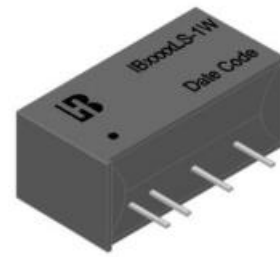


## Features

- 7pin SIP Package with Industry-Standard Footprint
- Input / Output Isolation Voltage: 1.5kVDC
- High Efficiency
- Lead Free Design, RoHS Compliant
- Operating temperature: -40°C to +85°C
- Meet Safety Standard / Approval: IEC / EN60950-1



## Applications

These converters are well suitable for battery operated equipment, measurement equipment, telecom, wireless network, Industry control system, everywhere where isolated, tightly regulated voltages and compact size are required.

**Technical Specification** All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

Model Number	Input Voltage Range(V)	Output Voltage (V)	Output Current (mA) <sup>(1)</sup>		Input Current (mA) Typ.		Eff. (%) <sup>(2)</sup> Typ.	Capacitive Load, max. <sup>(3)</sup> (uF)		
			Full Load	No Load	No Load	Full Load				
IB0303LS-1W	3.14-3.47 Nominal:3.3	3.3	300	35	455	66	68			
IB0305LS-1W		5	200					446	68	47
IB0503LS-1W	4.75-5.25 Nominal:5	3.3	300	25	291	68	68			
IB0505LS-1W		5	200					286	70	47
IB0509LS-1W		9	110					275	72	33
IB0512LS-1W		12	83					269	74	22
IB0515LS-1W		15	67					269	74	22
IB0515LS-1W		24	42					296	68	10
IB1203LS-1W	11.4-12.6 Nominal:12	3.3	300	15	121	68	68			
IB1205LS-1W		5	200					119	70	47
IB1209LS-1W		9	110					115	72	33
IB1212LS-1W		12	83					112	74	22
IB1215LS-1W		15	67					112	74	22
IB1215LS-1W		24	42					120	70	10
IB1503LS-1W	14.3-15.8 Nominal:15	3.3	300	12	97	68	68			
IB1505LS-1W		5	200					95	70	47
IB1509LS-1W		9	110					92	72	33
IB0512LS-1W		12	83					90	74	22
IB1515LS-1W		15	67					90	74	22
IB1515LS-1W		24	42					96	70	10
IB2403LS-1W	22.8-25.2 Nominal:24	3.3	300	7	59	70	68			
IB2405LS-1W		5	200					58	72	47
IB2409LS-1W		9	110					56	74	33
IB2412LS-1W		12	83					55	76	22
IB2415LS-1W		15	67					55	76	22
IB2415LS-1W		24	42					60	70	10
IB2615LS-1W	24.7-27.3 Nominal:26	26	200	7	55	70	47			

Input Specifications		
	3.3V nominal input	3.14-3.47V
	5V nominal input	4.75-5.25V
	12V nominal input	11.4-12.6V
	15V nominal input	14.3-15.8V
	24V nominal input	22.8-25.2V
	26V nominal input	24.7-27.3V

Input filter Capacitor

### Environmental Specifications

Operating ambient temperature	-40°C to +85°C
Maximum case temperature	+105°C
Storage temperature range	-55°C to +125°C
Relative humidity	95%RH Max.

### Output Specifications

Output power		1Watts Max.
Voltage accuracy	Nominal Vin and full load	
	3.3Vdc	3.135-3.399V
	5Vdc	4.75-5.15V
	9Vdc	8.73-9.18V
	12Vdc	11.64-12.24V
	15Vdc	14.55-15.30V
	24Vdc	23.52-24.36V
Voltage balance	Output	±1% max.
Minimum load		0A
Line regulation	For Vin change of -5% +5%	±0.25% Max.
Load Regulation	10%~100% load	±1% Max.
Ripple and Noise (20MHz Bandwidth)		60mVp-p Max.
Maximum capacitive load		See table
Output short circuit protection	Automatic recovery	Continuous
Temperature coefficient		±0.03%/°C Typ.

### General Specifications

Efficiency	Nominal input and full load	See table
Isolation voltage	Input to output	1500VDC (60 second)
Isolation resistance	500VDC	1000MΩ Min.
Isolation capacitance		30pF Typ.
Switching frequency		300kHz Max.
Reliability, calculated MTBF		2×10 <sup>6</sup> Hrs

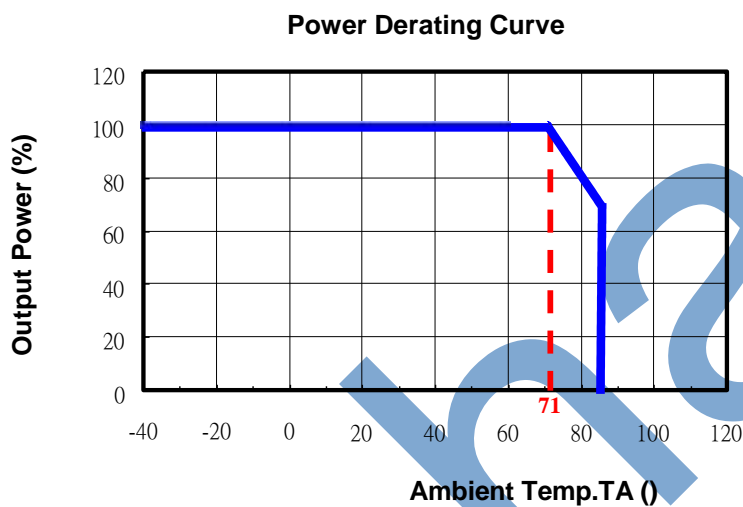
### Physical Specifications

Case material		Plastic (UL94 V-0)
Potting material		PU (UL94 V-0)
Dimensions		19.6×10.1×6.0 mm
Weight		2g Typ.

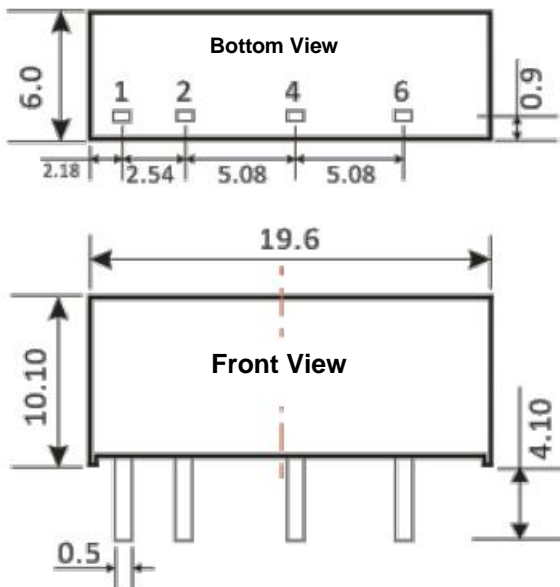
### Note

1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. For each output.
4. Specifications subject to change without notice.
5. This series of products do not support CC mode, CR mode is recommended.
6. In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22uF) near to the converter's input pins.

### Power Derating Curve



### Mechanical Dimensions

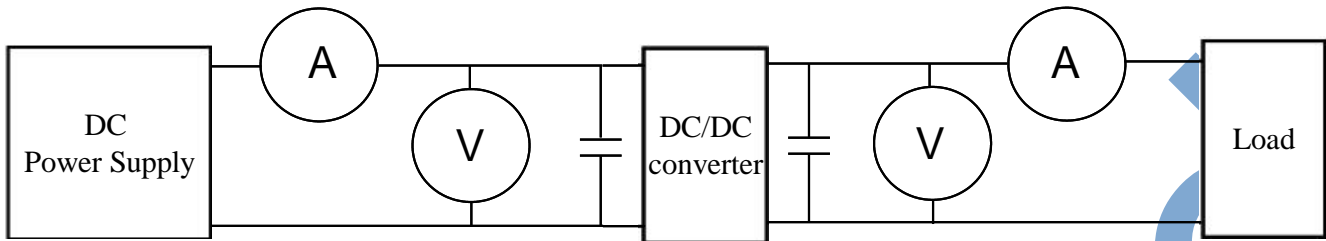


Pin Assignment	
Pin	Single
1	+Vin
2	-Vin
4	-Vout
6	+Vout

Unit: mm (inch)  
 Pin section tolerances:  $\pm 0.1 (\pm 0.004)$   
 General tolerances:  $\pm 0.5 (\pm 0.02)$

## Test Configurations

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.



◎DC Power Supply: It offers a wide voltage and current range precisely.

◎Current meter (A): Accuracy → 200μA ~ 200mA 4 ranges  $\pm(0.2\% \text{ rdg} + 2 \text{ digits})$   
 2000mA ~ 20A 2 ranges  $\pm(0.3\% \text{ rdg} + 2 \text{ digits})$ .

◎Voltage meter (V): Accuracy →  $\pm(0.03\% \text{ rdg} + 4 \text{ digits})$ .

◎Load: At full load.

◎Wires: The resistance of the wires must be small.

1. **Input voltage range:** Narrow input voltage range ( $\pm 10\%$ )、wide input voltage range (2:1 and 4:1)。

EX: Narrow input voltage range ( $\pm 10\%$ )

5V nominal input → 4.5~5.5V  
 12V nominal input → 10.10~13.2V  
 24V nominal input → 21.6~26.4V  
 26V nominal input → 23.4~28.4V

Wide input voltage range 2:1

5V nominal input → 4.5~9V  
 12V nominal input → 9~18V  
 24V nominal input → 18~36V  
 48V nominal input → 36~75V

Wide input voltage range 4:1 (W)

24V nominal input → 9~36V  
 48V nominal input → 18~75V

2. **Input power :**

$$P_{in} = V_{in} \times I_{in}$$

$V_{in}$  : Input voltage  
 $I_{in}$  : Input current

3. **Output power :**

$$P_{out} = V_{out} \times I_{out}$$

$V_{out}$  : Output voltage  
 $I_{out}$  : Output current

4. **Efficiency :**

$$\text{Efficiency} = \frac{P_{out}}{P_{in}} \times 100\%$$

$P_{out}$ : Output power  
 $P_{in}$ : Input power

5. **Voltage accuracy:**

$$\frac{|V_{out} - V_{out(nominal)}|}{V_{out}} \times 100\%$$

$V_{out}$ : Output voltage  
 $V_{out(nominal)}$ : Nominal output voltage

## 6. Line regulation:

Narrow input voltage range ( $\pm 10\%$ ) and unregulated output voltage series.

$$\text{Line regulation} = \frac{\Delta V_{out}}{\Delta V_{in}}$$

$$\Delta V_{out} = \frac{V_{out(+10\%)} - V_{out(-10\%)}}{V_{out}} \times 100\%$$

$V_{out(+10\%)}$ : Output voltage at  $V_{in} = 1.1 \times V_{in}(\text{nominal})$  & full load

$V_{out(-10\%)}$ : Output voltage at  $V_{in} = 0.9 \times V_{in}(\text{nominal})$  & full load

$V_{out}$ : Output voltage at  $V_{in} = V_{in}(\text{nominal})$  & full load

$$\Delta V_{in} = \frac{V_{in(+10\%)} - V_{in(-10\%)}}{V_{in}(\text{nominal})} \times 100\%$$

$V_{in(+10\%)}$ : Input voltage =  $1.1 \times V_{in}(\text{nominal})$

$V_{in(-10\%)}$ : Input voltage =  $0.9 \times V_{in}(\text{nominal})$

$V_{in}(\text{nominal})$ : Nominal Input voltage

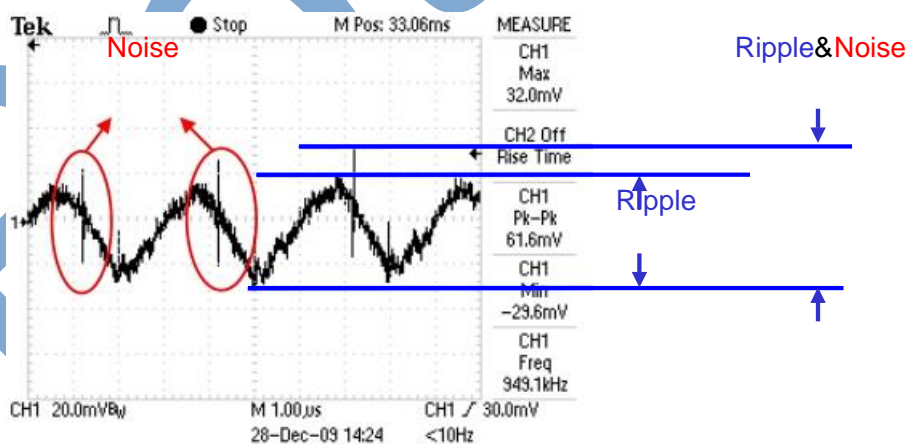
## 7. Load regulation :

$$\frac{|V_{out(FL)} - V_{out(NL)}|}{V_{out(FL)}} \times 100\%$$

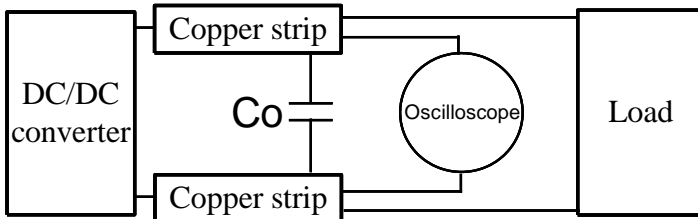
$V_{out(FL)}$ : Output voltage at full load

$V_{out(NL)}$ : Output voltage at 25% full load or 10% full load

## 8. Ripple and Noise: as shown below. The bandwidth is 0-20MHz.

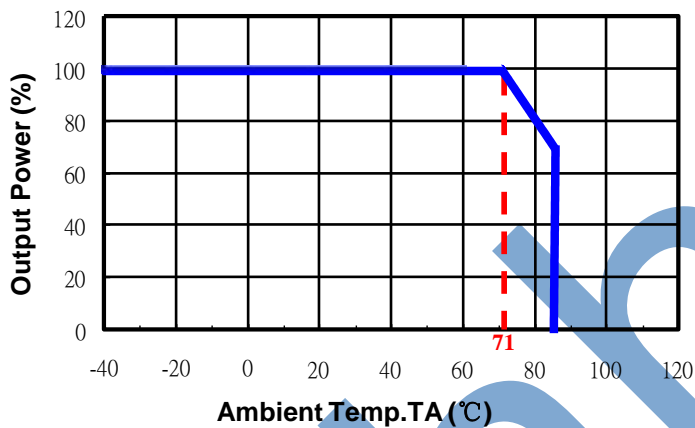


Output Ripple&Noise measurement test circuit: as shown below.



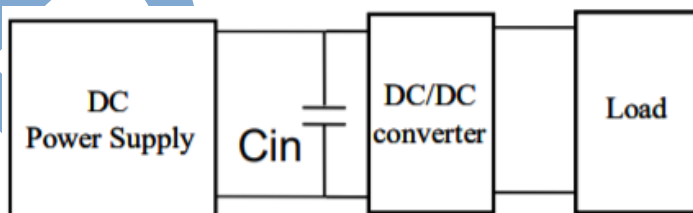
Co: usually 0.47uF.

9. **Temperature derating curve:** The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



10. **Switching frequency:** The nominal operating frequency of the DC-DC converters.
11. **Input to output isolation:** The dielectric breakdown strength test between input and output circuits. This is the isolation voltage the device is capable of withstanding for a specified time, usually 1 second or 1 minute.
12. **Input source impedance:** The power module should be connected to low ac-impedance input source.

Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. Capacitor mounted close to the power module helps ensure stability of the unit, it is commended to use a good quality low Equivalent Series Resistance ( ESR <math>< 0.1 \Omega</math> at 100KHz ) capacitor of a 22uF for the power module.



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