

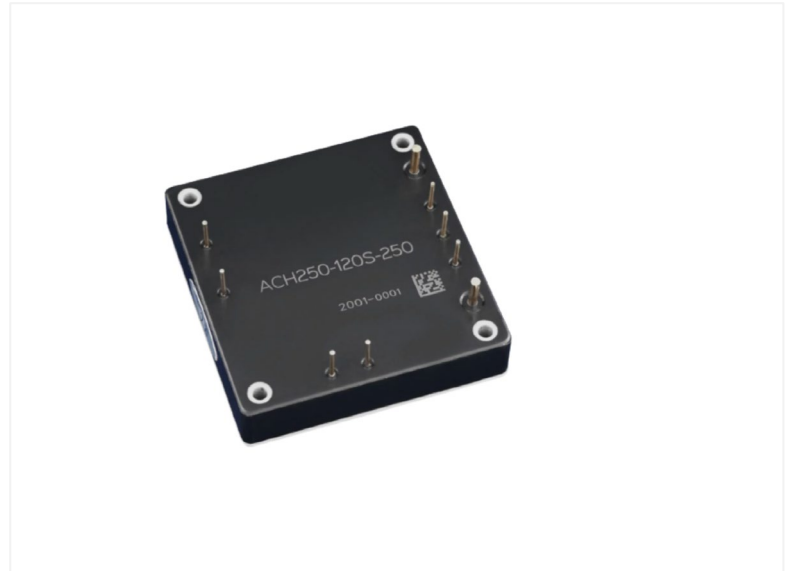
Features

- Input Range 90~264V AC
- Half Brick
- Operating Temperature Range: -40~100°C
- Approved to UKCA, CE, RoHS & REACH
- Safety Standards to IEC/EN 62368-1, EN 50155 & EN 60601-1
- Efficiency up to 91%
- Single output 12~48V DC



28ACH250xS-z-IP Series

350W Half Brick AC/DC Converters



Ideal Power's 28ACH250xS-z-IP 350W Half Brick AC/DC Converters Series are certified to UKCA, CE, RoHS, REACH & IEC/EN 62368-1/EN 50155/EN 60601-1 Standards and comply with Efficiency Regulations. These are primarily used in ITE, Audio & Video, Railway, Medical Industries, and customised solutions are available upon

Model Number Structure

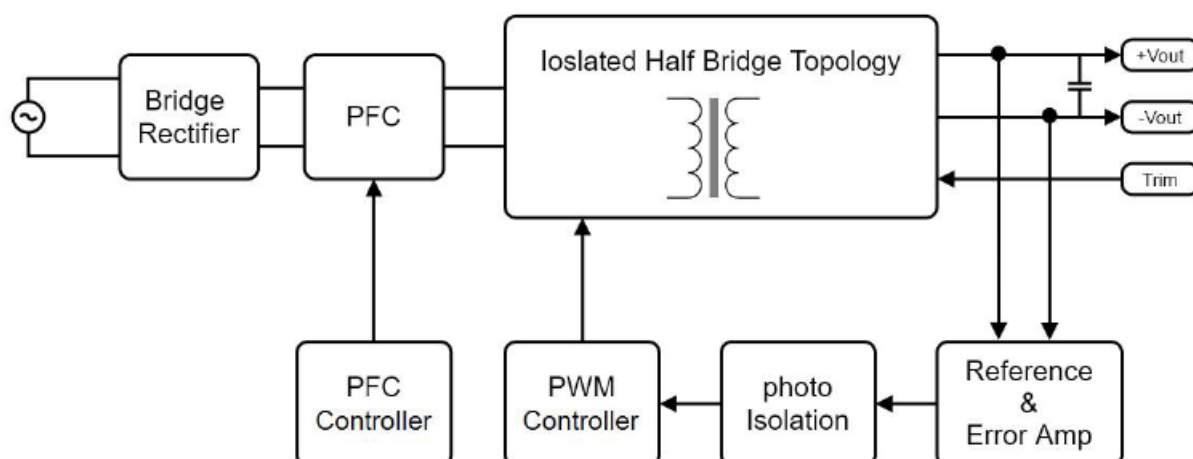
28AC	-	H	250	-	120	-	S	-	350	28AC
Series Name		Package	Watt		Output voltage (VDC)		Output Quantity		Actual Watt	
AC Series		Half brick	250		120 : 12 190 : 19 240 : 24 280 : 28 360 : 36 480 : 48		S : Single		Actual Watt	

Models

Model	Input		Current (A) Full load	Voltage (V)	Output		Efficiency Typ.(%)
	Range	Nominal			Current (A)	Power (W)	
28ACH250-120S-250	90-264	230	1.21	12	20.80	250	90
28ACH250-190S-250	90-264	230	1.19	19	13.16	250	91
28ACH250-240S-250	90-264	230	1.19	24	10.4	250	91
28ACH250-280S-250	90-264	230	1.19	28	8.93	250	91
28ACH250-360S-250	90-264	230	1.21	36	6.94	250	90
28ACH250-480S-250	90-264	230	1.21	48	5.20	250	90
28ACH250-120S-350	90-264	230	1.69	12	29.17	350	90
28ACH250-240S-350	90-264	230	1.67	24	14.58	350	91
28ACH250-280S-350	90-264	230	1.67	28	12.5	350	91
28ACH250-360S-350	90-264	230	1.69	36	9.72	350	90
28ACH250-480S-350	90-264	230	1.69	48	7.29	350	90

Description

Ideal Power's AC series - Half Brick 250 converter is a 250W / 350W isolated, regulated ac/dc converter with active PFC in half brick package and long hold-up time setting by external capacitors. It features a high efficiency up to 91%, wide working case temperature range -40~+100°C, no minimum load required, 3kVac reinforced insulation, OVP, OCP, SCP, OTP



Input Data

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Leakage current	At 240VAC 60Hz 100% Load	--	--	0.75	mA
Power factor	At 115VAC 100% Load At 230VAC 100% Load	--	1 0.99	--	--
Inrush Current	Cold start at 230VAC, 25C	Limited by external components (Thermistor)			
Input Current	At 115VAC 100% Load At 230VAC 100% Load	--	2.6 1.3	--	A
Operating Frequency Range	N/A	47	50/60	63	Hz
Operating Voltage Range	N/A	90	230	264	VAC

Output Data

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	100% Load	--	--	±1.5	%
Line Regulation	High line to low line	--	--	±0.5	%
Load Regulation	0% to 100% Load	--	--	±1	%
Ripple & Noise Voltage	Bandwidth 20MHz and with 10µF MLCC Output Capacitor	--	--	2	%Vpk-pk
Voltage Adjustment Range	Adjustable by external resistor	--	--	+5	%
Minimum Load	--	0	--	--	A
Over Voltage Protection	--	120	--	140	%
Over Current Protection	Hiccup Mode	120	--	140	%
Short Circuit Protection	Hiccup Mode	Auto Recovery			
Hold Up Time	At full load & 115 VAC	Setting by external capacitors between			

General Specifications & Environmental Data

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	PFC/LLC	--	100/130	--	kHz
Storage Temperature Range	All models	-55	--	125	C
Over Temperature Protection	Auto Recovery	--	110	--	C
Operating Temperature	On aluminium base plate	-40	--	100	C
Humidity (non-condensing)	All Models	--	--	95	%
Isolation Voltage	Input to output	--	3000	--	VAC
	Input to base	--	1500	--	VAC
	Output to base	--	500	--	VAC
Dimensions	2.36" x 2.30" x 0.50" (60.0 x 58.4 x 12.7mm)				
Weight			120 (4.23)		G (oz)
Calculated MTBF	BellCore-TR-332@ 50C G.B		1.1		M HR
Case Material	Aluminium base with plastic case				

It is recommended to protect the input by fuses or other protection devices.

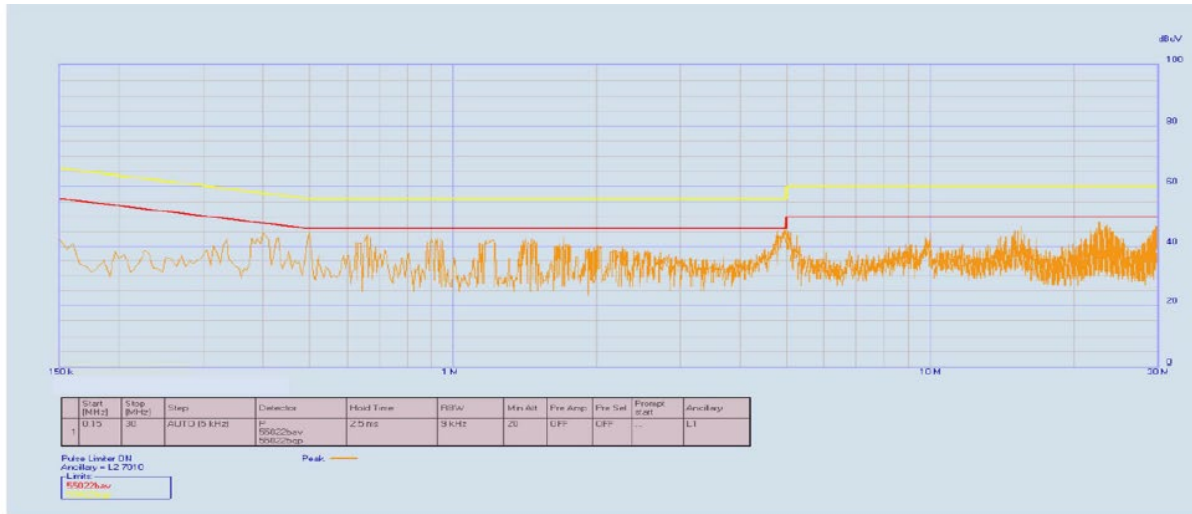
Modules could meet EN55022 Class A and Class B standard with external components.

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Note:
Pin Material: Copper Alloy
Pin Plating: Gold
Dimensions in inches [mm]
Tolerances: .XX±0.25 [.X±0.5mm]

Conducted EMI

Input terminal value (typ.) 28ACH250-120S-250 @Vin = 230VDC, Iout = 20.83A



The fundamental switching frequency of the module is 100 kHz.

Characteristic Curves

Testing conditions are at typical input, Ta=+25°C, full load (horizontal mount) Unless otherwise indicated

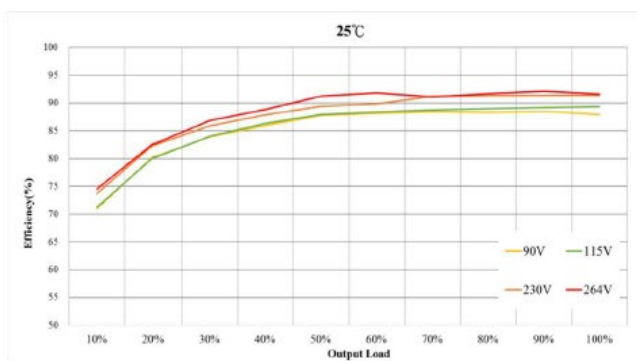


Figure 1 : Efficiency at Minimum, Nominal and Maximum Input Voltages VS. Output Load.

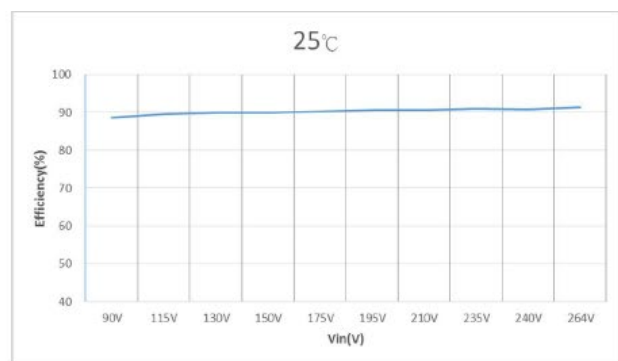


Figure 2 : Efficiency VS. Input Voltages at 100% rated power

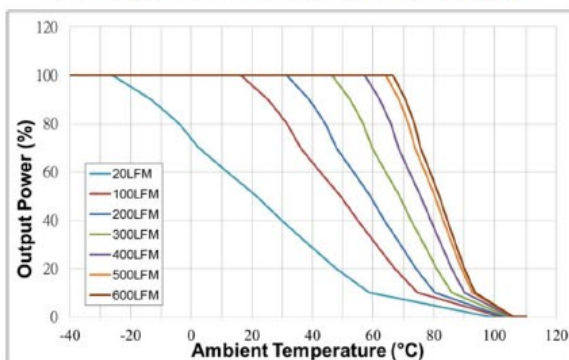


Figure 3 : Ambient Temperature VS. Output Power Derating Curves (Note: 20LFM=Free Air)

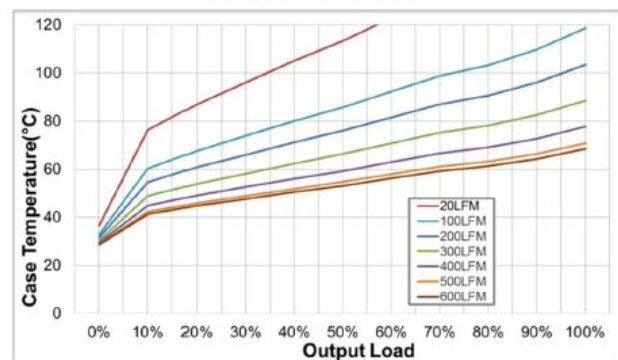


Figure 4 : Case Temperature VS. Output rated Power (Note: 20LFM=Free Air)

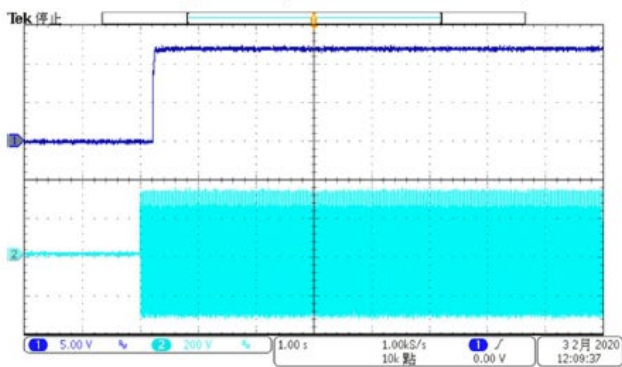


Figure 5 : CH1 = Vout, CH3 = Nominal Input
Typical Start-up waveform at Full load.

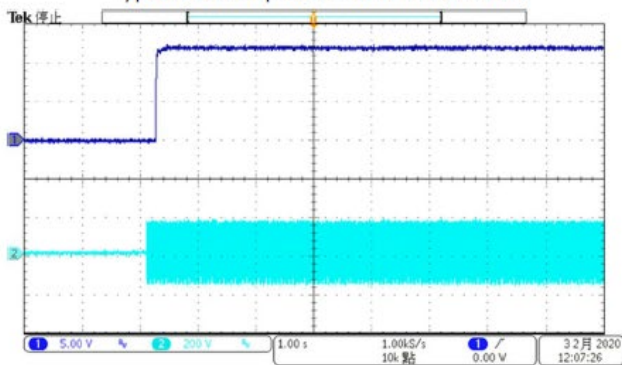


Figure 7 : CH1 = Vout, CH3 = 115V Input
Typical Start-up waveform at Full load.

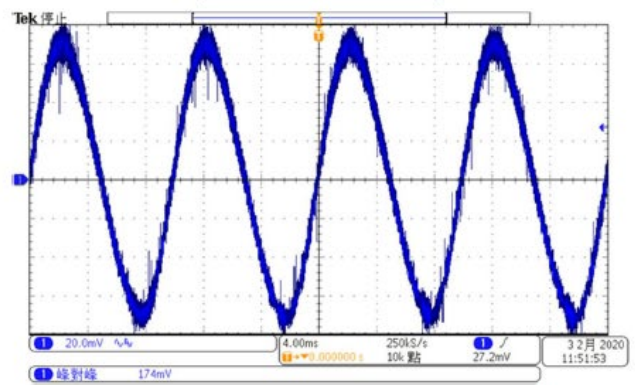


Figure 6 : Output Voltage Ripple & Noise at full load.
(Vin: Typical, With Output Capacitor to add 1uF MLCC)

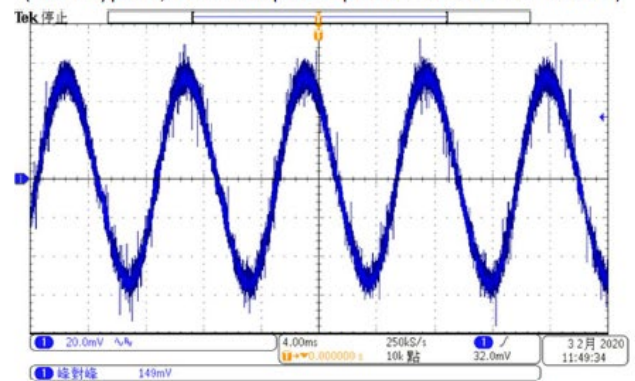


Figure 8 : Output Voltage Ripple & Noise at full load.
(Vin: 115V, With Output Capacitor to add 1uF MLCC)

Trimming Output Voltage – Single Models

Only the single output converters have a trim function. That allows users to adjust the output voltage from +5% to -5%, please refer to the trim table that follow for details. Adjustments to the output voltage can be used with a simple fixed resistor as shown in Figures 1 and 2. A single fixed resistor can increase or decrease the output voltage depending on its connection.

Note:

※ Trim adjustments higher than the specified range can have an adverse effect on the converter's performance and are not recommended.

※ If the trim function is not used, leave the trim pin open.

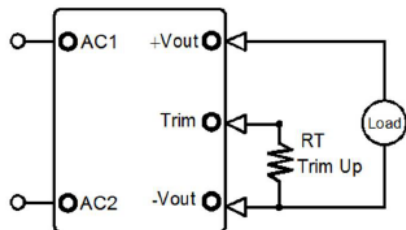


Figure 1. Trim Connections To increase Output Voltages Using Fixed Resistors

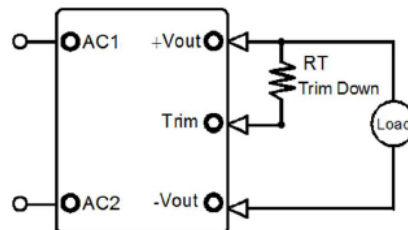


Figure 2. Trim Connections To Decrease Output Voltages Using Fixed Resistors

Output Ripple Noise

The two copper strips simulate real-world PCB impedances between the converter and its load. Scope measurements should be made using

BNC connectors or the probe ground should be less than 1/2 inch and soldered directly to the fixture.

All external capacitors should have appropriate voltage ratings and be located as close to the converter as possible.

Temperature variations for all relevant parameters should be taken into consideration. The most effective combination of external I/O

capacitors will be a function of line voltage and source impedance, as well as particular load and layout conditions. See Figure 3.

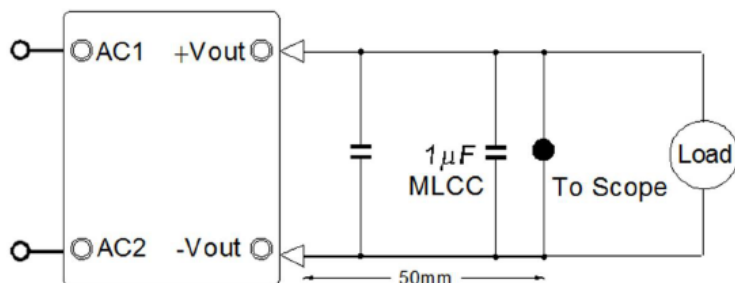
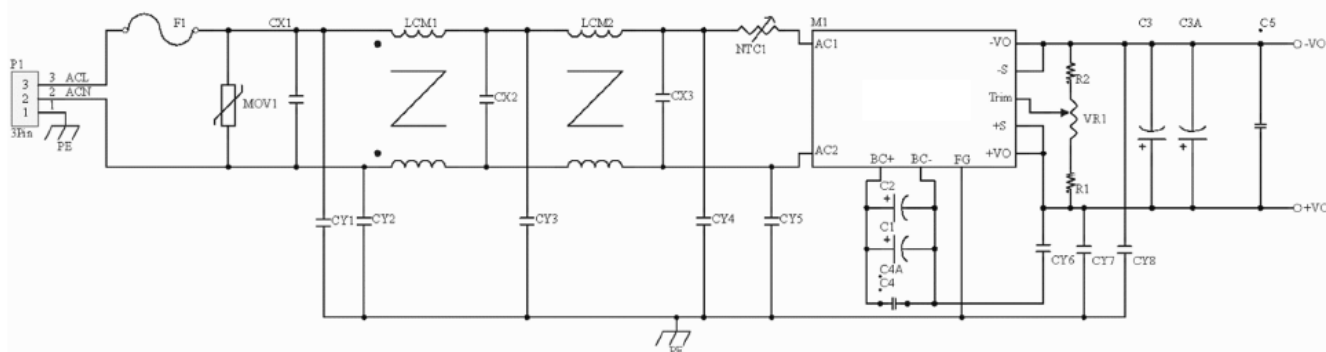


Figure 3. Measuring Output Ripple/Noise (20MHz bandwidth)

Trim up resistor value(KΩ)					
Vout	1%	2%	3%	4%	5%
12	198.23	73.56	32.01	11.23	0.00
19	1921.13	745.57	353.71	157.78	0.00
24	228.91	83.45	34.97	10.73	0.00
28	693.51	246.76	97.84	23.38	0.00
36	545.73	197.87	81.91	23.93	0.00
48	1407.66	537.83	247.89	102.91	0.00

Trim down resistor value(KΩ)					
Vout	-1%	-2%	-3%	-4%	-5%
12	887.57	412.24	253.79	174.57	127.03
19	14840.87	7116.43	4541.62	3254.22	2481.77
24	2419.09	1164.55	746.36	537.27	411.82
28	8806.49	4253.24	2735.50	1967.62	1521.30
36	9054.27	4402.13	2851.42	2076.07	1610.85
48	30796.34	15066.17	9822.78	7201.09	5628.07

Recommended Circuit Diagram



Bill of Materials

No.	Sch Symbol	Description	Rating
1	F1	Fuse	4A/250Vac
2	MOV1	Varistor	620V
3	CX1, CX2,	X Capacitor	0.47uF/310Vac
4	CX3	X Capacitor	0.68uF/250Vac
5	LCM1, LCM2	Common mode choke	6.8mH
6	CY2, CY3, CY7, CY6	Y Capacitor	2200pF/250Vac
7	NTC1	Thermistor	5R
8	C1,C2	PFC Boost capacitor	120uF/420Vdc
9	C3	Output Capacitor	12v 1000uF/35Vdc
			19v 1000uF/35Vdc
			24v 470uF/50Vdc
			28v 470uF/50Vdc
			36v 330uF/63Vdc
			48v 330uF/63Vdc
10	C4	Bypass Capacitor	0.1uF/630Vdc
	C5		1uF/100Vdc