

Features

- Ultra-wide 85 - 305V AC or 100 - 430V DC input voltage range
- Accepts AC and/or DC input (dual-use of same terminal)
- Operating Temperature Range: -40~+70°C
- Approved to cURus, CE, RoHS
- Safety Standards to IEC/EN/UL60950
- Efficiency up to 85%
- EMC Class A & B
- Single output 3.3~24V DC



Ideal Power's 36LH15-13Bxx-A2S 15W Chassis Mount AC/DC Power Supply Converter Series are certified to cRUus, CE, RoHS & IEC/EN/UL60950 Standards and comply with the relevant Efficiency Regulations. These are primarily used in ITE, Audio & Video Industries and customised solutions are available upon request.

Models

Model Number	Output Power	Output Voltage and Current (Vo/Io) Nominal	Efficiency at 230V AC (%) Typ	Capacitive Load (µF) Max
36LH15-13B03-A2S	9.9W	3.3V/3000mA	74	36000
36LH15-13B05-A2S	14W	5V/2800mA	78	20000
36LH15-13B09-A2S	15W	9V/1600mA	79	6000
36LH15-13B12-A2S	15W	12V/1250mA	82	3000
36LH15-13B15-A2S	15W	15V/1000mA	82	3000
36LH15-13B24-A2S	15W	24V/625mA	84	900
36LH15-13B48-A2S	15W	48V/320mA	85	370

Input Specifications


	Conditions	Min	Typ	Max	Unit
Input voltage range	AC input	85		305	VAC
	DC input	100		430	VDC
Input frequency		47		63	Hz
Input current	115V AC			0.37	A
	230V AC			0.22	
Inrush current	115V AC		10		A
	230V AC		20		
Leakage current		0.3mA RMS typ./230VAC/50Hz			
Recommended External Input Fuse (Special package series include fuse)		2A/300V, Slow fusing			
Hot Plug		Unavailable			

Output Specifications

Parameter	Conditions	Min	Typ	Max	Unit
Output voltage accuracy			±2		%
Line regulation	Full load		±0.5		%
Load regulation	0% - 100% load		±1		%
Ripple and Noise*	20MHz bandwidth (peak to peak value)		50	100	mV
Temperature coefficient			±0.2		%/°C
Short circuit protection		Hiccup, continuous, self-recovery			
Over current protection		≥ 110%Io, self-recovery			
Over voltage protection	3.3/5V DC output	≤7.5V DC			
	9V DC output	≤12V DC			
	12/15V DC output	≤20V DC			
	24V DC output	≤30V DC			
Minimum load		0			%
Hold up time	115V AC		15		ms
	230V AC		80		

Note: * Ripple and noise tested with “parallel cable” method, please see AC-DC Converter Application Notes for specific operation methods.

General Specifications

Parameter	Conditions	Min	Typ	Max	Unit
Isolation test	Test for 1min Input-Output Input - 	3000			V AC
		2000			
Operating Temperature		-40		+70	°C
Storage Temperature		-40		+105	°C
Storage Humidity				95	%RH
Soldering Temperature	Wave-soldering	260 ± 5°C; time: 5 - 10s			
	Manual-welding	360 ± 10°C; time: 3 - 5s			
Switching Frequency			65		kHz
Power Derating	-40°C to -10°C	2			°C
	55°C to +70°C	4			
Safety Standard		IEC/EN/UL60950			
Safety Certification		IEC/EN/UL60950			
Safety Class		Class II			
MTBF		MIL-HDBK-217F@25°C ≥ 300,000 h			

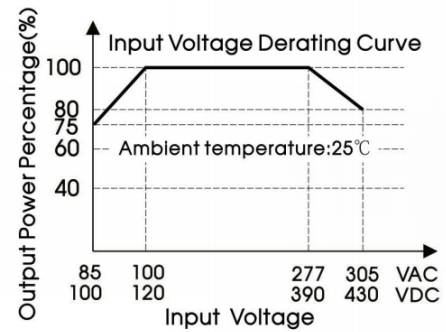
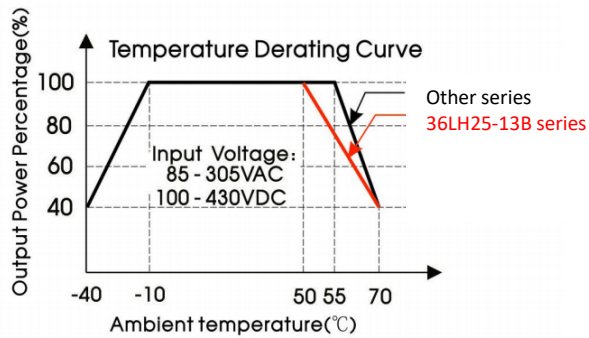
Mechanical Specifications

Case material	Black plastic, flame-retardant and heat-resistant (UL94 V-0)
Dimension	96.1 x 54 x 31mm
Weight	135g (Typ.)
Cooling method	Free air convection

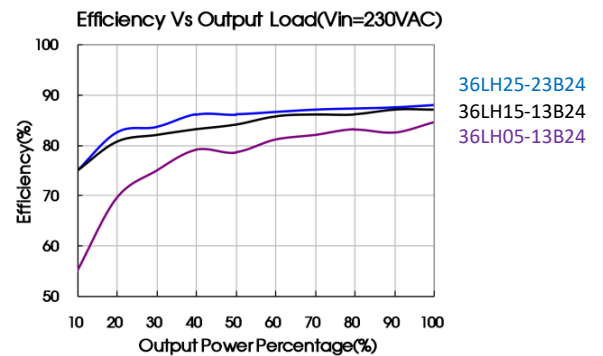
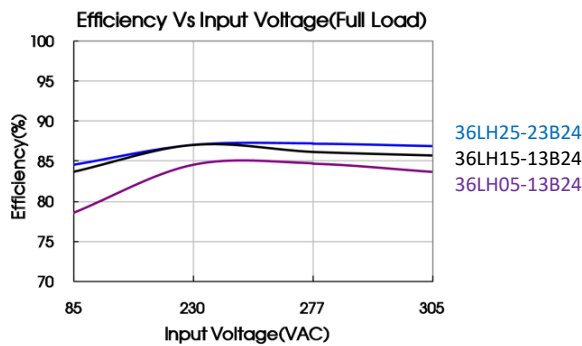
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
Immunity	ESD	IEC/EN 61000-4-2 Contact $\pm 6\text{KV}$ /Air $\pm 8\text{K}$	Perf. Criteria B
	RS	IEC/EN 61000-4-3 10V/m	Perf. Criteria A
	EFT	IEC/EN 61000-4-4 $\pm 2\text{KV}$	Perf. Criteria B
		IEC/EN 61000-4-4 $\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	Perf. Criteria B
	Surge	IEC/EN 61000-4-5 line to line $\pm 1\text{kV}$ / line to ground $\pm 2\text{KV}$	Perf. Criteria B
		IEC/EN 61000-4-5 line to line $\pm 2\text{KV}$ / line to ground $\pm 4\text{KV}$ (See Fig. 2 for recommended circuit)	Perf. Criteria B
	CS	IEC/EN61000-4-6 10Vr.m.s	Perf. Criteria A
	PFM	IEC/EN61000-4-8 10A/m	Perf. Criteria A
Voltage dips, short interruptions and voltage variations immunity		IEC/EN61000-4-11 0%, 70%	Perf. Criteria B

Characteristic Curve

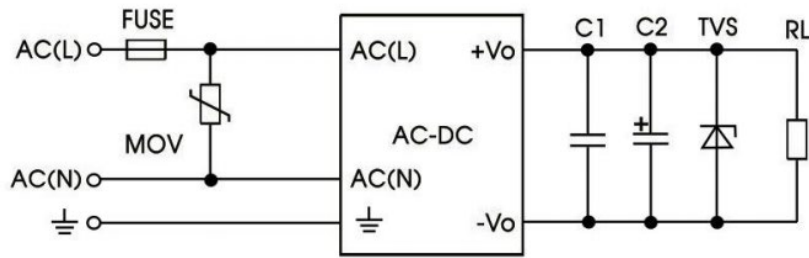


Note: ① Input voltage should be derated based on temperature derating when it is 85-100VAC/277~305VAC/100-120VDC/390~430VDC;
 ② This product is suitable for use in natural air cooling environments.



Design Reference (Figure 1)

1. Typical application circuit

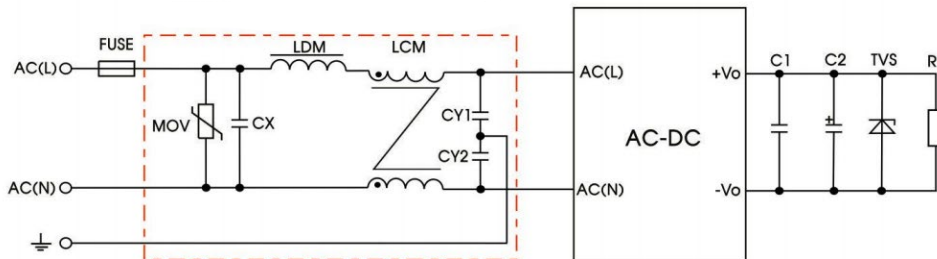


Element Model	MOV1	C1 μF	C2 μF	Fuse	TVS
36LH15-13B03-A2S	S14K350	1	680	1A/250V, slow blow required	SMBJ7.0A
36LH15-13B05-A2S	S14K350	1	680		SMBJ7.0A
36LH15-13B09-A2S	S14K350	1	470		SMBJ12A
36LH15-13B12-A2S	S14K350	1	220		SMBJ20A
36LH15-13B15-A2S	S14K350	1	220		SMBJ20A
36LH15-13B24-A2S	S14K350	1	68		SMBJ30A
36LH15-13B48-A2S	S14K350	1	33		SMBJ64A

Note: Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitor voltage reduced to at least 80%. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

Design Reference (Figure 2)

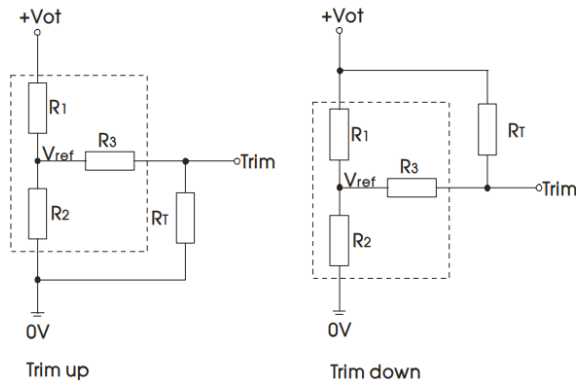
2. EMC solution-recommended circuit



Element Model	Component Values
MOV1	S14K350
CY1, CY2	1000pF/400VAC
CX	0.1 μF /310VAC
LCM	10mH, we recommend using part no. FL2D-Z5-103 (MORNSUN)
LDM	4.7 μH /2A
FC-LX1D	EMC filter
FUSE	2A/300V slow fusing, necessary

Design Reference (Figure 3)

3. Application of trim and calculation of trim resistance.



Applied circuits of Trim (Part in broken line is the interior of models)

Calculation formula of Trim resistance:

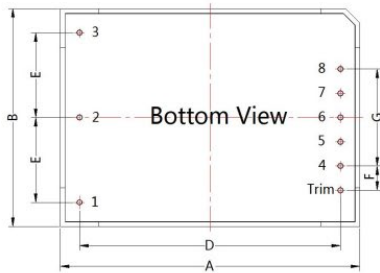
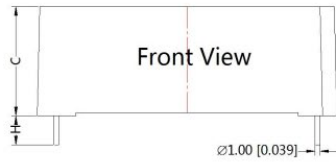
$$\begin{aligned} \text{up: } R_T &= \frac{\alpha R_2}{R_2 - \alpha} - R_3 & \alpha &= \frac{V_{ref}}{V_{ot} - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{\alpha R_1}{R_1 - \alpha} - R_3 & \alpha &= \frac{V_{ot} - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

R_T is Trim resistance
 α is a self-defined parameter, with no real meaning.

Vout	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)	Vot(V)
3.3V	3.3	1.98	1	1.24	Output voltage after regulation, Variation ≤ ±10%
5V	3.3	3.3	1	2.5	
9V	7.5	2.87	1	2.5	
12V	3.83	1	1	2.5	
15V	7.5	1.5	1	2.5	
24V	8.66	1	1	2.5	
48V	68	3.73	1	2.5	

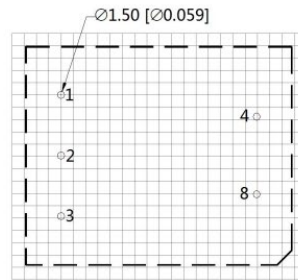
AC – DC

Dimensions and Recommended Layout

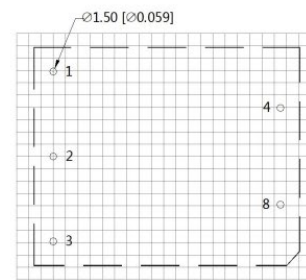


Note:
 Unit:mm[inch]
 Pin diameter tolerances:±0.10[±0.004]
 Pin length(H)≥6.00[0.236]
 General tolerances:±0.50[±0.020]

LH05 series

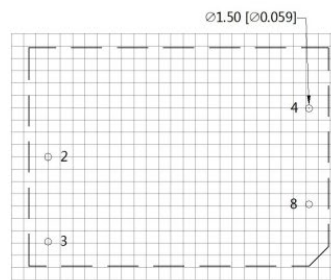


LH10 series

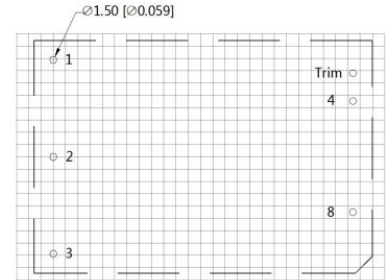


THIRD ANGLE PROJECTION

LH15 series



LH20/25 series



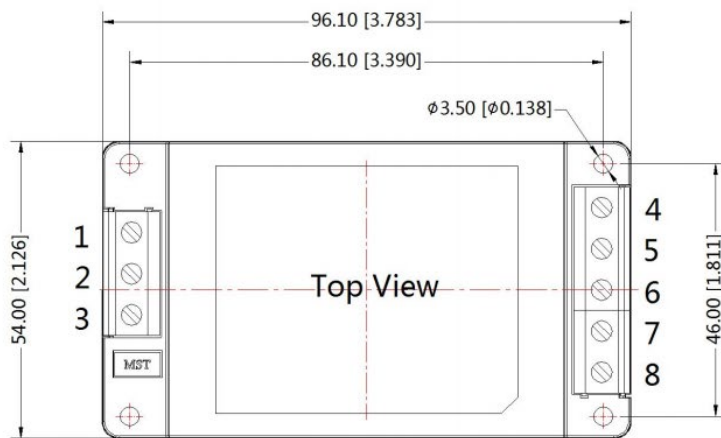
Note: Grid 2.54*2.54mm

Pin Connection

2	AC(N)
3	AC(L)
4	-Vo
5	NO PIN
6	NO PIN
7	NO PIN
8	+Vo
Trim	Trim**

There is no pin "1" on LH15-13Bxx
 Trim**: only for LH20/25-13Bxx Series

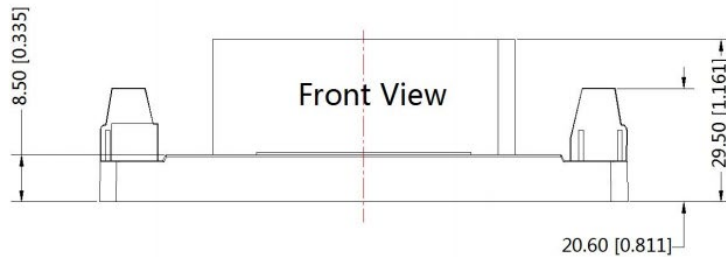
A2S Dimensions



THIRD ANGLE PROJECTION 

Pin-Out	
Pin	LHxx-13BxxA2
1	⏏
2	AC(N)
3	AC(L)
4	-Vo
5	NC
6	NC/Trim**
7	NC
8	+Vo

There is no pin "1" on the LH15-13BxxA2 series.
 NC/Trim** : The pin is Trim on the LH20/25-13BxxA2 series and is not connected on other single output products.



*The figure left is related to the LH10-13BxxA2 series. the height of other series is different.

Note:
 Unit:mm[inch]
 Wire range : 24-12 AWG
 Tightening torque: Max 0.4 N·m
 General tolerances:±1.00[±0.039]

Notes:

- For additional information on Product Packaging please refer to www.idealpower.co.uk. Packaging bag number: 58220003(DIP package); 58220022 (A2S/A4S package);
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity <75% with nominal input voltage.
- All index testing methods in this datasheet are based on our company corporate standards.
- We can provide product customization service, please contact our technicians directly for specific information.
- Products are related to laws and regulations: see "Features" and "EMC".
- Our products shall be classified according to ISO14001 and related environmental laws and regulations and shall be handled by qualified units.