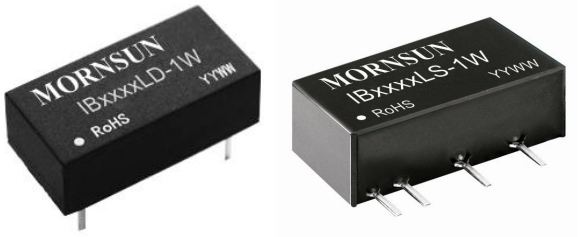
MORNSUN®

IB_LD-1W & IB_LS-1W Series

1W, FIXED INPUT, ISOLATED & REGULATED SINGLE OUTPUT DC-DC CONVERTER



Patent Protection RoHS

FEATURES

- Small Footprint
- SIP/DIP Package
- 1KVDC Isolation
- Temperature Range: -40°C to +85°C
- No Heat sink Required
- Internal SMD Construction
- No External Component Required
- Industry Standard Pinout
- RoHS Compliance

MODEL SELECTION

IB0515LS-1W

- Rated Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

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 ≤±5%);
2) Where isolation is necessary between input and output (isolation voltage ≤1000VDC);
3) Where the regulation of the output voltage and the output ripple noise are demanded.

PRODUCT PROGRAM

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
IB0515LD-1W			15	67	7	274		69	73
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
B1215LD-1W			15	67	7	113		70	74
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	15	63	67
IB1515LS-1W			15	67	7	93		68	72
IB1524LS-1W			24	42	5	98		64	68

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.
IB2405LD-1W	24	22.8-25.2	5	200	20	61	8	64	68
IB2409LD-1W			9	111	12	61		64	68
IB2412LD-1W			12	83	9	57		69	73
IB2415LD-1W			15	67	7	56		71	75
IB2424LD-1W			24	42	5	61		64	68
IB2405LS-1W			5	200	20	61		64	68
IB2409LS-1W			9	111	12	61		64	68
IB2412LS-1W			12	83	9	57		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 ±5%	--	--	±0.25	%
Load regulation	10% to 100% load	--	±1	±2	
Output voltage accuracy	100% load	--	--	±3	
Temperature drift	100% load	--	--	0.03	%/℃
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.					

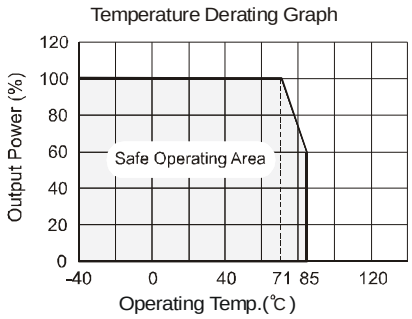
COMMON SPECIFICATION

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage humidity range	Non condensing	--	--	95	%
Operating temperature		-40	--	85	℃
Storage temperature		-55	--	125	
Lead temperature	Ta=25°C	--	15	25	
Temp. rise at full load	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			
Case material		Plastic(UL94-V0)			
Short circuit protection	*IBXX05(LS/LD)-1W IBXX24(LS/LD)-1W	--	--	1	S
	Others	Continuous			
Switching Frequency	100% load, nominal input	--	120	300	KHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
Weight	IB_LS-1W / IB_LS-W75	--	2.1	--	g
	IB_LD-1W / IB_LD-W75	--	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

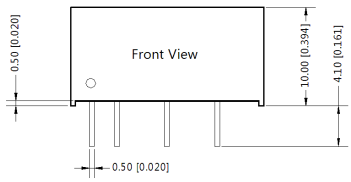
TYPICAL CHARACTERISTICS

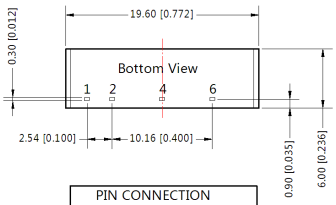


OUTLINE DIMENSIONS & PIN CONNECTIONS

IB_LS-1W / IB_LS-W75

MECHANICAL DIMENSIONS



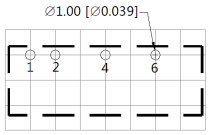


PIN CONNECTION	
Pin	Function
1	Vin
2	GND
4	0V
6	+Vo

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

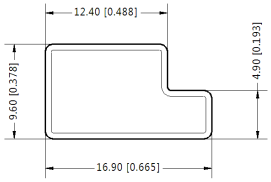
THIRD ANGLE PROJECTION

RECOMMENDED FOOTPRINT DETAILS



Note : Grid 2.54*2.54mm

TUBE PACKAGING DIMENSIONS



Note:
Unit :mm[inch]
General tolerances: ± 0.50[± 0.020]
L=220[8.661] Tube Quantity: 10pcs
L=530[20.866] Tube Quantity: 25pcs
Inner carton(S): L*W*H=255*170*80
Outer carton(S): L*W*H=375*280*270, 6 inner cartons(S)
Inner carton(L): L*W*H=580*200*100
Outer carton(L): L*W*H=600*215*220, 2 inner cartons(L)
Outer carton(L): L*W*H=600*215*325, 3 inner cartons(L)

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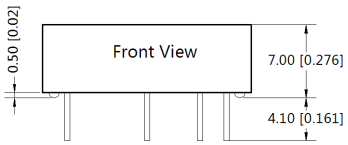
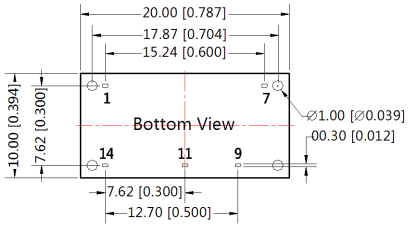
IB_LD-1W / IB_LD-W75

MECHANICAL DIMENSIONS





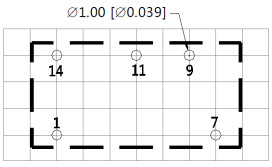
PIN CONNECTION	
Pin	Function
1	GND
7	NC
9	+Vo
11	0V
14	Vin

NC:No connection

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

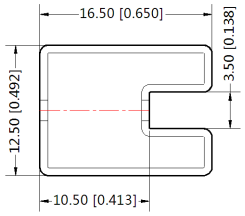
THIRD ANGLE PROJECTION

RECOMMENDED FOOTPRINT DETAILS



Note : Grid 2.54*2.54mm

TUBE PACKAGING DIMENSIONS



Note :
Unit:mm[inch]
General tolerances:±0.50[±0.020]
L=530[20.866] Tube Quantity:25pcs
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Inner carton(S): L*W*H=255*170*80
Outer carton(S): L*W*H=375*280*270, 6 inner cartons(S)
Inner carton(L): L*W*H=580*200*100
Outer carton(L): L*W*H=600*215*220, 2 inner cartons(L)
Outer carton(L): L*W*H=600*215*325, 3 inner cartons(L)

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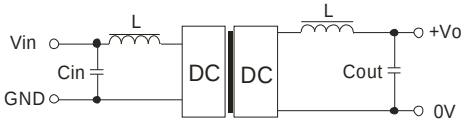
APPLICATION NOTE

1)Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load could not be less than 10% of the full load. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

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

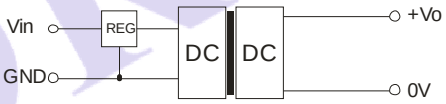
It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.

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 then 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%, 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. Please contact our technical support for any specific requirement.
7. Specifications of this product are subject to changes without prior notice.

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