

## Features

- Ultra High Efficiency (Up to 94.0%)
- Full Power at Wide Output Current Range (Constant Power)
- 0-5V/0-10V/PWM/Timer Dimmable
- Input Surge Protection: 6kV line-line, 10kV line-earth
- All-Around Protection: OVP, SCP, OTP
- Waterproof (IP67) and UL Dry / Damp Location
- SELV Output
- TYPE HL, for use in a Class I, Division 2 hazardous (Classified) location



## Description

The EUG-200SxxxDT series is a 200W, constant-current, programmable outdoor LED driver that operates from 90-305 Vac input with excellent power factor. It is created for high bay, high mast, arena and roadway lights. 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 Range	Full-Power Current Range (1)	Default Output Current	Input Voltage Range(2)	Output Voltage Range	Max. Output Power	Typical Efficiency (3)	Power Factor		Model Number (4)
							120Vac	220Vac	
70-1050mA	700-1050mA	700 mA	90~305 Vac/ 127~300 Vdc	95~286Vdc	200W	94.0%	0.99	0.96	EUG-200S105DT
140-2100mA	1400-2100mA	1400 mA	90~305 Vac/ 127~300 Vdc	48~143Vdc	200W	94.0%	0.99	0.96	EUG-200S210DT
245-3500mA	2450-3500mA	2800 mA	90~305 Vac/ 127~300 Vdc	29 ~ 82Vdc	200W	93.5%	0.99	0.96	EUG-200S350DT(5)
385-5600mA	3850-5600mA	4900 mA	90~305 Vac/ 127~300 Vdc	18 ~ 52Vdc	200W	92.5%	0.99	0.96	EUG-200S560DT(5)

Notes: (1) Output current range with constant power at 200W

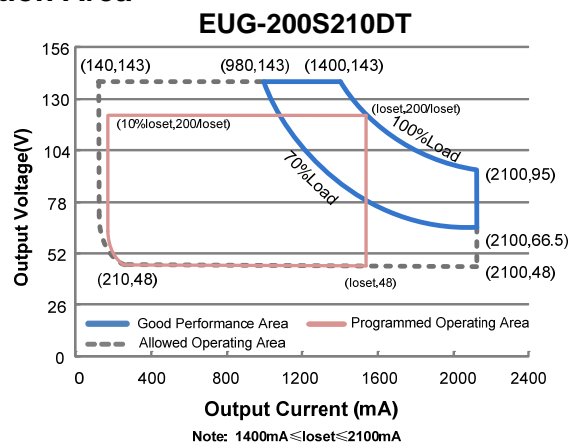
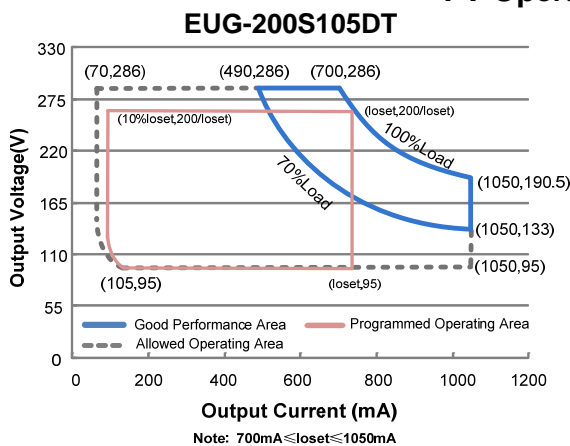
(2) UL, FCC certified input voltage range: 100-277Vac or 127-300Vdc; other certified input voltage range except UL & FCC: 100-240Vac or 127-250Vdc

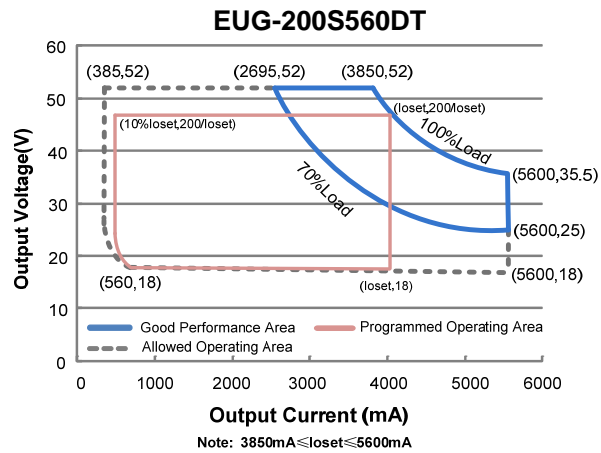
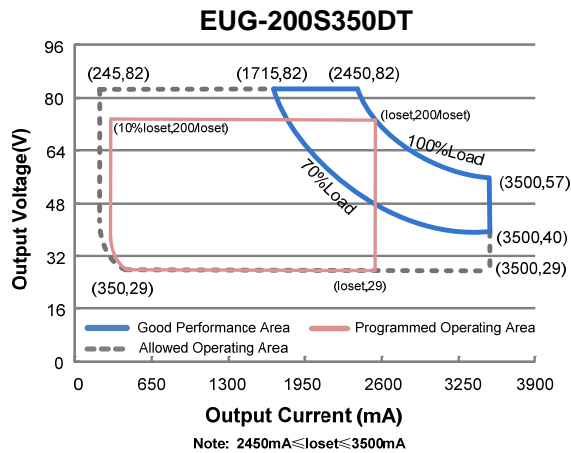
(3) Measured at full load and 220Vac input (see below "General Specifications" for details).

(4) All the models are certificated to KS, except EUG-200S105DT

(5) SELV Output.

## I-V Operation Area





## Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	90 Vac	-	305 Vac	127~300 Vdc
Input Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	0.75 MIU	UL8750; 277Vac/ 60Hz
	-	-	0.70 mA	IEC60598-1; 240Vac/ 60Hz
Input AC Current	-	-	2.64 A	Measured at full load and 100 Vac input.
	-	-	1.20 A	Measured at full load and 220 Vac input.
Inrush Current(I <sup>2</sup> t)	-	-	2.65 A <sup>2</sup> s	At 220Vac input, 25°C cold start, duration=1.36 ms, 10%I <sub>pk</sub> -10%I <sub>pk</sub> . See Inrush Current Waveform for the details.
PF	0.9	-	-	At 100-277Vac, 70%-100% Load (140-200W)
THD	-	-	20%	
THD	-	-	10%	At 220-240Vac, 50-60Hz, 75%-100% Load

## Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%loset	-	5%loset	At full load condition
Output Current Setting(loset) Range				
EUG-200S105DT	70 mA	-	1050 mA	
EUG-200S210DT	140 mA	-	2100 mA	
EUG-200S350DT	245 mA	-	3500 mA	
EUG-200S560DT	385 mA	-	5600 mA	
Output Current Setting Range with Constant Power				
EUG-200S105DT	700 mA	-	1050 mA	
EUG-200S210DT	1400 mA	-	2100 mA	
EUG-200S350DT	2450 mA	-	3500 mA	
EUG-200S560DT	3850 mA	-	5600 mA	

## Output Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Total Output Current Ripple (pk-pk)	-	5%I <sub>o</sub> max	10%I <sub>o</sub> max	At full load condition. 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)	-	2%I <sub>o</sub> max	-	At full load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%I <sub>o</sub> max	At full load condition
No Load Output Voltage				
EUG-200S105DT	-	-	330 V	
EUG-200S210DT	-	-	170 V	
EUG-200S350DT	-	-	95 V	
EUG-200S560DT	-	-	60 V	
Line Regulation	-	-	±0.5%	Measured at full load
Load Regulation	-	-	±1.5%	
Turn-on Delay Time	-	-	1.0 s	Measured at 120Vac input, 70%-100% Load
	-	-	0.5 s	Measured at 220Vac input, 70%-100% Load
Temperature Coefficient of I <sub>o</sub> set	-	-	0.03%/°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 typical at 25°C unless otherwise stated.

## General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 120 Vac input:				
EUG-200S105DT				
I <sub>o</sub> = 700mA	89.0%	91.0%	-	Measured at full load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
I <sub>o</sub> =1050mA	88.0%	90.0%	-	
EUG-200S210DT				
I <sub>o</sub> =1400mA	89.5%	91.5%	-	
I <sub>o</sub> =2100mA	88.0%	90.0%	-	
EUG-200S350DT				
I <sub>o</sub> =2450mA	88.5%	90.5%	-	
I <sub>o</sub> =3500mA	87.0%	89.0%	-	
EUG-200S560DT				
I <sub>o</sub> =3850mA	88.0%	90.0%	-	
I <sub>o</sub> =5600mA	87.0%	89.0%	-	
Efficiency at 220 Vac input:				
EUG-200S105DT				
I <sub>o</sub> = 700mA	92.0%	94.0%	-	Measured at full load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
I <sub>o</sub> =1050mA	91.0%	93.0%	-	
EUG-200S210DT				
I <sub>o</sub> =1400mA	92.0%	94.0%	-	
I <sub>o</sub> =2100mA	90.5%	92.5%	-	
EUG-200S350DT				
I <sub>o</sub> =2450mA	91.5%	93.5%	-	
I <sub>o</sub> =3500mA	89.5%	91.5%	-	
EUG-200S560DT				
I <sub>o</sub> =3850mA	90.5%	92.5%	-	
I <sub>o</sub> =5600mA	89.5%	91.5%	-	

## General Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 277 Vac input: EUG-200S105DT I <sub>o</sub> = 700mA I <sub>o</sub> =1050mA EUG-200S210DT I <sub>o</sub> =1400mA I <sub>o</sub> =2100mA EUG-200S350DT I <sub>o</sub> =2450mA I <sub>o</sub> =3500mA EUG-200S560DT I <sub>o</sub> =3850mA I <sub>o</sub> =5600mA	92.5% 91.5% 92.5% 91.0% 91.5% 90.0% 91.0% 90.0%	94.5% 93.5% 94.5% 93.0% 93.5% 92.0% 93.0% 92.0%	- - - - - - - -	Measured at full load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
MTBF	-	230,000 Hours	-	Measured at 220Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	95,000 Hours	-	Measured at 220Vac input, 80%Load and 70°C case temperature; See lifetime vs. T <sub>c</sub> curve for the details
Operating Case Temperature for Safety T <sub>c_s</sub>	-40°C	-	+90°C	
Operating Case Temperature for Warranty T <sub>c_w</sub>	-40°C	-	+80°C	
Storage Temperature	-40°C	-	+85°C	Humidity: 5%RH to 100%RH
Dimensions Inches (L × W × H) Millimeters (L × W × H)	7.87 × 2.66 × 1.56 200 × 67.5 × 39.5			
Net Weight	-	1100 g	-	

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

## Dimming Specifications

Parameter	Min.	Typ.	Max.	Notes	
Absolute Maximum Voltage on the V <sub>dim</sub> (+) Pin	-20 V	-	20 V		
Source Current on V <sub>dim</sub> (+)Pin	200 uA	300 uA	450 uA	V <sub>dim</sub> (+) = 0 V	
Dimming Output Range	EUG-200S105DT EUG-200S210DT EUG-200S350DT EUG-200S560DT	10%I <sub>o</sub> set	-	I <sub>o</sub> set	700 mA ≤ I <sub>o</sub> set ≤ 1050 mA 1400 mA ≤ I <sub>o</sub> set ≤ 2100 mA 2450 mA ≤ I <sub>o</sub> set ≤ 3500 mA 3850 mA ≤ I <sub>o</sub> set ≤ 5600 mA
	EUG-200S105DT EUG-200S210DT EUG-200S350DT EUG-200S560DT	70 mA 140 mA 245 mA 385 mA	-	I <sub>o</sub> set	70 mA ≤ I <sub>o</sub> set < 700 mA 140 mA ≤ I <sub>o</sub> set < 1400 mA 245 mA ≤ I <sub>o</sub> set < 2450 mA 385 mA ≤ I <sub>o</sub> set < 3850 mA
Recommended Dimming Range for 0-5V	0 V	-	5 V	Dimming mode set to 0-5V in PC interface.	
Recommended Dimming Range for 0-10V	0 V	-	10 V	Default 0-10V dimming mode with positive logic.	

## Dimming Specifications (Continued)

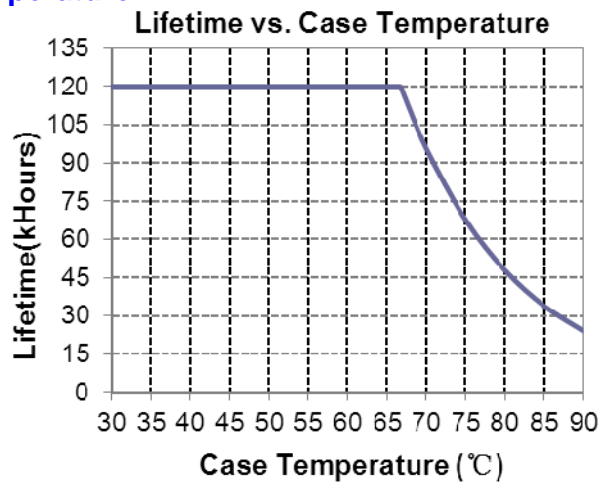
Parameter	Min.	Typ.	Max.	Notes
PWM_in High Level	3 V	-	10 V	Dimming mode set to PWM in PC interface.
PWM_in Low Level	-0.3 V	-	0.6 V	
PWM_in Frequency Range	200 Hz	-	2 KHz	
PWM_in Duty Cycle	1%	-	99%	

## Safety & EMC Compliance

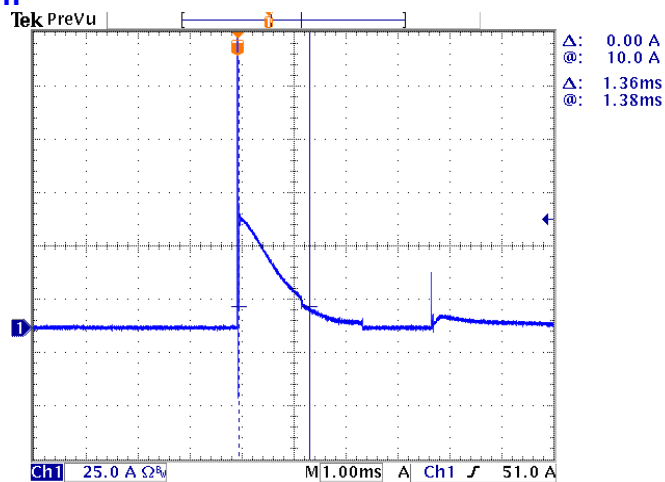
Safety Category	Standard
UL/CUL	UL8750, CAN/CSA-C22.2 No. 250.13-12
CE	EN 61347-1, EN61347-2-13
EMI Standards	Notes
EN 55015	Conducted emission Test & Radiated emission Test
EN 61000-3-2	Harmonic current emissions
EN 61000-3-3	Voltage fluctuations & flicker
FCC Part 15	ANSI C63.4:2009 Class B
	This device 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
EN 61000-4-5	Surge Immunity Test: AC Power Line: line to line 6 kV, line to earth 10 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:** To perform electric strength (hi-pot) testing, the “GDT ground disconnect” (nut 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.

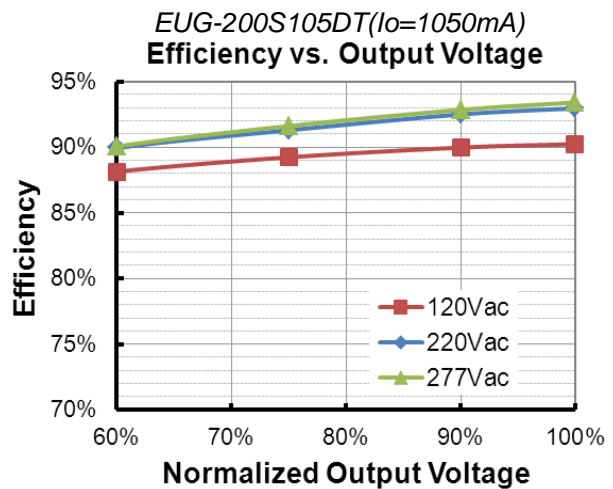
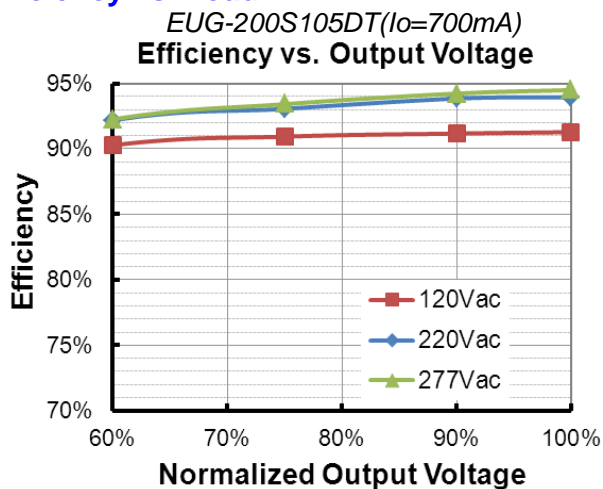
## Lifetime vs. Case Temperature

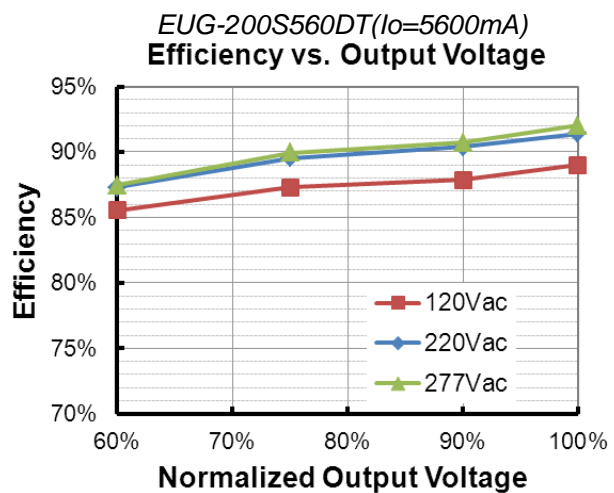
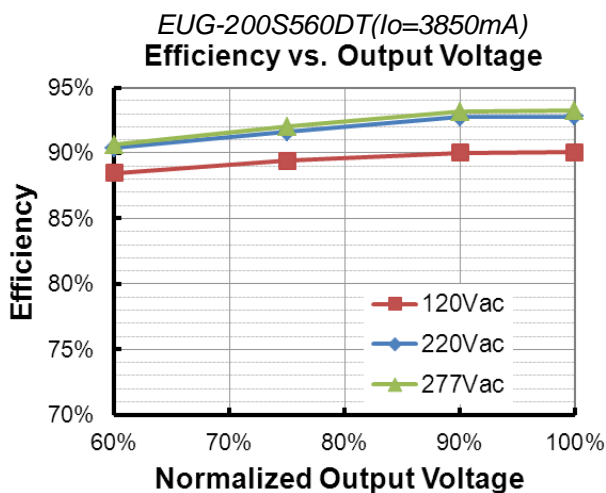
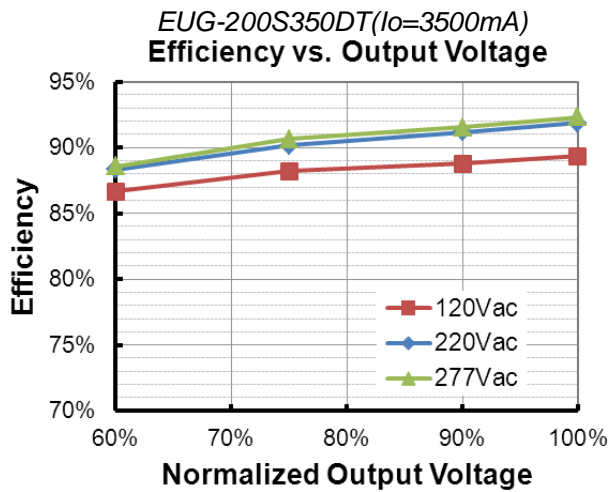
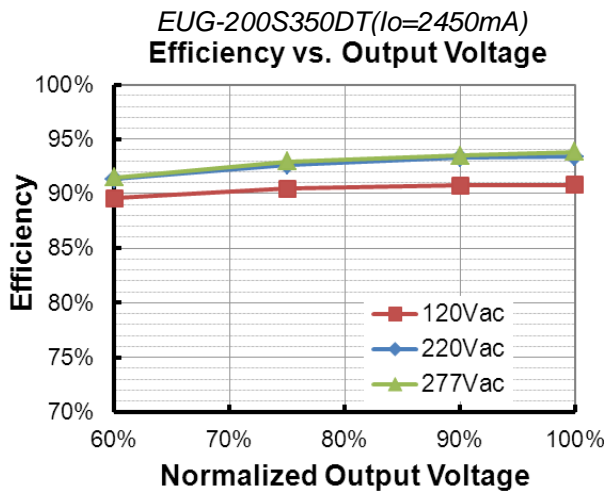
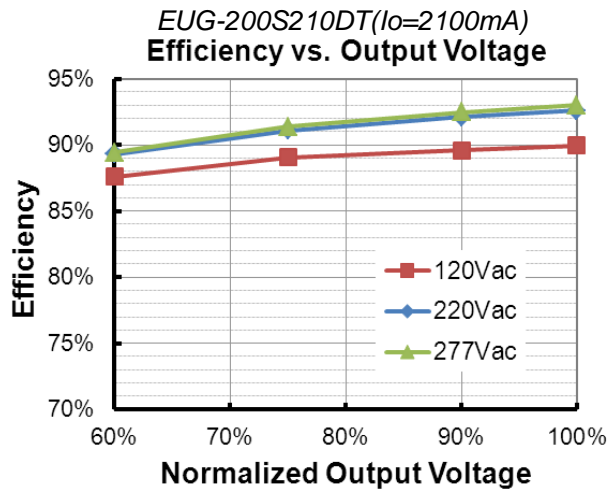
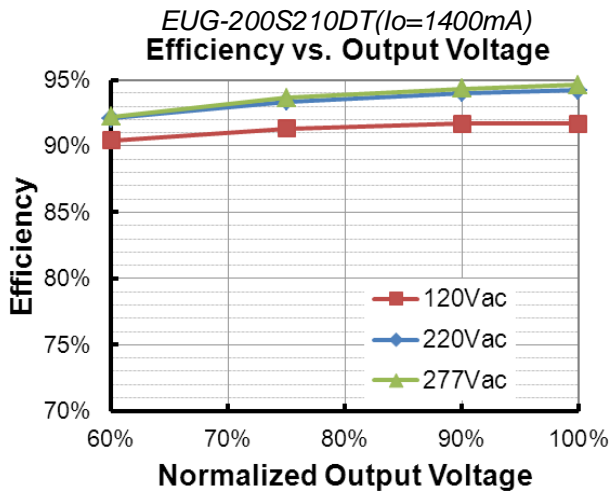


## Inrush Current Waveform

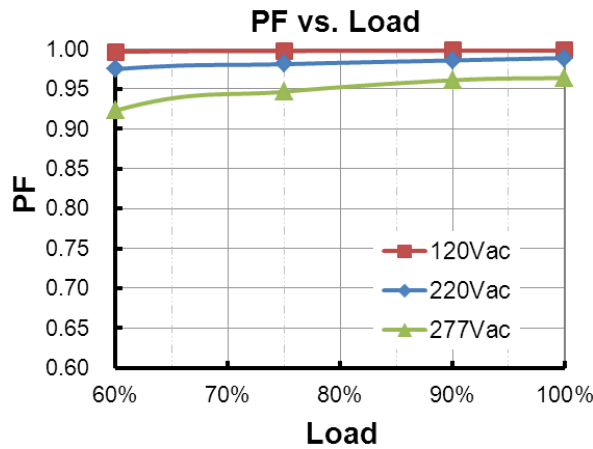


## Efficiency vs. Load

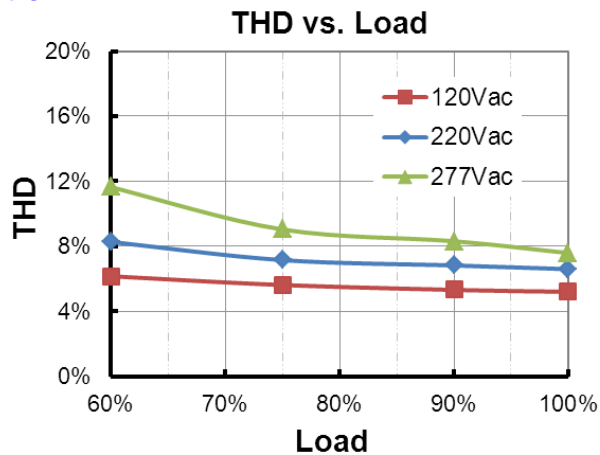




## Power Factor



## Total Harmonic Distortion



## Protection Functions

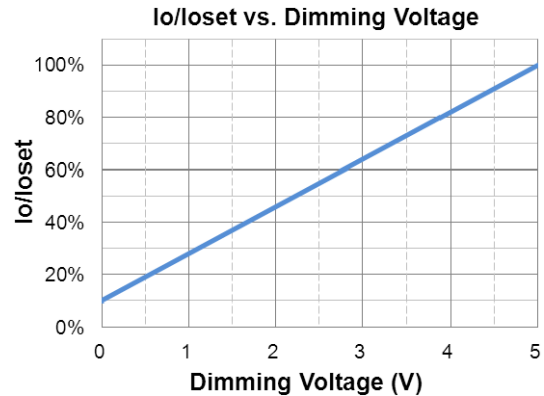
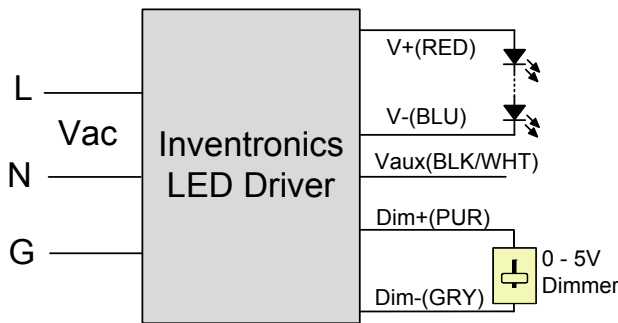
Parameter	Notes
Over Temperature Protection	Decreases output current, returning to normal after over temperature is removed.
Short Circuit Protection	Auto Recovery. No damage will occur when any output is short circuited. The output shall return to normal when the fault condition is removed.
Over Voltage Protection	Limits output voltage at no load and in case the normal voltage limit fails.

## Dimming

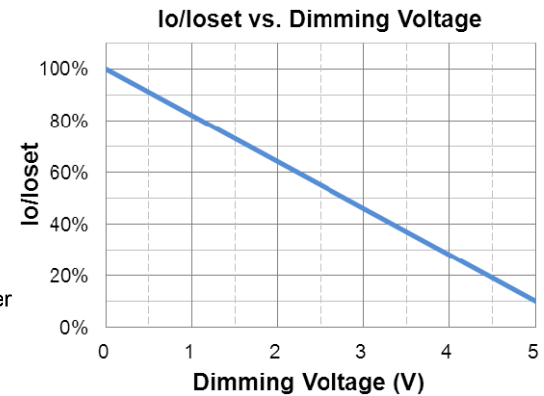
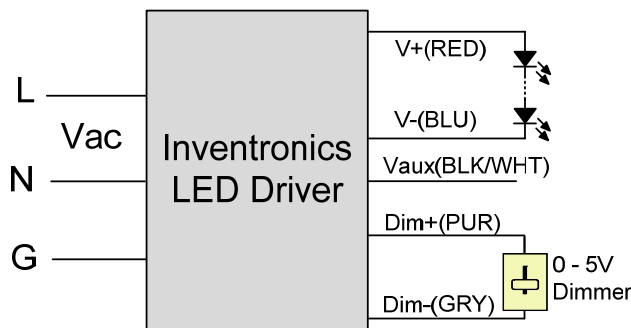
### ● 0-5V Dimming

The recommended implementation of the dimming control is provided below.





**Implementation 1: Positive logic**



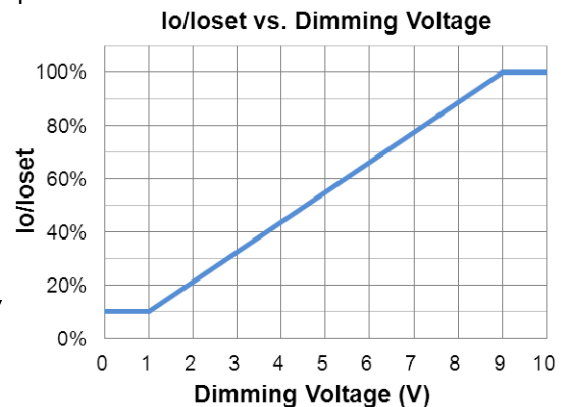
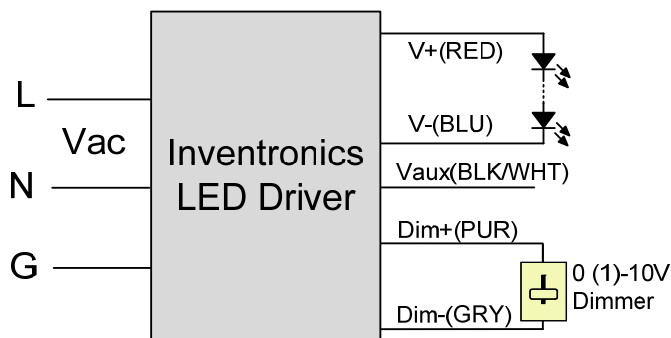
**Implementation 2: Negative logic**

**Notes:**

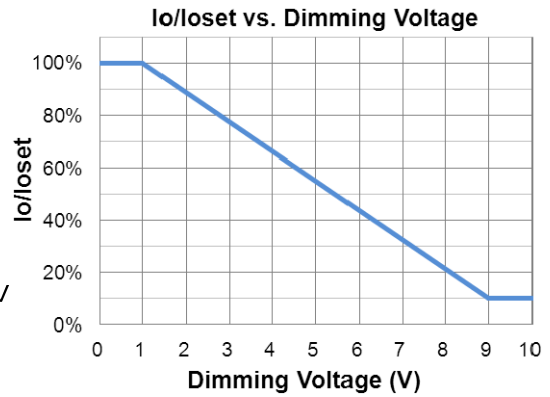
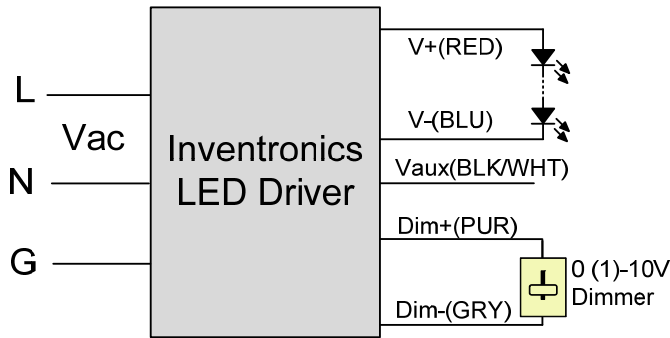
1. The dimmer can also be replaced by an active 0-5V voltage source signal or passive components like resistors and zener.
2. Do NOT connect Dim- to the output V- or V+, otherwise the driver will not work properly.
3. If 0-5V dimming is not used, Dim + should be open.
4. When 0-5V negative logic dimming mode and Dim+ is open, the driver will output maximum current.

● **0-10V Dimming**

The recommended implementation of the dimming control is provided below.



**Implementation 3: Positive logic**

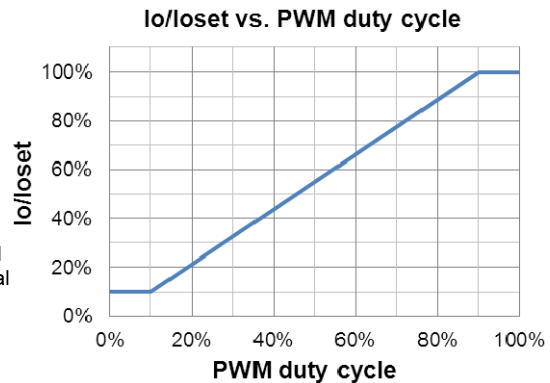
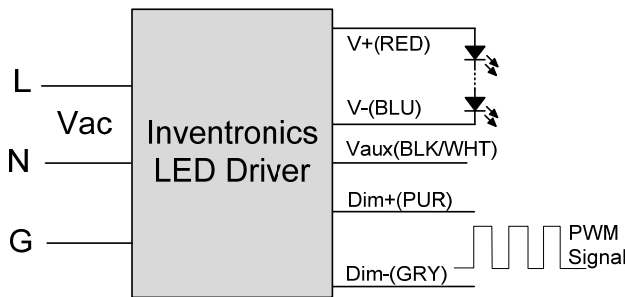


**Implementation 4: Negative logic**

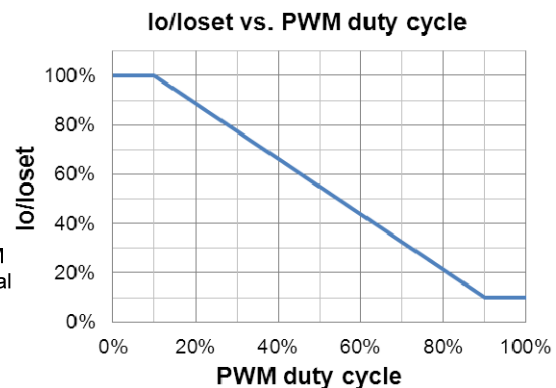
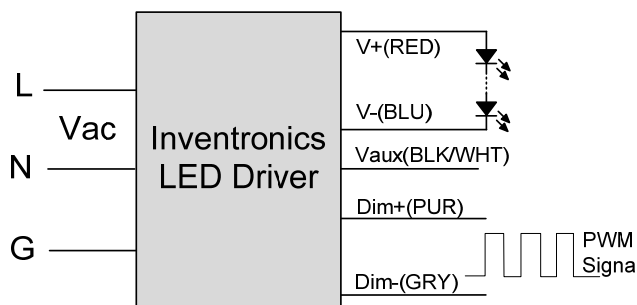
**Notes:**

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.
4. When 0-10V negative logic dimming mode and Dim+ is open, the driver will output minimum current.

● **PWM Dimming**



**Implementation 5: Positive logic**

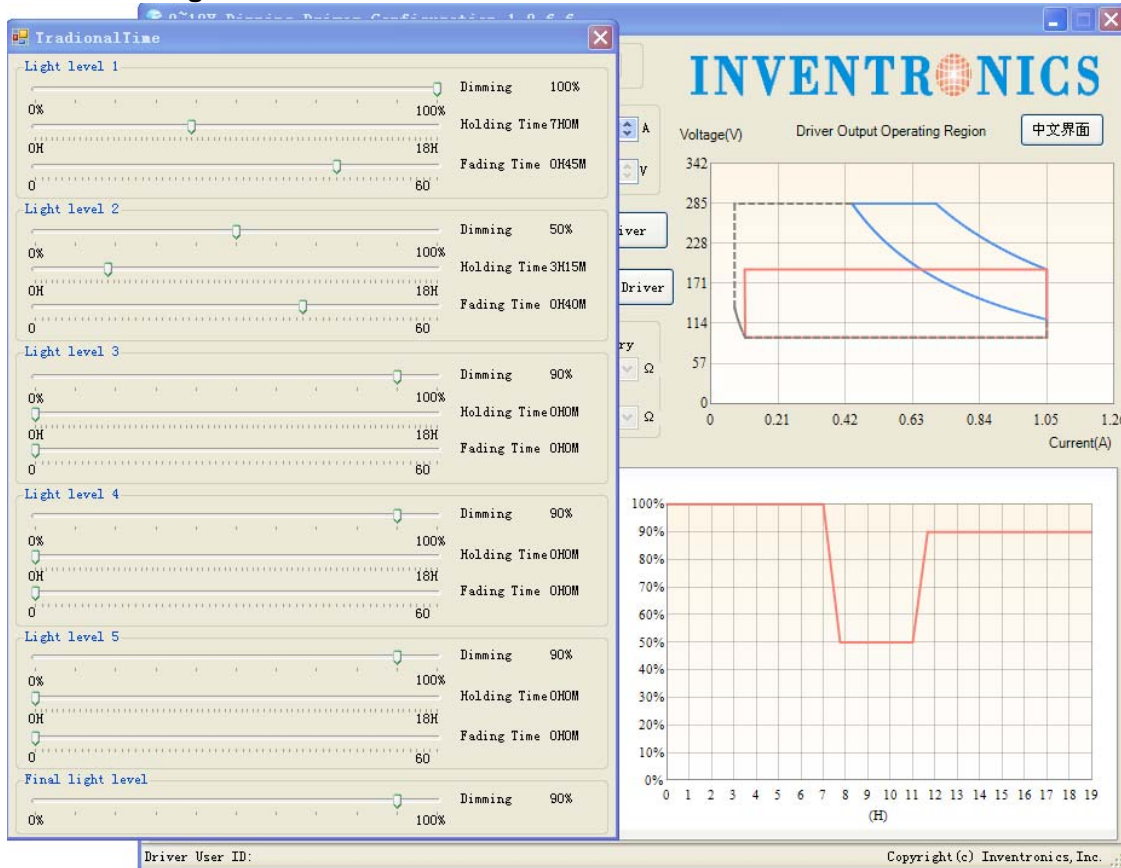


**Implementation 6: Negative logic**

**Notes:**

- 1. Do NOT connect Dim- to the output V- or V+, otherwise the driver will not work properly.
- 2. If PWM dimming is not used, Dim + should be open.
- 3. When PWM negative logic dimming mode and Dim+ is open, the driver will output minimum current.

● **Time Dimming**



Set the timing curve by pulling the sliders.



## Revision History

Change Date	Rev.	Description of Change		
		Item	From	To
2016-01-05	A	Datasheets Release	/	/