

## Features

- Ultra High Efficiency (Up to 90.5%)
- Constant Current Output
- 0-10V Dimmable
- Input Surge Protection: 6kV line-line, 10kV line-earth
- All-Around Protection: OVP, SCP, OTP
- Waterproof (IP67)
- SELV Output
- Suitable for Independent Use
- 5 Years Warranty



## Description

The EBC-060SxxxDV(SV)-000x series is a 60W, constant-current IP67 LED driver that operates from 160-305 Vac input with excellent power factor. It is created for many lighting applications including low bay, tunnel and street. 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(1)	Output Voltage Range	Max. Output Power	Typical Efficiency (2)	Power Factor (2)	Model Number (3)
700 mA	160~305 Vac	43~86 Vdc	60 W	90.5%	0.95	EBC-060S105DV(SV)-0007
860 mA	160~305 Vac	37~70 Vdc	60 W	89.5%	0.95	EBC-060S105DV(SV)-0004
1050 mA	160~305 Vac	37~57 Vdc	60 W	89.5%	0.95	EBC-060S105DV(SV)-0000
1200 mA	160~305 Vac	25~50 Vdc	60 W	88.5%	0.95	EBC-060S180DV(SV)-0006
1400 mA	160~305 Vac	22~43 Vdc	60 W	88.0%	0.95	EBC-060S180DV(SV)-0004
1800 mA	160~305 Vac	21~33 Vdc	60 W	87.5%	0.95	EBC-060S180DV(SV)-0000

**Notes:** (1) CCC certified input voltage range: 220/230/240Vac; other certified input voltage range except CCC: 200-240Vac.

(2) Measured at 100% load and 220Vac input.

(3) SELV output.

## Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	160 Vac	-	305 Vac	
Input Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	0.70 mA	IEC60598-1; 240 Vac/60 Hz
Input AC Current	-	-	0.5 A	Measured at 100% load and 220 Vac input.
Inrush Current(I <sup>2</sup> t)	-	-	0.36 A <sup>2</sup> s	At 220 Vac input, 25°C cold start, duration=312 μs, 10%I <sub>pk</sub> -10%I <sub>pk</sub> . See Inrush Current Waveform for the details.
PF	0.90	-	-	At 220-240 Vac, 65%-100% load(39-60W)
THD	-	-	20%	

## Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%loset	-	5%loset	
Total Output Current Ripple (pk-pk)	-	-	150%I <sub>omax</sub>	At 100% load condition. 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)	-	-	150%I <sub>omax</sub>	At 100% load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%loset	At 100% load condition
No Load Output Voltage EBC-060S105DV(SV)-000x x=0, 4, 7	-	-	95 V	
EBC-060S180DV(SV)-000x x=0, 4, 6	-	-	56 V	
Line Regulation	-	-	±0.5%	Measured at 100% load
Load Regulation	-	-	±1.5%	
Turn-on Delay Time	-	0.6 s	1.5 s	Measured at 220Vac input.
Temperature Coefficient of I <sub>omax</sub>	-	0.08%/°C	-	Case temperature = 0°C ~T <sub>c</sub> max
12V Auxiliary Output Voltage	10.8 V	12 V	13.2 V	
12V Auxiliary Output Source Current	0 mA	-	20 mA	Return terminal is "Dim"

**Note:** All specifications are tested by Cree XLamp XP-G and typical at 25°C unless otherwise stated.

## General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 220 Vac input: EBC-060S105DV(SV)-000x x=7: 700 mA x=4: 860 mA x=0: 1050 mA EBC-060S180DV(SV)-000x x=6: 1200 mA x=4: 1400 mA x=0: 1800 mA	88.5% 87.5% 87.5% 86.5% 86.0% 85.5%	90.5% 89.5% 89.5% 88.5% 88.0% 87.5%	- - - - - -	Measured at 100% load and steady-state temperature in 25°C ambient
MTBF	-	438,000 Hours	-	Measured at 220 Vac input, 80% load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	77,000 Hours	-	Measured at 220 Vac input, 80% load and 70°C case temperature; See lifetime vs. Tc curve for the details
Operating Case Temperature for Safety Tc_s	-40 °C	-	+90 °C	
Operating Case Temperature for Warranty Tc_w	-40 °C	-	+75 °C	Case temperature for 5 years warranty. Humidity: 10%RH to 100%RH
Storage Temperature	-40 °C	-	+85 °C	Humidity: 5%RH to 100%RH
Dimensions Inches (L × W × H) Millimeters (L × W × H)	6.78 × 1.77 × 1.38 172 × 45.0 × 35.0			With mounting ear 7.60 × 1.77 × 1.38 193 × 45.0 × 35.0
Net Weight	-	515 g	-	

**Note:** All specifications are tested by Cree XLamp XP-G and typical at 25°C unless otherwise stated.

## Dimming Specifications

Parameter	Min.	Typ.	Max.	Notes
Absolute Maximum Voltage on the Vdim (+) Pin	-20 V	-	20 V	
Source Current on Vdim (+) Pin	0 μA	200 μA	250 μA	
Dimming Output Range	10%Iomax	-	100%Iomax	
Recommended Dimming Input Range	0 V	-	10 V	

## Safety & EMC Compliance

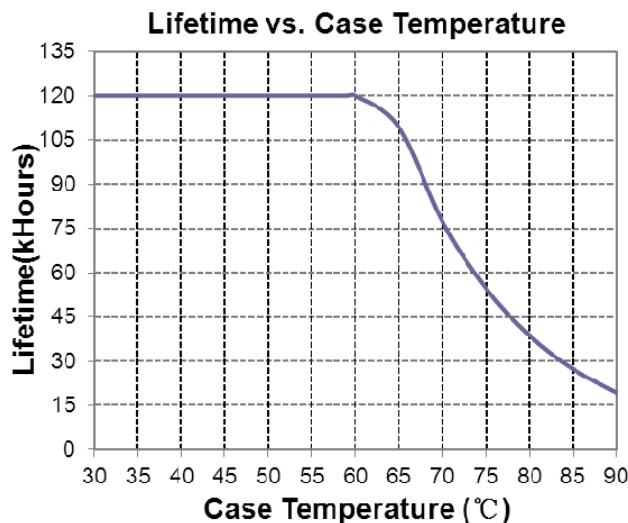
Safety Category	Standard
CE	EN 61347-1, EN61347-2-13
CCC	GB 19510.1, GB 19510.14
KS	KS C 7655
EMI Standards	Notes
EN 55015 <sup>(1)</sup> /GB 17743	Conducted emission Test & Radiated emission Test

## Safety & EMC Compliance (Continued)

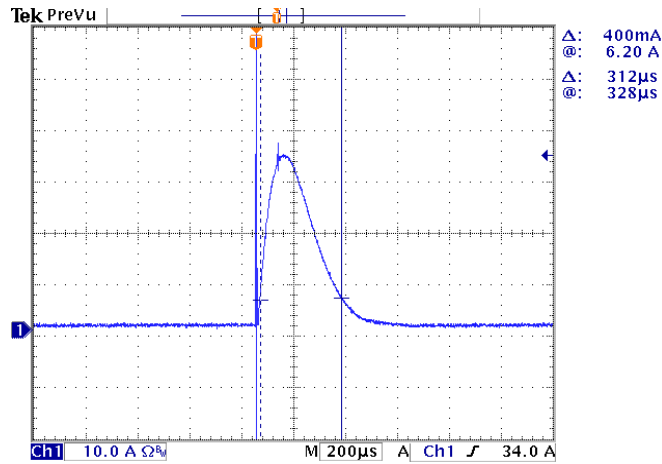
EMI Standards	Notes
EN 61000-3-2/GB 17625.1	Harmonic current emissions
EN 61000-3-3	Voltage fluctuations & flicker
EMS Standards	Notes
EN 61000-4-2	Electrostatic Discharge (ESD): 8 kV air discharge, 4 kV contact discharge
EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-RS
EN 61000-4-4	Electrical Fast Transient / Burst-EFT
EN 61000-4-5	Surge Immunity Test: AC Power Line: line to line 6 kV, line to earth 10 kV <sup>(2)</sup>
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

- Notes:** (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.
- (2) To perform electric strength (hi-pot) testing, the "GDT ground disconnect" (screw and metal lock sheet) on the driver end-cap should be removed temporarily to prevent the internal gas discharge tube from conducting (as allowed by IEC 60598-1 Clause 10.2). After testing is completed, these items must be reinstalled to restore line-to-earth surge protection and secure the end cap.

## Lifetime vs. Case Temperature



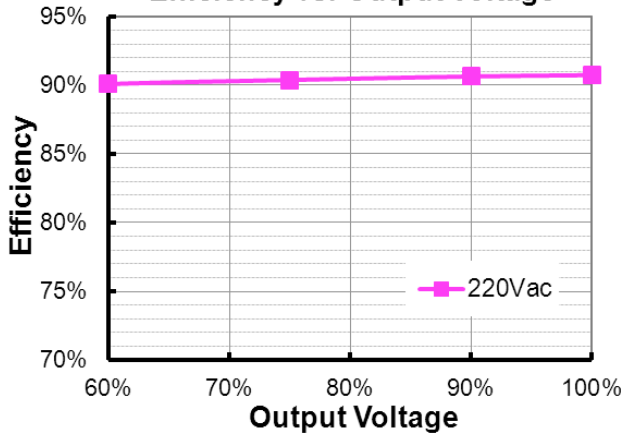
## Inrush Current Waveform



## Efficiency vs. Load

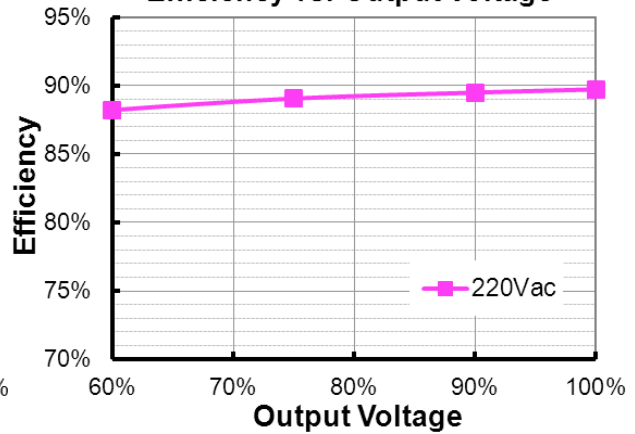
EBC-060S105DV(SV)-0007( $I_o=700mA$ )

Efficiency vs. Output Voltage



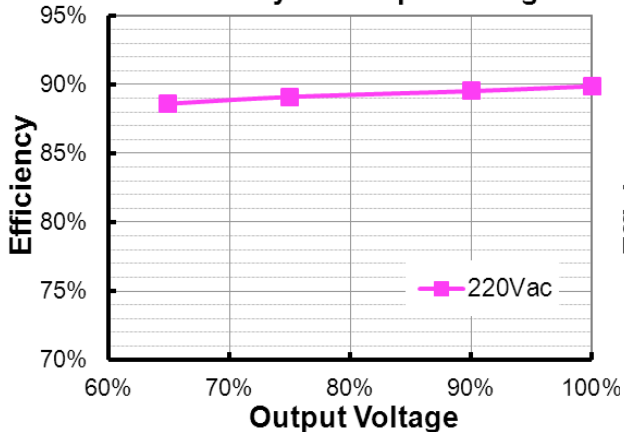
EBC-060S105DV(SV)-0004( $I_o=860mA$ )

Efficiency vs. Output Voltage



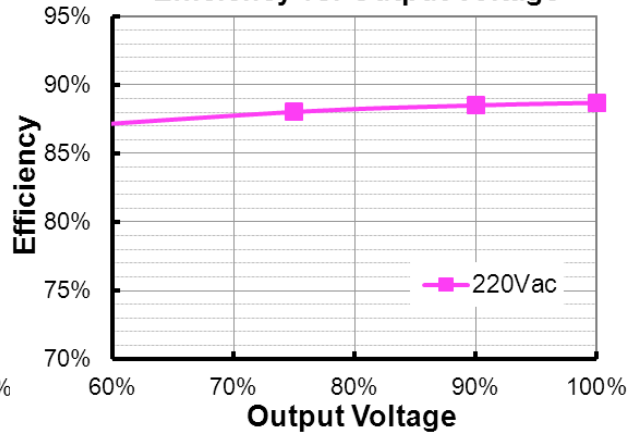
EBC-060S105DV(SV)-0000( $I_o=1050mA$ )

Efficiency vs. Output Voltage

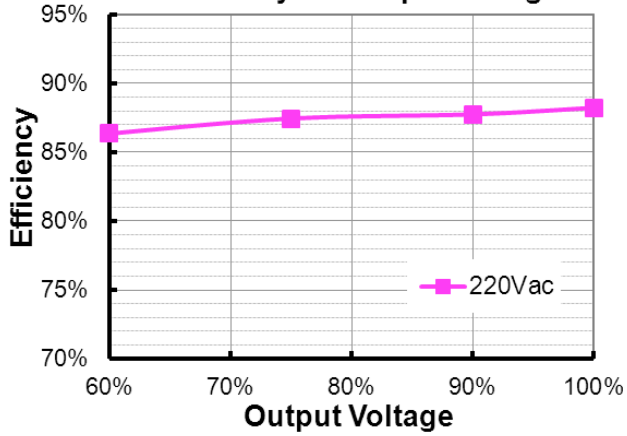


EBC-060S180DV(SV)-0006( $I_o=1200mA$ )

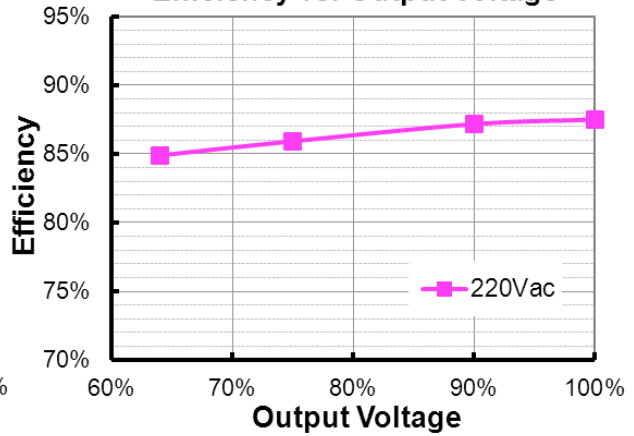
Efficiency vs. Output Voltage



EBC-060S180DV(SV)-0004(Io=1400mA)  
Efficiency vs. Output Voltage

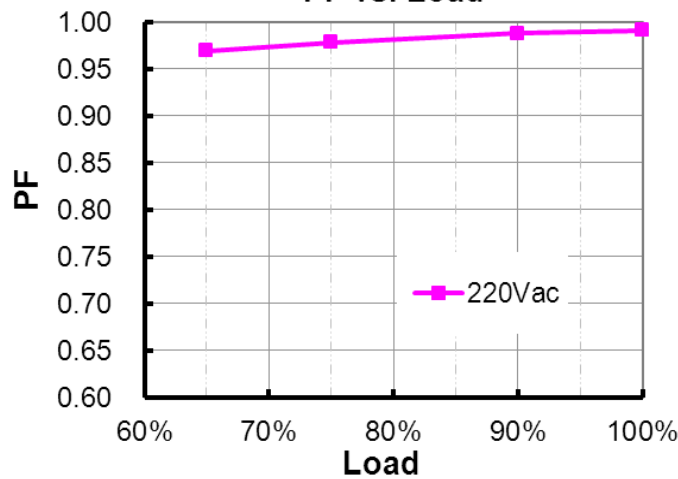


EBC-060S180DV(SV)-0000(Io=1800mA)  
Efficiency vs. Output Voltage



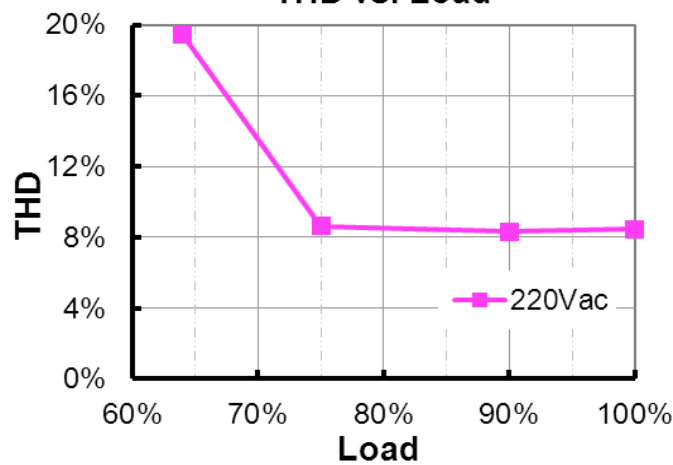
## Power Factor

PF vs. Load



## Total Harmonic Distortion

THD vs. Load



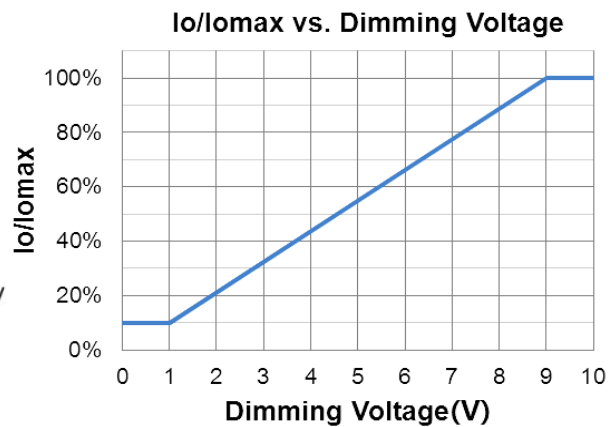
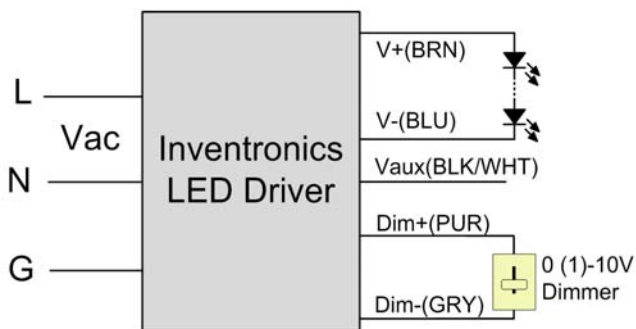
## Protection Functions

Parameter	Notes
Over Voltage Protection	Limits output voltage at no load and in case the normal voltage limit fails.
Short Circuit Protection	Auto Recovery. 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.
Over Temperature Protection	Decreases output current. Returning to normal after over temperature is removed.

## Dimming

### ● 0-10V Dimming

The recommended implementation is provided below.



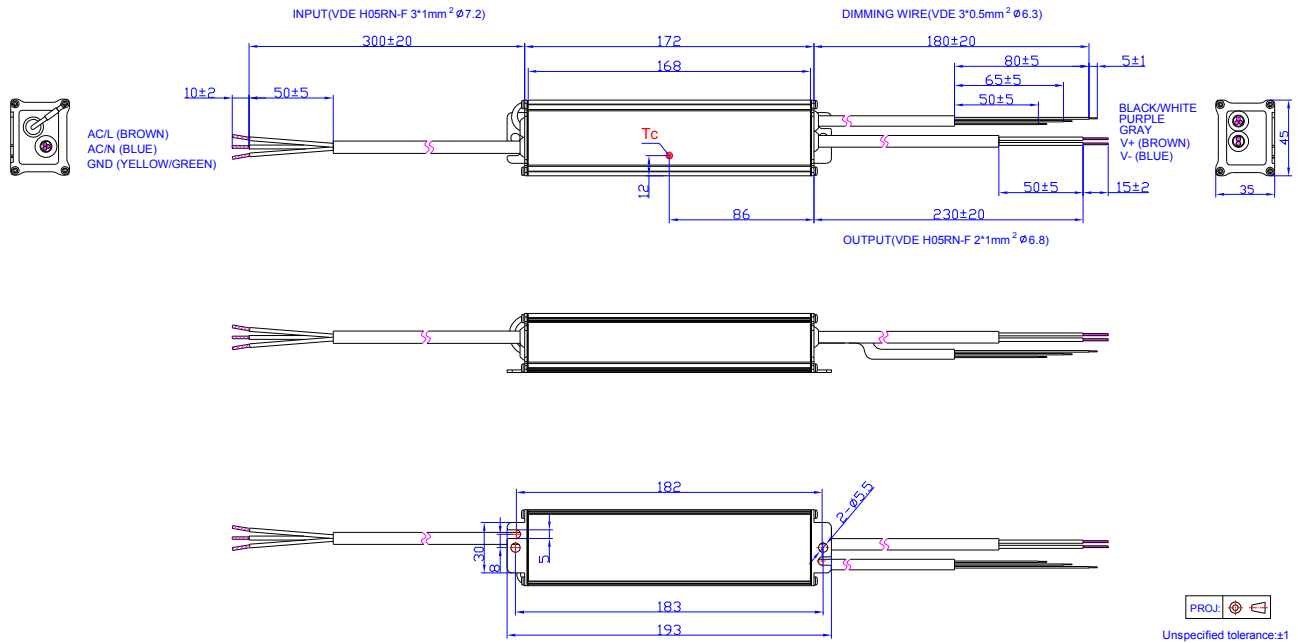
Implementation 1: DC Input

### Notes:

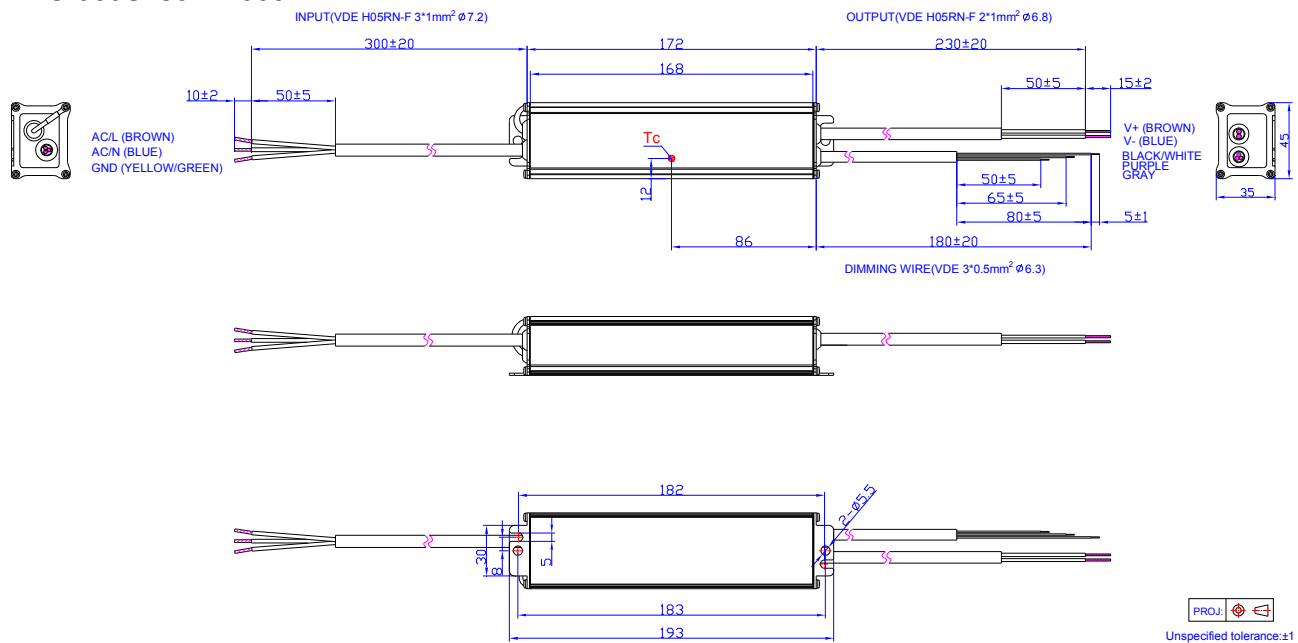
1. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like resistors and zener.
2. Do not connect Dim- to the output V- or V+, otherwise the driver will not work properly.
3. If 0-10V dimming is not used, Dim + should be open.

## Mechanical Outline

### EBC-060S105DV-000x

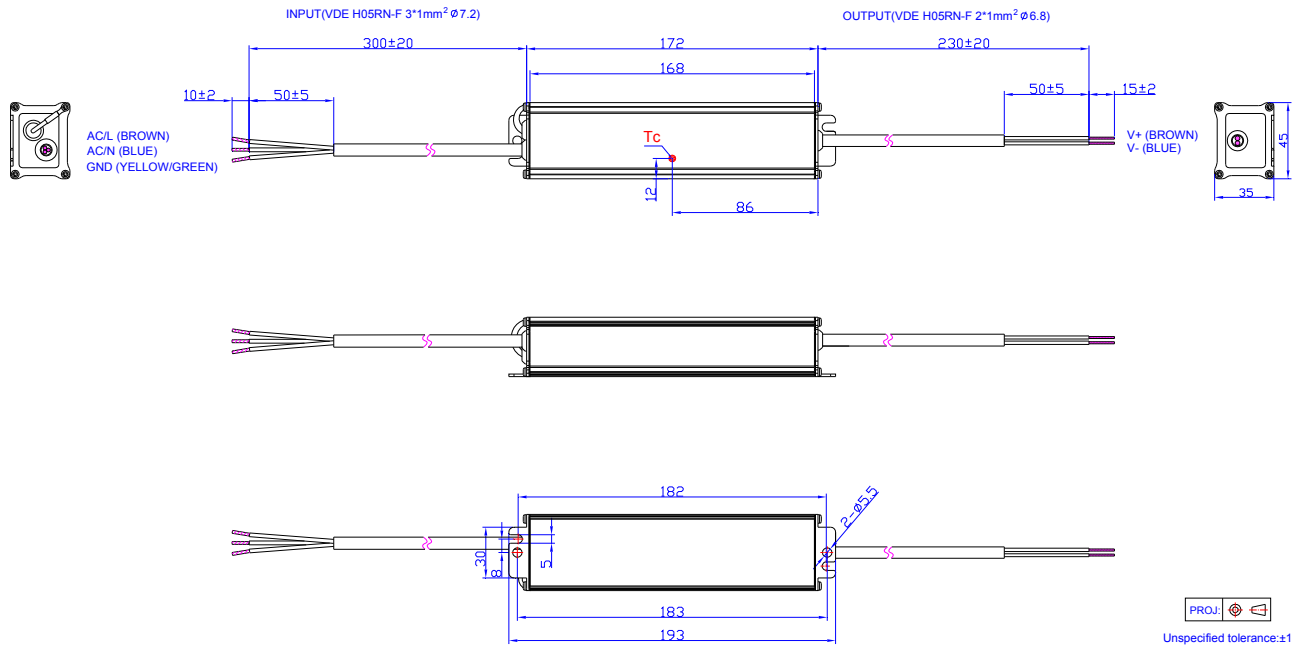


### EBC-060S180DV-000x





EBC-060SxxxSV-000x



## RoHS Compliance

Our products comply with the European Directive 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
2015-04-09	A	Datasheets Release	/	/
2015-12-25	B	Models-EBC-060S180DV(SV)	/	Added
		Input AC Current-Max	0.35 A	0.5 A
		Temperature Coefficient of Iomax	0.03%/°C	0.08%/°C
		MTBF	443,000Hours	438,000Hours
		Input Surge Protection	line to line 4 kV, line to earth 6 kV	line to line 6 kV, line to earth 10 kV
		THD Curve	/	Updated
2016-04-18	C	Lifetime	120,000Hours@ Tc=60°C	77,000 Hours@ Tc=70°C
		Net Weight	470 g	515 g
		KS Certificate Regulation	/	Added
		Note of EMI Standard	/	Added
2018-03-30	D	Features	/	Updated
		Description	/	Updated
		Note of Operating Case Temperature for Warranty Tc_w	/	Updated
		Dimensions	Inches (L x W x H) 6.78 x 1.67 x 1.34 Millimeters (L x W x H) 172 x 42.4 x 34	6.78 x 1.77 x 1.38 172 x 45.0 x 35.0
		Dimming - 0-10V Dimming - Implementation 2: External Resistor	/	Deleted
		Mechanical Outline		