

Features

- Ultra High Efficiency (Up to 93.0%)
- 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 / Wet Location
In Wet Locations must be Built-In
- Class 2 & SELV Output
- TYPE HL, for use in a Class I, Division 2 hazardous
(Classified) location



Description

The EUG-096SxxxDT series is a 96W, constant-current, programmable outdoor LED driver that operates from 90-305 Vac input with excellent power factor. It is created for low bay, tunnel and street 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
							120Vac	220Vac	
70-1050mA	700-1050mA	700 mA	90 ~ 305 Vac 100 ~ 300 Vdc	48~137Vdc	96 W	93.0%	0.99	0.96	EUG-096S105DT
140-2100mA	1400-2100mA	2100 mA	90 ~ 305 Vac 100 ~ 300 Vdc	24 ~ 69Vdc	96 W	92.0%	0.99	0.96	EUG-096S210DT(4)
245-3500mA	2450-3500mA	2800 mA	90 ~ 305 Vac 100 ~ 300 Vdc	14 ~ 39Vdc	96 W	91.0%	0.99	0.96	EUG-096S350DT(5)

Notes: (1) Output current range with constant power at 96W

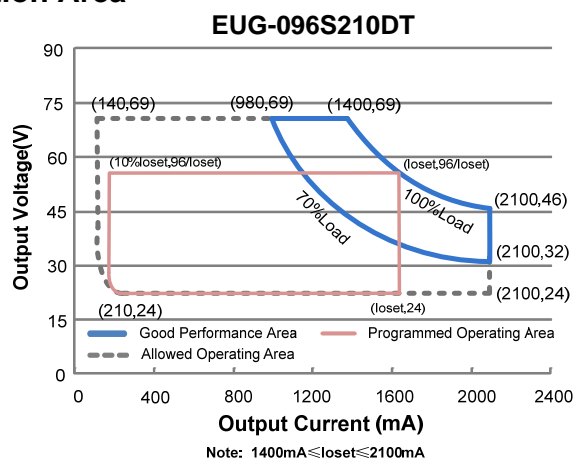
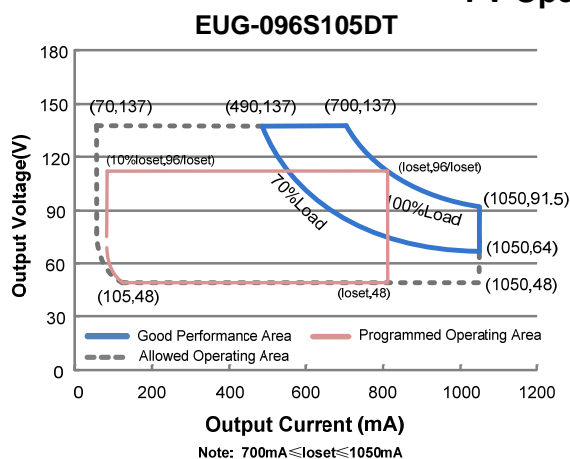
(2) UL, FCC certified input voltage range: 100-277Vac or 100-300Vdc; other certified input voltage range except UL & FCC: 100-240Vac /100-250Vdc.

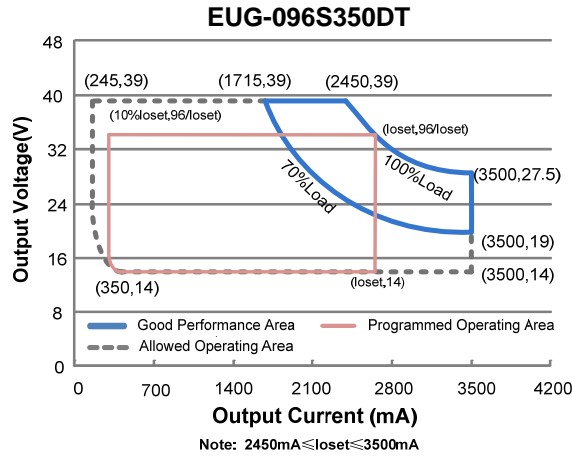
(3) Measured at full load and 220Vac input (see below "General Specifications" for details).

(4) SELV Output.

(5) Class 2 & SELV Output.

I-V Operation Area





Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	90 Vac	-	305 Vac	100-300Vdc
Input Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	0.75 MIU	UL8750; 277Vac/ 60Hz
	-	-	0.70 mA	IEC60598-1; 240Vac/ 60Hz
Input AC Current	-	-	1.32 A	Measured at full load and 100 Vac input.
	-	-	0.60 A	Measured at full load and 220 Vac input.
Inrush Current(I^2t)	-	-	1.65 A ² s	At 220Vac input, 25°C cold start, duration=760 μs, 10%l _{pk} -10%l _{pk} . See Inrush Current Waveform for the details.
PF	0.9	-	-	At 100-277Vac, 70%-100% Load (67-96W)
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-096S105DT	70 mA	-	1050 mA	
EUG-096S210DT	140 mA	-	2100 mA	
EUG-096S350DT	245 mA	-	3500 mA	
Output Current Setting Range with Constant Power				
EUG-096S105DT	700 mA	-	1050 mA	
EUG-096S210DT	1400 mA	-	2100 mA	
EUG-096S350DT	2450 mA	-	3500 mA	
Total Output Current Ripple (pk-pk)	-	5%lomax	10%lomax	At full load condition, 20 MHz BW

Output Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Output Current Ripple at < 200 Hz (pk-pk)	-	2%I _o max	-	At full load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%I _o max	At full load condition
No Load Output Voltage				
EUG-096S105DT	-	-	180 V	
EUG-096S210DT	-	-	90 V	
EUG-096S350DT	-	-	50 V	
Line Regulation	-	-	±0.5%	Measured at full load
Load Regulation	-	-	±1.5%	
Turn-on Delay Time	-	-	1.0 s	Measured at 120Vac input.
	-	-	0.5 s	Measured at 220Vac input.
Temperature Coefficient of I _o set	-	-	0.03%/°C	Case temperature = 0°C ~T _c 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-096S105DT				
I _o = 700mA	88.5%	91.5%	-	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 _o =1050mA	87.0%	90.0%	-	
EUG-096S210DT				
I _o =1400mA	87.0%	90.0%	-	
I _o =2100mA	87.0%	90.0%	-	
EUG-096S350DT				
I _o =2450mA	86.0%	89.0%	-	
I _o =3500mA	85.5%	88.5%	-	
Efficiency at 220 Vac input:				
EUG-096S105DT				
I _o = 700mA	91.0%	93.0%	-	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 _o =1050mA	89.0%	91.0%	-	
EUG-096S210DT				
I _o =1400mA	89.5%	91.5%	-	
I _o =2100mA	90.0%	92.0%	-	
EUG-096S350DT				
I _o =2450mA	89.0%	91.0%	-	
I _o =3500mA	88.0%	90.0%	-	
Efficiency at 277 Vac input:				
EUG-096S105DT				
I _o = 700mA	91.5%	93.5%	-	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 _o =1050mA	89.5%	91.5%	-	
EUG-096S210DT				
I _o =1400mA	90.0%	92.0%	-	
I _o =2100mA	90.5%	92.5%	-	
EUG-096S350DT				
I _o =2450mA	89.5%	91.5%	-	
I _o =3500mA	88.5%	90.5%	-	

General Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
MTBF	-	339,000 Hours	-	Measured at 220Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	80,000 Hours	-	Measured at 220Vac 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	
Storage Temperature	-40°C	-	+85°C	Humidity: 5%RH to 100%RH
Dimensions Inches (L × W × H) Millimeters (L × W × H)	6.85 × 2.66 × 1.44 174 × 67.5 × 36.5			
Net Weight	-	820 g	-	

Note: All specifications are 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		200 uA	300 uA	450 uA	Vdim(+) = 0 V
Dimming Output Range	EUG-096S105DT EUG-096S210DT EUG-096S350DT	10%loset	-	loset	700mA ≤ loiset ≤ 1050mA 1400mA ≤ loiset ≤ 2100mA 2450mA ≤ loiset ≤ 3500mA
	EUG-096S105DT EUG-096S210DT EUG-096S350DT	70mA 140mA 245mA	-	loset	70mA ≤ loiset < 700mA 140mA ≤ loiset < 1400mA 245mA ≤ loiset < 2450mA
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.
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

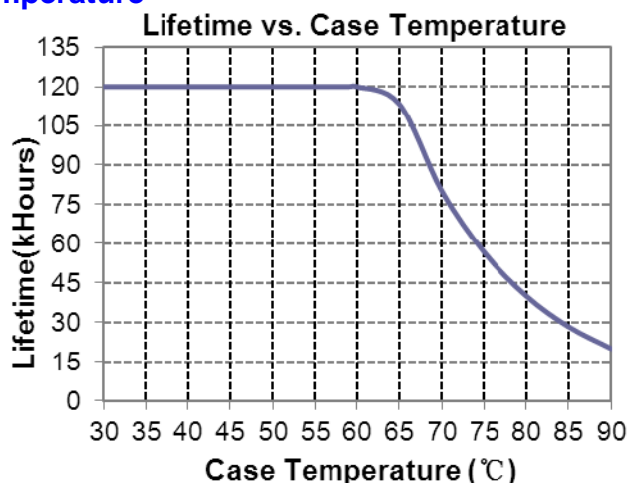
Safety Category	Standard
UL/CUL	UL 8750, UL 1310, CAN/CSA-C22.2 No. 250.13-12, CAN/CSA-C22.2 No. 223-M91
CE	EN 61347-1, EN61347-2-13

Safety & EMC Compliance (Continued)

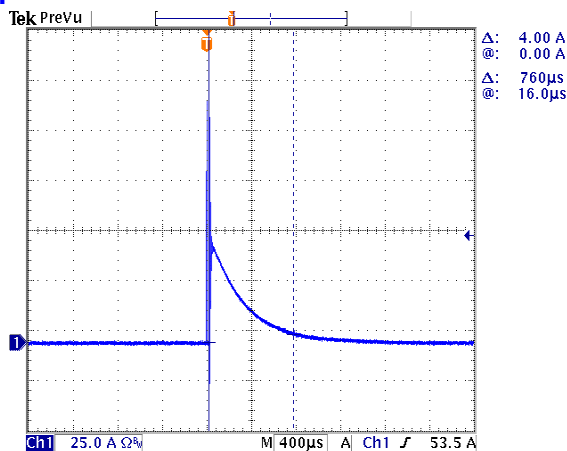
EMI Standards	Notes
EN 55015	Conducted emission Test & Radiated emission Test
EN 61000-3-2	Harmonic current emissions
EN 61000-3-3	Voltage fluctuations & flicker
FCC Part 15	ANSI C63.4:2009 Class B
	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (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 complete, these items must be reinstalled to restore line-to-earth surge protection and secure the end cap.

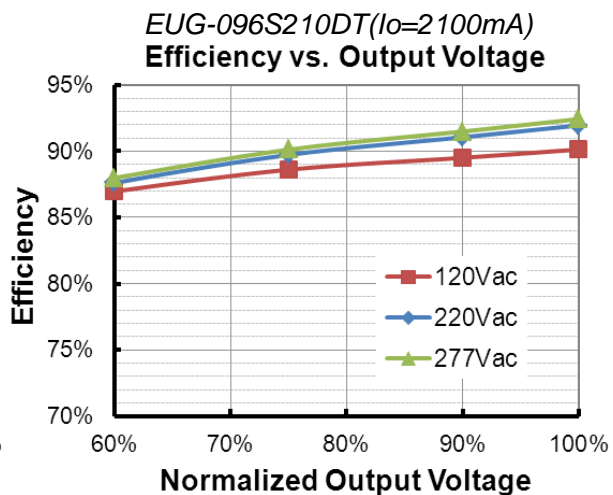
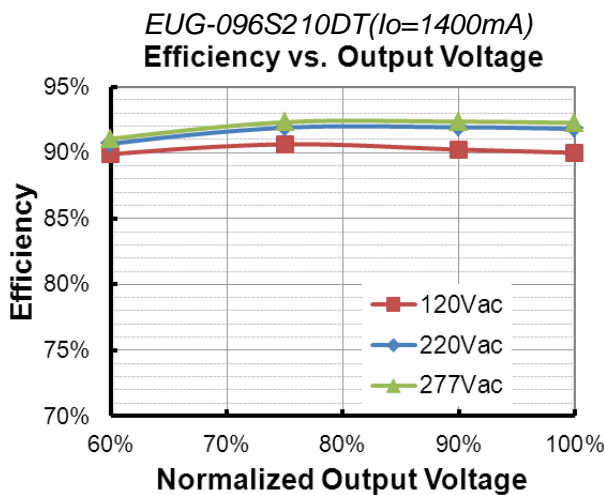
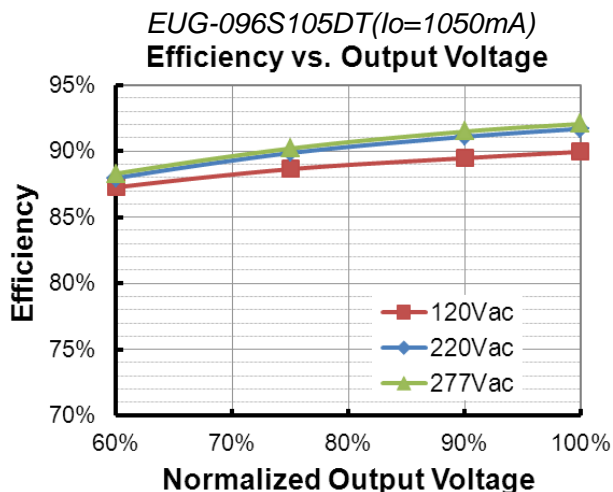
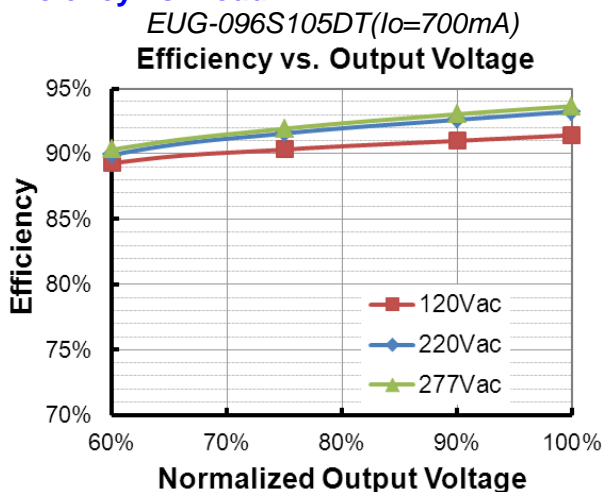
Lifetime vs. Case Temperature

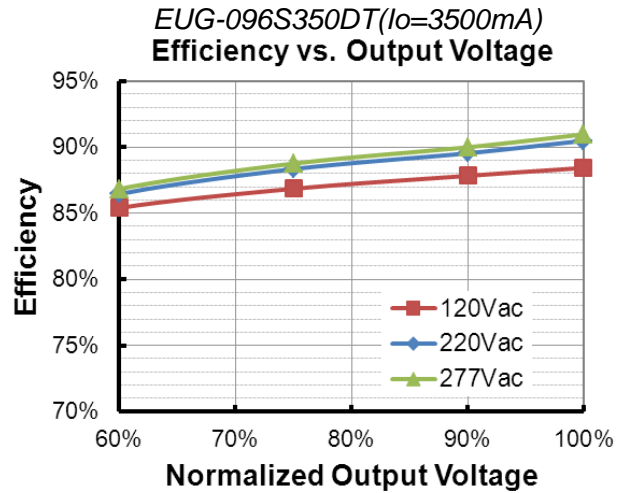
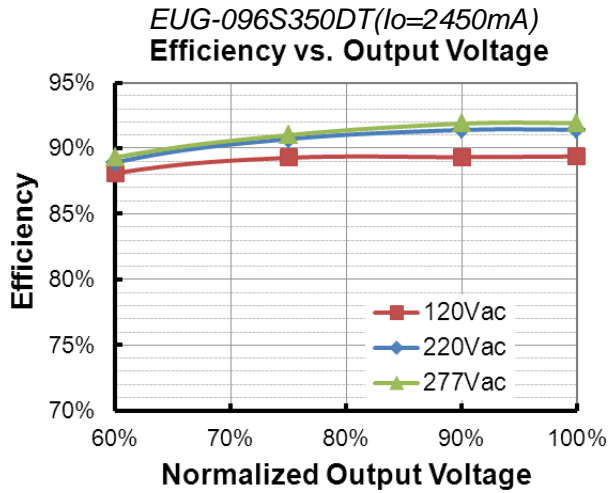


Inrush Current Waveform

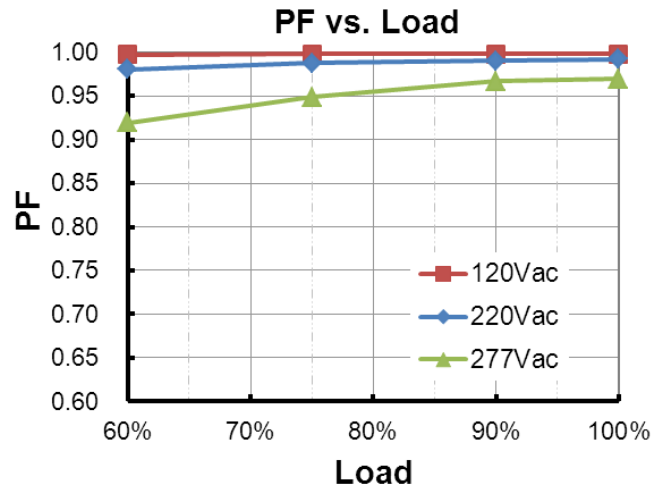


Efficiency vs. Load

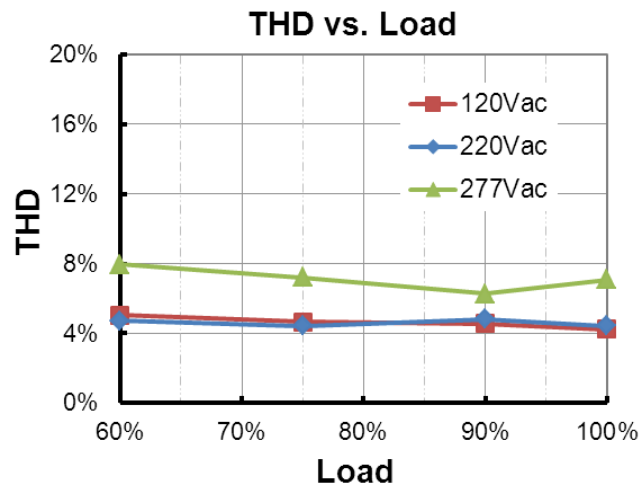




Power Factor



Total Harmonic Distortion



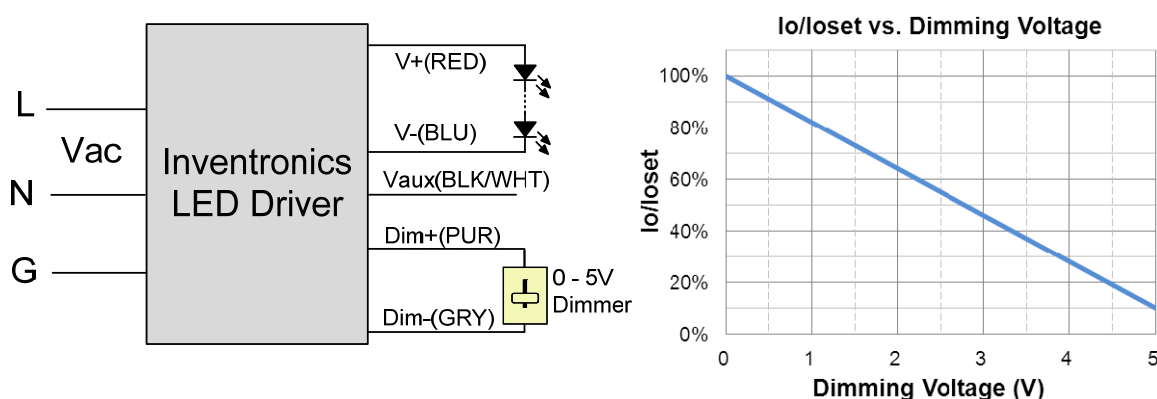
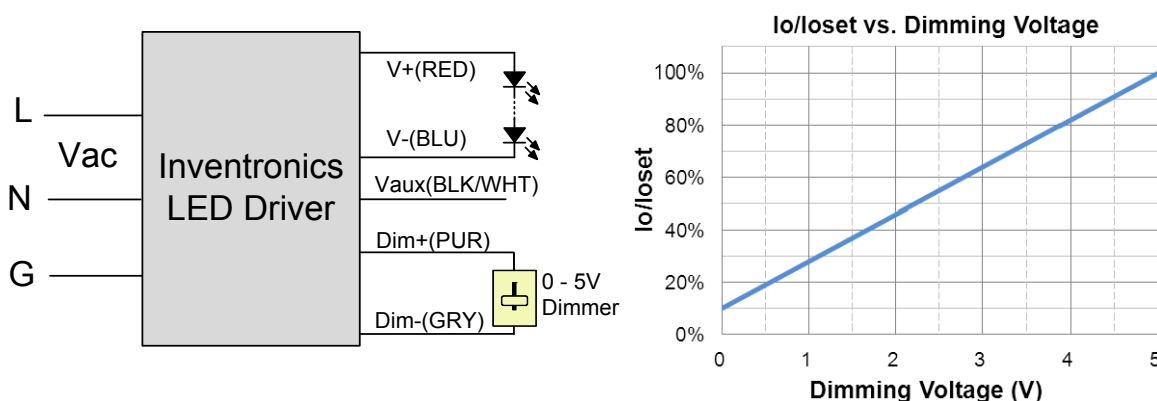
Protection Functions

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.

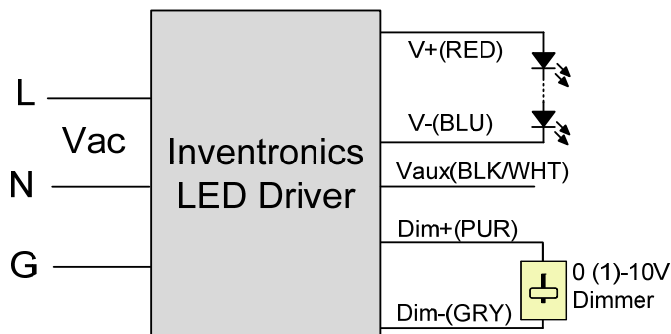


Notes:

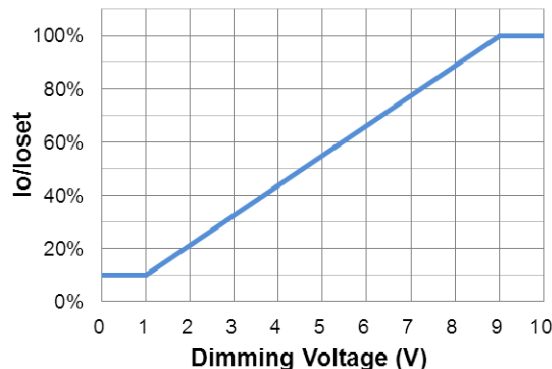
1. The dimmer can also be replaced by an active 0-5V voltage source signal or passive components like resistors and zener.
2. Do NOT connect Dim- to the output V- or V+, otherwise the driver will not work properly.
3. If 0-5V dimming is not used, Dim + should be open.
4. When 0-5V negative logic dimming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

● 0-10V Dimming

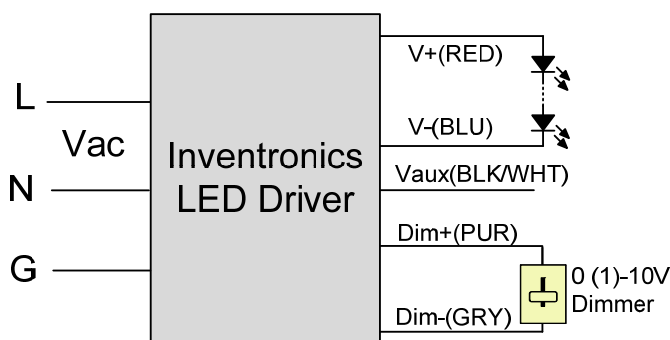
The recommended implementation of the dimming control is provided below.



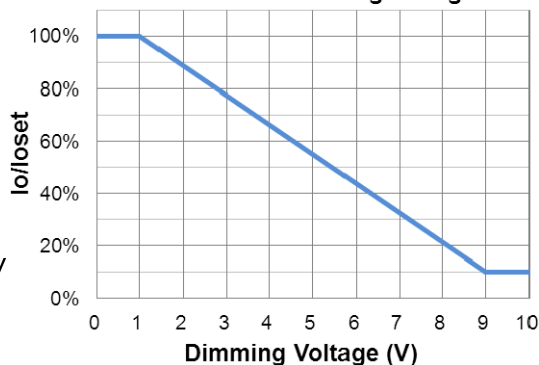
Io/loset vs. Dimming Voltage



Implementation 3: Positive logic



Io/loset vs. Dimming Voltage

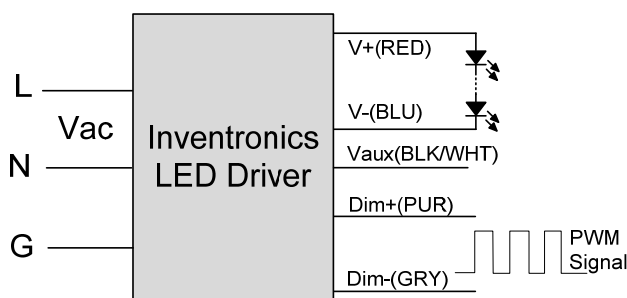


Implementation 4: Negative logic

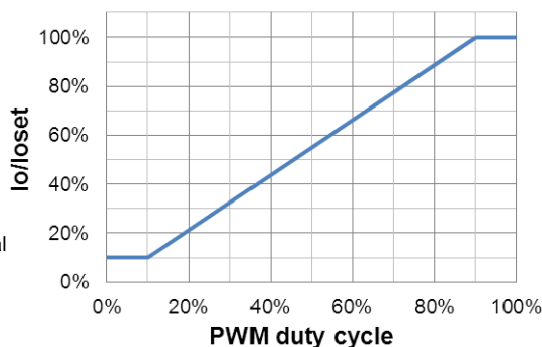
Notes:

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.

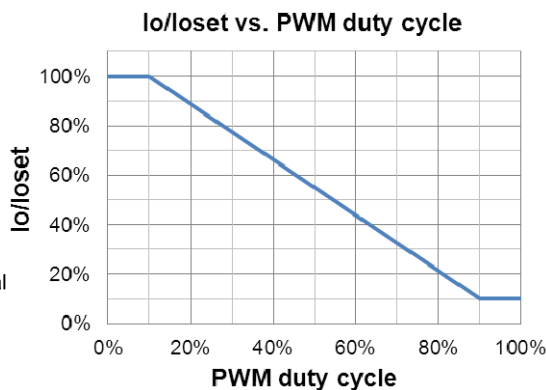
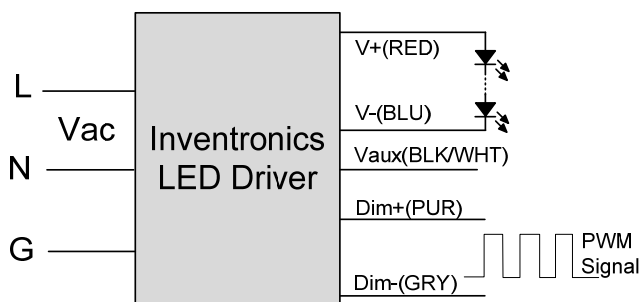
● PWM Dimming



Io/loset vs. PWM duty cycle



Implementation 5: Positive logic

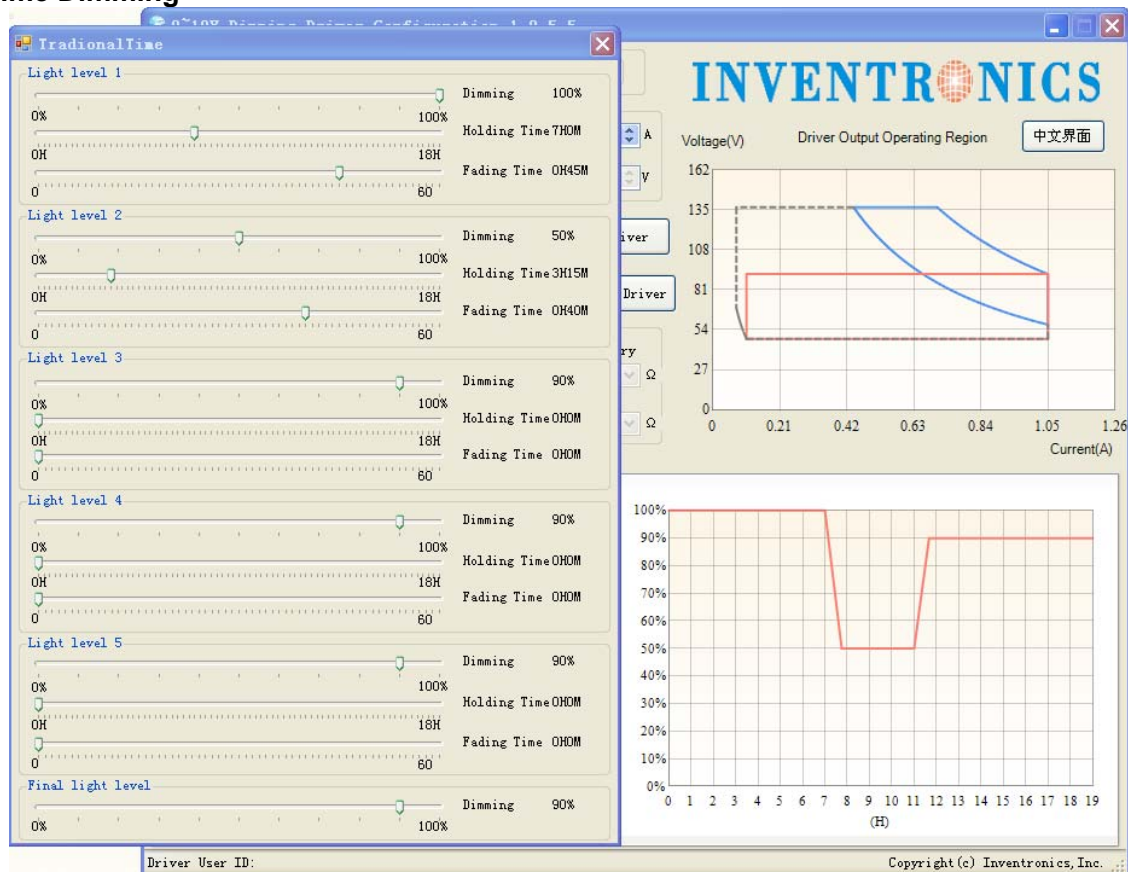


Implementation 6: Negative logic

Notes:

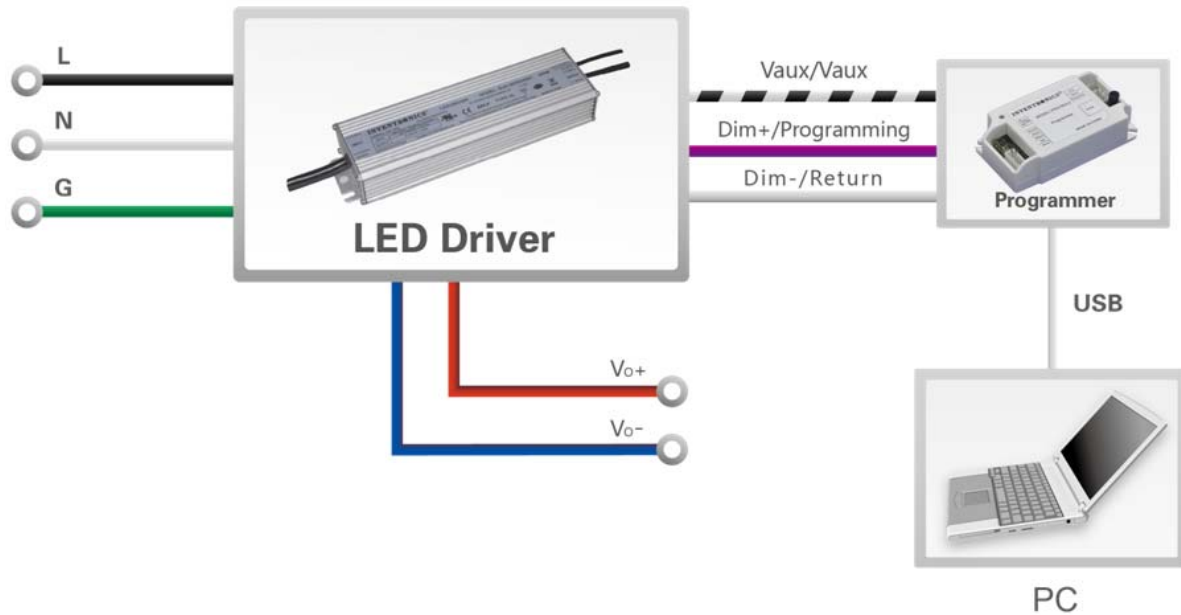
1. Do NOT connect Dim- to the output V- or V+, otherwise the driver will not work properly.
2. If PWM dimming is not used, Dim + should be open.
3. When PWM negative logic dimming mode and Dim+ is open, the driver will output minimum current.

● Time Dimming



Set the timing curve by pulling the sliders.

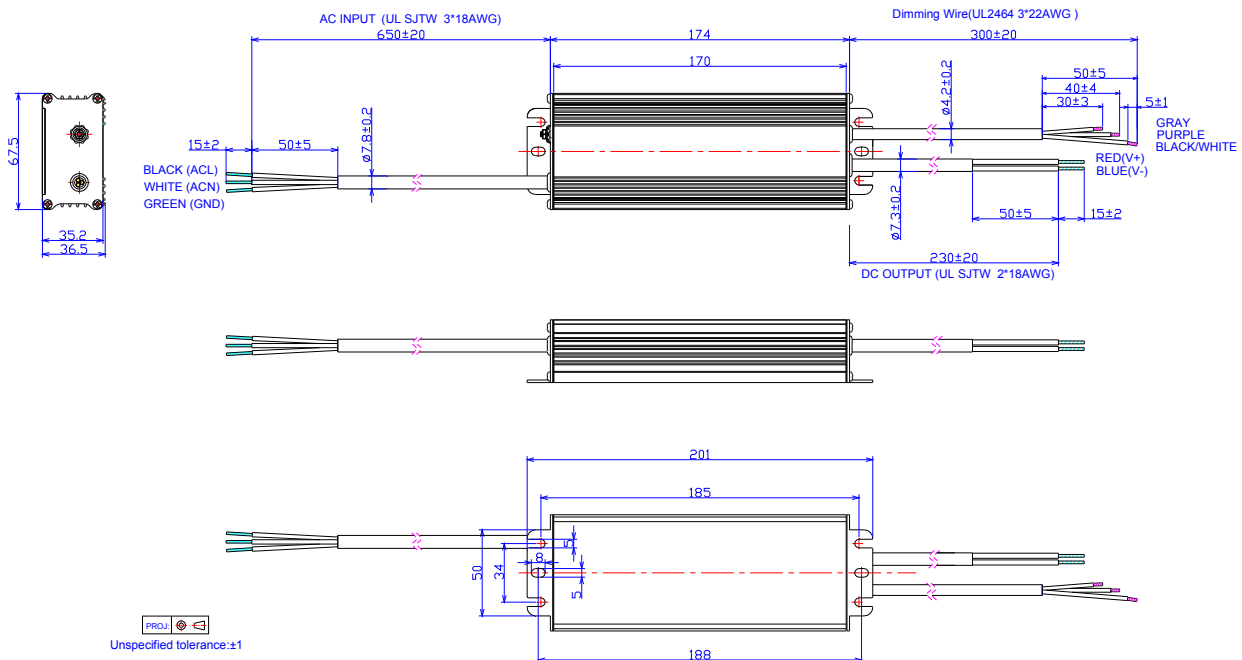
Programming Connection Diagram



Note: The driver does not need to be powered on during the programming process.

- Please refer to [PRG-MUL2](#) Multi-Programmer datasheet for details.

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
2015-07-08	A	Datasheets Release	/	/