

Features

- Ultra High Efficiency (Up to 94%)
- Full Power at Wide Output Current Range (Constant Power)
- Compact Package Design
- 0-5V/0-10V/PWM/Timer Dimmable
- Input Surge Protection: DM 6 kV, CM 10 kV
- All-Around Protection: OVP, SCP, OTP
- Waterproof (IP67)
- SELV Output



Description

The EBD-240SxxxDV series is a 240W, constant-current, programmable LED driver that operates from 176-305 Vac input with excellent power factor. It is created for many lighting applications including high bay, high mast and roadway, 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 Range	Full-Power Current Range (1)	Default Output Current	Input Voltage Range (2)	Output Voltage Range	Max. Output Power	Typical Efficiency (3)	Power Factor (3)	Model Number (4)
70-1050 mA	700-1050 mA	700 mA	176~305 Vac	155~343 Vdc	240 W	94.0%	0.98	EBD-240S105DV
420-6600 mA	4200-6600mA	6600 mA	176~305 Vac	26 ~ 57 Vdc	240 W	92.5%	0.98	EBD-240S660DV ⁽⁵⁾

Notes: (1) Output current range with constant power at 240W

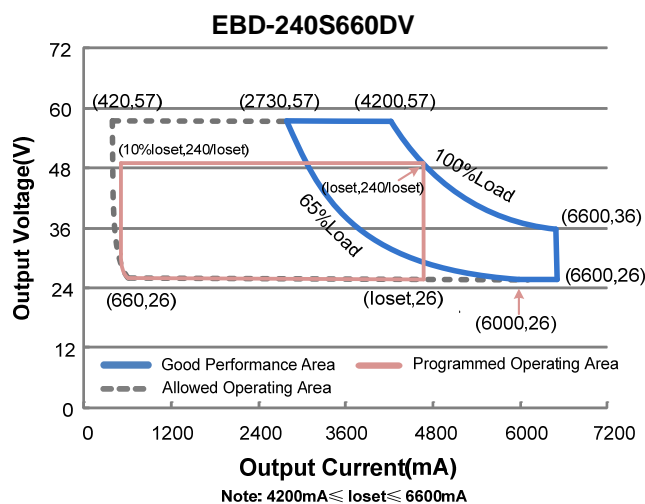
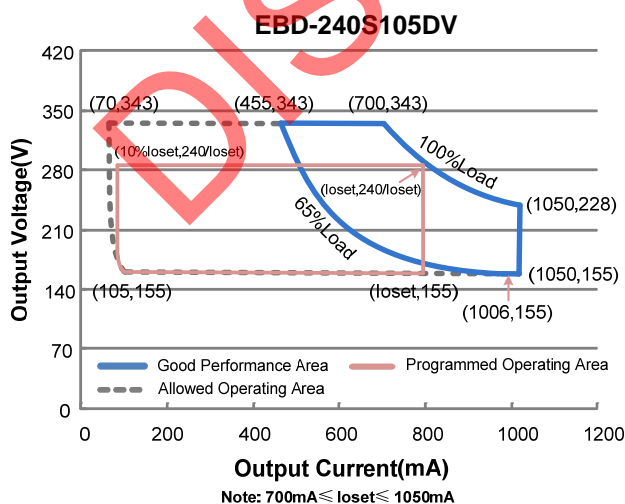
(2) CCC certified input voltage range: 220/230/240 Vac; otherwise: 200-240 Vac

(3) Measured at 100% load and 220Vac input (see below "General Specifications" for details).

(4) All the models are certificated to KS, except EBD-240S105DV

(5) SELV output

I-V Operation Area



Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	176 Vac	-	305 Vac	
Input Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	0.70 mA	IEC60598-1; 240Vac/ 60Hz, grounding effectively
Input AC Current	-	-	1.57 A	Measured at 100% load and 220 Vac input.
Inrush Current(I^2t)	-	-	3.0 A ² s	At 220Vac input, 25°C cold start, duration=1.78 ms, 10%Ipk-10%Ipk. See Inrush Current Waveform for the details.
PF	0.90	-	-	At 220-240Vac, 50-60Hz, 65%-100% Load
THD	-	-	20%	(156-240W)

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%loset	-	5%loset	At 100% load condition
Output Current Setting(loset) Range				
EBD-240S105DV	70 mA	-	1050 mA	
EBD-240S660DV	420 mA	-	6600 mA	
Output Current Setting Range with Constant Power				
EBD-240S105DV	700 mA	-	1050 mA	
EBD-240S660DV	4200 mA	-	6600 mA	
Total Output Current Ripple (pk-pk)	-	5%Iomax	10%Iomax	At 100% load condition, 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)	-	2%Iomax	-	At 100% load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%Iomax	At 100% load condition
No Load Output Voltage				
EBD-240S105DV	-	-	370 V	
EBD-240S660DV	-	-	70 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. 65%-100% Load
Temperature Coefficient	-	0.03%/°C	-	Case temperature = 0°C ~Tc 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 220 Vac input: EBD-240S105DV $I_o=700\text{ mA}$ $I_o=1050\text{ mA}$ EBD-240S660DV $I_o=4200\text{ mA}$ $I_o=6600\text{ mA}$	92.0% 91.0%	94.0% 93.0%	- - - -	Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
MTBF	-	200,000 Hours	-	Measured at 220Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	85,000 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)	8.03 × 2.66 × 1.56 204 × 67.5 × 39.7			With mounting ear 8.86 × 2.66 × 1.56 225 × 67.5 × 39.7
Net Weight	-	1220 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	EBD-240S105DV EBD-240S660DV	10%Io _{set}	-	Io _{set}	700mA ≤ Io _{set} ≤ 1050mA 4200mA ≤ Io _{set} ≤ 6600mA
	EBD-240S105DV EBD-240S660DV	70mA 420mA	-	Io _{set}	70mA ≤ Io _{set} < 700mA 420mA ≤ Io _{set} < 4200mA
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%	

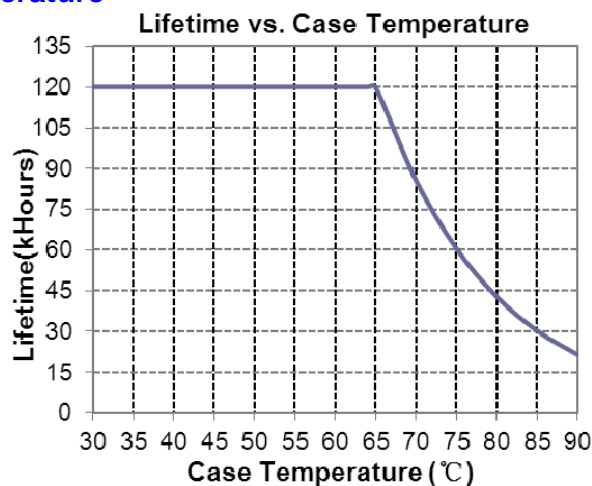
Safety & EMC Compliance

Safety Category	Standard
TUV & CE	EN 61347-1, EN61347-2-13
CB	IEC 61347-1, IEC 61347-2-13
CCC	GB 19510.1, GB 19510.14
KS	KS C 7655
EMI Standards	Notes
EN 55015/GB 17743 ⁽¹⁾	Conducted emission Test & Radiated emission Test
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: Differential Mode 6 kV, Common Mode 10 kV ⁽²⁾
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

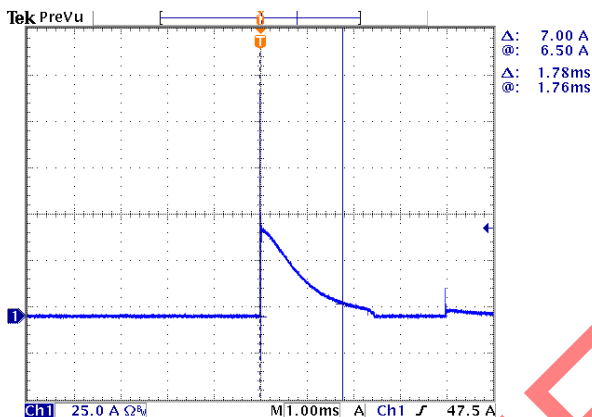
Note: (1) This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.

(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

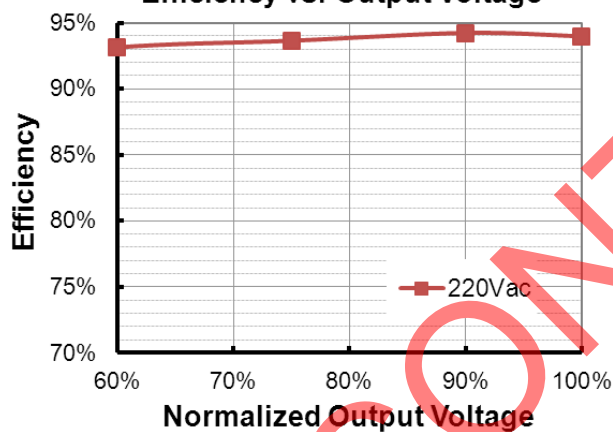


Inrush Current Waveform

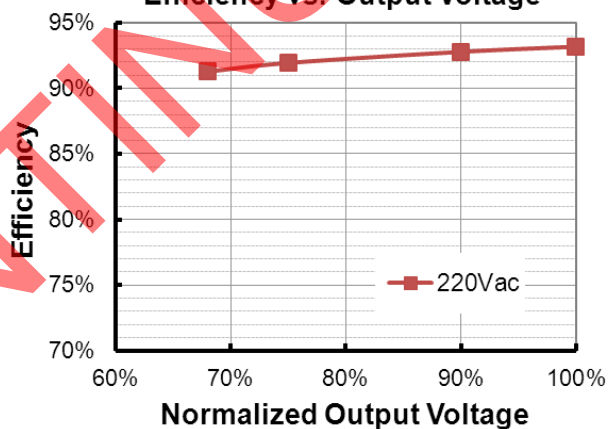


Efficiency vs. Load

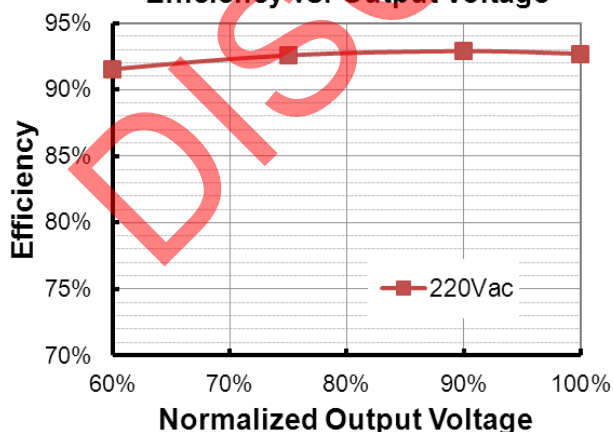
EBD-240S105DV($I_o=700mA$)
Efficiency vs. Output Voltage



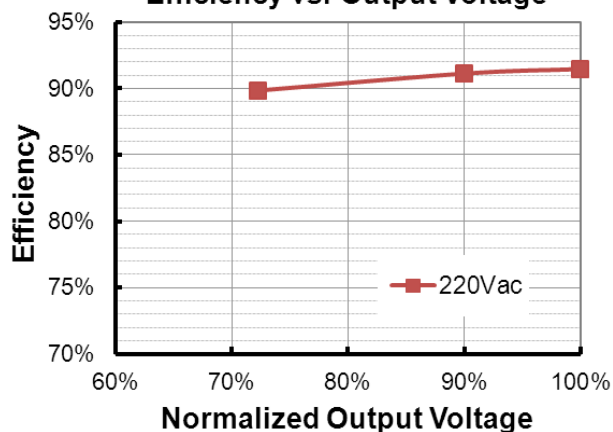
EBD-240S105DV($I_o=1050mA$)
Efficiency vs. Output Voltage



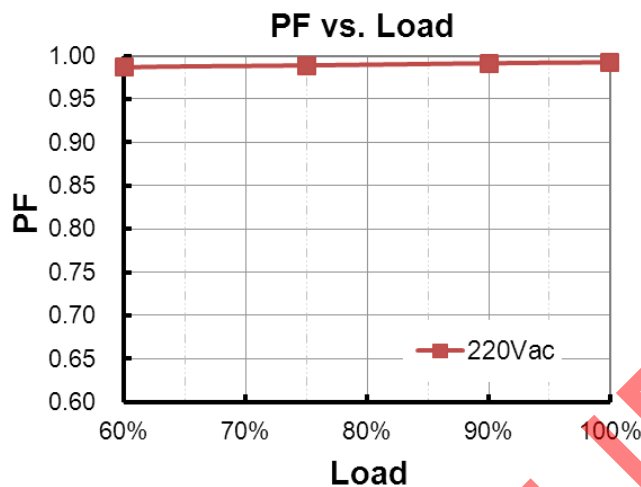
EBD-240S660DV($I_o=4200mA$)
Efficiency vs. Output Voltage



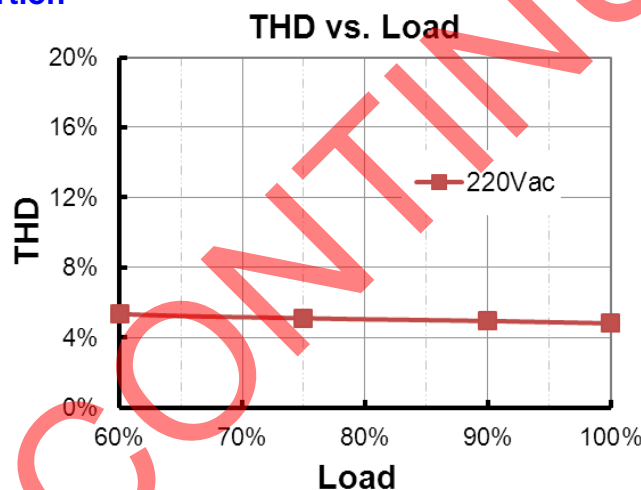
EBD-240S660DV($I_o=6600mA$)
Efficiency vs. Output Voltage



Power Factor



Total Harmonic Distortion



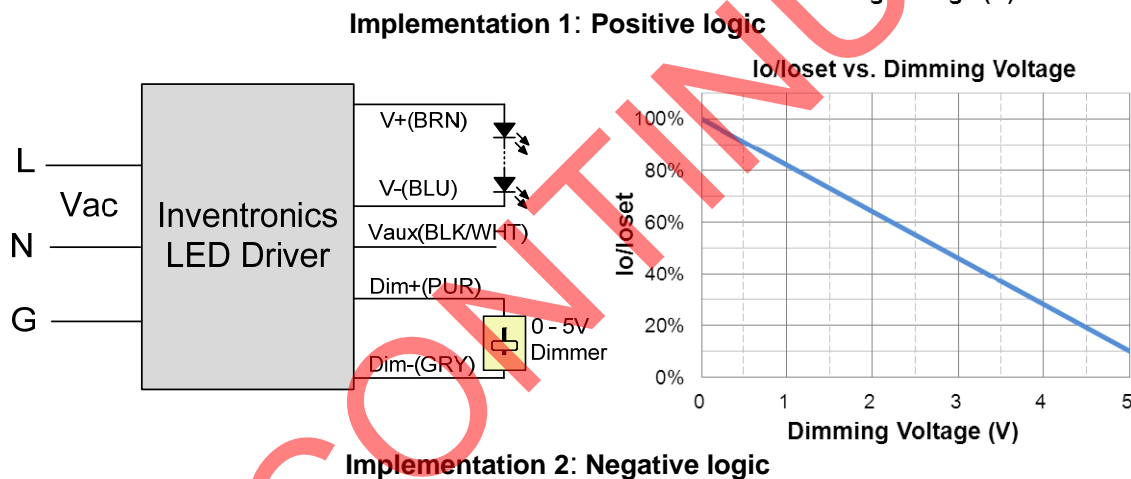
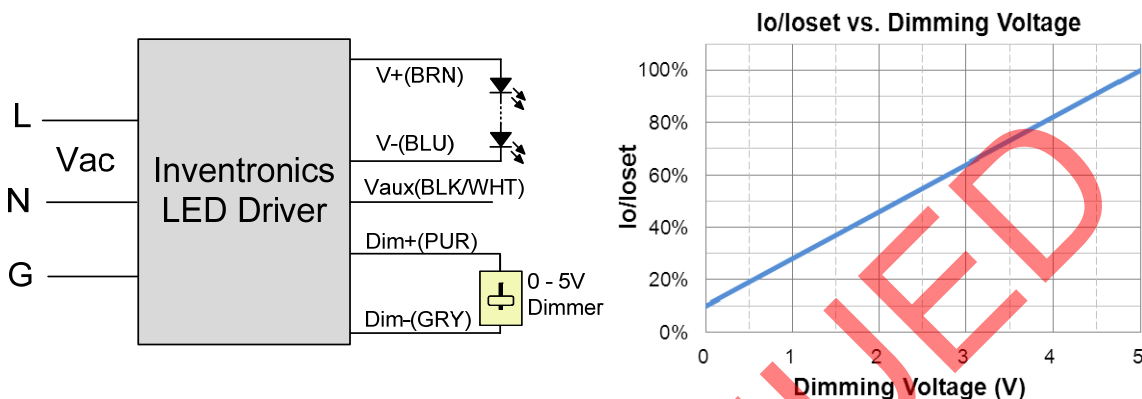
Protection Functions

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.

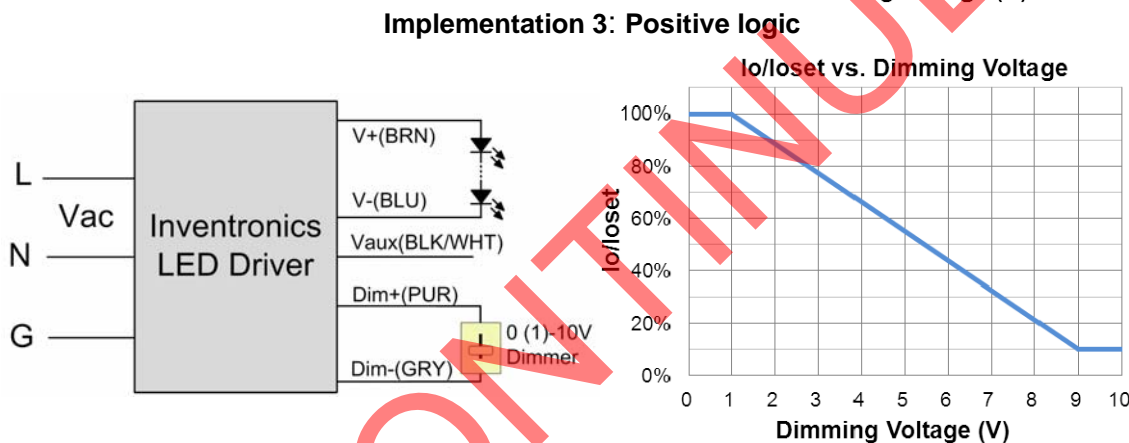
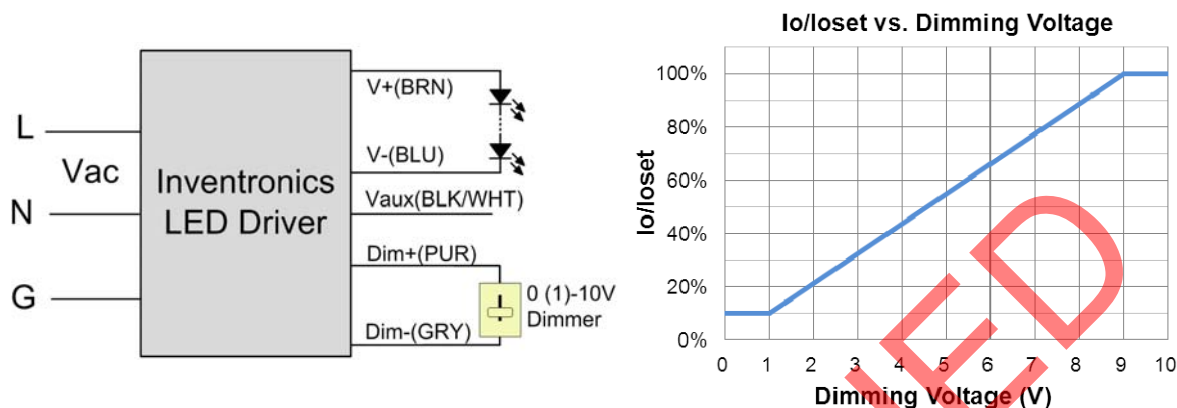


Notes:

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.

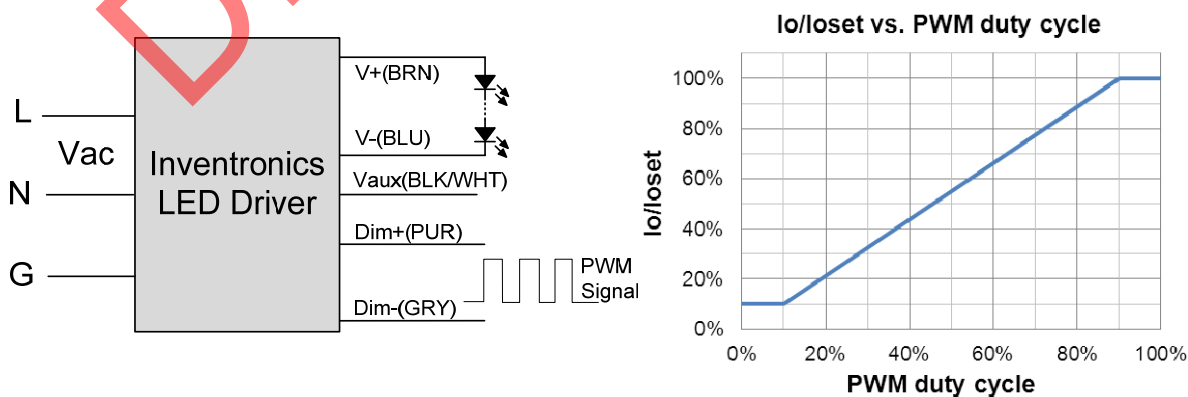


Notes:

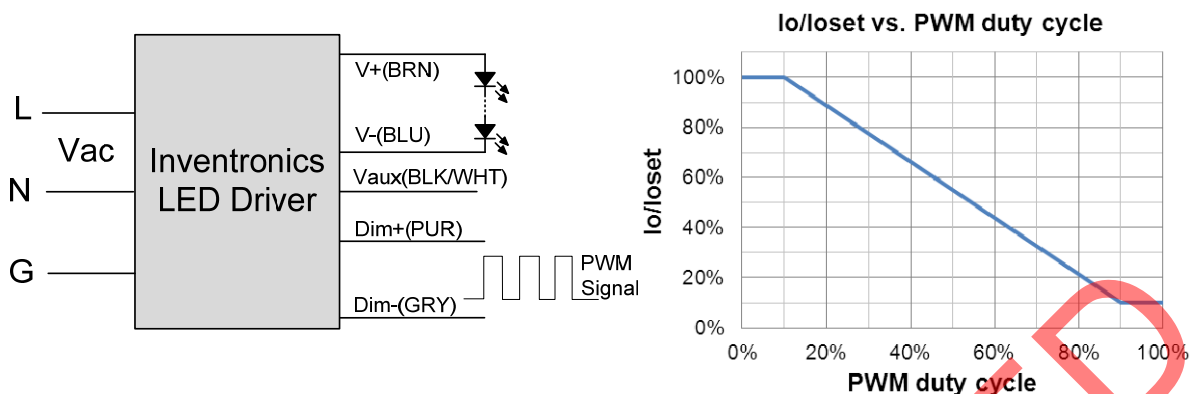
1. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like resistors and zener.
2. Do NOT connect Dim- to the output V- or V+, otherwise the driver will not work properly.
3. If 0-10V dimming is not used, Dim + should be open.
4. When 0-10V negative logic dimming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

● PWM Dimming

The recommended implementation of the dimming control is provided below.



Implementation 5: Positive logic

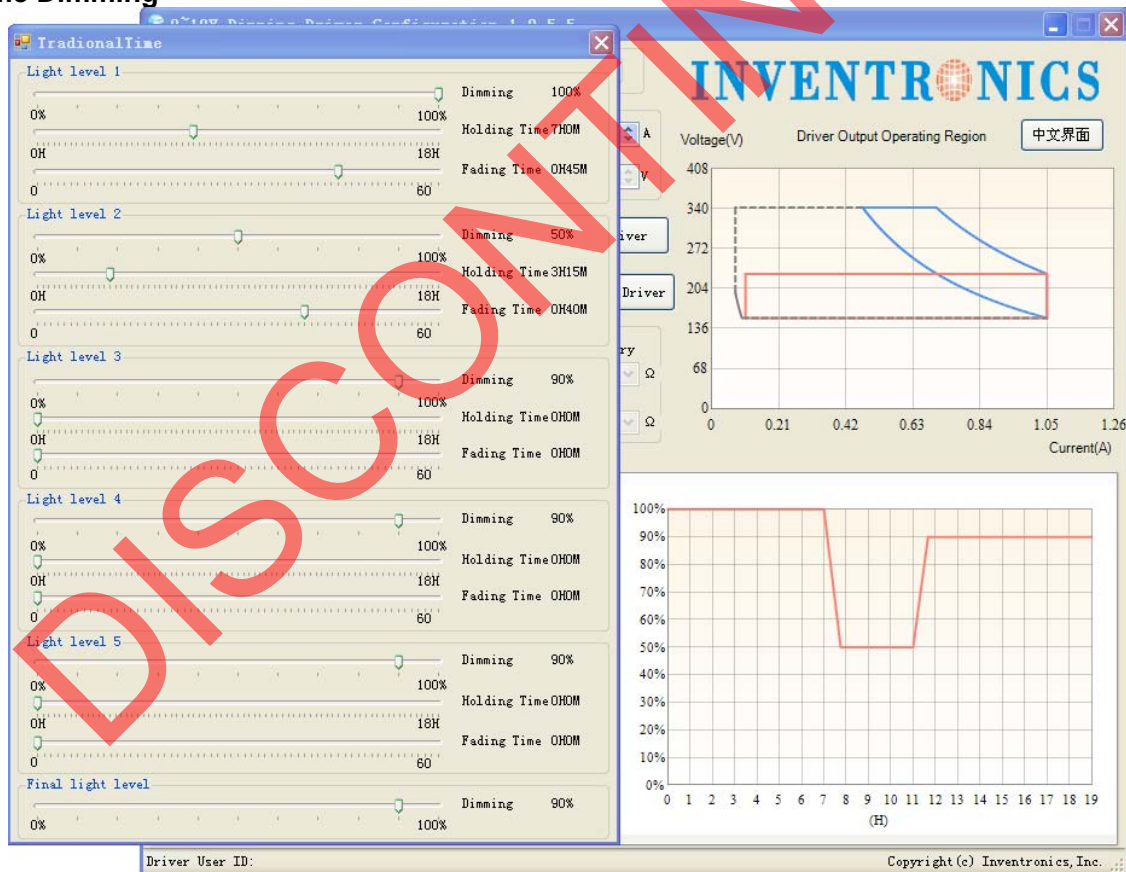


Implementation 6: Negative logic

Notes:

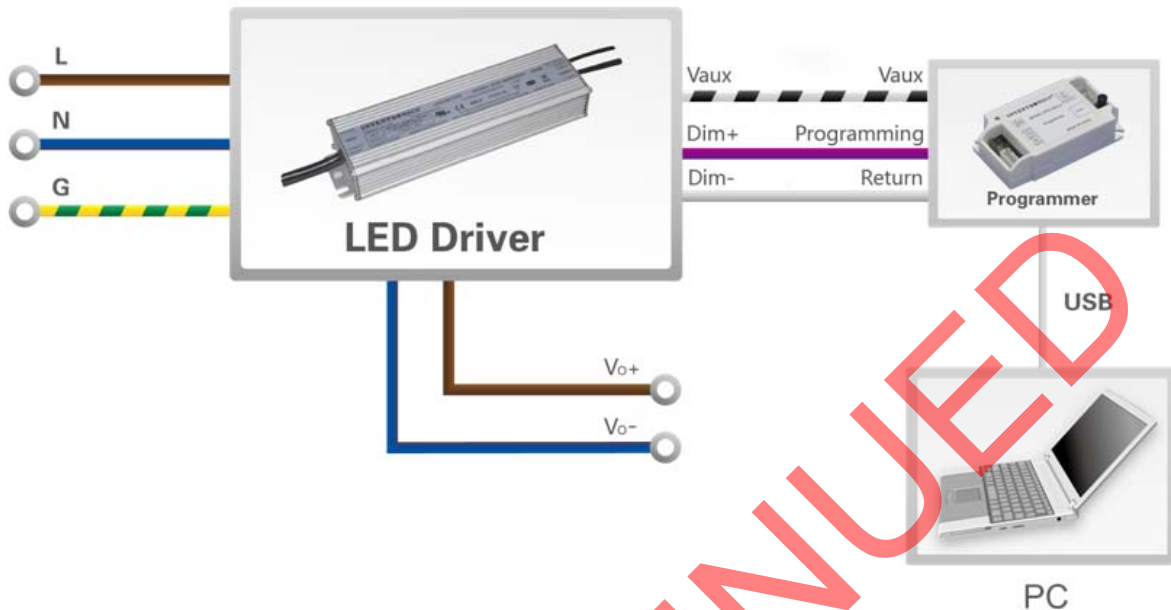
1. Do NOT connect Dim- to the output V- or V+, otherwise the driver will not work properly.
2. If PWM dimming is not used, Dim + should be open.
3. When PWM negative logic dimming mode and Dim+ is open, the driver will output minimum current.

● Time Dimming



Set the timing curve by pulling the sliders.

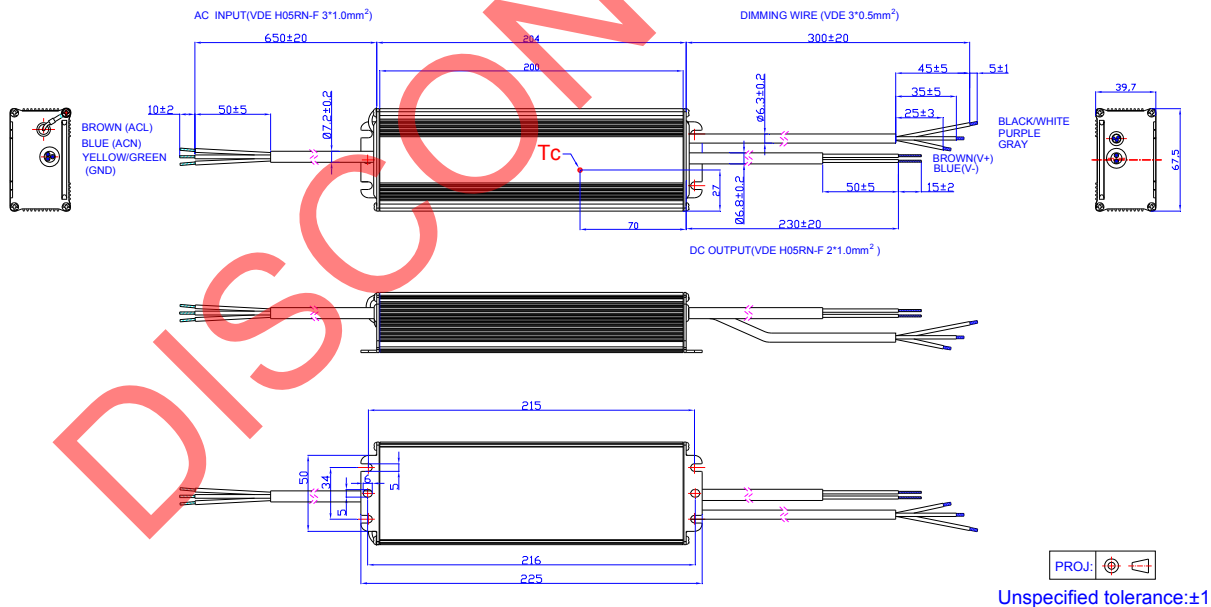
Programming Connection Diagram



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



PROJ: Unspecified tolerance: ±1

Note: Waterproof connectors certified to CCC & CE are also available for these drivers; please contact Inventronics Sales.

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
2015-07-13	A	Datasheets Release	/	/
2015-12-08	B	KS	/	Added
		Input surge protection	/	Updated
2016-03-30	C	General Specifications	Lifetime	Updated
		General Specifications	With mounting ear	Added
		General Specifications	Net Weight	Updated
		Safety & EMC Compliance	/	Updated
		Mechanical Outline	/	Updated
2019-08-15	D	TUV Logo	/	Updated
		Features	Input surge protection	Updated
		Features	Suitable for Independent Use	Independent Logo
		Description	/	Updated
		Input Specifications(PF/THD)	50-60Hz	Added
		Output Specifications(No Load Output Voltage)	365V	370V
		Output Specifications (Turn-on Delay Time)	65%-100% Load	Added
		Safety & EMC Compliance	TUV	Added
		Safety & EMC Compliance	CB	Added
		Safety & EMC Compliance	KS	Updated
		Safety & EMC Compliance	EN 61000-4-5	Updated
		RoHS Compliance	/	Updated