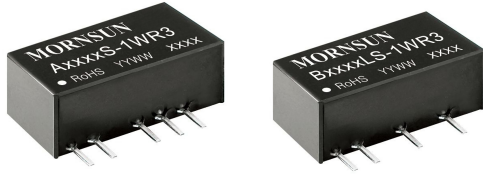


1W isolated DC-DC converter
Fixed input voltage, unregulated dual/single output



Continuous Short
Circuit Protection



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

A_S-1WR3 & B_LS-1WR3 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.

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 85%
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out

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.		
--	A0303S-1WR3	3.3 (2.97-3.63)	±3.3	±152/±15	74/78	1200
	A0305S-1WR3		±5	±100/±10	78/82	1200
	A0309S-1WR3		±9	±56/±6	81/85	470
	A0312S-1WR3		±12	±42/±5	78/82	220
	A0315S-1WR3		±15	±34/±4	78/82	220
	A0324S-1WR3		±24	±21/±2	80/84	100
	B0303LS-1WR3		3.3	303/30	75/79	2400
	B0305LS-1WR3		5	200/20	78/82	2400
	B0309LS-1WR3		9	111/11	81/85	1000
	B0312LS-1WR3		12	83/8	78/82	560
	B0315LS-1WR3		15	67/7	78/82	560
	B0324LS-1WR3		24	42/4	80/84	220
EN/BS EN	A0503S-1WR3	5 (4.5-5.5)	±3.3	±152/±15	70/74	1200
EN/BS EN/IEC	A0505S-1WR3		±5	±100/±10	78/82	1200
	A0509S-1WR3		±9	±56/±6	79/83	470
	A0512S-1WR3		±12	±42/±5	79/83	220
	A0515S-1WR3		±15	±34/±4	79/83	220
	A0524S-1WR3		±24	±21/±3	81/85	100
	B0503LS-1WR3		3.3	303/30	70/74	2400
	B0505LS-1WR3		5	200/20	78/82	2400
	B0509LS-1WR3		9	111/12	79/83	1000
	B0512LS-1WR3		12	84/9	79/83	560
	B0515LS-1WR3		15	67/7	79/83	560
	B0524LS-1WR3		24	42/4	81/85	220
EN/BS EN/IEC	A1203S-1WR3	12 (10.8-13.2)	±3.3	±152/±15	71/75	1200
--	A1205S-1WR3		±5	±100/±10	76/80	1200
	A1209S-1WR3		±9	±56/±5	76/80	470
EN/BS EN/IEC	A1212S-1WR3		±12	±42/±5	77/81	220
	A1215S-1WR3		±15	±34/±4	77/81	220
	A1224S-1WR3		±24	±21/±3	76/80	100

EN/BS EN/IEC	B1203LS-1WR3	12 (10.8-13.2)	3.3	303/30	71/75	2400
	B1205LS-1WR3		5	200/20	76/80	2400
	B1209LS-1WR3		9	111/12	76/80	1000
	B1212LS-1WR3		12	83/9	76/80	560
	B1215LS-1WR3		15	67/7	77/81	560
	B1224LS-1WR3		24	42/4	77/81	220
--	A1505S-1WR3	15 (13.5-16.5)	±5	±100/±10	76/80	1200
--	A1509S-1WR3		±9	±56/±5	76/80	470
EN/BS EN/IEC	A1512S-1WR3		±12	±42/±5	76/80	220
	A1515S-1WR3		±15	±34/±4	77/81	220
--	A1524S-1WR3		±24	±21/±2	77/81	100
EN/BS EN/IEC	B1505LS-1WR3		24 (21.6-26.4)	5	200/20	76/80
	B1509LS-1WR3	9		111/12	76/80	1000
	B1512LS-1WR3	12		83/9	76/80	560
	B1515LS-1WR3	15		67/7	77/81	560
	--	B1524LS-1WR3		24	42/5	77/81
EN/BS EN/IEC	A2405S-1WR3	24 (21.6-26.4)	±5	±100/±10	74/80	1200
--	A2409S-1WR3		±9	±56/±5	74/80	470
EN/BS EN/IEC	A2412S-1WR3		±12	±42/±5	75/81	220
	A2415S-1WR3		±15	±34/±4	73/79	220
	A2424S-1WR3		±24	±21/±3	74/80	100
	B2403LS-1WR3		3.3	303/30	69/75	2400
--	B2405LS-1WR3	5	200/20	73/79	2400	
	B2407LS-1WR3	7.2	139/13	74/80	1000	
EN/BS EN/IEC	B2409LS-1WR3	24 (21.6-26.4)	9	111/12	74/80	1000
	B2412LS-1WR3		12	83/9	75/81	560
	B2415LS-1WR3		15	67/7	75/81	560
	B2424LS-1WR3		24	42/4	75/81	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	--	384/10	405/--	mA
		Other output	--	370/18	389/--	
	5VDC input	3.3VDC/5VDC output	--	270/8	286/--	
		9VDC/12VDC output	--	241/12	254/--	
		15VDC/24VDC output	--	241/18	254/--	
	12VDC input		--	105/8	110/--	
	15VDC input		--	84/8	88/--	
24VDC input		--	56/8	61/--		
Reflected Ripple Current*			--	15	--	
Surge Voltage(1sec. max.)	3.3VDC input		-0.7	--	5	VDC
Surge Voltage(1sec. max.)	5VDC input		-0.7	--	9	VDC
	12VDC input		-0.7	--	18	
	15VDC input		-0.7	--	21	
	24VDC input		-0.7	--	30	
Input Filter				Capacitance filter		
Hot Plug				Unavailable		

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
		Other output	--	--	1.2	
Load Regulation	3.3VDC input 10% -100% load	3.3VDC output	--	12	18	%
		Other output	--	8	15	
		5VDC input 10% -100% load	3.3VDC output	--	15	
	5VDC input 10% -100% load	5VDC output	--	10	15	
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	6	10	
		24VDC output	--	5	10	
	12/15/24VDC input 10% -100% load	3.3VDC output	--	8	20	
		5VDC output	--	5	15	
		9VDC output	--	3	10	
		12VDC output	--	3	10	
15VDC output		--	3	10		
Ripple & Noise*	20MHz bandwidth	Other output	--	30	75	mVp-p
		24VDC output	--	50	100	
Temperature Coefficient	100% load		--	±0.02	--	%/°C
Short-circuit Protection			Continuous, self-recovery			

Note: * 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	5VDC input	Derating when operating temperature ≥ 85°C, (see Fig. 2)	-40	--	105	°C
	3.3/12/15/24VDC input	Derating when operating temperature ≥ 100°C, (see Fig. 2)				
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25°C		--	25	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
Storage Humidity	Non-condensing	3.3/12/15/24VDC input	5	--	95	
Storage Humidity	Non-condensing	5VDC input	--	--	95	%RH
Vibration	12/15/24VDC input		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	3.3VDC input	--	220	--	kHz
		5VDC input	--	270	--	
		12/15/24VDC input	--	260	--	
MTBF	MIL-HDBK-217F@25°C		3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 6.00 x 10.16mm

Weight	2.1g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	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 Performance Curves

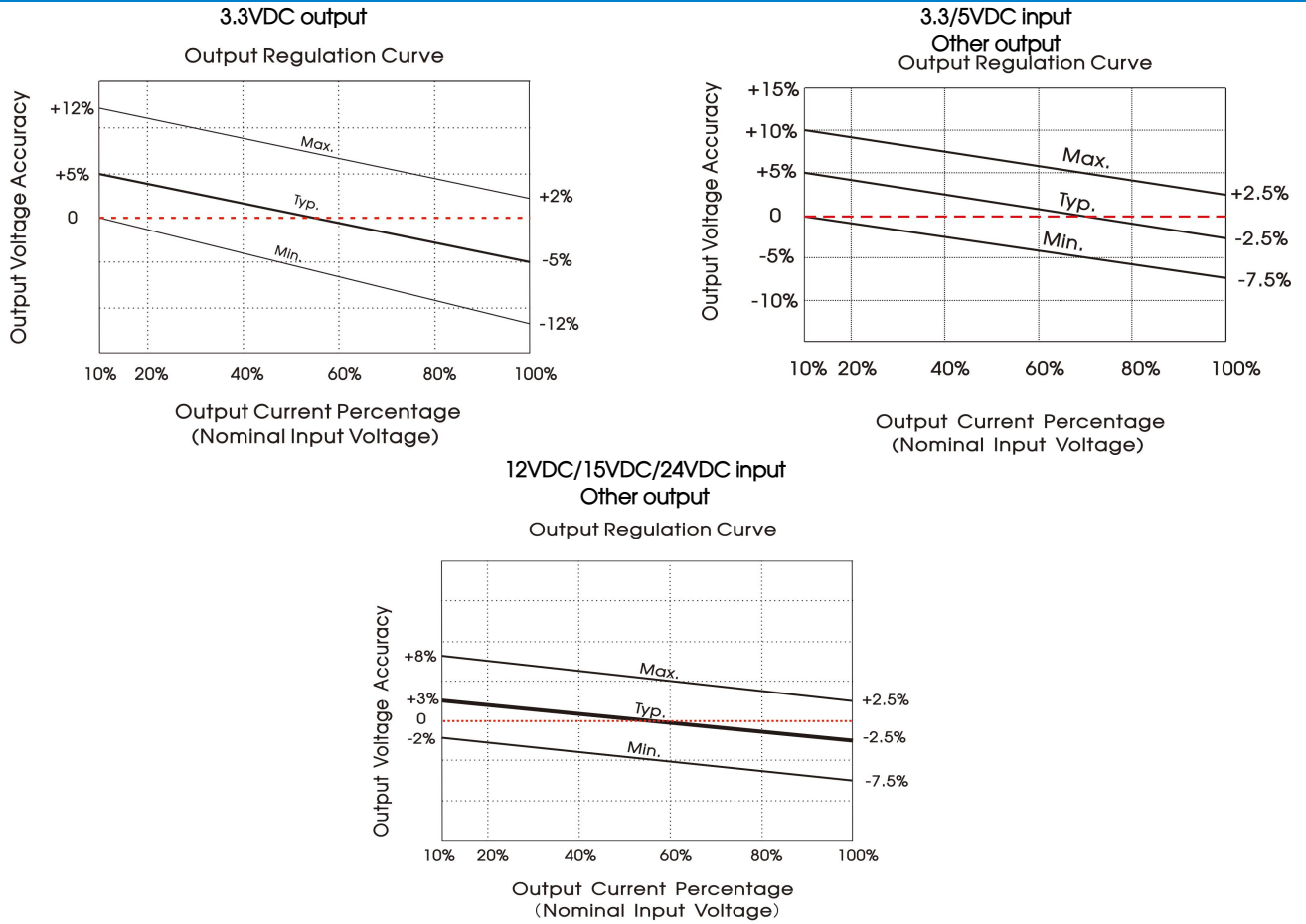


Fig. 1

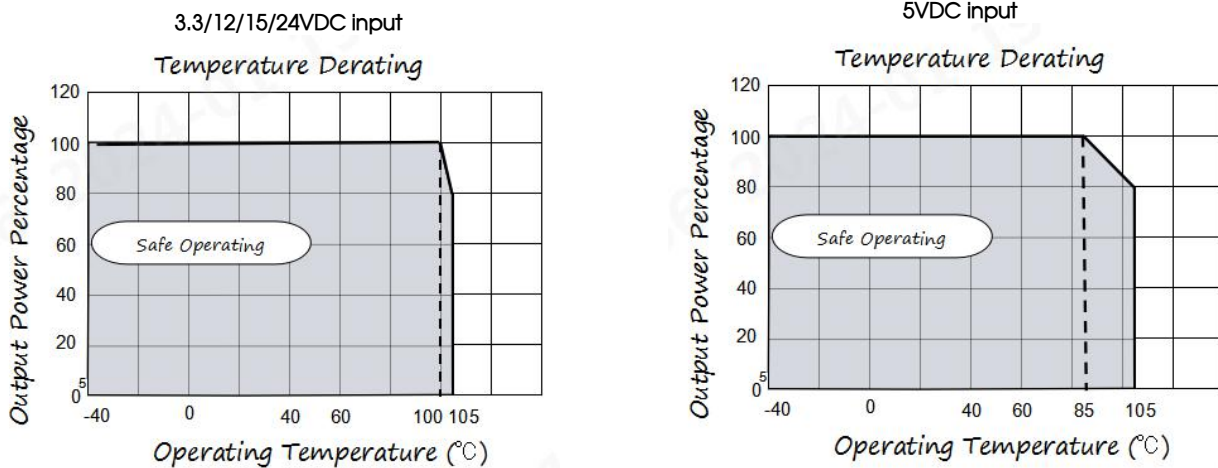
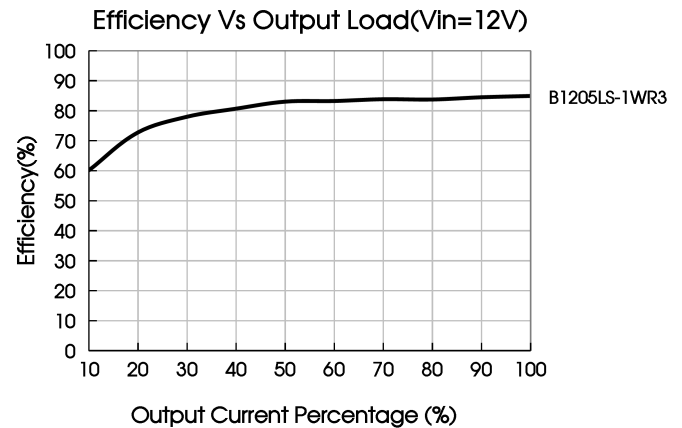
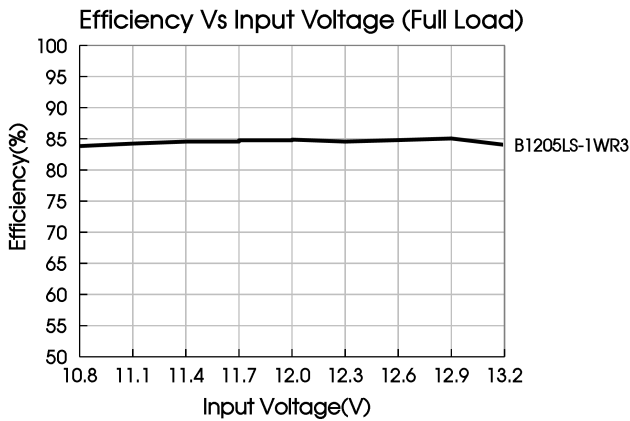
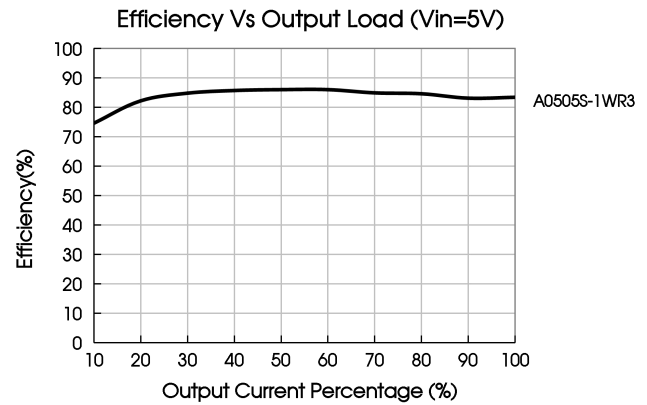
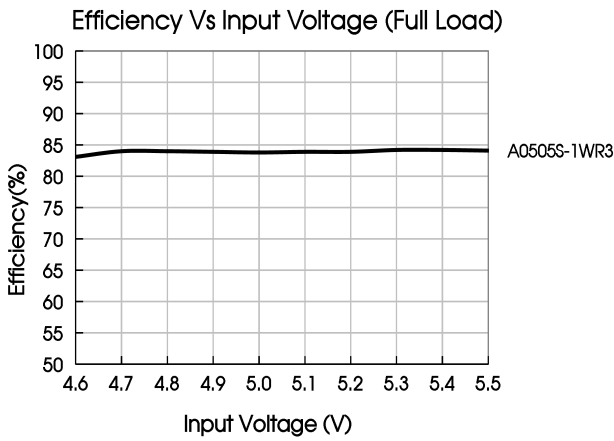
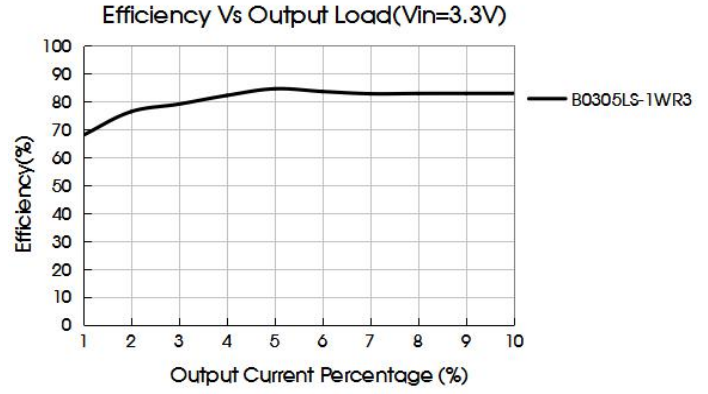
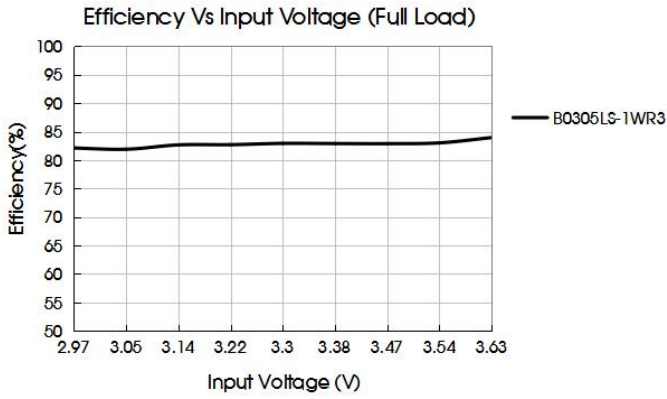


Fig. 2



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.

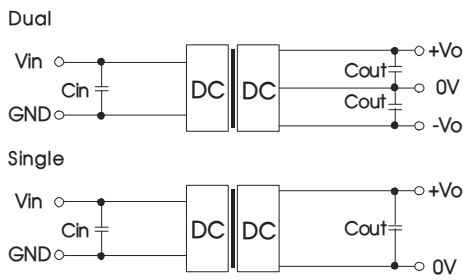


Fig. 3

Table 1: Recommended input and output capacitor values

	Vin	Cin	Single Vout	Cout	Dual Vout	Cout
3.3V	3.3VDC	10uF/16V	3.3/5VDC	10uF/16V	±3.3/±5VDC	10uF/16V
	--	--	9/12VDC	2.2uF/25V	±9/±12VDC	2.2uF/25V
	--	--	15/24VDC	1uF/50V	±15/±24VDC	1uF/50V
other	5VDC	4.7μF/16V	3.3/5VDC	10μF/16V	±3.3/5VDC	4.7μF/16V
	12VDC	2.2μF/25V	7.2/9VDC	2.2μF/16V	±9VDC	1μF/16V
	15VDC	2.2μF/25V	12VDC	2.2μF/25V	±12VDC	1μF/25V
	24VDC	1μF/50V	15VDC	1μF/25V	±15VDC	0.47μF/25V
	--	--	24VDC	1μF/50V	±24VDC	0.47μF/50V

2. EMC (CLASS B) compliance circuit

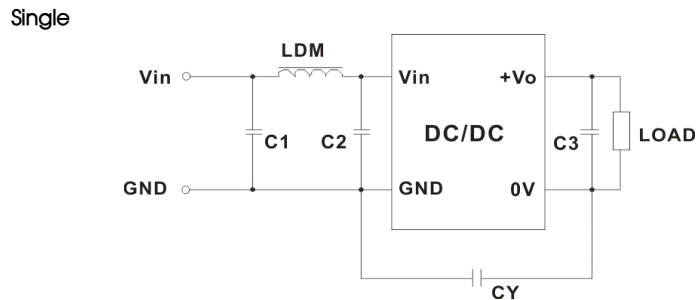
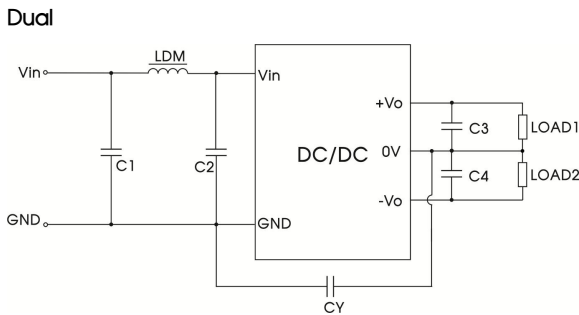


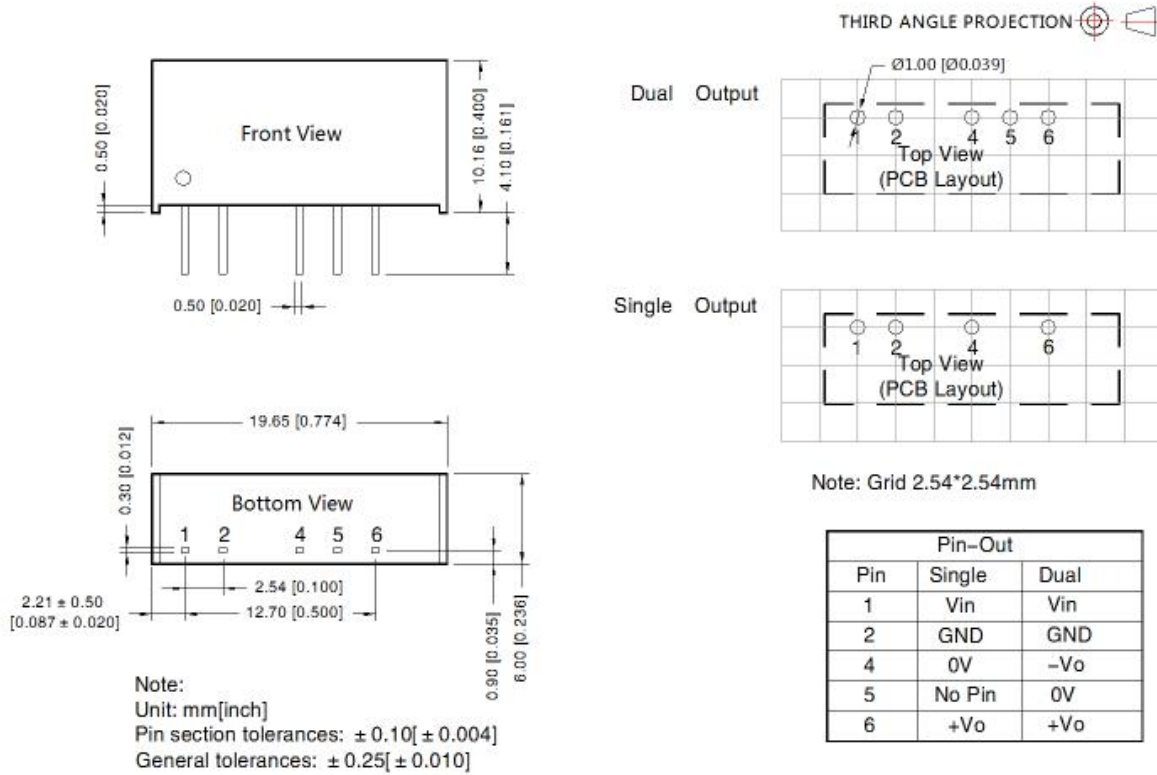
Fig. 4

Table 2: EMC recommended circuit value table

Input Voltage		3.3VDC		5VDC		Other Input
Output Voltage		3.3/5VDC	3.3/5VDC	3.3/5/9VDC	12/15/24VDC	--
Emissions	C1/C2	4.7μF /16V	4.7μF /16V	4.7μF /25V	4.7μF /25V	4.7μF /50V
	CY	--	270pF /4kVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA	100pF/2kV	1000pF/2kV	270pF /2kV
	C3/C4	Refer to the Cout in table 1				
	LDM	6.8μH				

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

Dimensions and Recommended Layout



Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200001 ;
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 $T_a=25^{\circ}\text{C}$, 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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