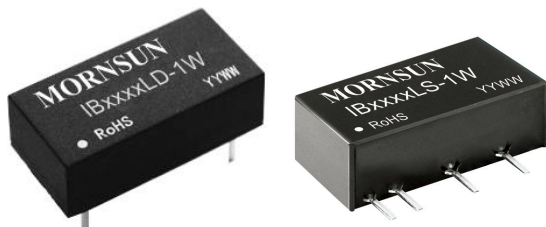


MORNSUN®

IB_LD-1W & IB_LS-1W Series

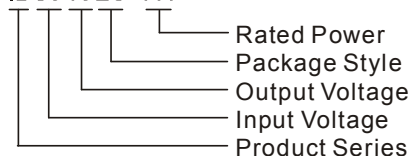
1W, fixed input voltage, isolated & regulated single output, DC-DC converter



CE Patent Protection RoHS

MODEL SELECTION

IB0515LS-1W



FEATURES

- Compact size
- SIP/DIP package
- Isolation voltage: 1K VDC
- Operating temperature range: -40°C to +85°C
- Good temperature characteristic
- Internal surface mounted design
- International standard pin-out
- No external component required
- RoHS Compliance
- EN60950 approval

APPLICATIONS

The IB_LD-1W & IB_LS-1W Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation $\leq \pm 5\%$);
- 2) Where isolation is necessary between input and output (isolation voltage $\leq 1000\text{VDC}$);
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

PRODUCT PROGRAM

Certification	Model	Input Voltage (VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(Typ.)		Efficiency(%) @Max. Load				
		Nominal	Range		Max.	Min.	@Max. Load	@No Load	Min.	Typ.			
--	IB0505LD-1W	5	4.75-5.25	5	200	20	299	30	63	67			
	IB0512LD-1W			12	83	9	278		68	72			
CE	IB0503LS-1W			3.3	303	3	333		56	60			
	IB0505LS-1W			5	200	20	299		63	67			
	IB0509LS-1W			9	111	12	286		66	70			
	IB0512LS-1W			12	83	9	282		67	71			
	IB0515LS-1W			15	67	7	274		69	73			
	IB0524LS-1W			24	42	5	294		64	68			
--	IB1205LD-1W			12	11.4-12.6	5	200		20	124	15	63	67
	IB1209LD-1W					9	111		12	116		68	72
	IB1212LD-1W					12	83		9	119		66	70
	IB1215LD-1W					15	67		7	113		70	74
CE	IB1205LS-1W					5	200		20	124		63	67
	IB1209LS-1W					9	111		12	116		68	72
	IB1212LS-1W	12	83			9	119	66	70				
	IB1215LS-1W	15	67			7	113	70	74				
	IB1224LS-1W	24	42			5	123	64	68				
	IB1505LS-1W	15	14.25-15.75			5	200	20	100	63		67	
IB1515LS-1W	15					67	7	93	68	72			
--	IB2405LD-1W	24	22.8-25.2			5	200	20	61	8		64	68
CE	IB2405LS-1W					5	200	20	61			64	68
	IB2409LS-1W					9	111	12	61			64	68

Certification	Model	Input Voltage (VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(Typ.)		Efficiency(%) @Max. Load	
		Nominal	Range		Max.	Min.	@Max. Load	@No Load	Min.	Typ.
CE	IB2412LS-1W	24	22.8-25.2	12	83	9	57	8	69	73
	IB2415LS-1W			15	67	7	56		71	75
	IB2424LS-1W			24	42	5	61		64	68

OUTPUT SPECIFICATIONS

Item	Test condition	Min.	Typ.	Max.	Unit
Line Regulation	For Vin change of $\pm 1\%$	--	--	± 0.25	%
Load regulation	10% to 100% load	--	± 1	± 2	
Output voltage accuracy	100% load	--	--	± 3	
Temperature drift	100% load	--	--	± 0.03	%/°C
Output ripple*	20MHz Bandwidth	--	10	20	mVp-p
Output Noise*	20MHz Bandwidth	--	50	75	

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at DC-DC Application Notes.

COMMON SPECIFICATION

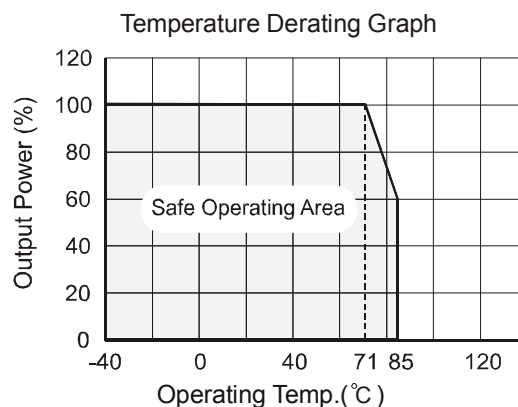
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage humidity range	Non condensing	--	--	95	%RH
Operating temperature		-40	--	85	°C
Storage temperature		-55	--	125	
Lead temperature	Ta=25°C	--	15	--	
Temp. rise at full load	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			
Case material		Black flame-retardant and heat-resistant plastic (UL94 V-0)			
Short circuit protection	*IBXX05LS/LD-1W、IBXX24LS-1W	--	--	1	S
	Others	Continuous			
Switching Frequency	100% load, nominal input	--	120	300	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours
Weight	IB_LS-1W	--	2.1	--	g
	IB_LD-1W	--	2.4	--	g

*Supply voltage must be discontinued at the end of short circuit duration.

ISOLATION SPECIFICATIONS

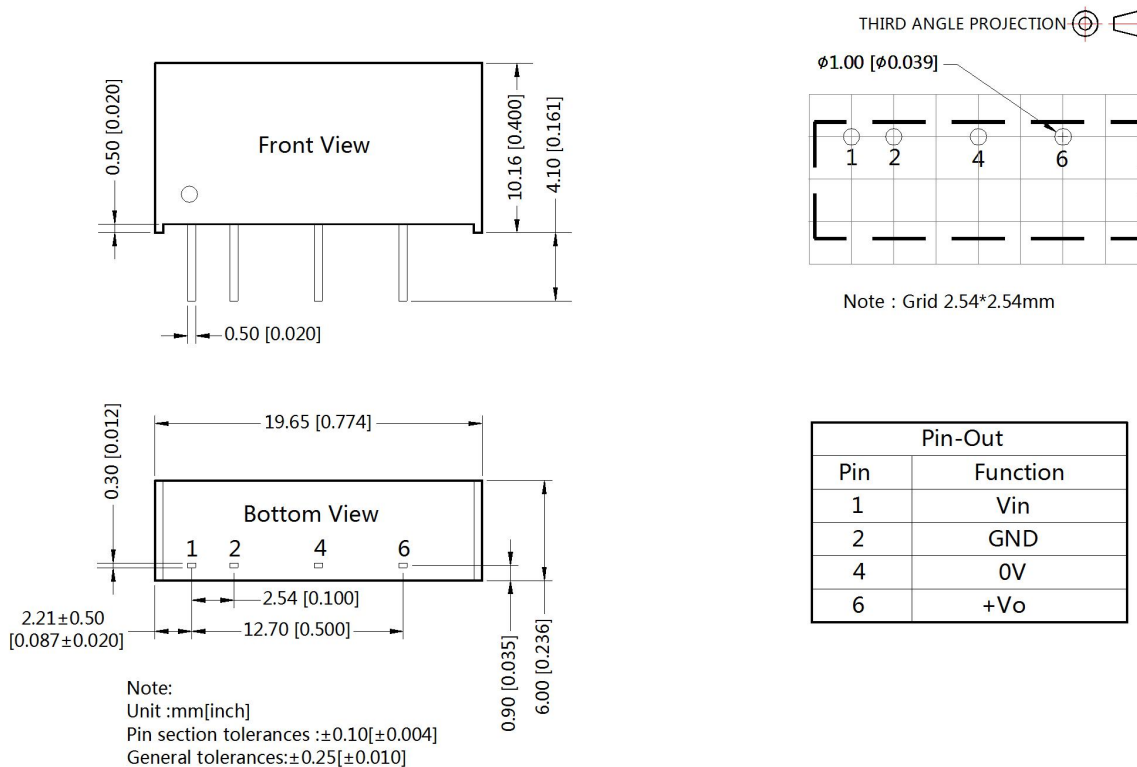
Item	Test condition	Min.	Typ.	Max.	Unit
Isolation voltage	Input-Output, tested for 1 minute and leakage current less than 1 mA	1000	--	--	VDC
Isolation resistance	Input-Output, test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output, 100KHz/0.1V	--	60	--	pF

TYPICAL CHARACTERISTICS

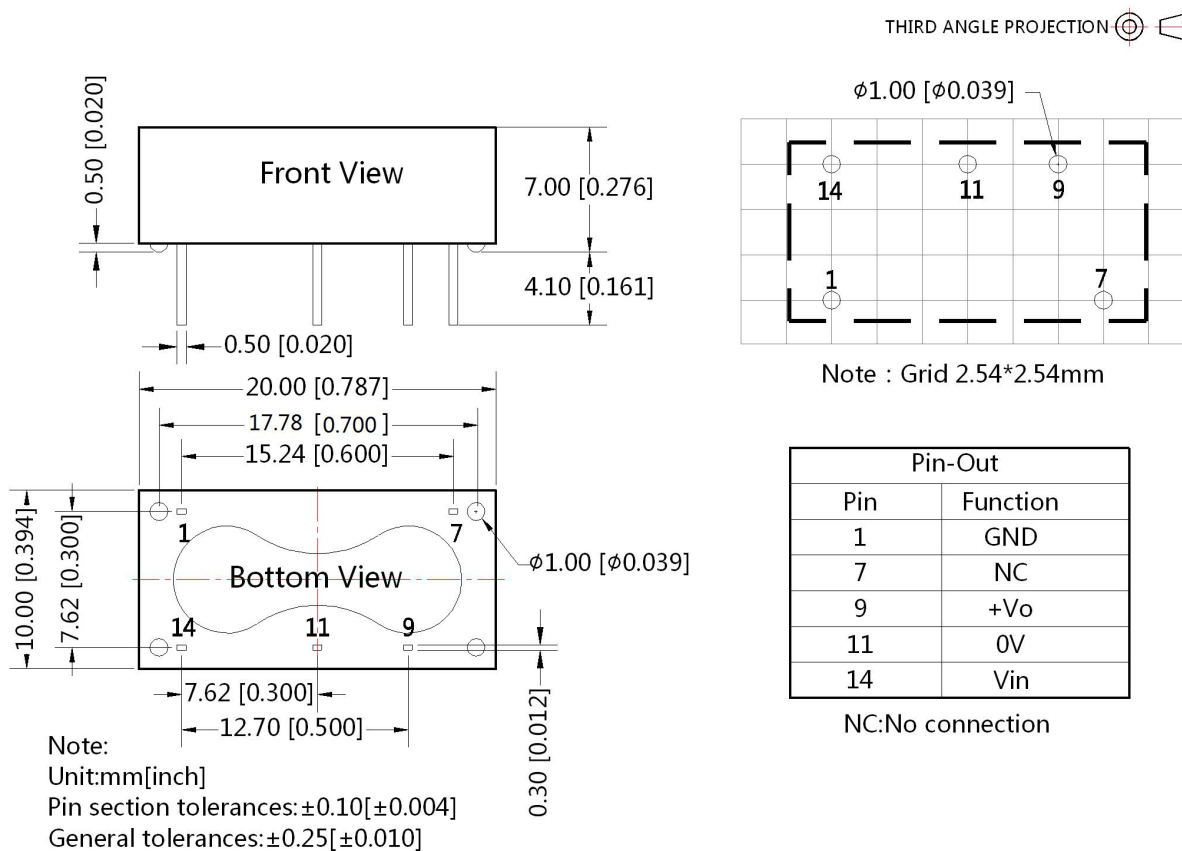


OUTLINE DIMENSIONS & PIN CONNECTIONS

IB_LS-1W



IB_LD-1W



APPLICATION NOTE

1) Requirement on output load

In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

2) Recommended circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).



(Figure 1)

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1).

EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (μF)	Vout (VDC)	Cout (μF)
5	4.7	3.3/5	10
12	4.7	9	4.7
15	2.2	12	2.2
24	1	15	1
--	--	24	0.47

It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.

3) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against over-current and short-circuits. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

4) Input Over-voltage Protection Circuit

The simplest device for input over-voltage protection is a linear voltage regulator with overheat protection that is connected to the input end in series (Figure 2).



(Figure 2)

5) When the environment temperature is higher than 71° C, the product output power should be less than 60% of the rated power.

6) It is not recommended to increase the output power capability by connecting two or more converters in parallel. The product is not hot-swappable.

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specifications.
2. Max. Capacitive Load is tested at nominal input voltage and full load.
3. Unless otherwise noted, All specifications are measured at Ta=25°C, humidity<75%RH, nominal input voltage and rated output load.
4. In this datasheet, all test methods are based on our corporate standards.
5. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more detail.
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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