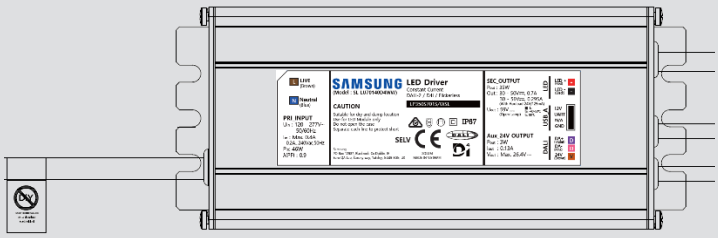
DALI-2 D4i LED Driver

Outdoor 40 W Programmable

SL-LU70140D4WW



High Efficiency Constant Current LED Driver With D4i functions for smart lighting

IP67

Features & Benefits

- Output Current Range: 295 - 700 mA adjustable output current by DALI-2 or U/I
- Output Voltage Range: 30 - 56 Vdc @ Iset = 295mA(with 3W aux. load)
  30 - 50 Vdc @ Iset = 700mA
- Output Power: Max. 35 W
- Dimming Control: DALI-2
- Input Voltage: 120 - 277 Vac, 50 / 60 Hz
- Safety: IEC 61347-1, IEC 61347-2-13, AS/NZS 61347-1, AS 61347-2-13
- EMC: EN IEC 55015, EN 61547
- Protections: Over load, No load, Short circuit, Over voltage
- t_a Range: -40 ~ +50 °C
- Expected Lifetime(B10): 180,000 hrs @ tc = 67°C, 100% load
- Environmental Compliance: RoHS
- Long Lasting & High Reliability
- Metal Housing
- Flickerless

Applications

- LED Street Lighting
- Outdoor LED Lighting
- Smart LED Lighting

SAMSUNG

Table of Contents

1. Characteristics

Article		Symbol	Specification			Unit	Note
			Min.	Typ.	Max.		
INPUT SPECIFICATIONS							
Nominal Input Voltage		Vin		120 ~ 277		Vac	
Input Voltage Range			108		300		
Nominal Frequency		fin		50 / 60		Hz	
Frequency Range			47		63		
Input Current	Vin=120Vac	Iin			0.4	A	100% load with 3W aux.load
	Vin=277Vac				0.2		
Total Harmonic Distortion		THD			20	%	At Vin=120V/60Hz, 30% load ↑, At Vin=240V/50Hz, 40% load ↑, At Vin=277V/60Hz, 52% load ↑, without aux.load
Power Factor		PF	0.9			-	
Efficiency	Iset=295mA	η	80	83		%	At Vin=240Vac/50Hz, without aux.load ±0.5%η
	Iset=350mA		82	85			
	Iset=700mA		86.5	88.5			
In-rush Current				40	50	A_{pk}	
OUTPUT SPECIFICATIONS							
Output Voltage	Iset=295mA	Vo	30		56	Vdc	Refer to operating window at page.5
	Iset=650mA		30		54		
	Iset=700mA		30		50		
Output Voltage Max.		Vmax			59	Vdc	Open circuit, No-load protection
Output Current		Io	295		700	mA	±5%Io, Default current set=350mA
Output Current Min.		Imin	35				Dimming by DALI-2 protocol
Auxiliary Output Voltage		Vaux	21.6	24	26.4	Vdc	D4i part-150
Auxiliary Output Current		Iaux			125	mA	
Output Power		Po			35	W	Without 3W aux. load
Integrated Bus Power Supply Voltage		Vbus	12	18	20	Vdc	D4i part-250
Integrated Bus Power Supply Current		Ibus	50		62.5	mA	
Turn-on Delay Time		Td		0.7	1	s	100% load

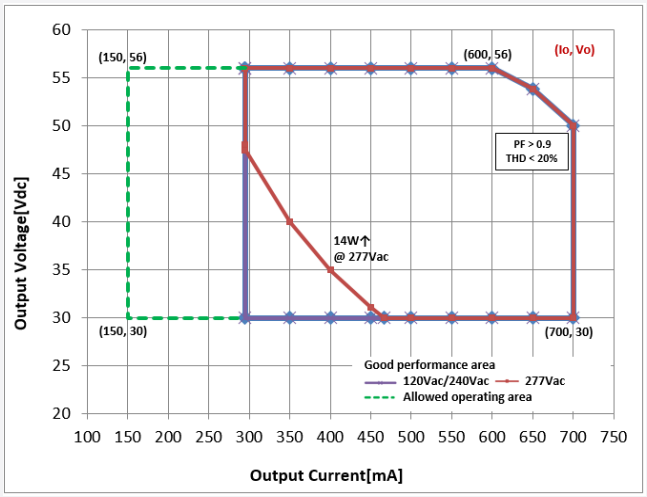
Article	Symbol	Specification			Unit	Note
		Min.	Typ.	Max.		
ENVIRONMENTAL SPECIFICATIONS						
Ambient Temperature	t_a	-40		50	ºC	
Case Temperature	t_c			80	ºC	Measured at t_c point on the label
Storage Temperature	t_s	-40		80	ºC	Cool down before operating
Relative Humidity		20		85	%	
Power Monitoring Accuracy		-1		1	%	At Vin=240Vac/50Hz, 100% load
IP Rating			67		-	Suitable for outdoor environment
Expected Lifetime (B10)			180,000		hrs	tc=67°C, 100% load
MTBF			280,144			tc=40°C, Vin=120V/60Hz, 100% load with 3W aux.load
Dimensions	L x W x H		6.18 x 2.68 x 1.24		inch	
			157 x 68 x 31.4		mm	
Net weight			600		g	± 10 g

2. Safety Standards

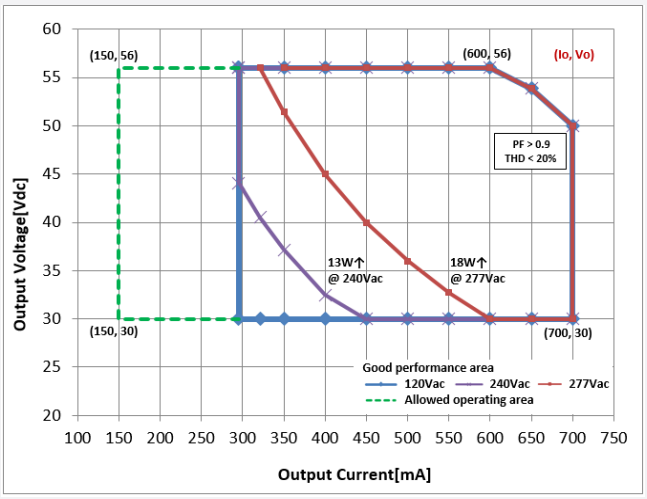
Safety standard	Description
IEC/EN 61347-1, IEC/EN 61347-2-13, AS/NZS 61347-1:2016, AS 61347-2-13:2018	IEC/EN Safety standards
EN IEC 55015:2019, EN 61547:2009	Conducted and radiated emission test
IEC/EN 61000-3-2	Harmonic current emission : Class C
IEC/EN 61000-3-3	Voltage fluctuations and flicker
IEC/EN 61000-4-2	Electrostatic discharge(ESD)
IEC/EN 61000-4-3	Radio-frequency electromagnetic fields
IEC/EN 61000-4-4	Electrical fast transient(EFT)/Burst
IEC/EN 61000-4-5	Lightning surge
IEC/EN 61000-4-6	Injected currents
IEC/EN 61000-4-8	Power frequency magnetic fields
IEC/EN 61000-4-11	Voltage dips and short interruptions
IEC 60529 : 2013 Degrees of protection provided by enclosures(IP code)	IP grade(IP67)
IEC/EN 62386 - 101, 102, 207	DALI-2 protocol
DiiA Specification Part - 150, 250, 251, 252, 253	D4i protocol

3. Typical Characteristics Graphs

a) Operating Window(with 3W aux. load)

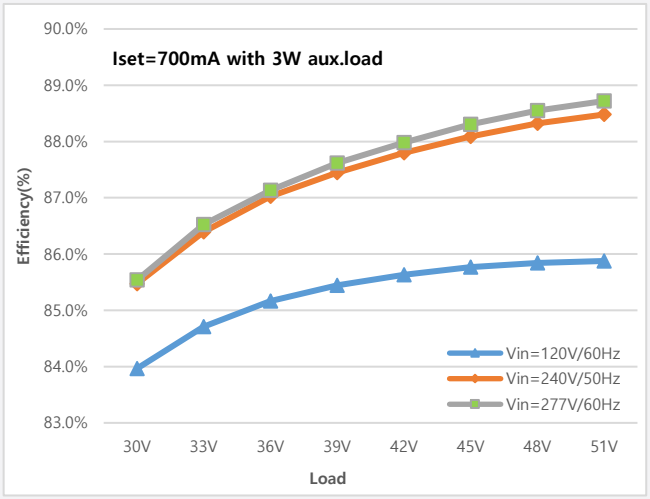


b) Operating Window(without aux. load)

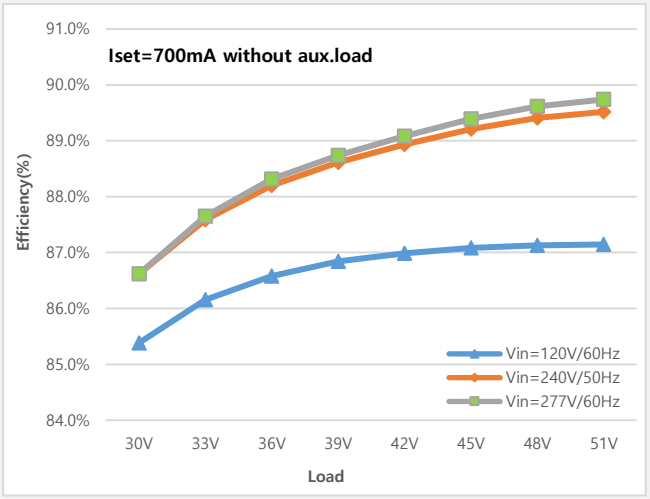


※ The expanded area can be set by SMPro v.4.2.0.

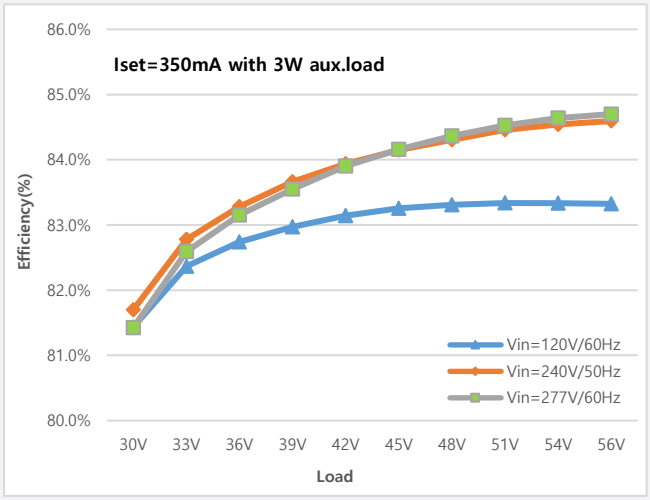
c) Efficiency vs. Load 1-1



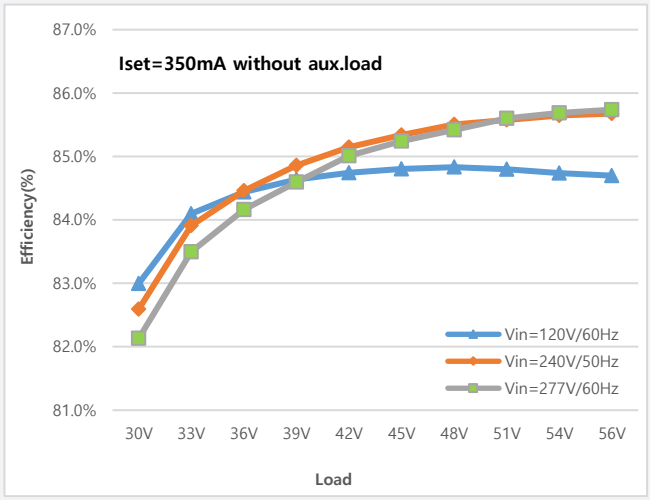
d) Efficiency vs. Load 1-2



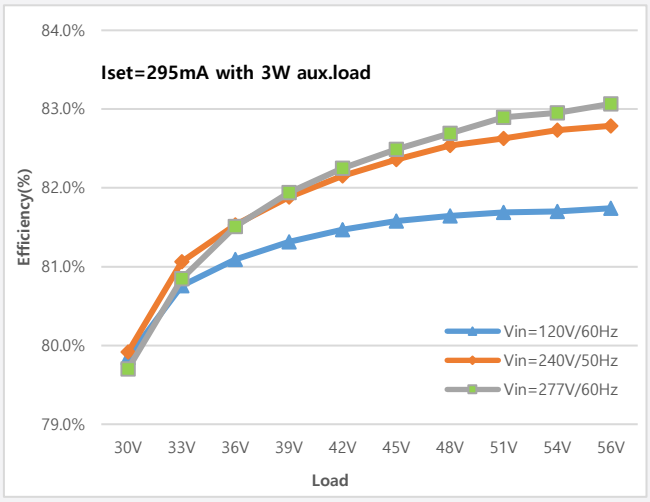
e) Efficiency vs. Load 2-1



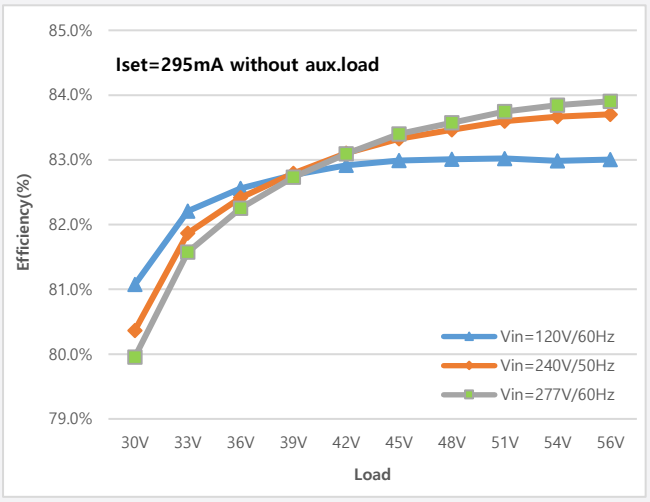
f) Efficiency vs. Load 2-2



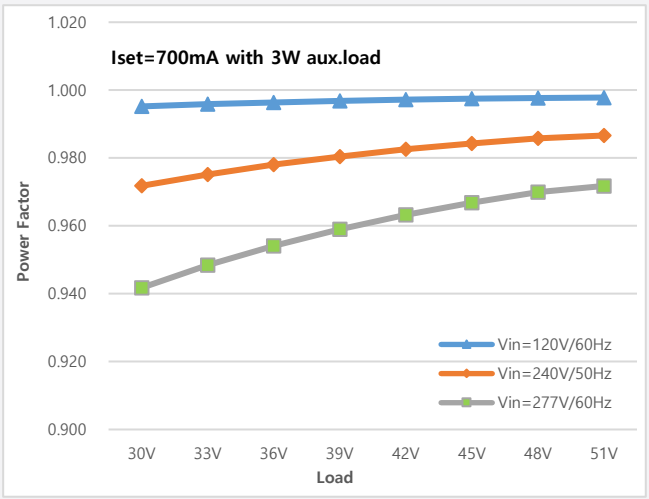
g) Efficiency vs. Load 3-1



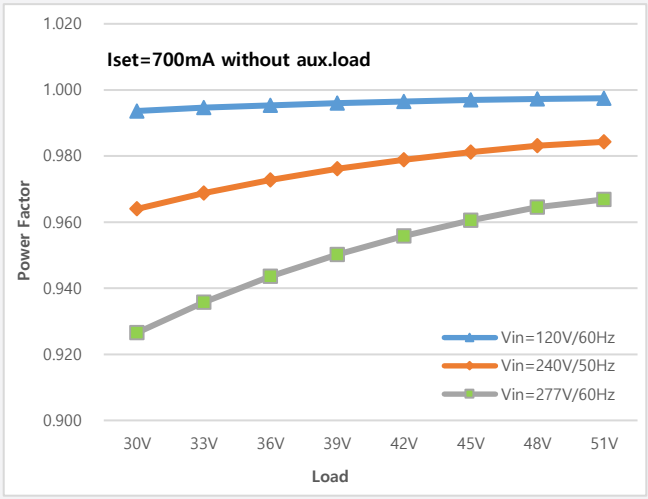
h) Efficiency vs. Load 3-2



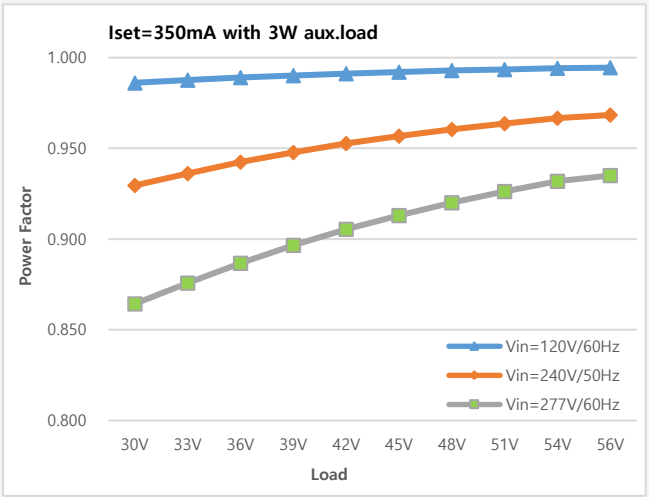
i) PF vs. Load 1-1



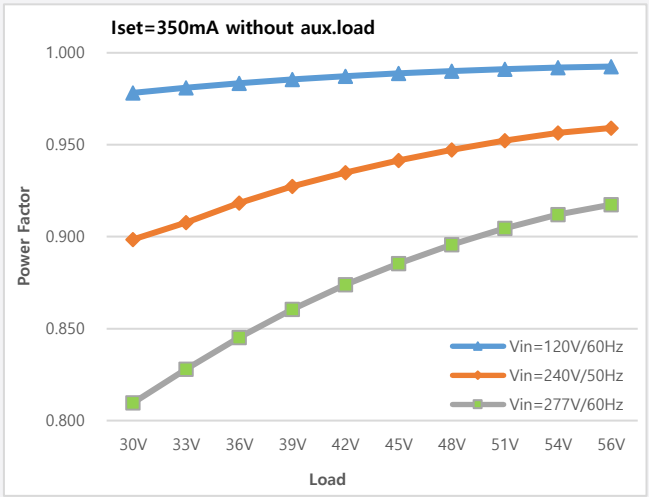
j) PF vs. Load 1-2



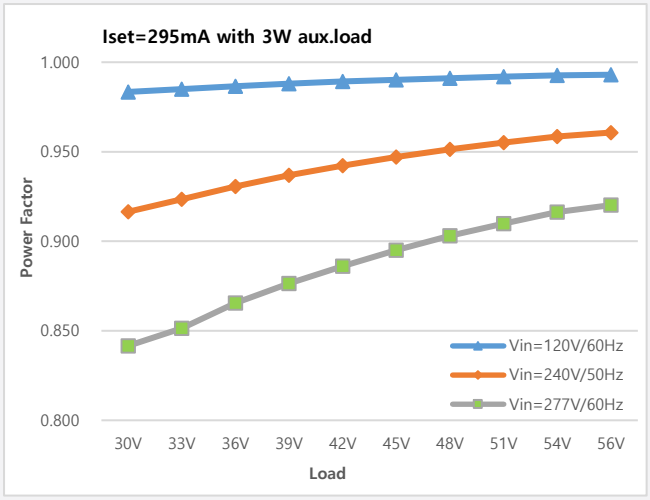
k) PF vs. Load 2-1



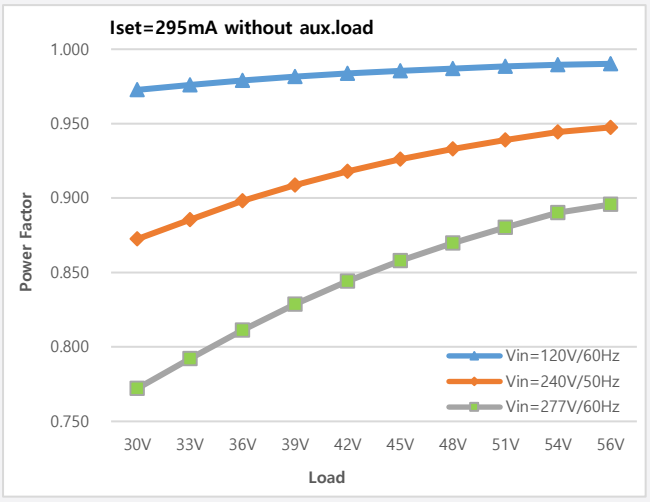
l) PF vs. Load 2-2



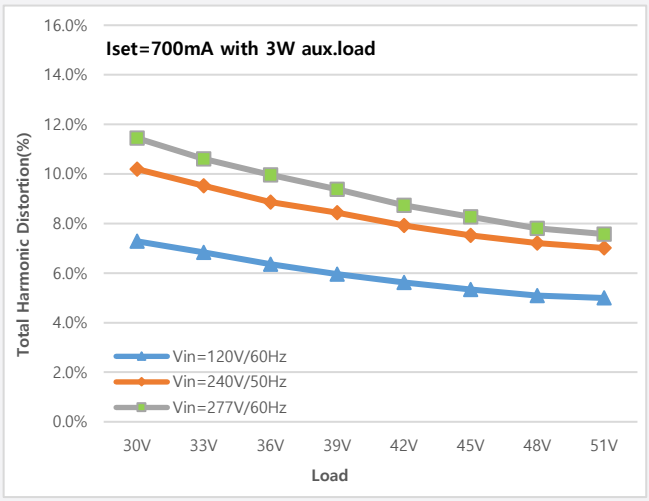
m) PF vs. Load 3-1



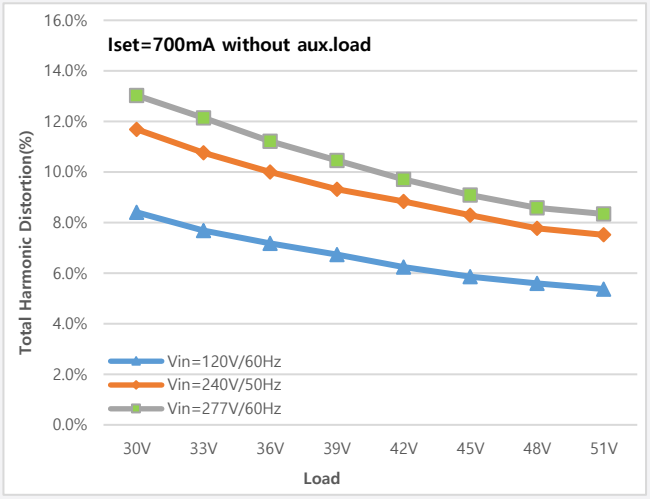
n) PF vs. Load 3-2



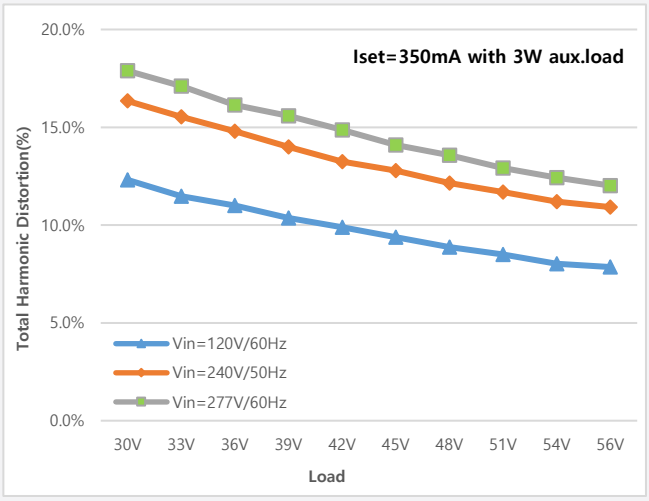
o) THD vs. Load 1-1



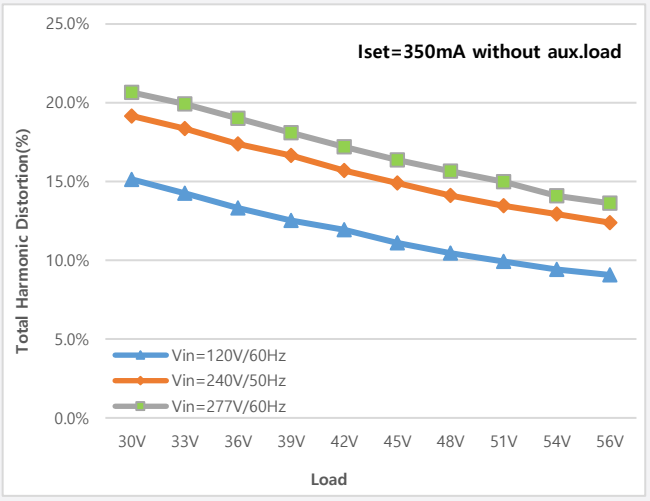
p) THD vs. Load 1-2



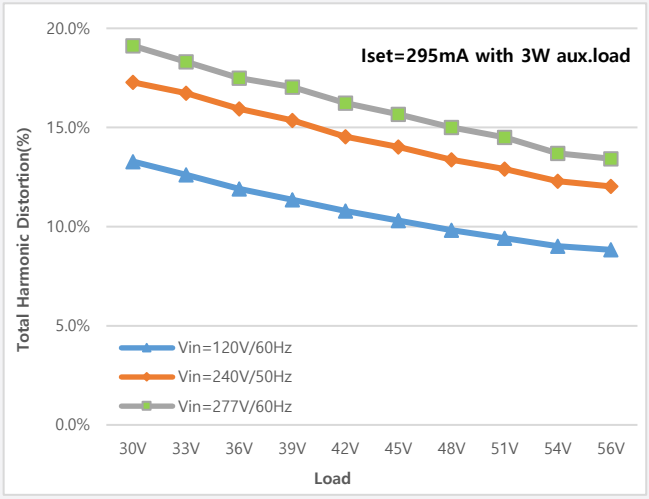
q) THD vs. Load 2-1



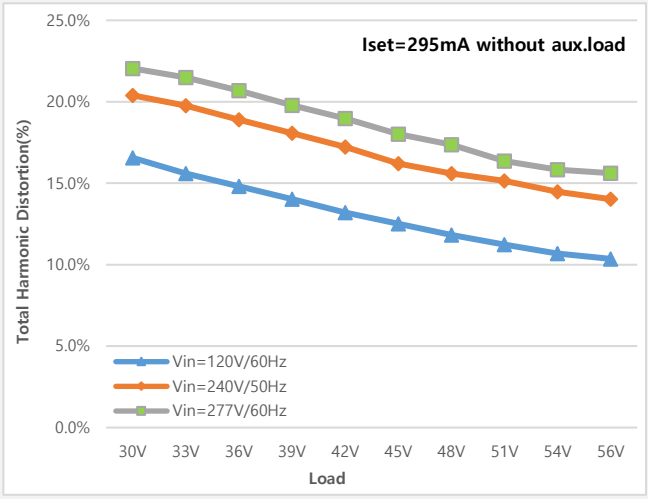
r) THD vs. Load 2-2



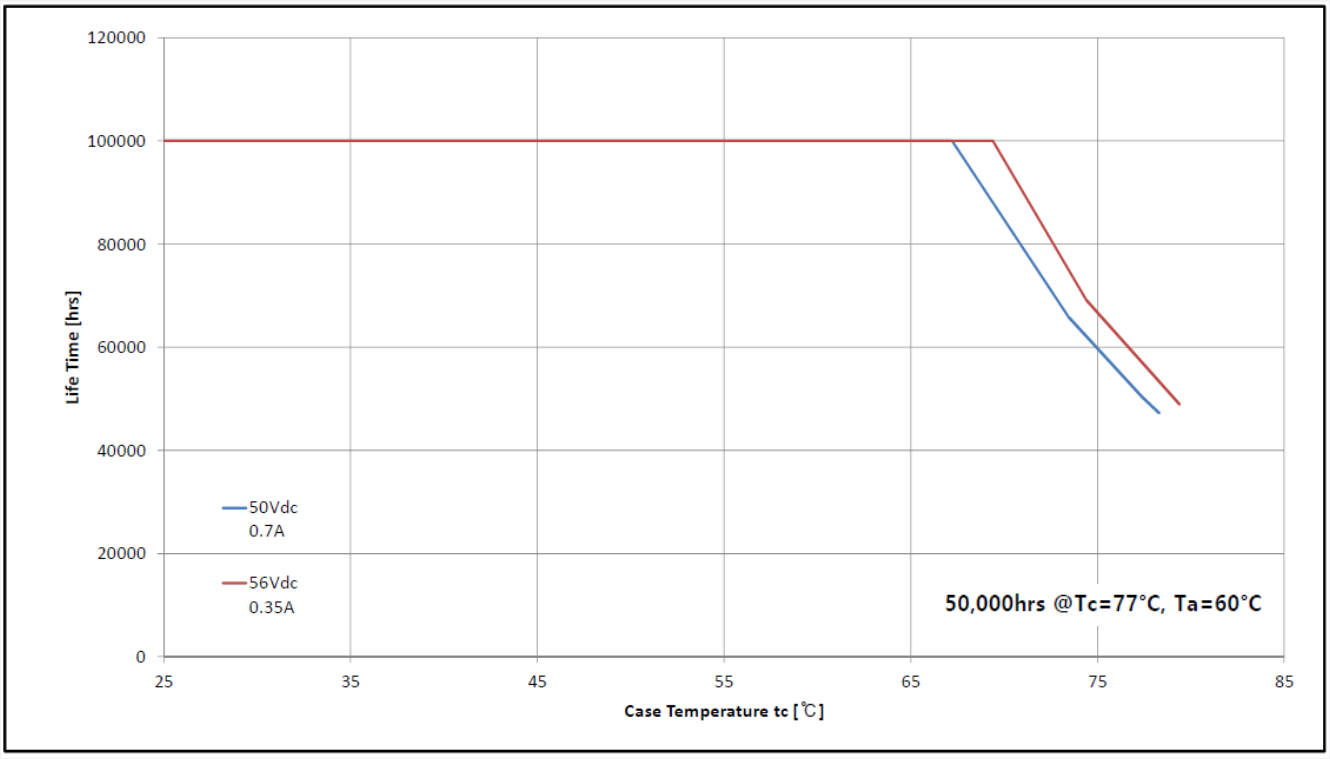
s) THD vs. Load 3-1



t) THD vs. Load 3-2



u) Lifetime



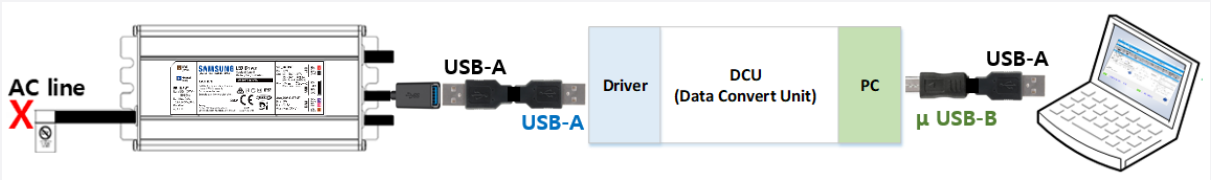
4. Output Current Setting Process

The programmable driver can be programmed by using special U/I software or DALI-2 protocol.

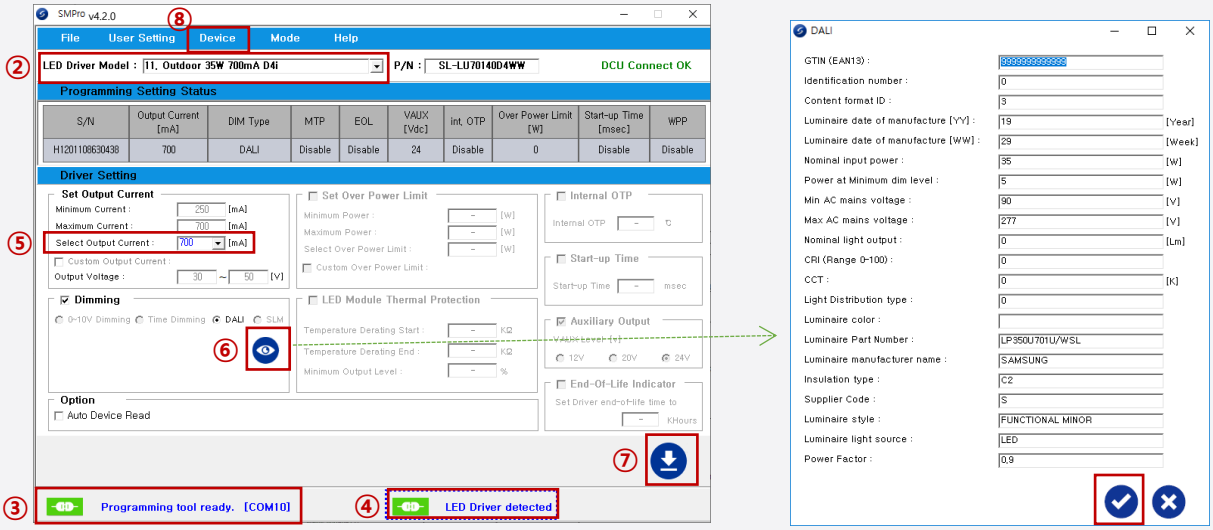
After installing the U/I software, follow steps below.

*Download link for Software : https://cdn.samsung.com/led/file/data/SMPro_v.4.2.0.zip

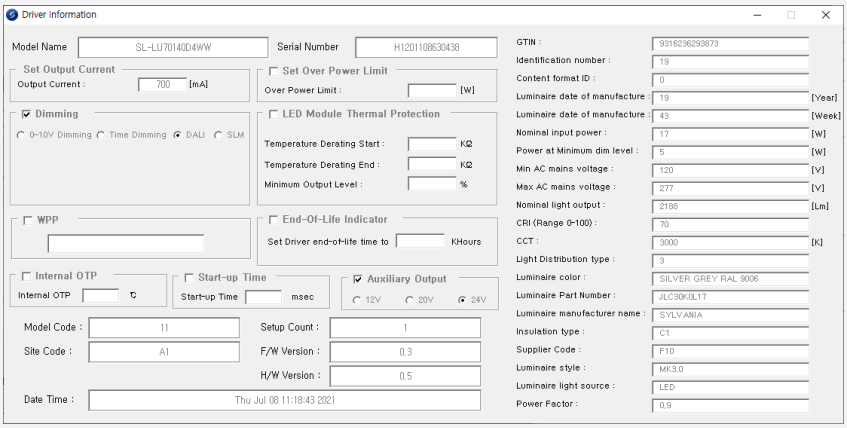
1. Run the U/I software named SMPro v4.2.0.
2. Select the LED driver model(11. Outdoor 35W 700mA D4i).
3. Connect DCU(Data Convert Unit) and PC first. The connection status of DCU changes to 'Programming tool ready'.
4. Connect DCU and LED Driver. The connection status of LED Driver changes to 'LED Driver detected'.



5. Select the output current value.
6. Click the 'View/Driver setting' button. Then another window will be opened and you can write the luminaire information on it. After writing the luminaire information, and then click the √ button.



7. Click the 'Download' button to apply the changed value and the luminaire information into the LED driver.
8. You can check the programming result on 'Device Information' from 'Device' menu tab.



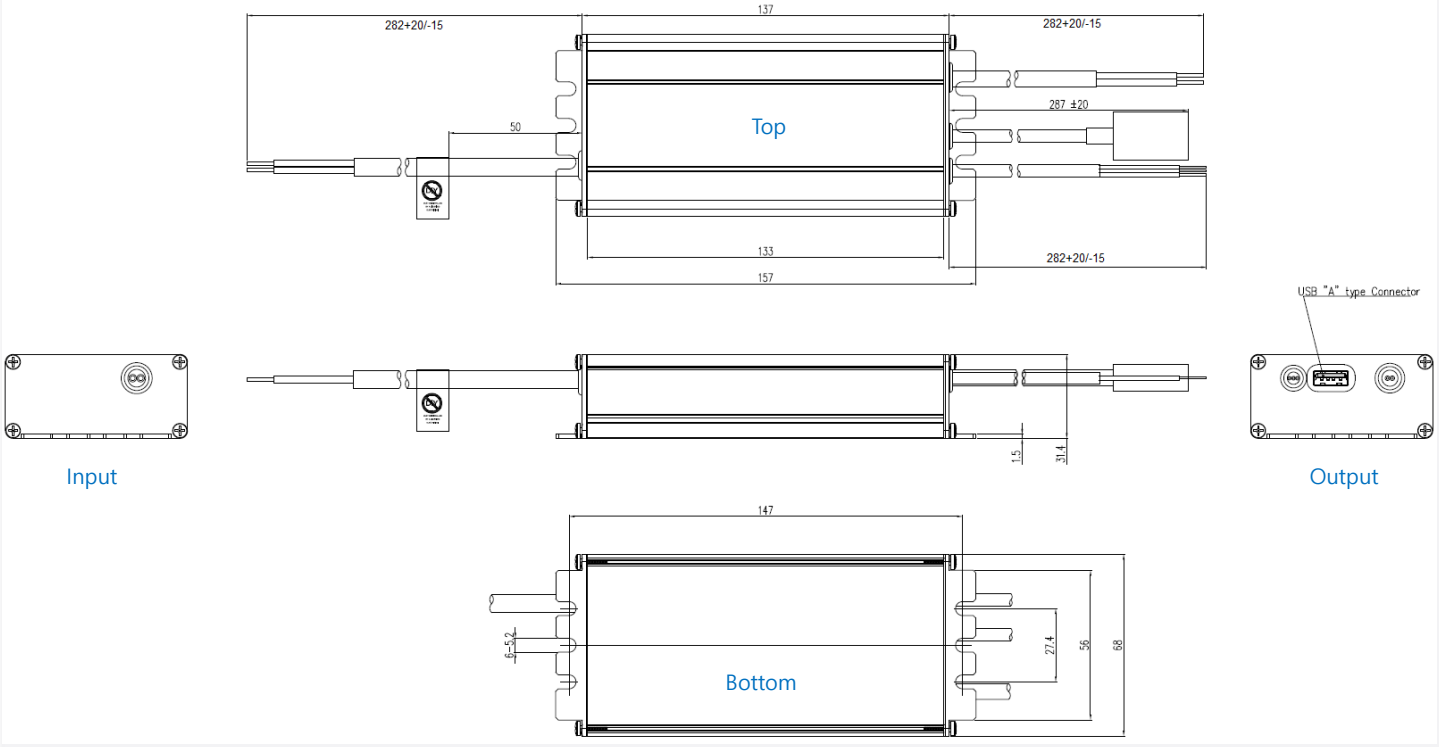
5. Reliability

Test Items and Conditions

Test Item		Specification	Condition
Leakage Current		< 0.7 mA	
Hi-pot	Input – Output	3750 Vac, 60 s ≤ 10 mA	
	Input – Case	3750 Vac, 60 s ≤ 10 mA	
	Input – DALI	3750 Vac, 60 s ≤ 10 mA	
	Output – Case	500 Vdc, 60 s ≤ 10mA	
Insulation Resistance	Input – Output	500 Vdc, 60 s ≥ 10 MΩ	
	Input – Case	500 Vdc, 60 s ≥ 10 MΩ	
Lightning Surge	L / N	± 6 kV	Combination waveform
	LN / FG	± 9 kV	
ESD	Contact	± 6 kV	
	Air	± 10 kV	

6. Outline Drawing & Dimension

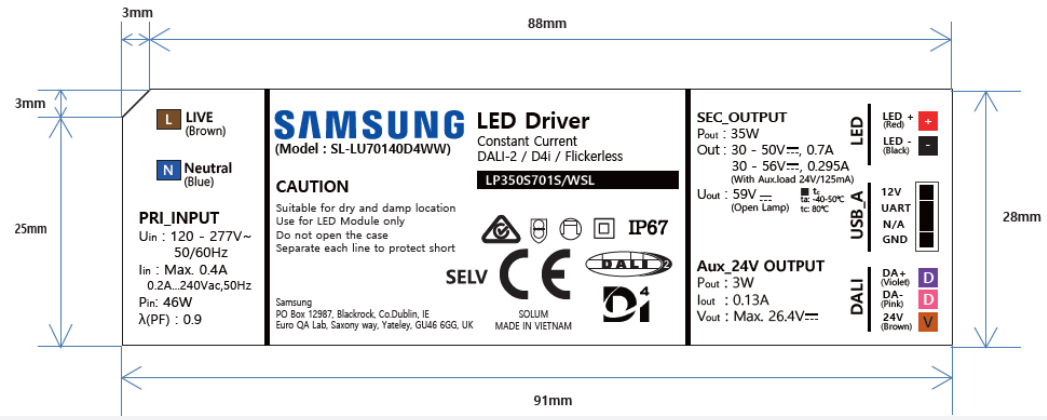
a) Dimension (mm)



b) Wiring

Part	Name	Feature	Color	Purpose
LED	LED+	Positive output	Red	Supply power to LED module
	LED-	Negative input	Black	Power ground
USB_A	12V	12V auxiliary power supply	-	Supply 12V to the DCU
	UART	UART port	-	Adjustable output current through the user interface
	N/A.	N/A	-	Not available
	GND	2nd ground	-	Signal ground
DALI	DA+	Positive DALI port	Violet	DALI+ communication line
	DA-	Negative DALI port	Pink	DALI- communication line / 24V aux. ground
	24V	24V auxiliary power supply	Brown	Supply 24V/3W to sensor or dimmer

7. Label Structure



8. Packing Structure

Packing material	Max. quantity (pcs)	Dimension (mm)		
		Length	Width	Height
Outer box	14	544	208	130
Pallet	840 (60 outer boxes)	1130	1130	118

9. Precautions in Handling & Use

1) To prevent the LED Driver from any defect, please handle and store it with care
   - Do not drop or give shock
   - Do not store in very humid location or at extreme temperature
   - Do not open or disassemble the product
2) Static electricity or surge voltage may damage the components inside LED Driver, as such please observe proper anti-electrostatic working process
   - People handing the Driver should be well grounded (e.g. using ESD wrist band) and wear anti-static working clothes and gloves
   - All related devices and instruments in the production line should be well grounded (e.g. working table, measuring equipment, assembly jigs)
3) Observe the correct polarity of output terminal
4) Avoid input voltage exceeds the maximum rating, which will cause damage to the circuit and result in malfunction

10. Installation guide

The long-term reliability of the LED driver depends on the installation guide.

1) General instructions

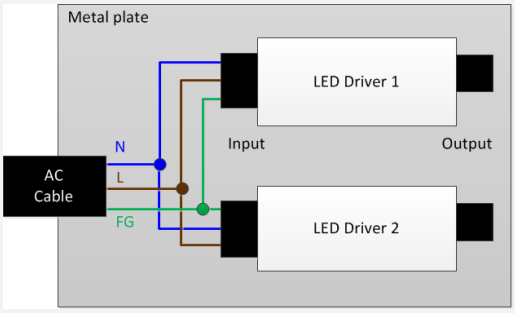
. The switching of LEDs on secondary side is not permitted.
. Do not install the LED driver in places with high ambient temperature or near fire source.
- Please refer to the specifications for the maximum ambient temperature limitations named max. ta.
- During operation, the temperature measured at tc point must not exceed the specified max. tc.

. Install the LED driver in a waterproof enclosure or at least under the cover to prevent direct exposure to rain or moving water.
- Avoid cables bent or looped above the LED driver to prevent water from flowing to junction area.
- Avoid a situations that the wire leads or end of cable jacket are exposed to moisture or wet environment.

2) Earth connection

. The earth connection is conducted as protection earth(PE).
. The LED driver can be earthed via metal housing. If the LED driver will be earthed, PE has to be used.
. The earth connection is recommended to improve following behavior.
- Electromagnetic interferences(EMI)
- Lightning surge immunity from AC power line
- Transmission of mains transients to the LED output

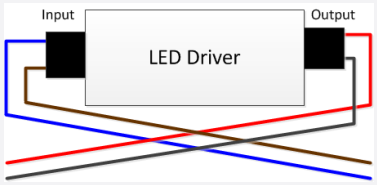
. The PE between AC power line and the LED driver should be connected in common point as below.

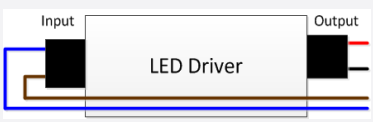


3) Wiring instruction

. All connections should be kept as short as possible to ensure good EMI operation.
. To reduce the EMI, don't cross the wire between input and output, don't put the wire above the LED driver as below.

Example of bad wiring

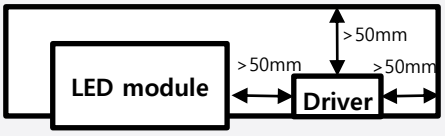




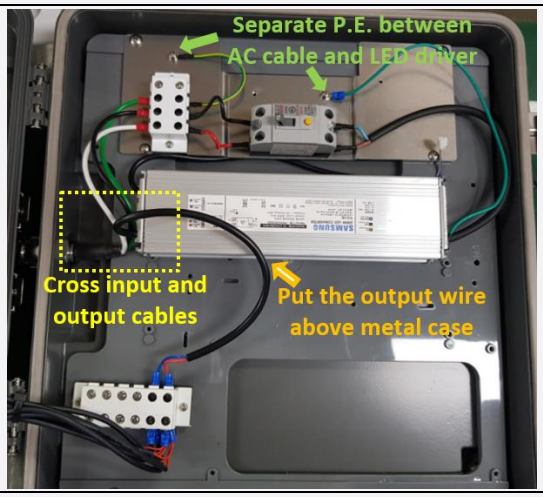
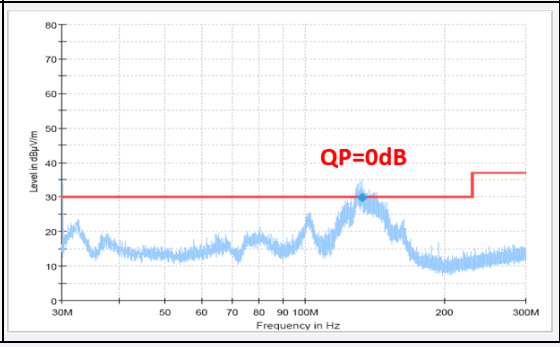
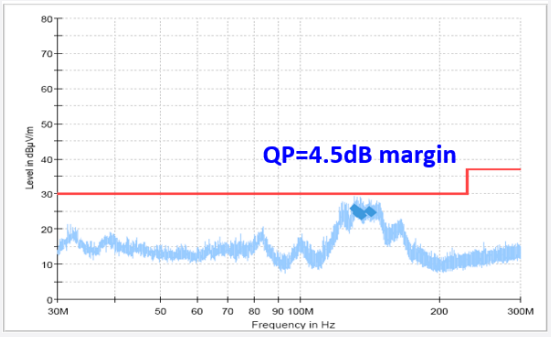
. Main cables should be kept apart from the LED driver and other cables(more than 5~10cm distance).
. It is recommended that the maximum length of the output wire be 5 meters or less.
. Please ensure the correct polarity of the leads prior to commissioning. Reversed polarity can destroy the LED modules.
. To avoid the damage of the LED driver, the wiring must be protected against short circuits to earth.

4) Fixing conditions

. If the LED driver is destined for installation in a luminaire, sufficient heat transfer must be ensured between the LED driver and the luminaire casing.
. The LED drivers should be mounted with enough clearance to heat sources.
. Minimum distances stated on the right is recommended on the actual luminaire.
. It is not suitable for fixing the LED driver at the corner.



5) Example of EMI(RE) effect on wiring and earth connection

	Bad set-up	Good set-up
Photo of tunnel lighting fixture		
EMI(RE) measurement result		

Legal and additional information.

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