

## Features

- Ultra High Efficiency (Up to 91%)
- High Power Factor (0.99 Typical)
- Constant Current Output
- Lightning Protection
- Dimming Function
- All-Around Protection: OVP, SCP, OTP
- IP67 and UL Damp & Wet Location
- 5 Years Warranty



## Description

The EUC-096SxxxDT(ST) series is a 96W, constant-current LED driver that operates from 90-305 Vac input with excellent power factor. It is created for many lighting applications including low bay, tunnel and street lights, etc. The high efficiency of these drivers and compact metal case enables them to run cooler, significantly improving reliability and extending product life. To ensure trouble-free operation, protection is provided against input surge, output over voltage, short circuit, and over temperature.

## Models

Output Current	Input Voltage Range	Output Voltage Range	Max. Output Power	Typical Efficiency (1)	Power Factor		Model Number (2)(10)
					120Vac	220Vac	
350 mA	90 ~ 305 Vac	137-274 Vdc	96 W	91.0%	0.99	0.96	EUC-096S035DT(ST) <sup>(8)</sup>
450 mA	90 ~ 305 Vac	106-213 Vdc	96 W	91.0%	0.99	0.96	EUC-096S045DT(ST) <sup>(8)</sup>
700 mA	90 ~ 305 Vac	68-137 Vdc	96 W	90.0%	0.99	0.96	EUC-096S070DT(ST) <sup>(8)</sup>
1050 mA	90 ~ 305 Vac	46-92.0 Vdc	96 W	90.0%	0.99	0.96	EUC-096S105DT(ST) <sup>(8)(9)</sup>
1400 mA	90 ~ 305 Vac	35-69.0 Vdc	96 W	89.0%	0.99	0.96	EUC-096S140DT(ST) <sup>(8)(9)</sup>
1750 mA	90 ~ 305 Vac	27-54.8 Vdc	96 W	89.0%	0.99	0.96	EUC-096S175DT(ST) <sup>(5)(9)</sup>
2100 mA	90 ~ 305 Vac	22-45.7 Vdc	96 W	88.0%	0.99	0.96	EUC-096S210DT(ST) <sup>(5)(9)</sup>
2450 mA	90 ~ 305 Vac	19-39.1 Vdc	96 W	88.0%	0.99	0.96	EUC-096S245DT(ST) <sup>(4)(7)(9)</sup>
2800 mA	90 ~ 305 Vac	17-34.2 Vdc	96 W	88.0%	0.99	0.96	EUC-096S280DT(ST) <sup>(4)(7)(9)</sup>
3150 mA	90 ~ 305 Vac	15-30.4 Vdc	96 W	87.0%	0.99	0.96	EUC-096S315DT(ST) <sup>(4)(7)(9)</sup>
3500 mA	90 ~ 305 Vac	13-27.4 Vdc	96 W	87.0%	0.99	0.96	EUC-096S350DT(ST) <sup>(4)(7)(9)</sup>
4000 mA	90 ~ 305 Vac	12-24.0 Vdc	96 W	87.0%	0.99	0.96	EUC-096S400DT(ST) <sup>(4)(6)(9)</sup>

**Notes:** (1) Measured at 25°C, 100% load and 220 Vac input.

(2) A suffix –xxx may be added to denote variations or modifications to the base product, where x can be any alphanumeric character or blank.

(3) The DT suffix may be changed to ST to omit the dimming function and remove the three wires associated with that function.

(4) Class 2 output (USR & CNR) for dry and damp location.

(5) Class 2 output (USR), Non-Class 2 output (CNR) for dry and damp location.

(6) Class 2 output (USR & CNR) for wet location.

(7) Class 2 output (CNR), Non-Class 2 output (USR) for wet location.

(8) Non-Class 2 output (USR & CNR).

(9) SELV output

(10) All the models are certificated to KS, except EUC-096S035DT(ST)

## Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage Range	90 Vac	-	305 Vac	
Input Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	1 mA	At 277Vac 60Hz input
Input AC Current	-	-	1.2 A	Measured at 100% load and 100 Vac input.
	-	-	0.6 A	Measured at 100% load and 220 Vac input.
Inrush current	-	-	69 A	At 220Vac input, 25°C Cold Start, Duration=2 mS, 10%lpk-10%lpk
Inrush Current(I <sup>2</sup> t)	-	-	2.8 A <sup>2</sup> s	
Power Factor	0.90	-	-	At 100-277Vac, 50-60Hz, 75% -100%load (72W-96W)
THD	-	-	20%	

## Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%	-	5%	
No Load Output Voltage				
I <sub>o</sub> = 350 mA	-	279 V	-	
I <sub>o</sub> = 450 mA	-	219 V	-	
I <sub>o</sub> = 700 mA	-	141 V	-	
I <sub>o</sub> = 1050 mA	-	94.0 V	-	
I <sub>o</sub> = 1400 mA	-	71.0 V	-	
I <sub>o</sub> = 1750 mA	-	56.5 V	-	
I <sub>o</sub> = 2100 mA	-	47.5 V	-	
I <sub>o</sub> = 2450 mA	-	40.5 V	-	
I <sub>o</sub> = 2800 mA	-	35.5 V	-	
I <sub>o</sub> = 3150 mA	-	31.5 V	-	
I <sub>o</sub> = 3500 mA	-	28.5 V	-	
I <sub>o</sub> = 4000 mA	-	25.0 V	-	
Ripple and Noise (pk-pk)	-	-	30% I <sub>o</sub>	Measured by 20 MHz bandwidth oscilloscope and the output paralleled a 0.1 uF ceramic capacitor and a 10 uF electrolytic capacitor
Line Regulation	-	-	±1%	
Load Regulation	-	-	±3%	
Turn-on Delay Time	-	1.0 s	2.0 s	Measured at 120Vac input, 75% -100%load.
	-	1.0 s	2.0 s	Measured at 220Vac input, 75% -100%load.
Temperature coefficient	-	0.03%/°C	-	Case temperature = 0°C ~T <sub>c</sub> max

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

## Protection Functions

Parameter	Min.	Typ.	Max.	Notes
Over Temperature Protection-T <sub>c</sub>	-	110 °C	-	Maximum temperature of components inside the case. The power supply shall be self-recovery when the fault condition is removed.
Short Circuit Protection	No damage shall occur when any output operating in a short circuit condition. The power supply shall be self-recovery when the fault condition is removed.			

## General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency				
I <sub>o</sub> = 350 mA	87.0%	89.0%	-	Measured at 100% load, 120Vac input, 25°C ambient temperature, after the unit is thermally stabilized. It will be about 2.5% lower, if measured immediately after startup.
I <sub>o</sub> = 450 mA	87.0%	89.0%	-	
I <sub>o</sub> = 700 mA	86.0%	88.0%	-	
I <sub>o</sub> = 1050 mA	86.0%	88.0%	-	
I <sub>o</sub> = 1400 mA	85.0%	87.0%	-	
I <sub>o</sub> = 1750 mA	85.0%	87.0%	-	
I <sub>o</sub> = 2100 mA	84.0%	86.0%	-	
I <sub>o</sub> = 2450 mA	84.0%	86.0%	-	
I <sub>o</sub> = 2800 mA	84.0%	86.0%	-	
I <sub>o</sub> = 3150 mA	83.0%	85.0%	-	
I <sub>o</sub> = 3500 mA	83.0%	85.0%	-	
I <sub>o</sub> = 4000 mA	83.0%	85.0%	-	
Efficiency				
I <sub>o</sub> = 350 mA	89.0%	91.0%	-	Measured at 100% load, 220Vac input, 25°C ambient temperature, after the unit is thermally stabilized. It will be about 2.5% lower, if measured immediately after startup.
I <sub>o</sub> = 450 mA	89.0%	91.0%	-	
I <sub>o</sub> = 700 mA	88.0%	90.0%	-	
I <sub>o</sub> = 1050 mA	88.0%	90.0%	-	
I <sub>o</sub> = 1400 mA	87.0%	89.0%	-	
I <sub>o</sub> = 1750 mA	87.0%	89.0%	-	
I <sub>o</sub> = 2100 mA	86.0%	88.0%	-	
I <sub>o</sub> = 2450 mA	86.0%	88.0%	-	
I <sub>o</sub> = 2800 mA	86.0%	88.0%	-	
I <sub>o</sub> = 3150 mA	85.0%	87.0%	-	
I <sub>o</sub> = 3500 mA	85.0%	87.0%	-	
I <sub>o</sub> = 4000 mA	85.0%	87.0%	-	
MTBF	-	202,000 Hours	-	Measured at 120Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	120,000 Hours	-	Measured at 120Vac input, 80%load; Case temperature=60°C @ Tc point. See life time vs. Tc curve for the details
Operating Case Temperature for Safety Tc_s	-40 °C	-	+89 °C	
Operating Case Temperature for Warranty Tc_w	-40 °C		+70 °C	Case temperature for 5 years warranty;
Storage Temperature	-40 °C	-	+85 °C	Humidity: 5% RH to 100% RH
Dimensions				With mounting ear
Inches (L x W x H)	6.85 x 2.66 x 1.44			7.92 x 2.66 x 1.44
Millimeters (L x W x H)	174 x 67.5 x 36.5			201 x 67.5 x 36.5
Net Weight	-	925 g	-	

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

## Safety & EMC Compliance

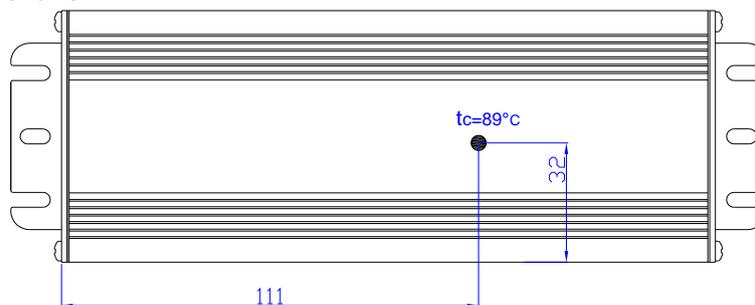
Safety Category	Standard
UL/CUL	UL8750, UL 1310, CAN/CSA-C22.2 No. 250.13, CAN/CSA-C22.2 No. 223-M91
CE	EN 61347-1, EN61347-2-13
KS	KS C 7655
EMI Standards	Notes
EN 55015 <sup>(1)</sup>	Conducted emission Test & Radiated emission Test

## Safety & EMC Compliance (Continued)

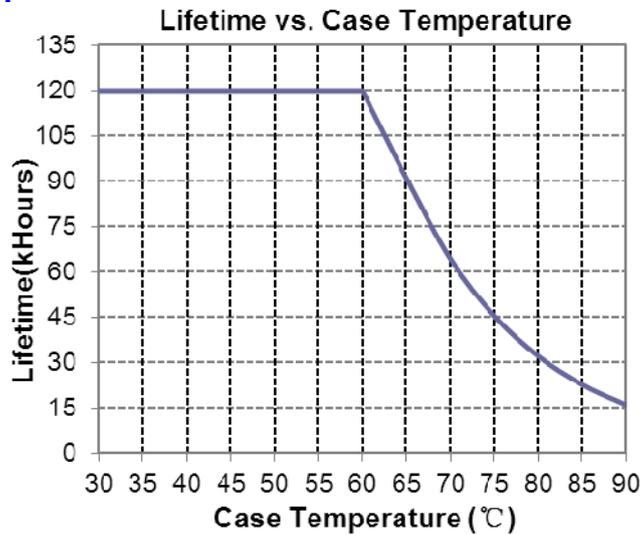
EMI Standards	Notes
EN 61000-3-2	Harmonic current emissions
EN 61000-3-3	Voltage fluctuations & flicker
FCC Part 15 <sup>(1)</sup>	ANSI C63.4 Class B
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: [1] this device may not cause harmful interference, 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): 15 kV air discharge, 8 kV contact discharge
EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-RS
EN 61000-4-4	Electrical Fast Transient / Burst-EFT
EN 61000-4-5	Surge Immunity Test: AC Power Line: Differential Mode 4 kV, Common Mode 6 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

## Max. Case Temperature



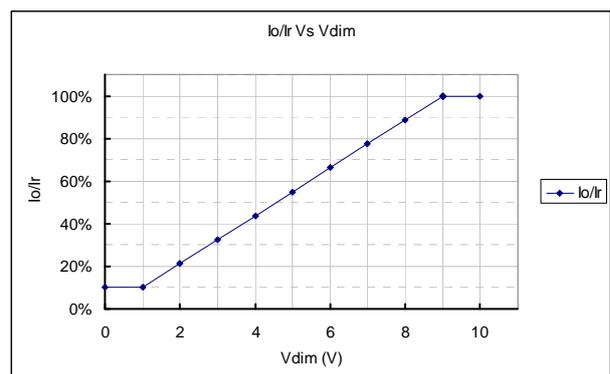
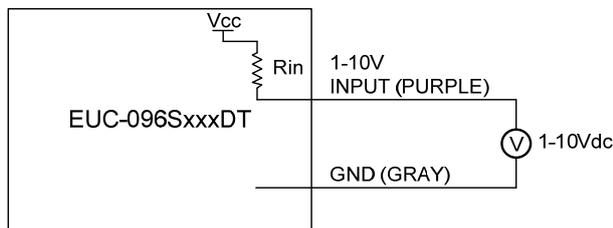
## Lifetime vs. Case Temperature Curve



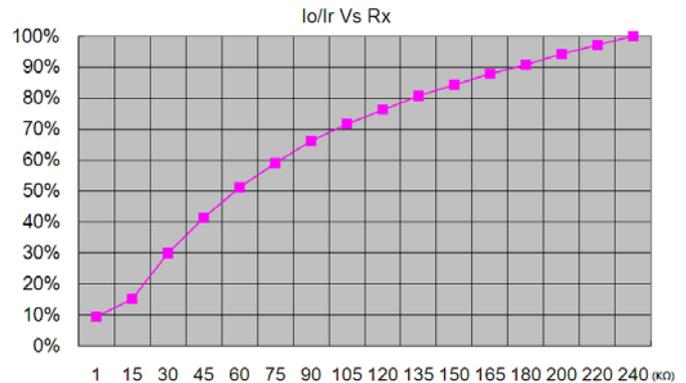
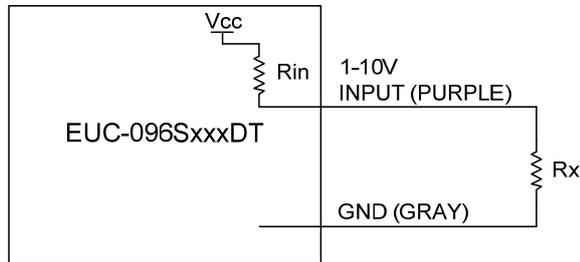
## Dimming Control (On secondary side)

Parameter	Min.	Typ.	Max.	Notes
Absolute maximum voltage on the 1~10V input pin	0 V	-	12 V	
Source current on 1~10V input pin	0 mA	-	0.5 mA	
Value of Rin ( the resistor inside the LED driver which locate between the 1-10V input and Vcc output pin)	19.8 K	20 K	20.2 K	

The dimmer control is operated from an input signal of 1 – 10 Vdc. Recommended implementations are provided below.



Implementation 1: DC input



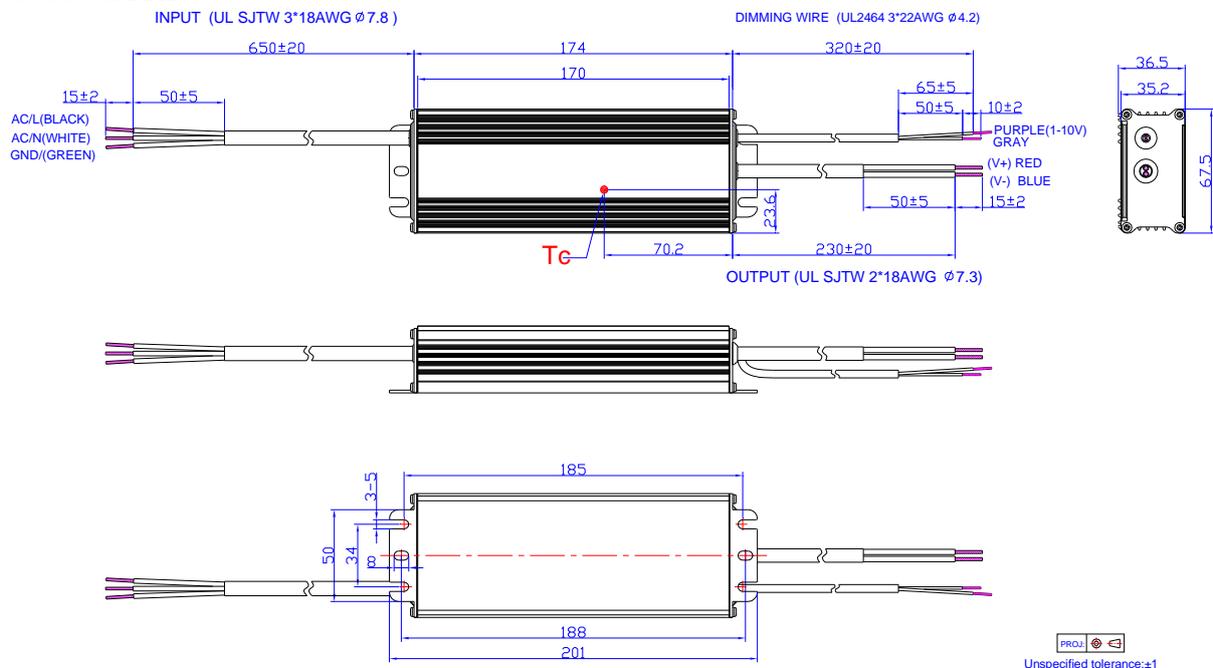
## Implementation 2: External resistor

### Notes:

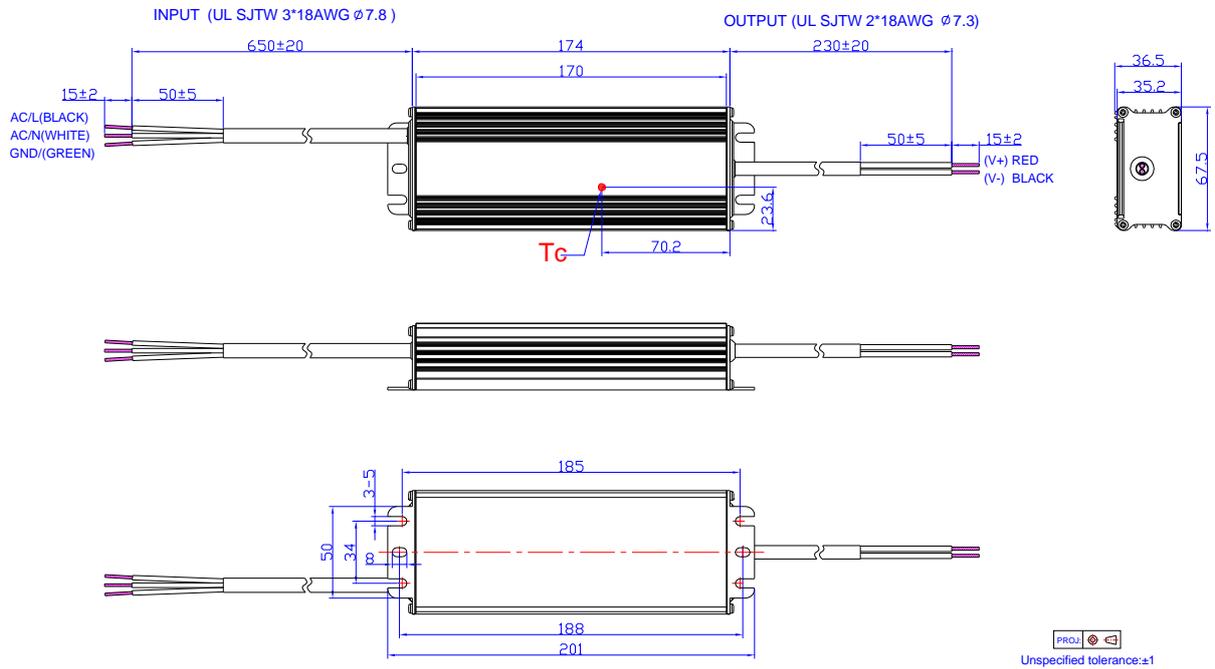
1.  $I_o$  is actual output current and  $I_r$  is rated current without dimming control.
2. For the driver to operate properly, the load voltage must be maintained above the minimum voltage threshold (approx. 50% of the max. output voltage for any given model).
3. If the output voltage is maintained above 50% of the maximum output voltage, the dimming control may be operated over the entire 1-10V range with output current varying from 10% to 100% of  $I_r$ .
4. The dimming signal is allowed to be less than 1V, however, when it is 0-1V, the output current is 10% $I_o$ .
5. Do not connect the GND of dimming to the output cable; otherwise, the LED driver cannot work normally.

## Mechanical Outline

### EUC-096SxxxDT



## EUC-096SxxxST



## RoHS Compliance

Our products comply with reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU, calling for the elimination of lead and other hazardous substances from electronic products.

## Revision History

Change Date	Rev.	Description of Change				
		Item	From		To	
2010-12-21	A	Change PF at 220Vac	0.95		0.96	
		Change the notes for models	/		/	
		Delete Derating Curve	/		/	
		Add Max. Case Temperature	/		tc: 89 °C	
		Add another dimming version with pull-down resistor	/		/	
		Update safety standards	/		/	
		Add FCC Part15 Class B	/		FCC Part 15 Class B, ANSI C63.4: 2009.	
		Update mechanical Outline	/		/	
2011-07-08	B	Features	Up to 92%		Up to 91%	
		Models-Typical Efficiency	92%, 92%...		91%, 91%...	
		Input Specifications-Input AC Current	1.2A		1.3A	
		Input Specifications-Inrush Current	50A		69A	
2011-07-08	B	Output Specifications-No Load Output Voltage	278V,216V,140V,95V,72V,57V,48V,42V,37V,32V,29V,26V		279V,219V,141V,94V,71V,56.5V,47.5V,40.5V,35.5V,31.5V,28.5V,25V	
		Output Specifications-Ripple and Noise	3%Vo		lo x 30%	
		Output Specifications-Turn-on Delay Time	0.8S	1S	1S	3S
			0.8S	1S	0.8S	2S
		Protection Functions-OVP	/		Delay	
		General Specifications-Tpy	/		All minus 1%	
General Specifications-Notes	1%		2%-3%			
2012-01-31	C	Photo	/		Changed	
2012-05-17	D	All Models-Min Efficiency	/		1% Lower	
2012-5-25	E	Input Current @100V	1.3A		1.2A	
2012-06-08	F	Life Time Curve	/		Added	
2012-07-05	G	Io/Ir Vs Rx Curve	/		Updated	
2012-07-17	H	Max Case Temperature	/		Updated	
		EN61000-4-5	line to line 2 kV, line to earth 4 kV	line to line 4 kV, line to earth 6 kV		
2012-08-03	I	Operating Temperature/ Derating Curve	-35°C		-40°C	
		Class 2 Details	/		Updated	

## Revision History (Continued)

Change Date	Rev.	Description of Change				
		Item	From		To	
2012-08-03	I	Turn-on delay time	1s	3s	1s	2s
			0.8s	2s	1s	2s
2012-9-19	J	MTBF & Life time Typical	/		Added	
		Life time Curve	/		Updated	
		Min PF, Max THD, Temperature Coefficient	/		Added	
2015-11-20	K	Lifetime	/		Updated	
		Lifetime vs. Case Temperature Curve	/		Updated	
2019-09-19	L	KS Logo	/		Added	
		Features	Waterproof(IP67)		IP67	
		Features	5 Years Warranty		Added	
		Description	/		Updated	
		Models	Notes(10)		Added	
		Input Specifications(Power Factor / THD)	/		Updated	
		General Specifications	Operating Case Temperature for Safety Tc_s		Updated	
		General Specifications	Operating Case Temperature for Warranty Tc_w		Added	
		General Specifications	Storage Temperature		Added	
		General Specifications	With mounting ear		Added	
		General Specifications(Net Weight)	850 g		925 g	
		Environmental Specifications	/		Deleted	
		Safety &EMC Compliance	UL/CUL		Updated	
		Safety &EMC Compliance	KS		Added	
		Safety &EMC Compliance	FCC		Updated	
		Safety &EMC Compliance	EN 61000-4-5		Updated	
		Safety &EMC Compliance	Note		Added	
		Derating Curve	/		Deleted	
Mechanical Outline	/		Updated			
RoHS Compliance	/		Updated			