

## Features

- Leading Edge and Trailing Edge AC Dimmable
- Constant Current Output
- High Efficiency
- Active Power Factor Correction (Up to 0.96)
- All-Around Protection: SCP and Open Lamp Protection
- Class 2 Output



## Description

The LLC-012SxxxRSP series operates from a 90 ~ 132 Vac input range. They are designed to be highly efficient and reliable. Features include dimming control with leading edge and trailing edge, open lamp, short circuit.

## Models

Output Current	Input Voltage Range(1)	Output Voltage Range	Max. Output Power	Efficiency (2)	Power Factor (2)	Model Number
350 mA	90 ~ 132 Vac	17~34 Vdc	12 W	78%	0.96	LLC-012S035RSP
500 mA	90 ~ 132 Vac	12~24 Vdc	12 W	77%	0.96	LLC-012S050RSP
700 mA	90 ~ 132 Vac	9~17 Vdc	12 W	77%	0.96	LLC-012S070RSP

Notes: (1) UL, FCC certified input voltage range: 100-120Vac.

(2) Measured in 120 Vac input with full conduction angle at full load.

## Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	90 V	-	132 V	
Input Frequency	57 Hz	-	63 Hz	
Leakage Current	-	-	0.5 mA	At 120Vac, 60Hz input.
Input AC Current	-	-	0.18 A	Measured at full load and 120 Vac input.
Inrush Current	-	-	50 A	At 120Vac input, 25°C cold start, duration =200 us, 10%lpk-10%lpk.
Inrush Current(I <sup>2</sup> t)	-	-	0.02 A <sup>2</sup> s	
Power Factor	0.93	-	-	At 120Vac, 75%load-100%load(9~12W)
THD	-	-	20%	

## Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%Io	-	5%Io	Full load condition at 120Vac
Output Current Overshoot / Undershoot	-	-	10%Io	Full load condition
No Load Voltage	-	-	120% Vomax	Vomax is the maximum operation output voltage.
Line Regulation	-	-	±2%	Input voltage from 110Vac to 132Vac
	-	-	±30%	Input voltage from 90Vac to 110Vac
Load Regulation	-	-	±3%	Input voltage from 110Vac to 132Vac
	-	-	±30%	Input voltage from 90Vac to 110Vac
Turn-on Delay Time	-	0.40 s	0.75 s	Measured at 120Vac input, 75%load-100%load
Dimming Range	10%Io	-	100%Io	
Temperature coefficient	-	-	0.03%/°C	Case temperature = 0°C ~Tc max

**Note:** All specifications are typical at 25°C unless otherwise stated.

## General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 120Vac Input: Io = 350 mA Io = 500 mA Io = 700 mA	76% 75% 75%	78% 77% 77%	- - -	Measured at full load with full conduction angle and steady-state temperature in 25°C ambient.
No Load Power Dissipation	-	-	3 W	
MTBF	-	333,700 Hours	-	Measured at 120Vac input, 80%load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	80,200 Hours	-	Measured at 120Vac input, 80%Load and 60°C case temperature; See life time vs. Tc curve for the details
Operating Case Temperature for Safety Tc_s	-20 °C	-	+90 °C	
Operating Case Temperature for Warranty Tc_w	-20 °C	-	+65 °C	Humidity: 10% RH to 90% RH.
Storage Temperature	-30 °C	-	+85 °C	Humidity: 5% RH to 90% RH
Dimensions Inches (L x W x H) Millimeters (L x W x H)	4.13 x 1.65 x 1.22 105 x 42 x 31			
Net Weight	-	165 g	-	

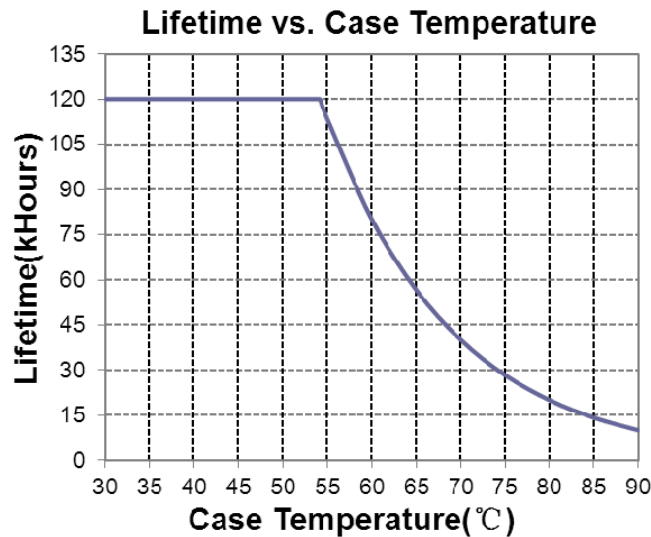
**Note:** All specifications are tested by YW-PWH01 and typical at 25°C unless otherwise stated.

## Safety & EMC Compliance

Safety Category	Standard
UL/CUL	UL8750, UL1310 Class 2, CAN/CSA-C22.2 No. 223-M91 Class 2
EMI Standards	Notes
FCC Part 15 <sup>(1)</sup>	ANSI C63.4:2009 Class B
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: [1] this device may not cause harmful interference, and [2] this device must accept any interference received, including interference that may cause undesired operation.

**Note:** (1) This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.

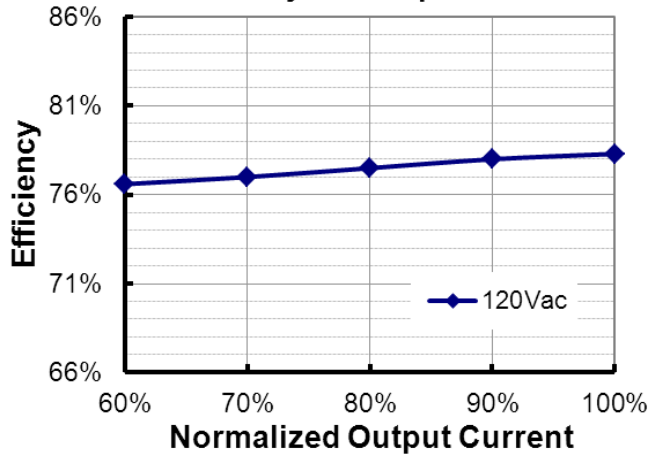
## Lifetime vs. Case Temperature



## Efficiency vs. Load

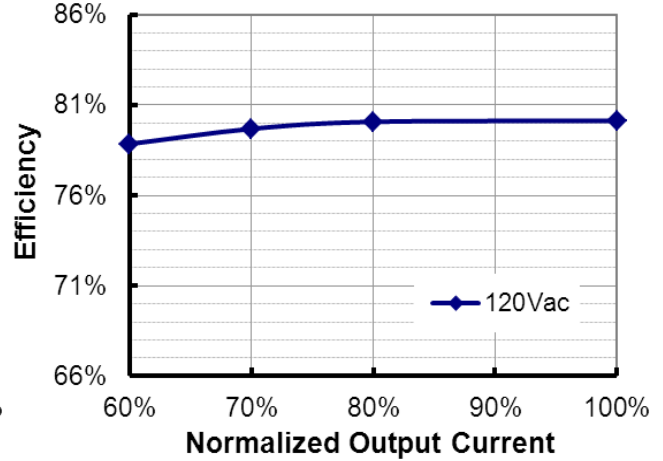
LLC-012S035RSP

Efficiency vs. Output Current



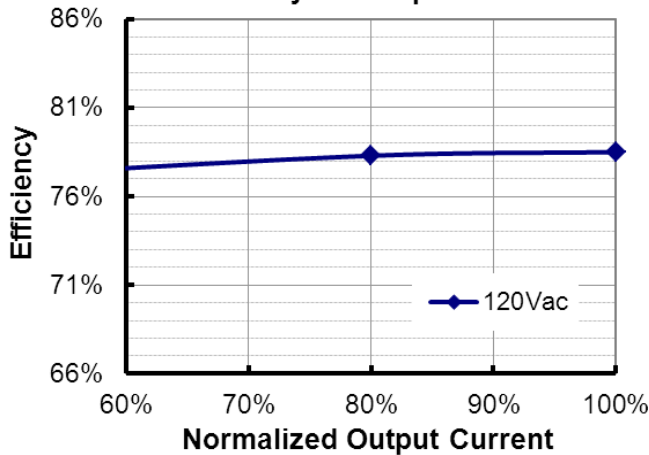
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Efficiency vs. Output Current



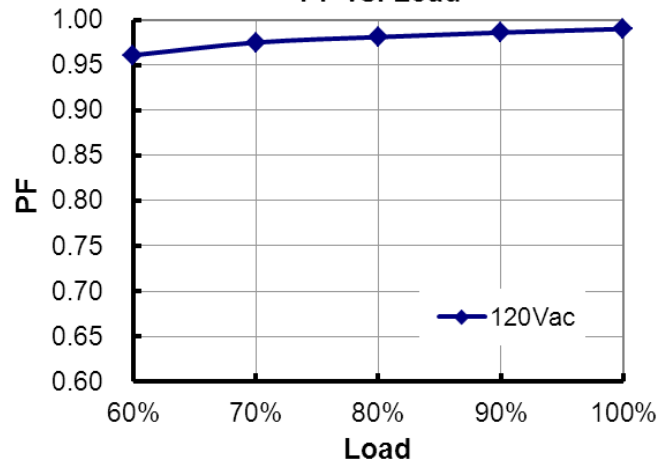
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Efficiency vs. Output Current



## Power Factor

PF vs. Load



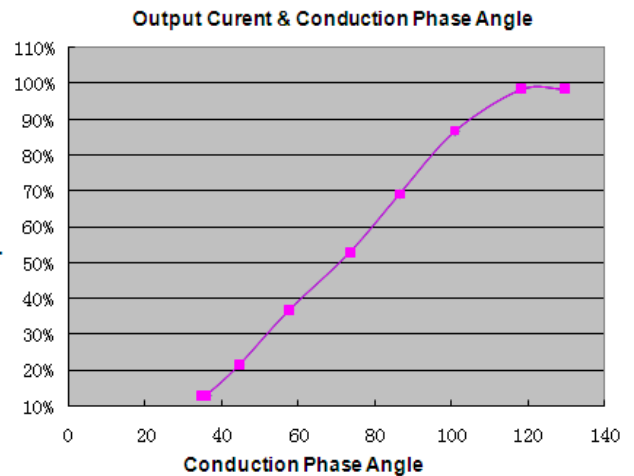
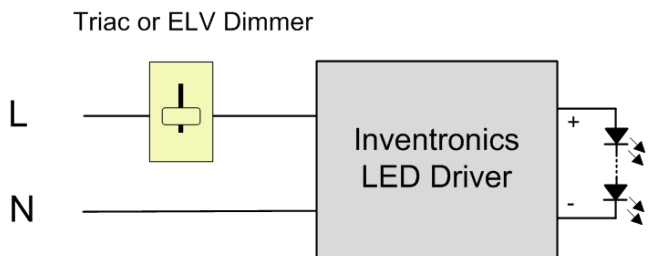
## Protection Functions

Parameter	Min.	Typ.	Max.	Notes
Short Circuit Protection	Auto Recovery. The power supply shall return to normal operation after the fault condition is removed.			

## Dimmer Recommendation

Manufacturer	Type	Applicable Voltage	Power Rating	Notes
LUTRON	SKYLARK CTCL-153PDH	120Vac	600W	
LUTRON	DIVA DVF-103P	120Vac	600W	
LUTRON	SKYLARK S-600P-WH	120Vac	600W	
LUTRON	SKYLARK CT-600PR-WH	120Vac	600W	
LUTRON	SKYLARK LX-103PL-WH	120Vac	1000W	
LUTRON	MAESTRO MA-1000-WH	120Vac	600W	
LEVITON	011-IPI06-1LZ	120Vac	600W	
LEVITON	011-IPI10-1LZ	120Vac	1000W	

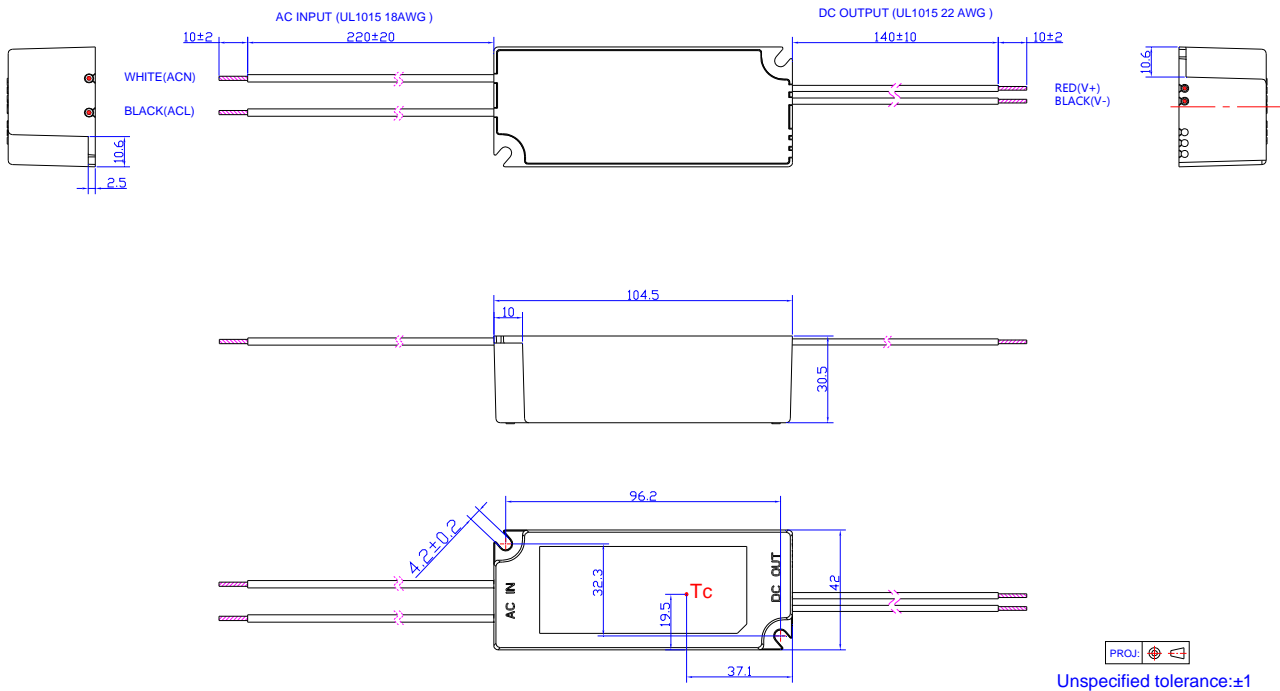
## TRIAC Dimming Control



Implementation: Dimming with Triac or ELV Dimmer

Parameter	Min.	Typ.	Max.	Notes
Dimming Range	10%lo	-	100%lo	Measured at 120 Vac input.
Conduction Angle	30°	-	180°	Measured at 120 Vac input.

## Mechanical Outline



## RoHS Compliance

Our products comply with the European Directive 2011/65/EC, calling for the elimination of lead and other hazardous substances from electronic products.

## Revision History

Change Date	Rev.	Description of Change		
		Item	From	To
2012-05-22	A	Datasheet Release	/	/
		Derating Curve	/	50°C 100% load, 70°C 80% load
		PF, Efficiency Curve	/	Updated
2012-07-10	B	Life time Curve	/	Updated
2012-7-18	C	Max Case Temperature	/	Added
2012-8-27	D	Min PF	/	Added
		MAX THD	/	Added
		Temperature coefficient	/	Added
		Storage Temperature	-20 °C	-30 °C
2014-03-26	E	Mechanical Outline	/	Updated
2017-01-06	F	Turn-on Delay Time at 120Vac	Max.=1.0s	Max.=0.75s
		Lifetime	72,000Hours	80,200Hours
		Operating Case Temperature for Warranty Tc_w	/	Added
		Net Weight	152 g	165 g
		Environmental Specifications	/	Deleted
		Note of EMI Standard	/	Added
		Derating Curve	/	Deleted