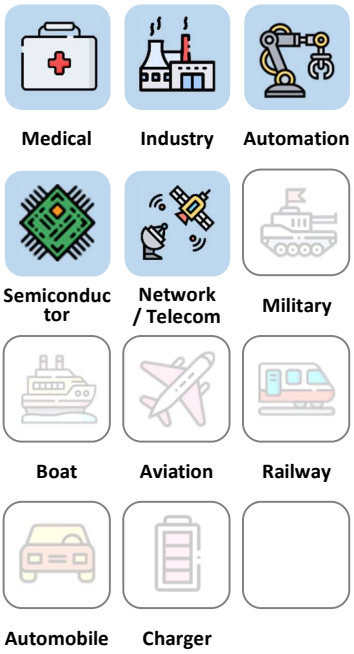
ACE60 Series
60W / Encapsulated AC/DC

Applications



2 Years Warranty

CE RoHS COMPLIANT ISO REACH

Features

2" x 2"	90~264VAC Input range	120W Peak Load	Long Hold-up Time	<0.5W No Load	100μA Leakage current	±10% Output Trimming	4000 VAC Insulation
90 % High efficiency	OCP	OVP	OTP	SCP			

Model Number Structure

AC E 60 - 050 S - 60

Series Name	Package	Watt	Output Voltage (VDC)	Output Quantity	Actual Watt
AC series	**E**ncapsulated	**60**	**050** : 5 **120** : 12 **150** : 15 **240** : 24 **360** : 36 **480** : 48	**S** : Single	Actual Watt

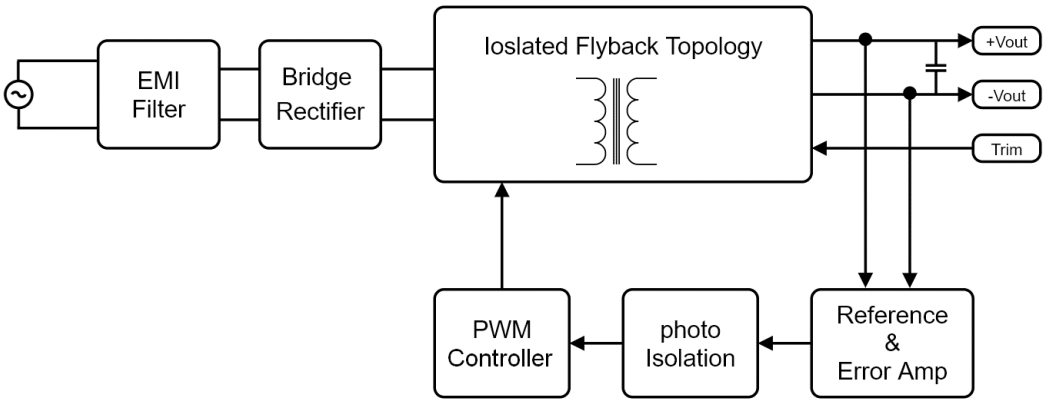
Model Selection Guide

Typical @ Ta=+25 ℃ under nominal line voltage conditions unless noted

Model	Input			Output			Efficiency
	Voltage (V)		Current (A)	Voltage	Current	Power	
	Range	Nominal	Full load	(V)	(A)	(W)	Typ.(%)
ACE60-050S-60	90-264	230	0.25	5	10	50	86
ACE60-120S-60	90-264	230	0.30	12	5	60	88
ACE60-150S-60	90-264	230	0.30	15	4	60	88
ACE60-240S-60	90-264	230	0.29	24	2.5	60	89
ACE60-360S-60	90-264	230	0.29	36	1.67	60	89
ACE60-480S-60	90-264	230	0.29	48	1.25	60	90

Description

AC series - Encapsulated 60W converter is a 60W Isolated, regulated ac/dc encapsulated power module with 120W peak load lasting 10 seconds and long hold-up time setting by external capacitors. It features a high efficiency up to 90%, wide working ambient temperature range -40~+80°C, no minimum load required, 4kVac reinforced insulation, OVP, SCP, etc. These power modules use advanced power processing, control and packaging technologies and are suitable for all kinds of systems, such as household appliances, medical devices, industrial control communication systems and network equipment, etc.



ACE60 Series Block Diagram

Electrical Specifications

(Typical @ Ta=+25°C under nominal line voltage conditions unless noted.)

Input Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Operating Input Voltage Ranges		90	230	264	VAC
Operating Input Frequency Ranges		47		63	Hz
Input Current				1.5	A
Inrush Current	cold start at 230Vac, 25℃			100	A
Power Factor			EN61000-3-2 Class A		
Leakage Current				100	μA

Output Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	100% Load			±1.5	%
Line Regulation	High Line to Low Line			±0.5	%
Load Regulation	0% to 100% Load			±1	%
Output Ripple & Noise Voltage	Bandwidth 20MHz and with 10uF MLCC Output Capacitor			1.5	$\%V_{pk-pk}$
Minimum Load		0			A
Hold Up Time	at full load & 115 VAC	8			mSec.
Over Voltage Protection		120		140	%
Over current Protection		120		140	%
Short-circuit Protection		Hiccup mode (Auto-Recovery)			

General Specifications & Environmental Specifications

Parameter	Notes and Conditions	Min.	Typ.	Max.	Unit
Switching Frequency			67		kHz
Storage Temperature Range	All models	-55		100	˚C
Operating Temperature	All models, derating from 100% at 50˚C to 50% at 80˚C	-40		80	˚C
Humidity (non condensing)	All models			95	%
Operating Altitude				3000	m
Isolation Voltage	Input to Output	4000			VAC
Weight		175 (6.17)			g (oz.)
Dimensions		2.10” x 2.10” x 1.10” (53.3 x 53.3 x 27.9mm)			
Case Material	Plastic				

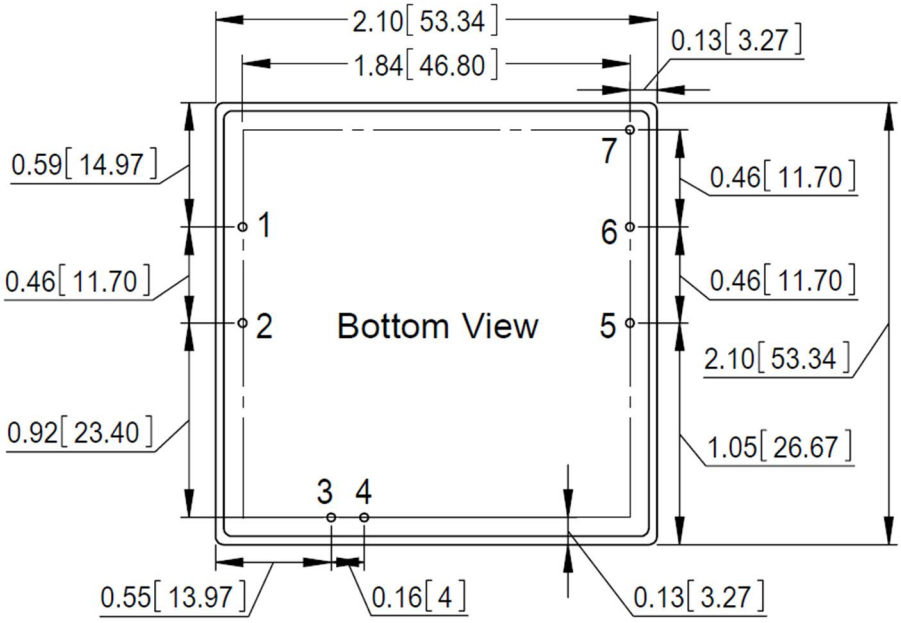
Standards Compliance

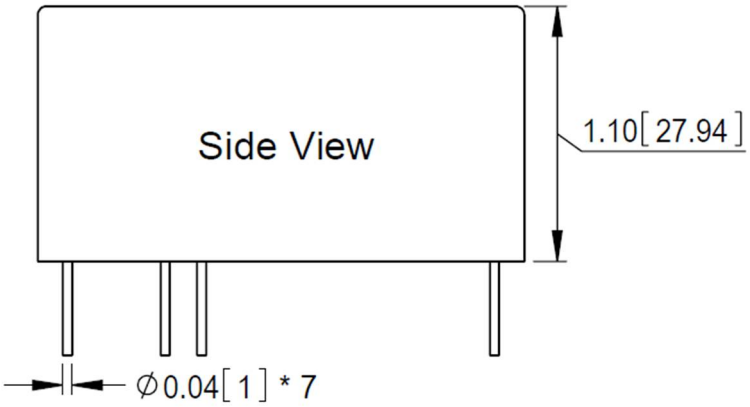
Parameter	Standard	Test Conditions	Performance Criteria
Environmental Compliance	Reach; RoHS		PASS
EMI	EN55032		Class A / Class B
ESD	EN61000-4-2	±4 kV Air Discharge ±4 kV Contact Discharge	Crit. A
Radiated Immunity	EN61000-4-3	Level 2, 3 V/m	Crit. A
Fast Transient	EN61000-4-4	±2 kV Applied	Crit. A
Surge	EN61000-4-5	±2 kV Applied	Crit. A
Conducted Immunity	EN61000-4-6	Level 2, 3 V rms	Crit. A

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

Mechanical Dimensions & Pin Assignments

Shape





Pin Assignments:

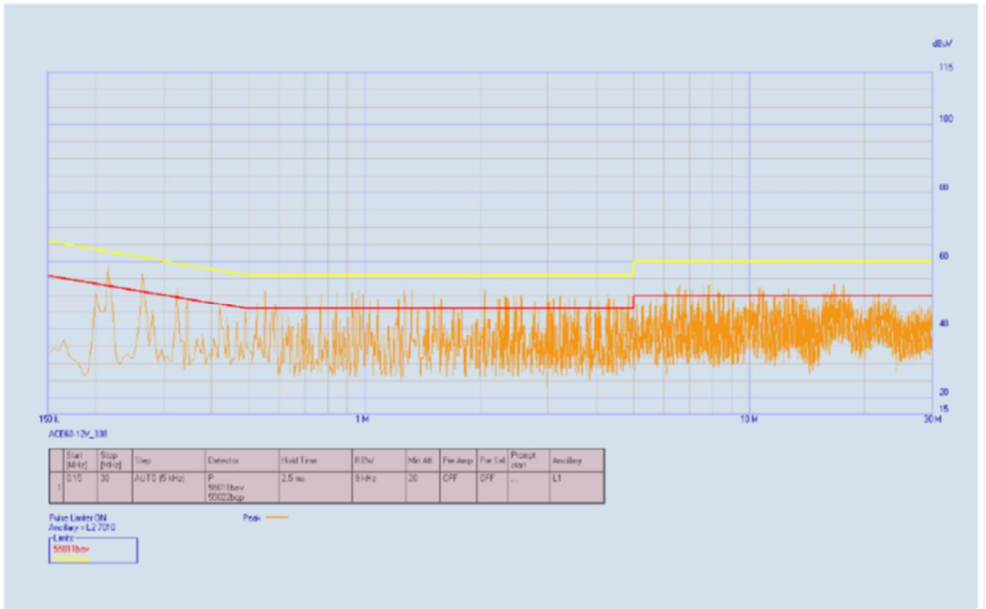
Pin#	Function
1	AC1
2	AC2
3	BC+ (optional)
4	BC- (optional)
5	Trim
6	-Vo
7	+Vo

Note:

Pin Material: Red Copper
Pin Plating: Tin
Dimensions in inches [mm]
Tolerances: .XX±0.25 [.X±0.5mm]

Conducted EMI

Input terminal value (typ.) ACE60-120S-60 @Vin = 230VAC, Iout = 2A



The fundamental switching frequency of the module is 63 kHz.

Characteristic Curves

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

The figures of ACE60-120S-60

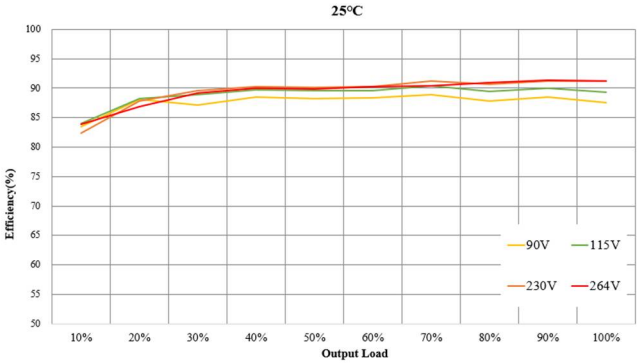


Figure 1 : Efficiency at Minimum, Nominal and Maximum Input Voltages VS. Output Load.

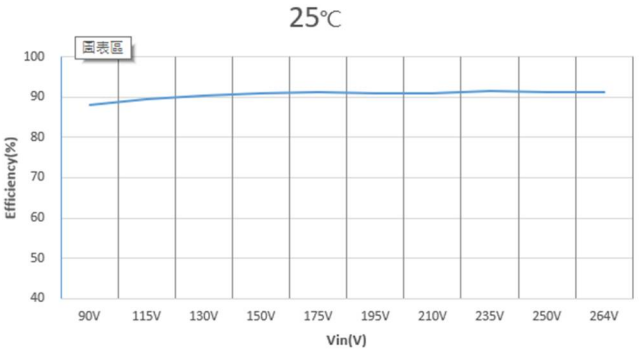


Figure 2 : Efficiency VS. Input Voltages at 100% rated power

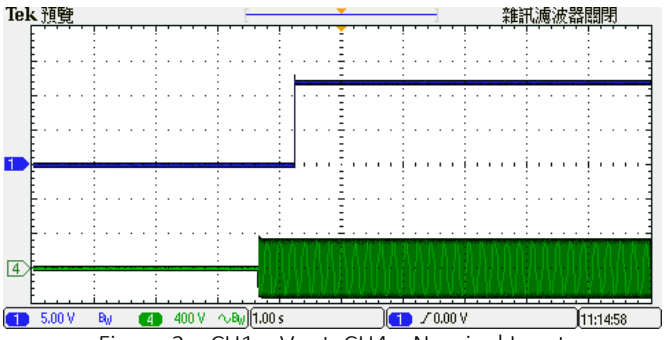


Figure 3 : CH1 = Vout, CH4 = Nominal Input Typical Start-up waveform at Full load.

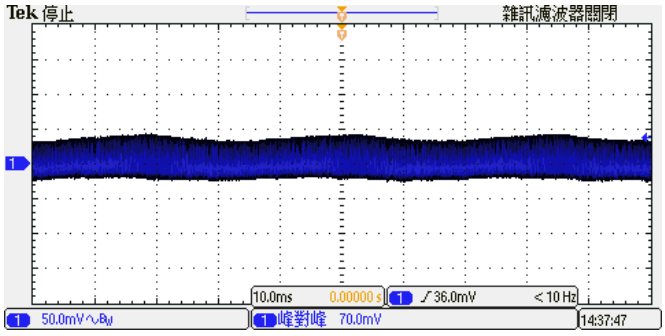
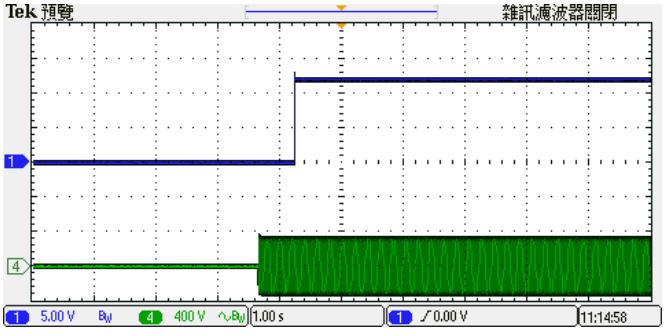


Figure 4 : Output Voltage Ripple & Noise at full load. (Vin: Typical, With Output Capacitor to add 1uF MLCC)



igure 5 : CH1 = Vout, CH4 = 115V Input Typical Start-up waveform at Full load.

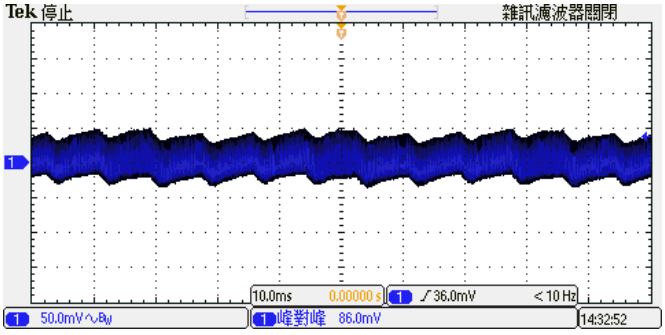


Figure 6 : Output Voltage Ripple & Noise at full load. (Vin: 115V, With Output Capacitor to add 1uF MLCC)

Trimming Output Voltage – for Single output models

Only the single output converters have a trim function. That allows users to adjust the output voltage from +10% to –10%, 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.

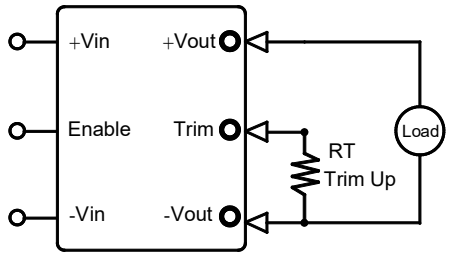


Figure 1. Trim Connections To increase Output Voltages Using Fixed Resistors

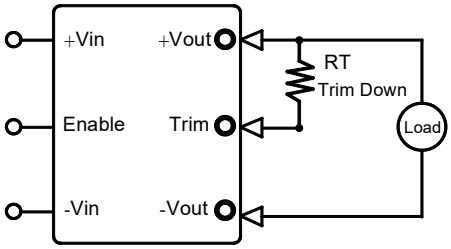


Figure 2. Trim Connections To Decrease Output Voltages Using Fixed Resistors

	Trim up resistor value(KΩ)									
Vout	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
5	219.55	96.27	55.18	34.64	22.31	14.09	8.22	3.82	0.39	0.00
12	224.33	99.66	58.11	37.33	24.87	16.55	10.62	6.17	2.70	0.00
15	181.65	81.72	48.42	31.76	21.77	15.11	10.35	6.78	4.01	0.00
24	265.91	120.45	71.97	47.73	33.18	23.48	16.56	11.36	7.32	0.00
36	627.7	279.9	163.9	105.9	71.10	48.00	31.40	19.0	9.30	0.00
48	1560.67	695.84	407.56	263.42	176.93	119.28	78.10	47.21	23.19	0.00

	Trim down resistor value(KΩ)									
Vout	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
5	716.45	339.73	214.15	151.36	113.69	88.58	70.64	57.18	46.72	38.35
12	913.67	438.34	279.89	200.67	153.13	121.45	98.81	81.83	68.63	58.07
15	969.95	469.88	303.18	219.84	169.83	136.49	112.68	94.82	80.93	69.82
24	2456.09	1201.55	783.36	574.27	448.82	365.18	305.44	260.64	225.79	197.91
36	9136.3	4484.1	2933.4	2158.1	1692.9	1382.7	1161.2	995.0	865.8	7624
48	30969.33	15234.16	9989.11	7366.58	5793.07	4744.05	3994.76	3432.79	2995.70	2646.03

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.

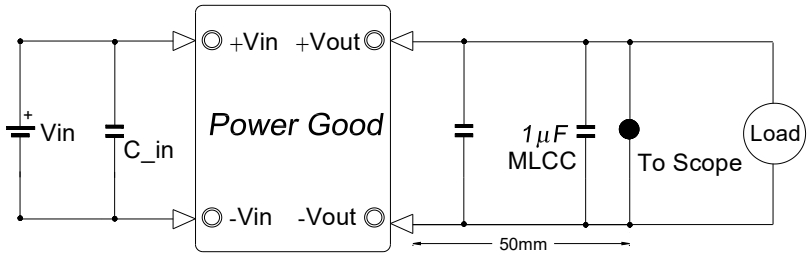


Figure 3. Measuring Output Ripple/Noise(20MHz bandwidth)

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