

Features

- Leading Edge and Trailing Edge AC Dimmable
- Constant Current Output
- High Efficiency (Up to 86%)
- Active Power Factor Correction (Up to 0.95)
- All-Around Protection: SCP and OLP
- Class 2 Output



Description

The LLC-040SxxxRSP 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 and thermal protections.

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	60-100Vdc	35 W	86%	0.95	LLC-040S035RSP
500 mA	90 ~ 132 Vac	40-70 Vdc	35 W	85%	0.95	LLC-040S050RSP
700 mA	90 ~ 132 Vac	30-50 Vdc	35 W	85%	0.95	LLC-040S070RSP ⁽³⁾
820 mA	108 ~ 132 Vac	30-42 Vdc	35 W	85%	0.95	LLC-040S082RSP ⁽³⁾
1050 mA	90 ~ 132 Vac	20-33 Vdc	35 W	83%	0.95	LLC-040S105RSP ⁽³⁾⁽⁴⁾

Notes: (1) Certified input voltage range: 108-120Vac(LLC-040S082RSP), 100-120Vac(other models).

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

(3) UL Class 2 (US).

(4) CUL Class 2 (Canada).

Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	90 Vac	-	132 Vac	
Input Frequency	57 Hz	-	63 Hz	
Leakage Current	-	-	0.5 mA	At 120Vac, 60Hz input.
Input AC Current	-	-	0.5 A	Measured at full load and 120 Vac input.
Inrush Current	-	-	50 A	At 120Vac input, 25°C cold start, duration=200 us, 10% pk-10% pk.
Inrush Current(I ² t)	-	-	0.05 A ² s	
Power Factor	0.93	-	-	At 120Vac, 75%load-100%load(30~40W)
THD	-	-	20%	

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%Io	-	5%Io	Full load condition, Input voltage from 110Vac to 132Vac
Startup Overshoot Current	-	-	10%Io	Full load condition
No Load Output Voltage				
Io = 350 mA	-	-	120V	
Io = 500 mA	-	-	84V	
Io = 700 mA	-	-	60V	
Io = 820 mA	-	-	50.5V	
Io = 1050 mA	-	-	39.5V	
Line Regulation	-	-	±30%	90Vac to 110Vac input.
	-	-	±3%	110Vac to 132Vac input.
Load Regulation	-	-	±30%	90Vac to 110Vac input.
	-	-	±3%	110Vac to 132Vac input.
Turn-on Delay Time	-	0.40s	0.75s	Measured at 120Vac input, 75%load-100%load
Dimming Range	0%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	84%	86%	-	Measured at full load with full conduction angle and steady-state temperature in 25°C ambient.
Io = 500 mA	83%	85%	-	
Io = 700 mA	83%	85%	-	
Io = 820 mA	83%	85%	-	
Io = 1050 mA	81%	83%	-	
No Load Power Dissipation	-	-	3 W	
MTBF	-	448,300 Hours	-	Measured at 120Vac input, 80%load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	62,500 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	-	+65 °C	Humidity: 5% RH to 90% RH

General Specifications

Parameter	Min.	Typ.	Max.	Notes
Dimensions Inches (L x W x H) Millimeters (L x W x H)		5.31 x 1.73 x 1.2 135 x 44 x 30.5		
Net Weight	-	275 g	-	

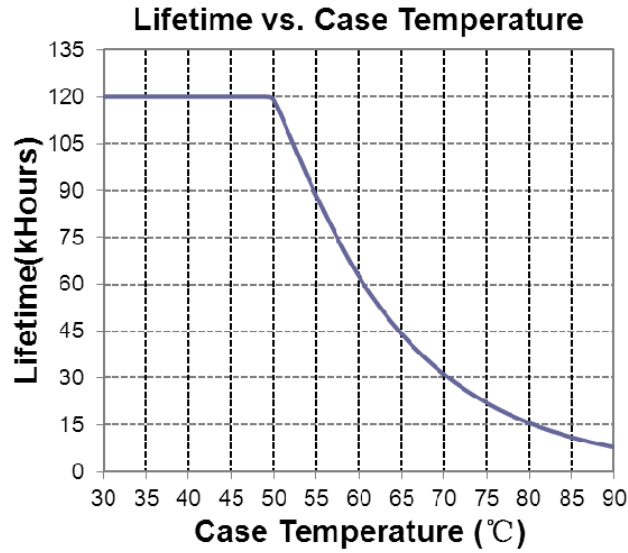
Note: All specifications are typical at 25 °C unless otherwise stated.

Safety & EMC Compliance

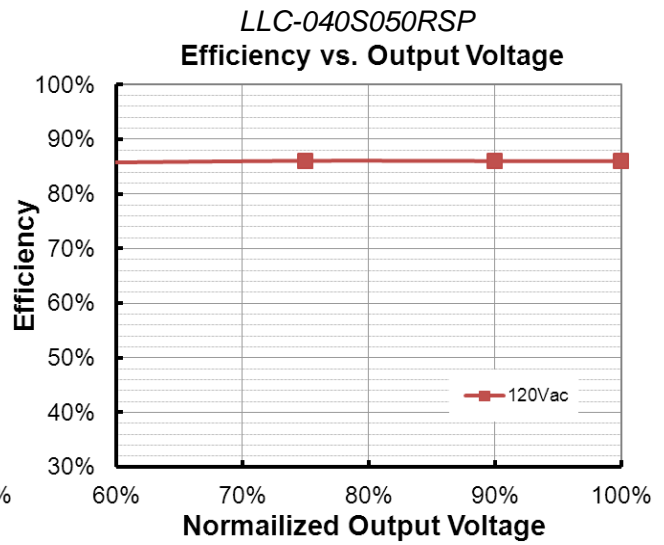
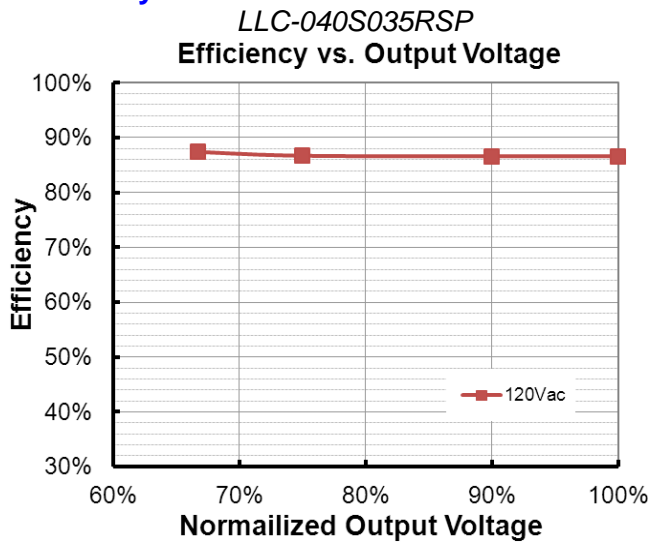
Safety Category	Standard
UL/CUL	UL8750, UL1310, UL1012, CAN/CSA-C22.2 No. 223-M91, CSA C22.2 No. 107.1-01
EMI Standards	Notes
EN 55015 ⁽¹⁾	Conducted emission Test & Radiated emission Test
EN 61000-3-2	Harmonic Current Emissions
EN 61000-3-3	Voltage Fluctuations & Flicker
FCC Part 15 ⁽¹⁾	ANSI C63.4:2009 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.
EMS Standards	Notes
EN 61000-4-2	Electrostatic Discharge (ESD): 8 kV air discharge, 4 kV contact discharge
EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-RS
EN 61000-4-4	Electrical Fast Transient / Burst-EFT: level 3, criteria A
EN 61000-4-5	Surge Immunity Test: AC Power Line: line to line 1 kV
EN 61000-4-6	Conducted Radio Frequency Disturbances Test-CS
EN 61000-4-8	Power Frequency Magnetic Field Test
EN 61000-4-11	Voltage Dips
EN 61547	Electromagnetic Immunity Requirements Applies To Lighting Equipment

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.

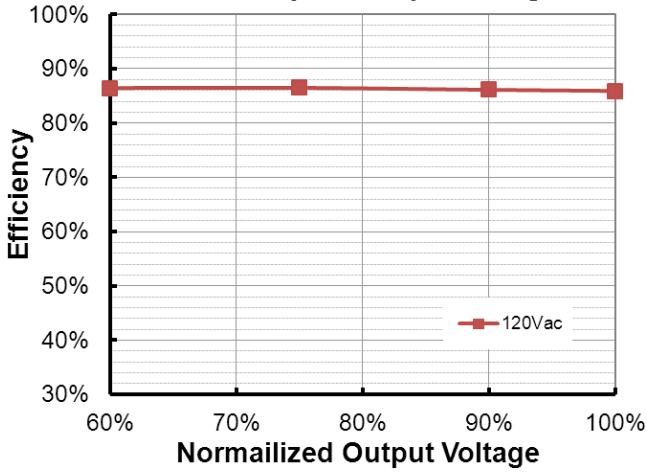
Lifetime vs. Case Temperature Curve



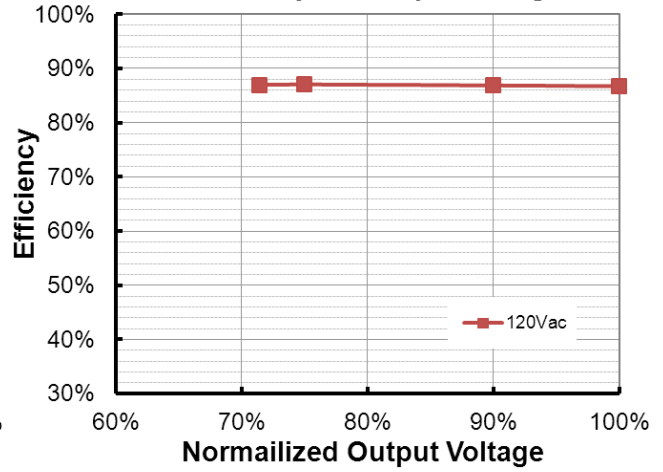
Efficiency vs. Load



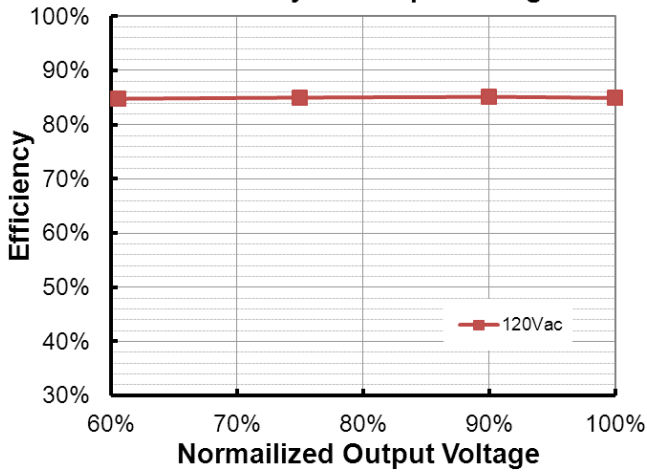
LLC-040S070RSP
Efficiency vs. Output Voltage



LLC-040S082RSP
Efficiency vs. Output Voltage

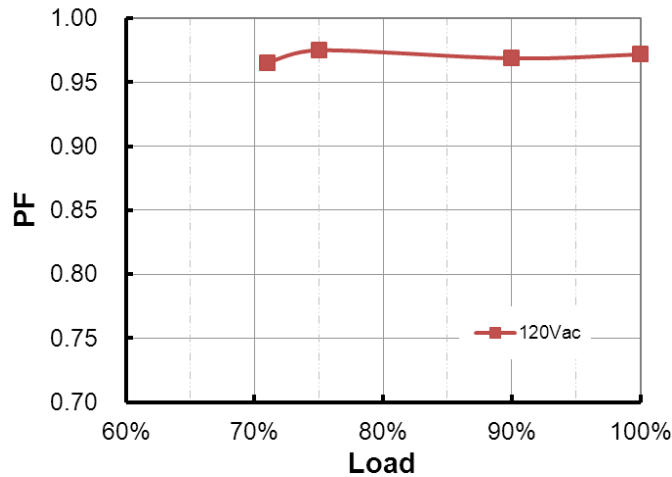


LLC-040S105RSP
Efficiency vs. Output Voltage

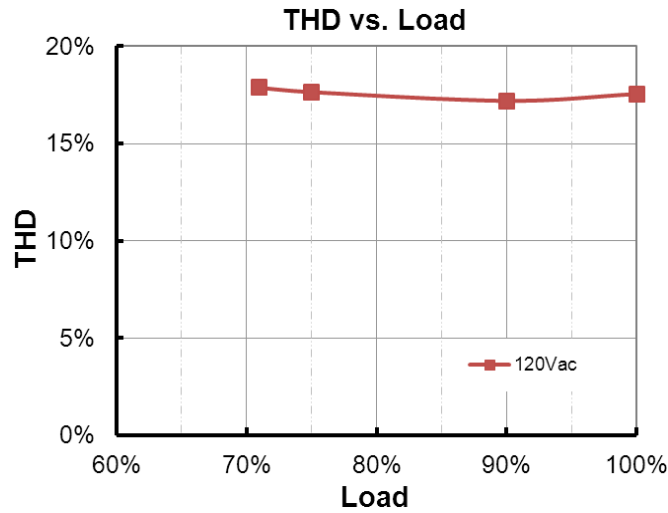


Power Factor

PF vs. Load



Total Harmonic Distortion



Protection Functions

Parameter	Min.	Typ.	Max.	Notes
Short Circuit Protection	Hiccup. The power supply shall be self-recovery when the fault condition is removed.			

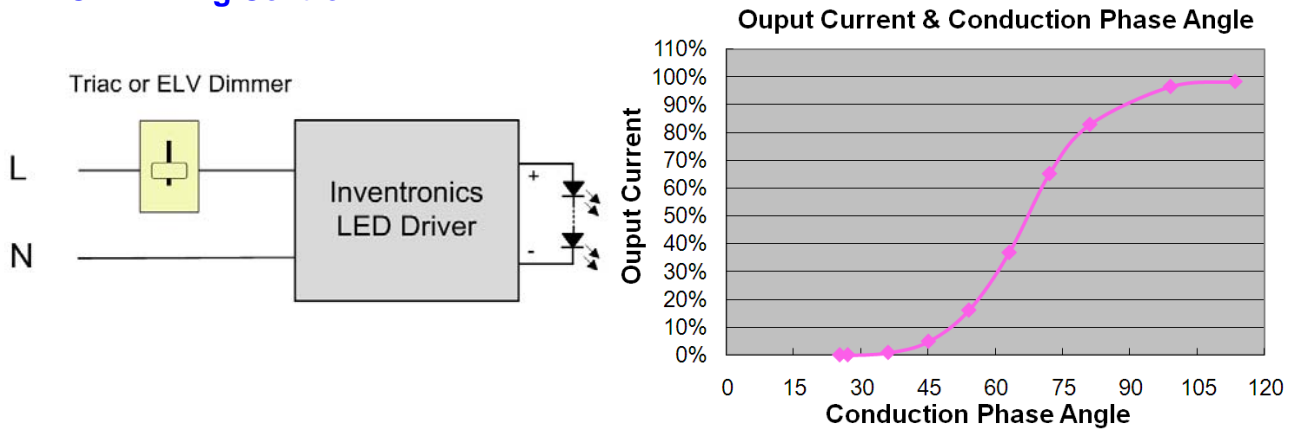
Dimmer Recommendation

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	

Dimmer Recommendation (Continued)

Manufacturer	Type	Applicable Voltage	Power Rating	Notes
LUTRON	MAESTRO MA-1000-WH	120Vac	600W	
LEVITON	011-IP106-1LZ	120Vac	600W	
LEVITON	011-IP110-1LZ	120Vac	1000W	

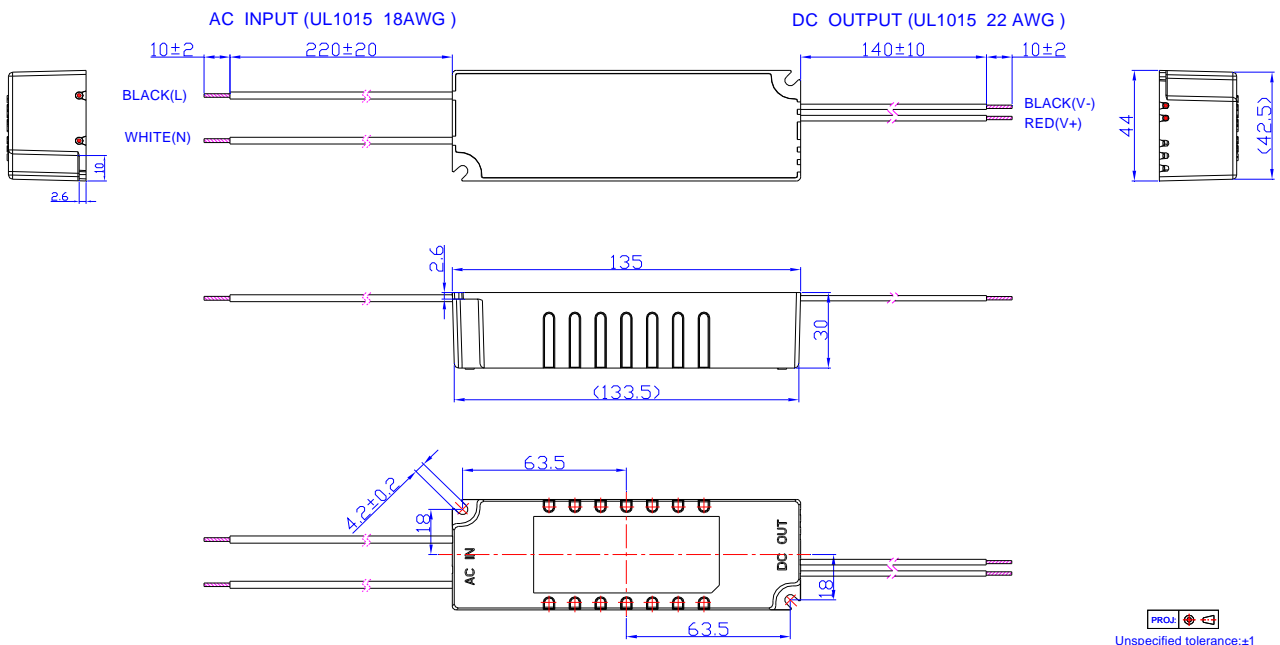
TRIAC Dimming Control



Implementation: Dimming with Triac or ELV Dimmer

Parameter	Min.	Typ.	Max.	Notes
Dimming Range	0%lo	-	100%lo	Measured at 120 Vac input.
Conduction Angle	0°	-	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
2012-10-16	A	Datasheet Release	/	/
2013-03-21	B	Line Regulation (110Vac to 132 Vac)	±2%	±3%
		PF	0.98	0.95
		PF curve updated	350 mA model curve	820 mA model curve
		THD curve (820 mA)	/	Added
		Dimming curve	/	Updated
2017-01-06	C	Turn-on Delay Time at 120Vac	Max.=1.0 s	Max.=0.75 s
		Operating Case Temperature for Warranty Tc_w	/	Added
		Environmental Specifications	/	Deleted
		Net Weight	255 g	275 g
		Note of EMI Standard	/	Added
		Derating Curve	/	Deleted