Features

- Dim-to-Off with Standby Power ≤0.5 W
- Always-On Auxiliary Power: 12 Vdc, 200 mA
- Thermal Sensing and Protection for LED Module
- Full Power at 50% -100% Max Current (Constant Power)
- Flicker-Free
- Dimmable to 5% by 0-10V/PWM/Timer (3 Timer Modes)
- Output Lumen Compensation
- Suitable for Class I and Class II Luminaires
- Suitable for Built-in Use

Description

The *LUD-040SxxxDSF* series is a 40W, constant-power, programmable IP20 LED driver that operates from 90-305 Vac input with excellent power factor. Created for dimmable panel lights and linear lights, it provides good dimming accuracy down to 5% output, plus a dim-to-off mode with low standby power. The high efficiency of these drivers and slim metal case enables them to run cooler, significantly improving reliability and extending product life. To ensure trouble-free operation, protection is provided against open lamp protection, short circuit, and over temperature of both the driver and the external LED array.

Models

Output Current Range	Full-Power Current Range (1)	Default Output Current	Input Voltage Range(2)	Output Voltage Range(3)	Max. Output Power	Typical Efficiency (4)	Power Factor		Model Number
							120Vac	220Vac	
17.5-750mA	350-750 mA	700 mA	90~305 Vac 127~300 Vdc	17~114Vdc	40 W	88%	0.99	0.96	LUD-040S075DSF(5)
37.5-1500mA	750-1500 mA	1050 mA	90~305 Vac 127~300 Vdc	8~54 Vdc	40 W	88%	0.99	0.96	LUD-040S150DSF(6)

Notes: (1) Output current range with constant power at 40W.

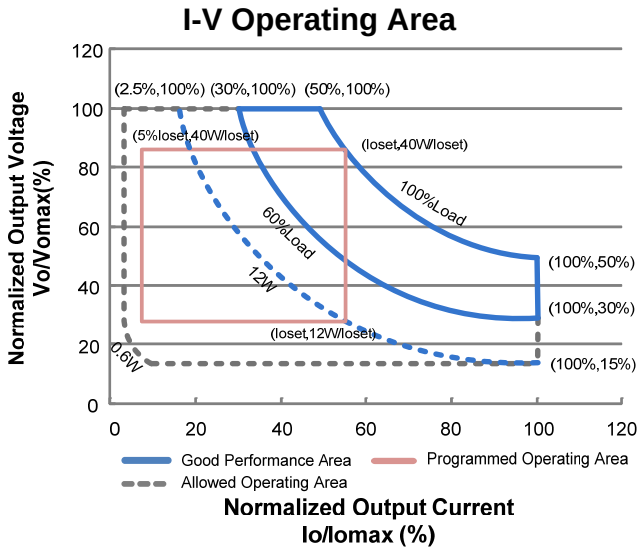
(2) UL, FCC certified input voltage range: 100-277 Vac or 127-300 Vdc; other certified input voltage range except UL & FCC: 100-240 Vac, or 127-250 Vdc (except CCC)

(3) Minimum output voltage depends on the programmed output current, Vomin = 12W／Ioset.

(4) Measured at a 220Vac input with 50% maximum output current and 100% maximum output voltage.

(5) SELV output.

(6) Class 2 & SELV output.



Note: Operating range depends on the programmed output current Ioset. Vomax is limited internally to 40W／Ioset or 40W／(50% Iomax), whichever is less. The load should be chosen to satisfy Vomin = 12W／Ioset to achieve the specified output-current tolerance. For example, if Ioset=1.05A, the output-voltage operating range is 11.4–38.1V.

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	-	-	0.55 A	Measured at full load and 100 Vac input.
	-	-	0.3 A	Measured at full load and 220 Vac input.
Inrush Current(I^2t)	-	-	0.14 A^2s	At 220Vac input, 25°C Cold Start, Duration= 230 μs, 10%Ipk-10%Ipk. See Inrush Current Waveform for the details.
PF	0.90	-	-	At 100-277Vac, 60%-100%load(24-40W)
THD	-	-	20%	

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%Ioset	-	5%Ioset	At full load condition
Output Current Setting(Ioset) Range LUD-040S075DSF LUD-040S150DSF	 150 mA 300 mA	 - -	 750 mA 1500 mA	

Output Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Output Current Setting Range with Constant Power LUD-040S075DSF LUD-040S150DSF	 350 mA 750 mA	 - -	 750 mA 1500 mA	
Total Output Current Ripple (pk-pk)	-	8%Iomax	15%Iomax	At full load condition. 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)	-	1%Iomax	5%Iomax	At full load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%Iomax	At full load condition
No Load Output Voltage LUD-040S075DSF LUD-040S150DSF	 - -	 - -	 120 V 60 V	
Line Regulation	-	-	±1%	Measured at full load
Load Regulation	-	-	±5%	
Turn-on Delay Time	-	0.40 s	0.75 s	Measured at 120Vac input, 60%-100% Load
	-	0.40 s	0.50 s	Measured at 220Vac input, 60%-100% Load
Temperature Coefficient of Ioset	-	0.06%/°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	-	200 mA	Return terminal is “Return.” When dimmed-to-OFF, auxiliary load changes ⩾150mA should be limited to a maximum di/dt of 100A/s to keep Vaux in the specified range.

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

General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 120 Vac input: LUD-040S075DSF Io=350 mA Io=750 mA LUD-040S150DSF Io=750 mA Io=1500 mA	 85.0% 83.0% 85.0% 82.0%	 87.0% 85.0% 87.0% 84.0%	 - - - -	Measured at full load and steady-state temperature in 25°C ambient; (Efficiency will be about 1.0% lower if measured immediately after startup.)
Efficiency at 220 Vac input: LUD-040S075DSF Io=350 mA Io=750 mA LUD-040S150DSF Io=750 mA Io=1500 mA	 86.0% 84.0% 86.0% 83.0%	 88.0% 86.0% 88.0% 85.0%	 - - - -	Measured at full load and steady-state temperature in 25°C ambient; (Efficiency will be about 1.0% lower if measured immediately after startup.)

General Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 277 Vac input: LUD-040S075DSF Io=350 mA Io=750 mA LUD-040S150DSF Io=750 mA Io=1500 mA	 85.0% 83.0% 85.5% 82.5%	 87.0% 85.0% 87.5% 84.5%	 - - - -	Measured at full load and steady-state temperature in 25°C ambient; (Efficiency will be about 1.0% lower if measured immediately after startup.)
Standby Power	-	-	0.5 W	Measured at 230Vac/50Hz; Dimming off
MTBF	-	210,000 hours	-	Measured at 220Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	96,000 hours	-	Measured at 120Vac input, 80%Load and 60°C case temperature; See lifetime vs. Tc curve for the details
Operating Case Temperature for Safety Tc_s	-30°C	-	+87°C	
Operating Case Temperature for Warranty Tc_w	-30°C	-	+70°C	Humidity: 10% RH to 90% RH; No condensation
Storage Temperature	-30°C	-	+85°C	Humidity: 5% RH to 95% RH No condensation
Dimensions Inches (L × W × H) Millimeters (L × W × H)	13.1 × 1.18 × 0.83 333 × 30 × 21			
Net Weight	-	300 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		230 uA	380 uA	430 uA	Vdim(+) = 1 V
Dimming Output Range	LUD-040S075DSF LUD-040S150DSF	5%Ioset	-	Ioset	350 mA ⩽ Ioset ⩽ 750 mA 750 mA ⩽ Ioset ⩽ 1500 mA
	LUD-040S075DSF LUD-040S150DSF	17.5 mA 37.5 mA	-	Ioset	17.5 mA ⩽ Ioset < 350 mA 37.5 mA ⩽ Ioset < 750 mA
Recommended Dimming Input Range		0 V	-	10 V	Default 0-10V dimming mode.
Dim off Voltage		0.35 V	0.5 V	0.65 V	
Dim on Voltage		0.55 V	0.7 V	0.85 V	
Hysteresis		-	0.2 V	-	
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	-	3 KHz	

Dimming Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
PWM_in Duty Cycle	1%	-	99%	Dimming mode set to PWM in PC interface.
PWM Dimming off (Positive Logic)	2%	5%	8%	
PWM Dimming on (Positive Logic)	4%	7%	10%	
PWM Dimming off (Negative Logic)	92%	95%	98%	
PWM Dimming on (Negative Logic)	90%	93%	96%	
Hysteresis	-	2%	-	

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

Safety & EMC Compliance

Safety Category	Standard
UL/CUL	UL 8750,UL1310,CAN/CSA-C22.2 No. 250.13,CAN/CSA-C22.2 No. 223-M91
CE	EN61347-1(1), EN61347-2-13
KS	KS C 7655
EMI Standards	**Notes**
EN 55015(2)	Conducted emission Test &Radiated emission Test
EN 61000-3-2	Harmonic current emissions Class C
EN 61000-3-3	Voltage Fluctuations & Flicker
FCC Part 15(2)	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): 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 1 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

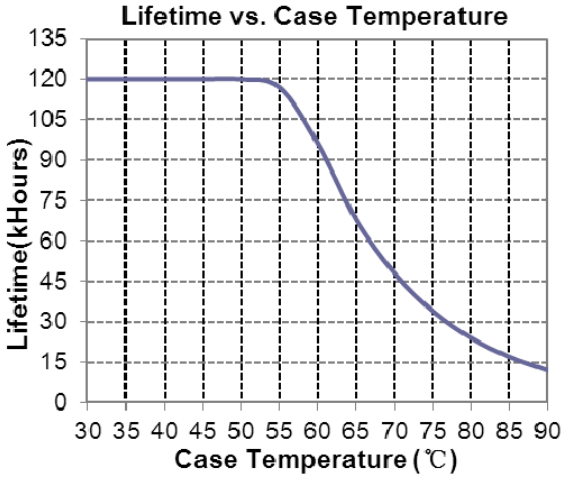
Safety & EMC Compliance (Continued)

EMS Standards	Notes
EN 61547	Electromagnetic Immunity Requirements Applies to Lighting Equipment

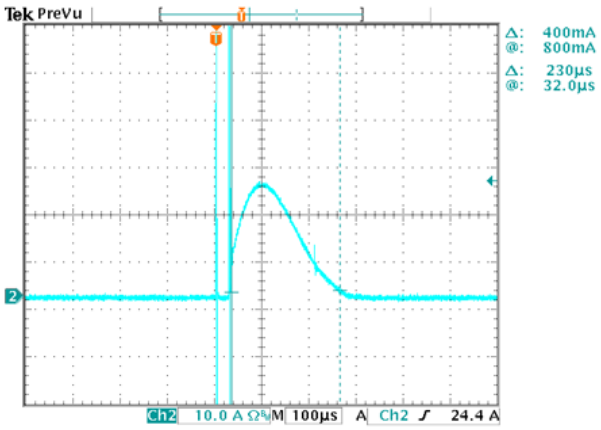
Notes: (1) This product meets all requirements for EN=61347-1, A2:2013 Annex O (Double insulation). When the driver is energized, the allowed leakage current is perceptible but harmless.

(2) 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.

Lifetime vs. Case Temperature



Inrush Current Waveform



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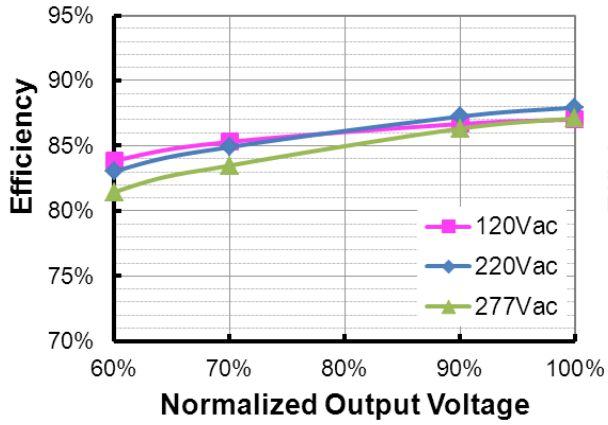
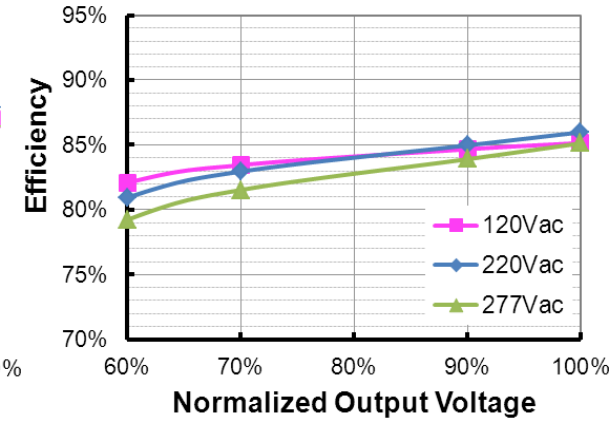
Efficiency vs. Load

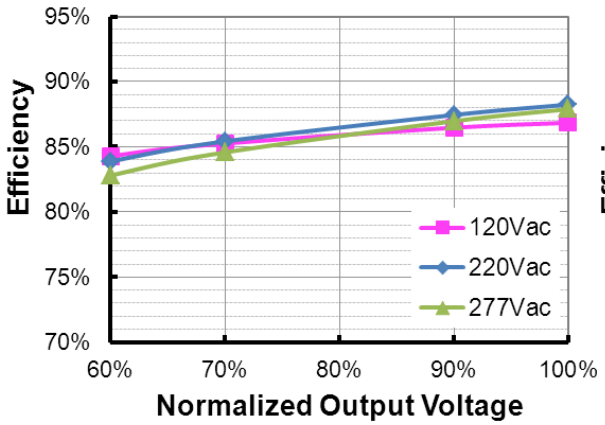
LUD-040S075DSF(Io=350mA)



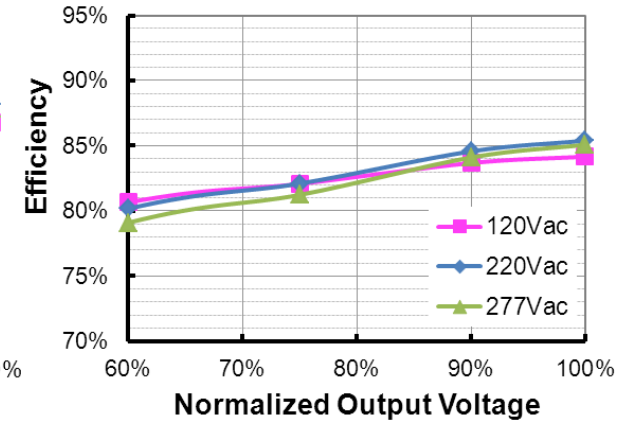
LUD-040S075DSF(Io=750mA)



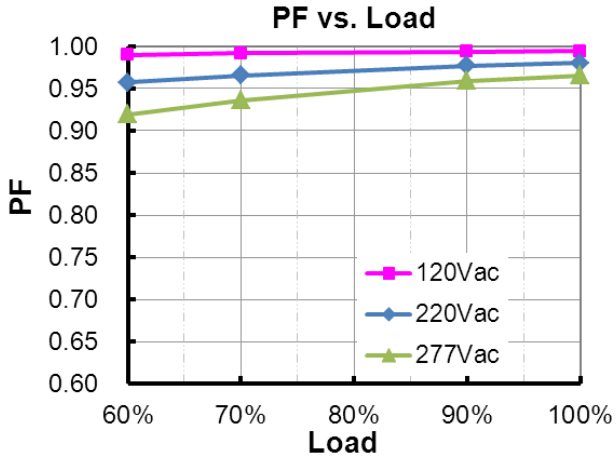
LUD-040S150DSF(Io=750mA)



LUD-040S150DSF(Io=1500mA)



Power Factor



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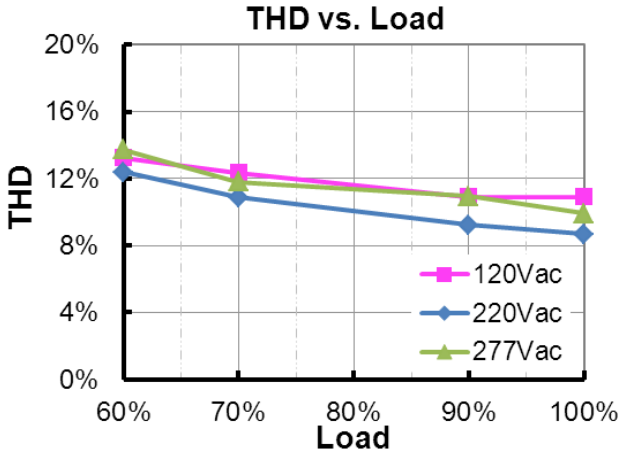
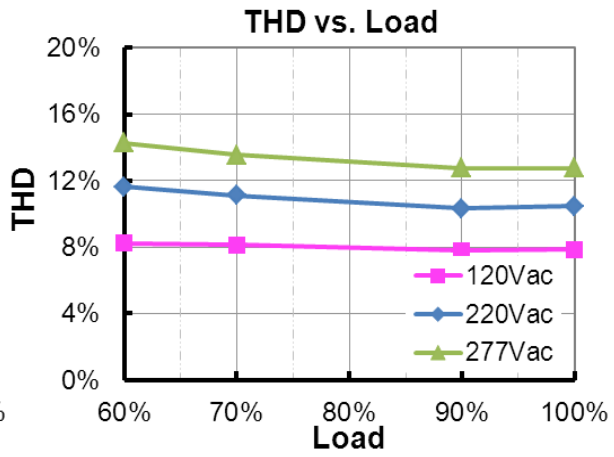
Total Harmonic Distortion

LUD-040S075DSF



LUD-040S150DSF



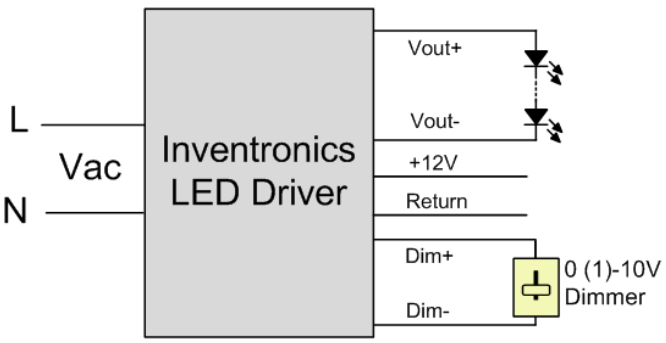
Protection Functions

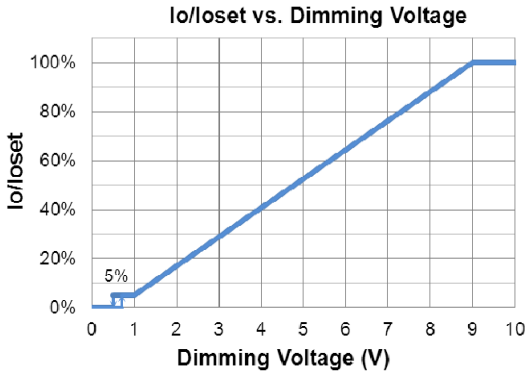
Parameter		Min.	Typ.	Max.	Notes
Over Temperature Protection		Decreases output current, returning to normal after over temperature is removed.			
Short Circuit Protection		Auto Recovery. The power supply will shut off all of the output and restarts 1 minute later when output operates in a short circuit condition.			
Open Lamp Protection		Auto Recovery. The power supply will shut off all of the output and restart 1 minute later when output operates in an open lamp condition.			
External Thermal Protection NTC	R1	-	7.91 kOhm	-	When R_NTC falls below R1, External Thermal Protection is triggered, reducing output current until R2 is reached.
	R2	-	4.26 kOhm	-	When R_NTC is less than R2, output current is reduced to the programmed “Protection Current Floor.”
	Protection Current Floor	5%Ioset	60%Ioset	100%Ioset	5%Ioset>Iomin (default setting is 60%)
		Iomin	60%Ioset	100%Ioset	5%Ioset≤Iomin (default setting is 60%)

Dimming

- **0-10V Dimming**

The recommended implementation of the dimming control is provided below.



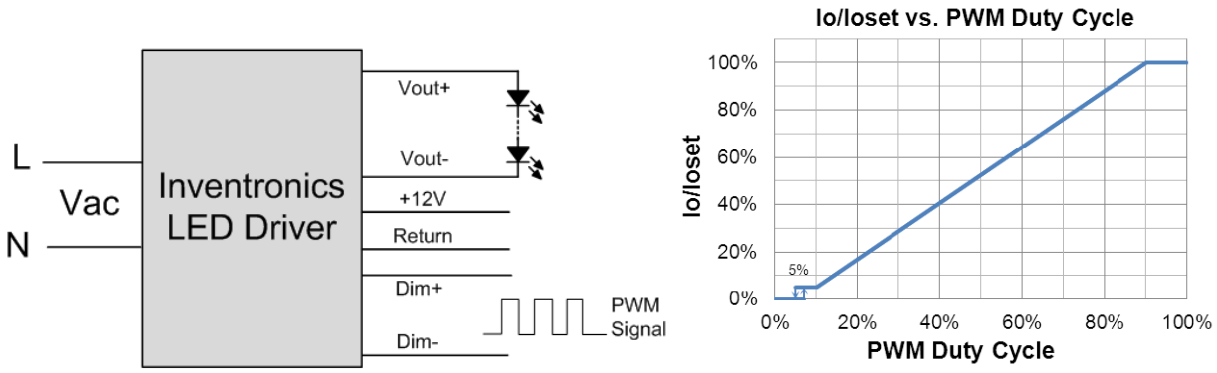


Implementation 1: DC Input

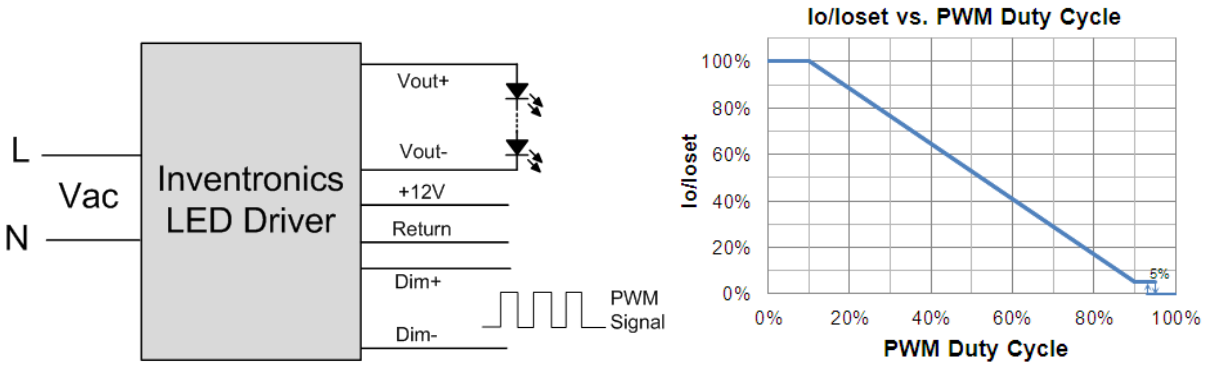
Notes:

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

- **PWM Dimming**



Implementation 2: Positive logic



Implementation 3: Negative logic

- **Timing Dimming**

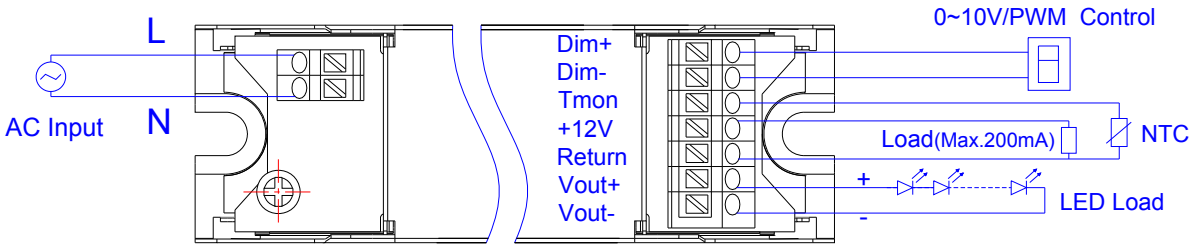
Time dimming control includes 3 kinds of modes, they are Self Adapting-Midnight, Self Adapting-Percentage and Traditional Timer.

- **Self Adapting-Midnight**: Automatically adjusts the dimming curve based on the on-time of past two days (if difference <15 minutes), assuming that the center point of the dimming curve is midnight local time.
- **Self Adapting-Percentage**: Automatically adjusts the on-time of each step by a constant percentage = (actual on-time for the past 2 days if difference <15 min) / (programmed on-time from the dimming curve).
- **Traditional Timer**: Follows the programmed timing curve after power on with no changes.

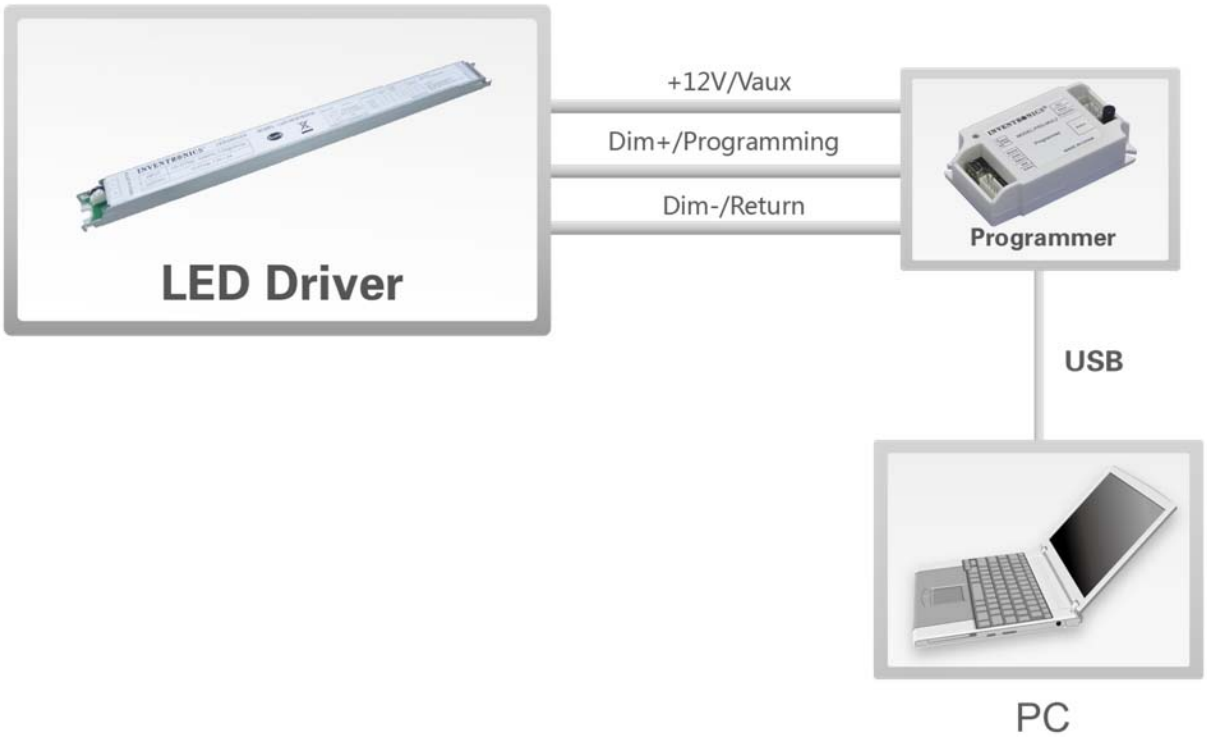
- **Output Lumen Compensation**

Output Lumen Compensation (OLC) may be used to maintain constant light output over the life of the LEDs by driving them at a reduced current when new, then gradually increasing the drive current over time to counteract LED lumen degradation.

Wire Connection Diagram



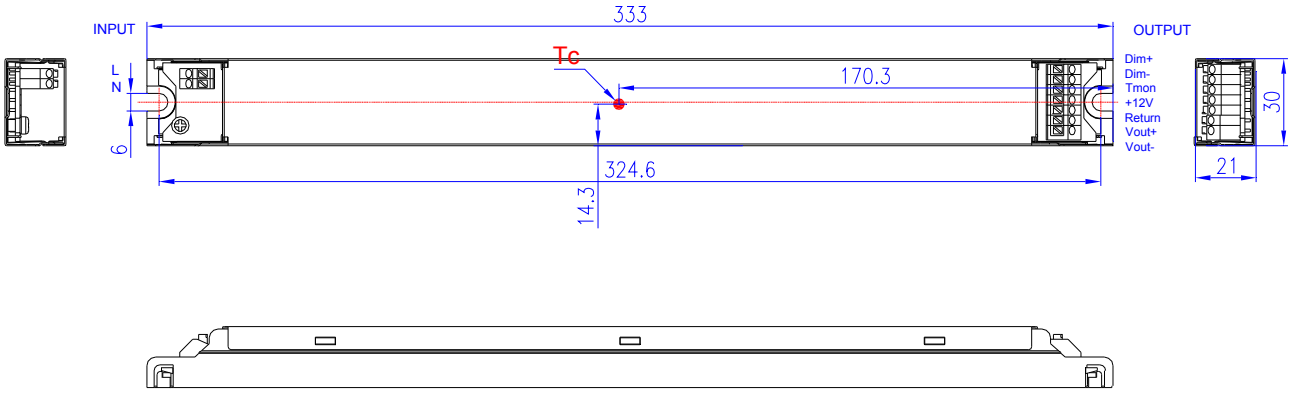
Programming Connection Diagram



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

- **Please refer to PRG-MUL2 (Programmer) datasheet for details.**

Mechanical Outline



PROJ:

Unspecified tolerance:±1

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
2015-06-24	A	Datasheets Release	/	/
2015-08-03	B	Release LUD-040S075DSF	/	/
2016-02-25	C	KS Certificate	/	Added
		IP Rating	/	Added
		Note of EMI Standards	/	Added
2016-09-20	D	Load Regulation	±3%	±5%
2017-05-25	E	Turn-on Delay Time at 120Vac	Max.=1.0 s	Max.=0.75 s