±7	±143/±14	80/84	470
	A0509D-2WR3		±9	±111/±11	81/85	470
	A0512D-2WR3		±12	±83/±8	81/85	220
	A0515D-2WR3		±15	±67/±7	82/86	220
	A0524D-2WR3		±24	±42/±4	82/86	100
	B0503D-2WR3		3.3	400/40	74/78	2400
	B0505D-2WR3		5	400/40	80/84	2400
	B0509D-2WR3		9	222/22	81/85	1000
	B0512D-2WR3		12	167/17	81/85	560
	B0515D-2WR3		15	133/13	82/86	560
	B0524D-2WR3		24	83/8	82/86	220
--	A1205D-2WR3	12 (10.8-13.2)	±5	±200/±20	76/80	1200
	A1209D-2WR3		±9	±111/±11	78/82	500
	A1212D-2WR3		±12	±83/±8	79/83	280
	A1215D-2WR3		±15	±67/±7	79/83	280
	A1224D-2WR3		±24	±42/±4	81/85	110
	B1205D-2WR3		5	400/40	78/82	2400
	B1209D-2WR3		9	222/23	78/82	1000
	B1212D-2WR3		12	167/17	80/84	560
	B1224D-2WR3		24	83/8	82/86	220
	B1515D-2WR3	15 (13.5-16.5)	15	133/13	75/79	560

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--	A2405D-2WR3	24 (21.6-26.4)	±5	±200/±20	74/80	1200
	A2409D-2WR3		±9	±111/±11	75/81	500
	A2412D-2WR3		±12	±83/±8	77/83	280
	A2415D-2WR3		±15	±67/±7	77/83	280
	A2424D-2WR3		±24	±42/±4	77/83	110
	B2405D-2WR3		5	400/40	76/82	2400
	B2409D-2WR3		9	222/23	76/82	1000
	B2412D-2WR3		12	167/17	80/86	560
	B2415D-2WR3		15	133/13	82/88	560
	B2424D-2WR3		24	83/8	82/88	220

Note: * The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	513/12	541/--	mA
		5VDC output	--	778/12	820/--	
	5VDC input	3.3VDC output	--	513/8	541/--	
		5VDC/7VDC output	--	477/8	500/--	
		9VDC/12VDC output	--	471/8	494/--	
		15VDC/24VDC output	--	466/8	488/--	
	A12_D-2WR3	5VDC output	--	209/8	220/--	
		9VDC output	--	204/8	214/--	
		12VDC/15VDC output	--	201/8	211/--	
		24VDC output	--	197/8	206/--	
	B12_D-2WR3	5VDC/9VDC output	--	204/8	214/--	
		12VDC output	--	199/8	209/--	
		24VDC output	--	194/8	204/--	
	B15_D-2WR3	15VDC output	--	169/8	178/--	
	A24_D-2WR3	5VDC output	--	105/8	113/--	
		9VDCoutput	--	103/8	112/--	
		12VDC/15VDC/24VDC output	--	101/8	109/--	
	B24_D-2WR3	5VDC/9VDC output	--	102/8	110/--	
		12VDC output	--	97/8	105/--	
		15VDC/24VDC output	--	95/8	102/--	
Reflected Ripple Current	3.3V input		--	30	--	
	Others		--	15	--	
Surge Voltage (1sec. max.)	3.3VDC input		-0.7	--	5	VDC
	5VDC input		-0.7	--	9	
	12V input		-0.7	--	18	
	15V input		-0.7	--	21	
	24V input		-0.7	--	30	
Input Filter			Capacitance filter			
Hot Plug			Unavailable			

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Output Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Voltage Accuracy				See output regulation curve (Fig. 1)			
Linear Regulation	Input voltage change: ±1%		3.3VDC output	--	--	±1.5	--
			Other output	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC input	3.3VDC output	--	15	20	%
			5VDC output	--	20	25	
		5VDC input	3.3VDC output	--	12	20	
			5/7VDC output	--	9	15	
			9/12/15 VDC output	--	7	10	
			24VDC output	--	5	10	
		Other input	5VDC output	--	7	15	
			9VDC output	--	5	10	
			12VDC output	--	5	10	
			15VDC output	--	4	10	
			24VDC output	--	3	10	
Ripple & Noise*	20MHz bandwidth	3.3V/5VDC input		--	75	200	mVp-p
		Other input	5/9/12/15VDC output	--	75	180	
			24VDC output	--	75	200	
Temperature Coefficient	Full load			--	±0.02	--	%/℃
Short-circuit Protection				Continuous, self-recovery			

Notes: * The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
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		--	20	--	pF
Operating Temperature	Derating when operating temperature≥85℃ (see Fig. 2)		-40	--	105	℃
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25℃		--	25	--	
Pin Soldering Resistance Temperature*	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
Storage Humidity	Non-condensing		5	--	95	%RH
Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	100% load, nominal input voltage	3.3/5VDC input	--	220	--	kHz
		Other input	--	260	--	
MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours

Note:②The pin resistance temperature is not the actual set temperature of the soldering iron, but the temperature required for a good solder joint. The actual set temperature by the customer needs to be determined based on the thickness of the PCB, the size of the copper cladding, the power of the soldering iron, and the selection of the soldering iron tip.

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	20.32 x 10.16 x 8.20 mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

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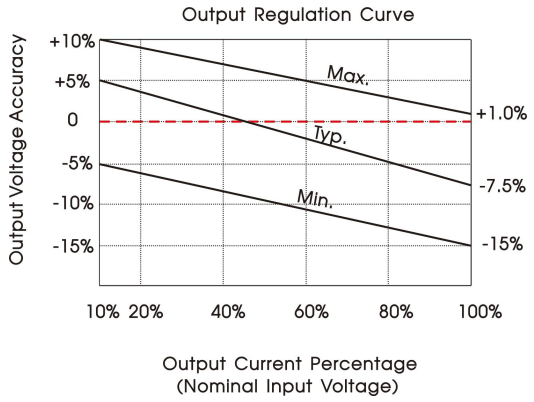
Electromagnetic Compatibility (EMC)

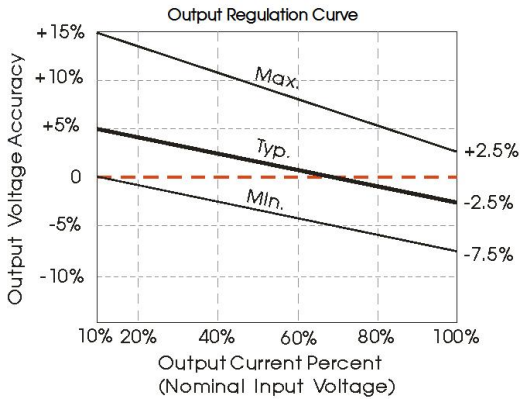
Emission	CE	CISPR32/EN55032	CLASS B
	RE	CISPR32/EN55032	CLASS B
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV perf. Criteria B
Note: Refer to Fig. 4 for recommended circuit test.			

Typical Characteristic Curves

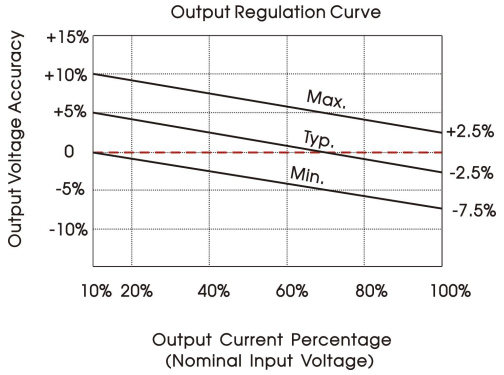
B0303D-2WR3/A0503D-2WR3/B0503D-2WR3



B0305D-2WR3



A05_D-2WR3/B05_D-2WR3/A_05D-2WR3/B_05D-2WR3
(Except 3.3VDC output)



Others

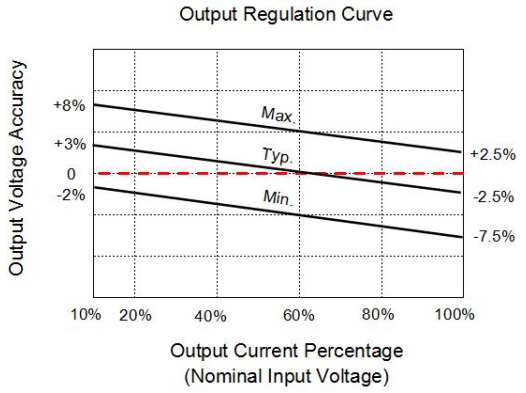
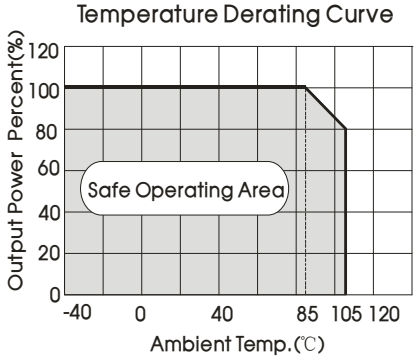


Fig. 1

5VDC/3.3VDC input
Temperature Derating Curve



Other input
Temperature Derating Curve

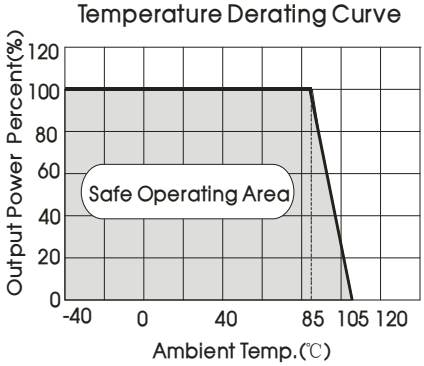


Fig. 2

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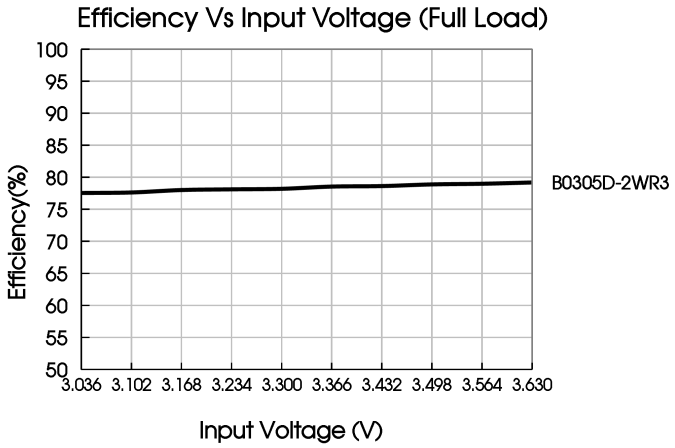

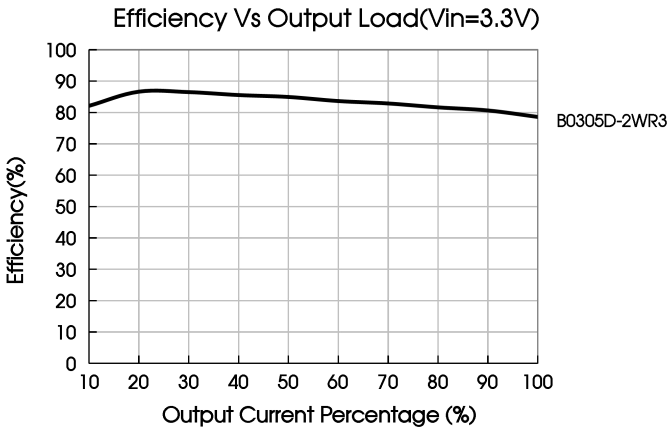

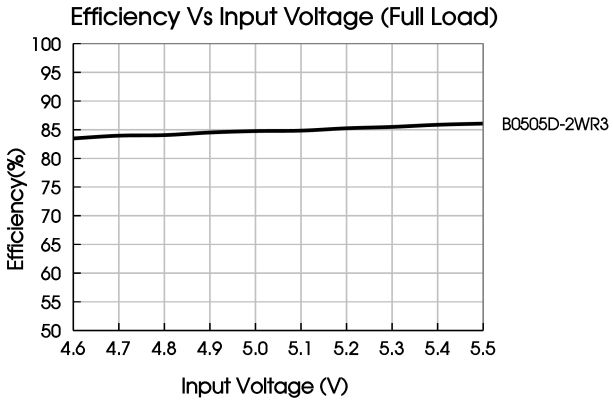

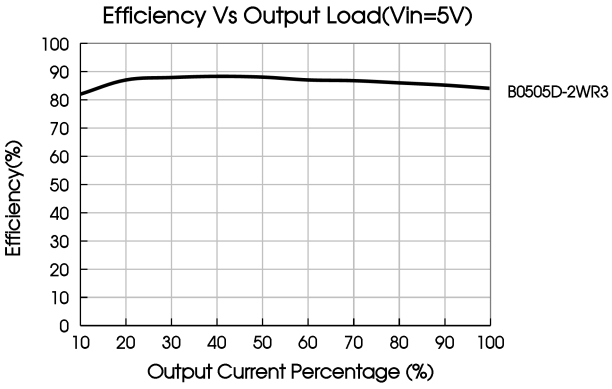

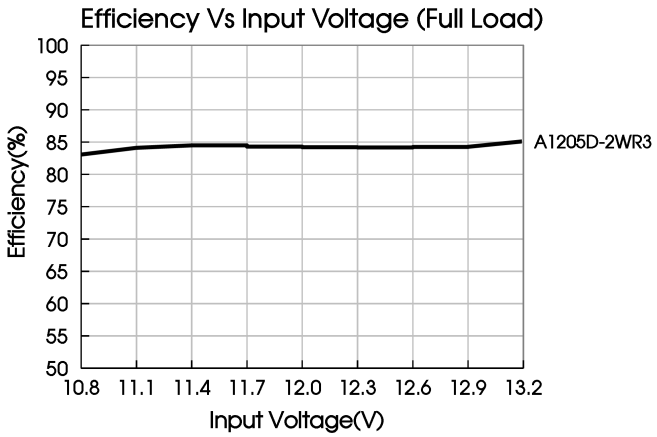

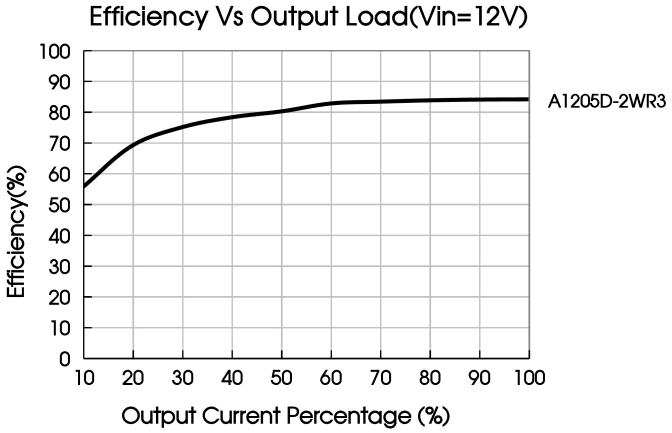

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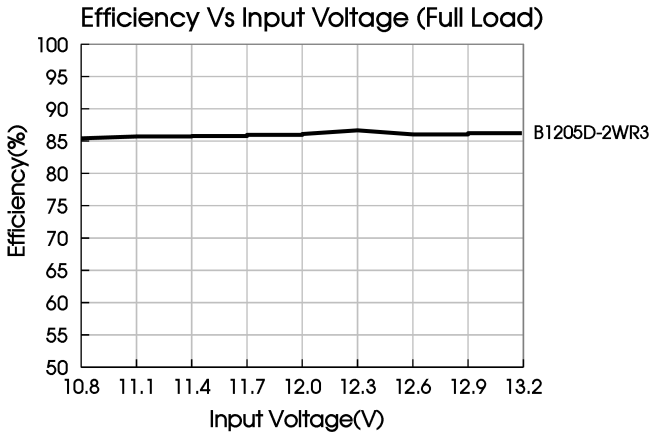

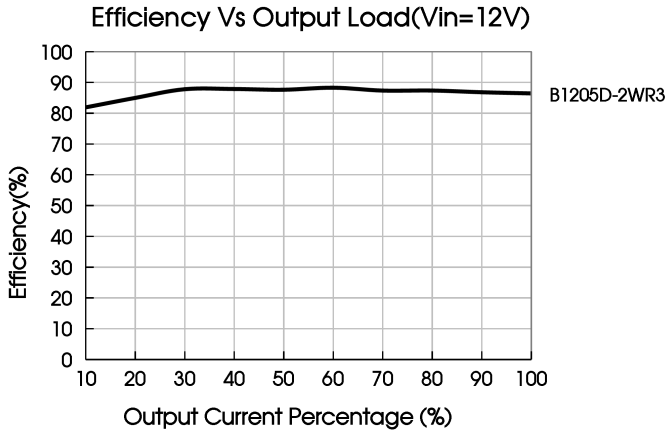

Design Reference

1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig.3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

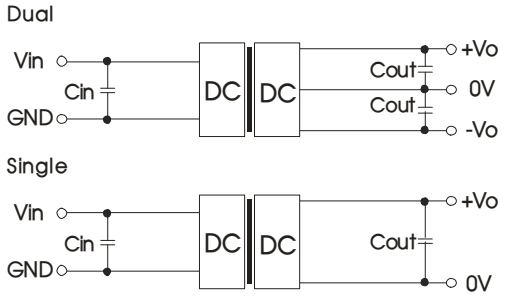

Fig.3

Table 1: Recommended input and output capacitor values

Vin	Cin	Dual Vout	Cout*	Single Vout	Cout
3.3VDC	10μF/16V	±3.3VDC	4.7μF/16V	3.3VDC	10μF/16V
5VDC	4.7μF/16V	±5/±7VDC	4.7μF/16V	5VDC	10μF/16V
12VDC	2.2μF/25V	±9VDC	1μF/16V	9VDC	2.2μF/25V
15VDC	2.2μF/25V	±12/±15VDC	1μF/25V	12VDC	2.2μF/25V
24VDC	1μF/50V	±24VDC	0.47μF/50V	15VDC	2.2μF/25V
--	--	--	--	24VDC	1μF/50V

Note: *The capacitor value of the positive and the negative output is identical.

2. EMC compliance circuit

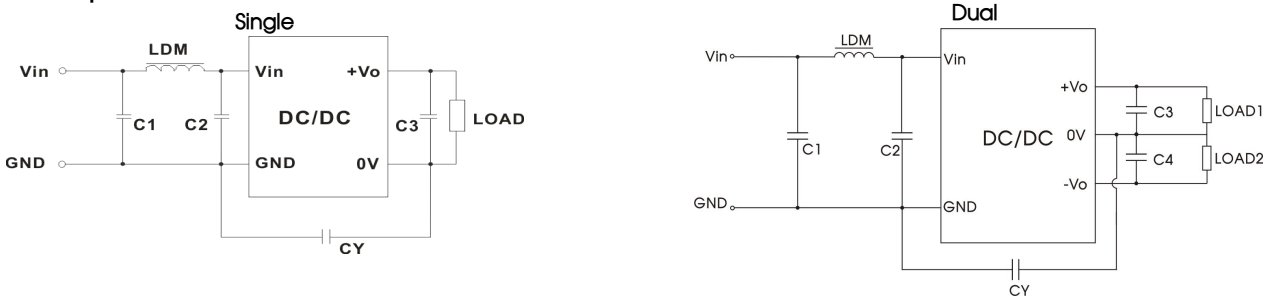

Fig.4

Emissions	C1/C2	4.7μF/50V
	CY	270pF/2kV
	C3/C4	Refer to the Cout in Fig.3
	LDM	6.8μH

3. For additional information, please refer to DC-DC converter application notes on www.mornsun-power.com

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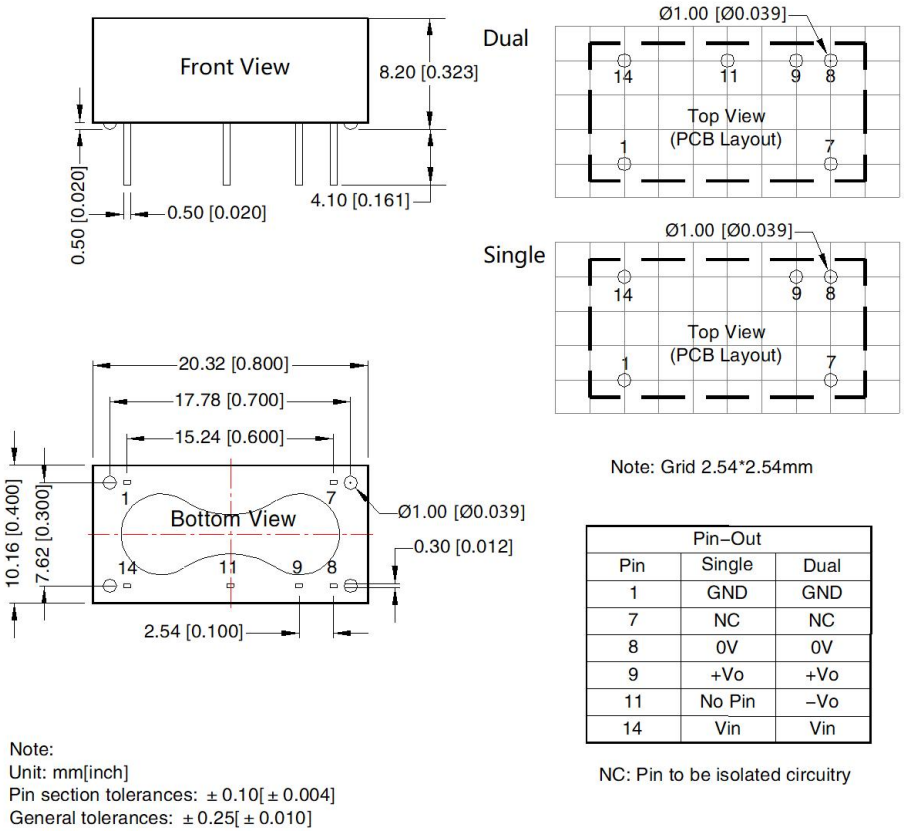
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin–Out		
Pin	Single	Dual
1	GND	GND
7	NC	NC
8	0V	0V
9	+Vo	+Vo
11	No Pin	–Vo
14	Vin	Vin

NC: Pin to be isolated circuitry

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200009;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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