



## SPECIFICATION FOR APPROVAL

**Customer:** \_\_\_\_\_

**Product Material No.:** \_\_\_\_\_

**Model No.:** \_\_\_\_\_ **LF-GSD040YA** \_\_\_\_\_

**Version:** \_\_\_\_\_ **V1.1** \_\_\_\_\_

**Manufacturer:** \_\_\_\_\_

### Customer Approval

Tested by	Checked by	Approved by

### Ledfriend Approval

Tested by	Checked by	Approved by

### The full model numbers required by customers

Full model No.		Full model No.	
Full model No.		Full model No.	

### E.C. List

Version	Description of change	Engineer	Date
0.1	Original version	Liao Xinggao	2016-12-12
0.2	Updated the specification form	Liao Xinggao	2017-05-03
1.0	Updated the wire diagram	Liao Xinggao	2017-06-22
1.1	Packing information is revised	Liao Xinggao	2017-08-21

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<b>Model</b>	LF-GSD040YA	<b>Series</b>	AC220-240V, DALI 1.0, PUSH Dim, DIP Switch & Flicker-Free
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## DESCRIPTION

LF-GSD040YA series of driver is the 40W constant current LED driver. Its DALI dimming function meets the standards of DALI 1.0 which are IEC 62386-101: 2014, IEC 62386-102: 2014 and IEC 62386-207: 2009. It can work under 180-264VAC. The output current is from 350mA to 1050mA and can be modulated by the **DIP switch**, in steps of 50mA. The unique circuit structure helps the efficiency to reach 87%. The dimming functions, including DALI, **PUSH** and 1-10V/ PWM dimming, meet the needs of diverse design of the LED lighting system.

## ◇ FEATURE

- Constant current LED driver. The output current can be modulated by the DIP switch, in steps of 50mA.
- Plastic casing (applicable to Class I & Class II LED lamps)
- Built-in active PFC function
- Standby power consumption low to 0.7W (when the DALI instruction “OFF” works)
- DALI dimming - support logarithmic or linear dimming curve; support PUSH dim; support synchronous dimming (max. 8 LF-GSD040YA are with the same address) ;
- Compatible with 1-10V/ PWM dimming
- Flicker-free design
- 5 Years warranty (Please refer to the warranty condition.)

## ◇ APPLICATION

- LED office lighting
- LED residential lighting
- LED commercial lighting
- LED greenhouse lighting
- LED decorative lighting
- LED flood lighting

Model	LF-GSD040YA	Series	AC220-240V, DALI 1.0, PUSH Dim, DIP Switch & Flicker-Free
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## SPECIFICATION

### I.

MODEL		LF-GSD040YA							
Output	Output Voltage	46-57V							
	Output Current	Modulated by the DIP Switch. Please refer to the “DIP Switch Table”.							
		350mA	400mA	450mA	500mA	550mA	600mA	650mA	700mA
	Ripple Voltage	<1V							
	No flicker Coefficient	<0.5%							
	Current Tolerance	±5%							
	Temperature Drift	±10%							
	Load Regulation Rate	±5%							
Set Up Time	230Vac <0.5S								
Input	Input Line Regulation	±5%							
	AC Voltage	220-240Vac ( Max input voltage: 180-264Vac )							
	Frequency	47Hz-63Hz							
	AC Current	0.3A Max							
	Power Factor	≥ 0.95/230Vac							
	THD	≤ 15%							
	Efficiency	≥ 86%/230Vac							
	In-rush Current	≤ 30A/350uS@230Vac							
	Leakage Current	≤ 0.7mA							
	No load / Standby Power Consumption	≤0.7W							
Protection	Over Voltage	< 80V							
	Short Circuit	Hiccup mode (auto-recovery)							
Environment	Working TEMP.	-30℃ - +50℃							
	Working Humidity	20-90%RH (no condensation)							
	Storage Temp./Humidity	-40℃ - 80℃(6 months under the class I environment);10-90%RH(no condensation)							
	Atmospheric Pressure	86-106KPa							
Safety & EMC	Certificate	CE compliant							
	Hi-pot Test	I/P-O/P: 3.75kV 5mA 60S							
	Insulation Resistance	I/P-O/P:500VDC,>100MΩ							
	Isolation Resistance	IEC61000-4-5(L-N:1KV )							
	Safety Emission	EN61347, GB19510							
	EMC Emission	EN55015, EN61000-3-2							
Others	EMC Immunity	EN61000-4-2,3,4,5,6,8,11; EN61547							
	IP Level	IP20							
	Warranty Condition	5 years ( Tc≤80℃ )							
Testing Equipment	DALI Standard	IEC 62386-101: 2014, IEC 62386-102: 2014, IEC 62386-207: 2009, DALI 1.0							
	Test Conditions	AC power source: CHROMA6530, digital power meter: CHROMA66202, Oscilloscope: Tektronix DPO3014, DC electronic load: M9712B, LED board, constant temperature and humidity chamber, lightning surge generator: Everfine EMS61000-5B, rapid group pulse generator: Everfine EMS61000-4A, spectroanalyzer: KH3935, hi-pot tester: TH9201B, flicker-free tester (flicker-free coefficient tester) 60N-01, etc.							
Test Conditions	The parameters above including the power factor, THD, efficiency are all tested under the ambient temperature 25℃ and humidity 50%, AC input 230V and 90% output load.								

Model	LF-GSD040YA	Series	AC220-240V, DALI 1.0, PUSH Dim, DIP Switch & Flicker-Free
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<b>Additional Remarks</b>	<p>1. In the power supply circuit, it is recommended that the customer should install an over-under-voltage protection and surge protection device to ensure the safety of using electricity.</p> <p>2. The PC cover, shell, end caps used together with the LED driver inside the LED lamp must meet the UL94V-0 fire rating level or above.</p> <p>3. As a part of the LED lamp, the LED driver is not the only factor determining the EMC performance of the LED lamp. And the EMC performance is also related to the LED lamp's structure and the wire routing. Thus we strongly recommend the manufacturer of the finished LED lamp must re-confirm the EMC of the LED lamps.</p>
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## SPECIFICATION

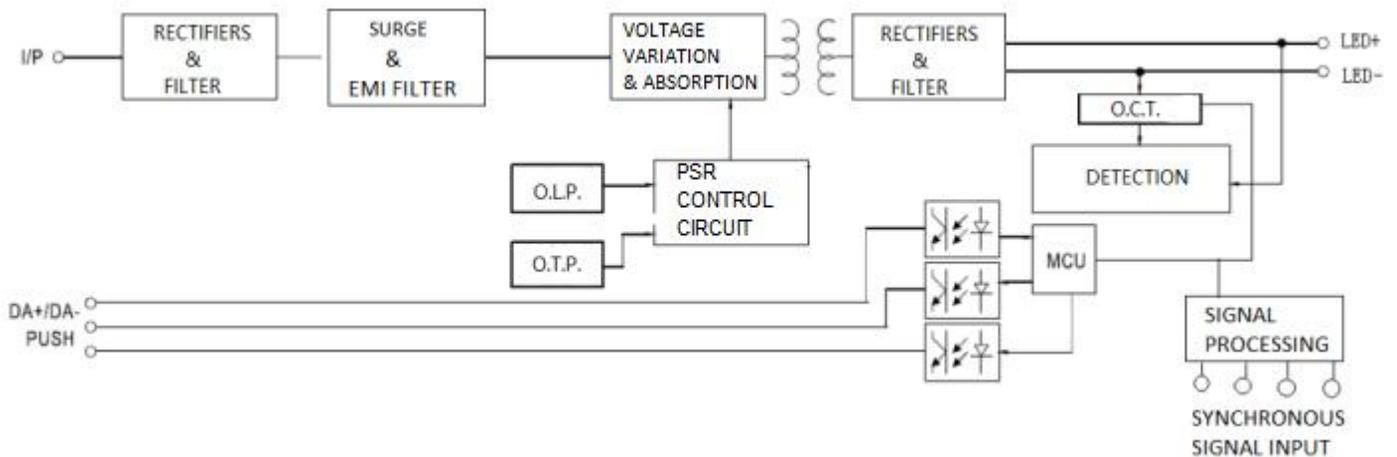
### II.

MODEL		LF-GSD040YA						
<b>Output</b>	Output Voltage	36-53V	36-50V	36-47V	35-45V	30-42V	30-40V	30-38V
	Output Current	Modulated by the DIP Switch. Please refer to the "DIP Switch Table".						
		750mA	800mA	850mA	900mA	950mA	1000mA	1050mA
	Ripple Voltage	<1V						
	No flicker Coefficient	<0.5%						
	Current Tolerance	±5%						
	Temperature Drift	±10%						
	Load Regulation Rate	±5%						
Set Up Time	230Vac <0.5S							
<b>Input</b>	Input Line Regulation	±5%						
	AC Voltage	220-240Vac ( Max input voltage: 180-264Vac )						
	Frequency	47Hz-63Hz						
	AC Current	0.3A Max						
	Power Factor	≥ 0.95/230Vac						
	THD	≤ 15%						
	Efficiency	≥ 87%/230Vac						
	In-rush Current	≤ 30A/350uS@230Vac						
	Leakage Current	≤ 0.7mA						
<b>Protection</b>	No load/Standby Power Consumption	≤ 0.7W						
	Over Voltage	< 80V						
<b>Environment</b>	Short Circuit	Hiccup mode (auto-recovery)						
	Working TEMP.	-30°C - +50°C						
	Working Humidity	20-90%RH (no condensation)						
	Storage Temp./Humidity	-40°C - 80°C (6 months under the class I environment); 10-90%RH (no condensation)						
<b>Safety &amp; EMC</b>	Atmospheric Pressure	86-106KPa						
	Certificate	CE compliant						
	Hi-pot Test	I/P-O/P: 3.75kV 5mA 60S						
	Insulation Resistance	I/P-O/P: 500VDC, >100MΩ						
	Isolation Resistance	IEC61000-4-5(L-N:1KV )						
	Safety Emission	EN61347, GB19510						
	EMC Emission	EN55015, EN61000-3-2						
<b>Others</b>	EMC Immunity	EN61000-4-2,3,4,5,6,8,11; EN61547						
	IP Level	IP20						
	Warranty Condition	5 years ( Tc≤80°C )						
	DALI Standard	IEC 62386-101: 2014, IEC 62386-102: 2014, IEC 62386-207: 2009, DALI 1.0						

<b>Model</b>	LF-GSD040YA	<b>Series</b>	AC220-240V, DALI 1.0, PUSH Dim, DIP Switch & Flicker-Free
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<b>Testing Equipment</b>	AC power source: CHROMA6530, digital power meter: CHROMA66202, Oscilloscope: Tektronix DPO3014, DC electronic load: M9712B, LED board, constant temperature and humidity chamber, lightning surge generator: Everfine EMS61000-5B, rapid group pulse generator: Everfine EMS61000-4A, spectroanalyzer: KH3935, hi-pot tester: TH9201B, flicker-free tester (flicker-free coefficient tester) 60N-01, etc.
<b>Test Conditions</b>	The parameters above including the power factor, THD, efficiency are all tested under the ambient temperature 25°C and humidity 50%, AC input 230V and 90% output load.
<b>Additional Remarks</b>	<ol style="list-style-type: none"> <li>In the power supply circuit, it is recommended that the customer should install an over-under-voltage protection and surge protection device to ensure the safety of using electricity.</li> <li>The PC cover, shell, end caps used together with the LED driver inside the LED lamp must meet the UL94V-0 fire rating level or above.</li> <li>As a part of the LED lamp, the LED driver is not the only factor determining the EMC performance of the LED lamp. And the EMC performance is also related to the LED lamp's structure and the wire routing. Thus we strongly recommend the manufacturer of the finished LED lamp must re-confirm the EMC of the LED lamps.</li> </ol>

## BLOCK DIAGRAM

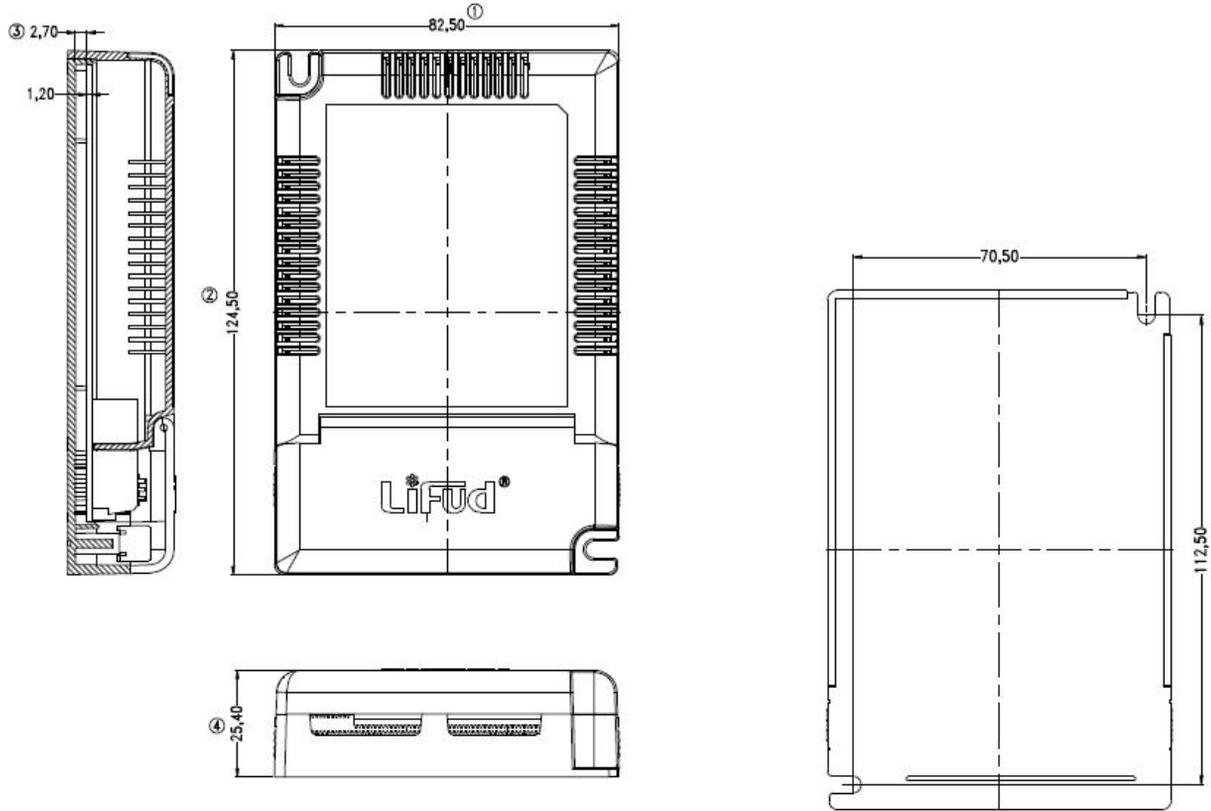


## DIP SWITCH TABLE

TA	VO DC	Current	1	2	3	4	5	6
50°C	57V	350mA	-	-	-	-	-	ON
	57V	400mA	-	-	-	ON	-	ON
	57V	450mA	-	-	ON	-	-	ON
	57V	500mA	-	-	ON	ON	-	ON
	57V	550mA	-	ON	-	-	-	ON
	57V	600mA	-	ON	-	ON	-	ON
	57V	650mA	-	ON	ON	-	-	ON
	57V	700mA	-	ON	ON	ON	-	ON
	53V	750mA	ON	-	-	-	-	ON
	50V	800mA	ON	-	-	ON	-	ON
	47V	850mA	ON	-	ON	-	-	ON
	45V	900mA	ON	ON	-	-	-	ON
	42V	950mA	ON	ON	-	ON	-	-
	40V	1000mA	ON	ON	ON	-	-	-
38V	1050mA	ON	ON	ON	ON	-	-	

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**MECHANICAL SPECIFICATION (unit: mm)** Tolerance:  $\pm 0.5\text{mm}$



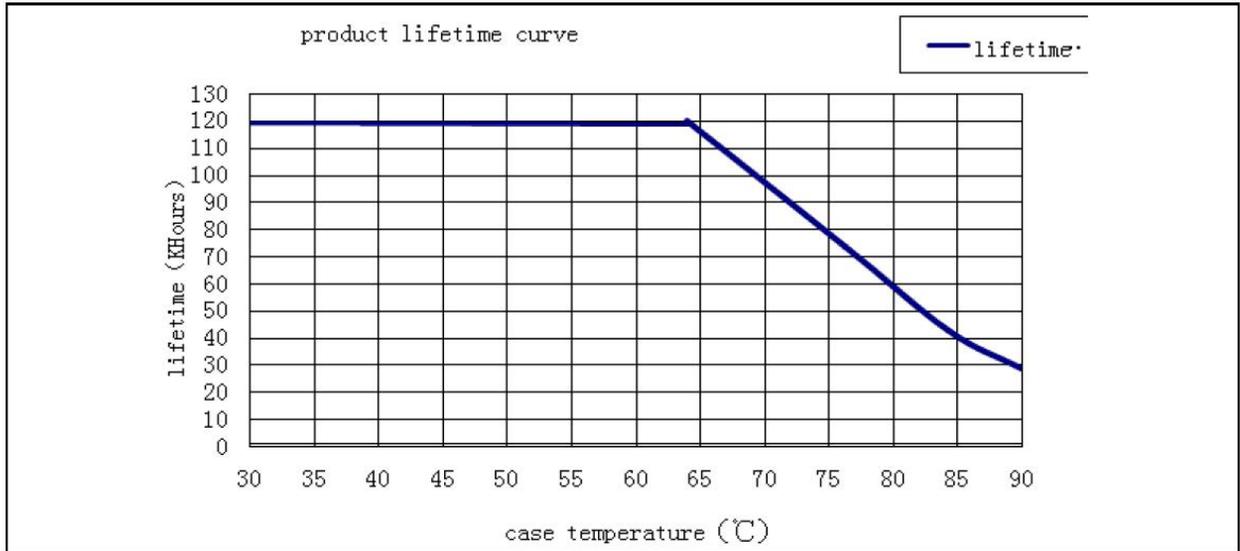
**PACKING**

MODEL	CARTON SIZE	QUANTITY AND WEIGHT
LF-GSD040YA	385*285*210mm	8pcs/layer; 7 layers/ctn; 56pcs/ctn; 180g/pcs; 11.50kg/ctn

Model	LF-GSD040YA	Series	AC220-240V, DALI 1.0, PUSH Dim, DIP Switch & Flicker-Free
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## PRODUCT REFERENCE LIFETIME CURVE

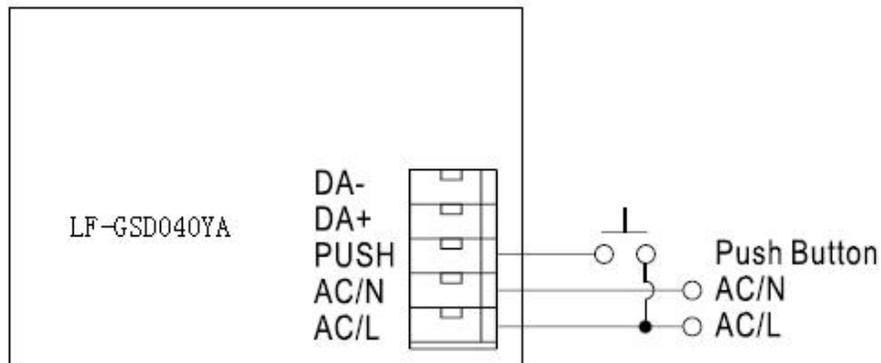
The curve below illustrates the driver's lifetime data when the LED driver's Max. case temperature reaches 40°C, 50°C, 60°C, 70°C, 80°C, 85°C.



## DIMMING FUNCTION INSTRUCTIONS

### I. PUSH Dimming

#### (I) Wire Connection Diagram



Operation	Operation Time	Variation
Instant Push	0.1 sec ~ 1 sec	Light On / Off
Long Push	1.5 sec ~ 10 sec	Brighter / Dimmer
Reset Push	> 11 sec	Back to Brightest

(III) Factory defaults is of 100% brightness.

(IV) The push won't cause any variation if it's less than 0.1 sec.

(V) Max. 8 pcs of LED drivers, in parallel, can be controlled by one button. (One master. The others are slaves.)

(VI) The lead wire (AWG16-22) that connects the master to the farthest slave can be up to 105 meters (max.).

(VII) The Push Button can only be connected to the AC/L and PUSH terminals of the driver. It results in the short circuit if the Push Button is connected to the AC/N terminal.

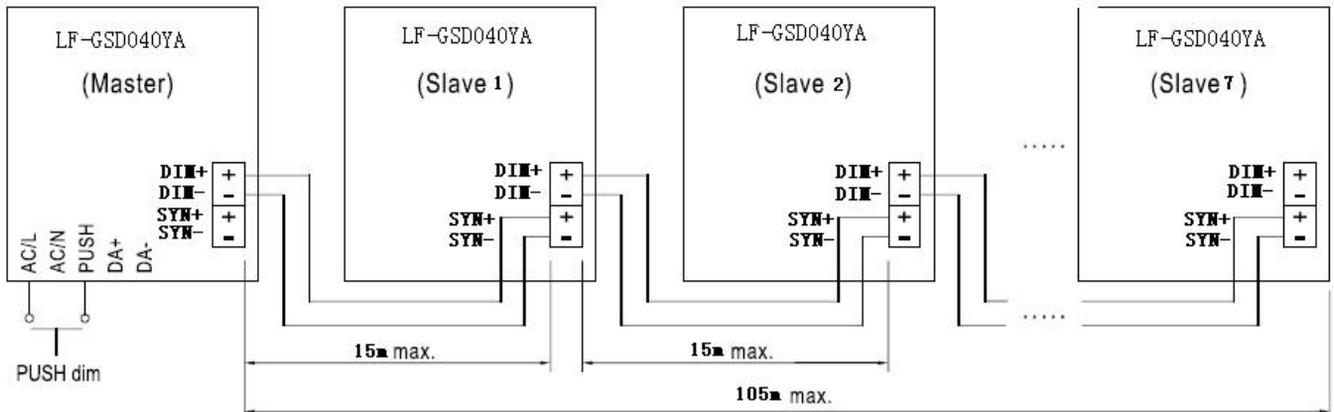
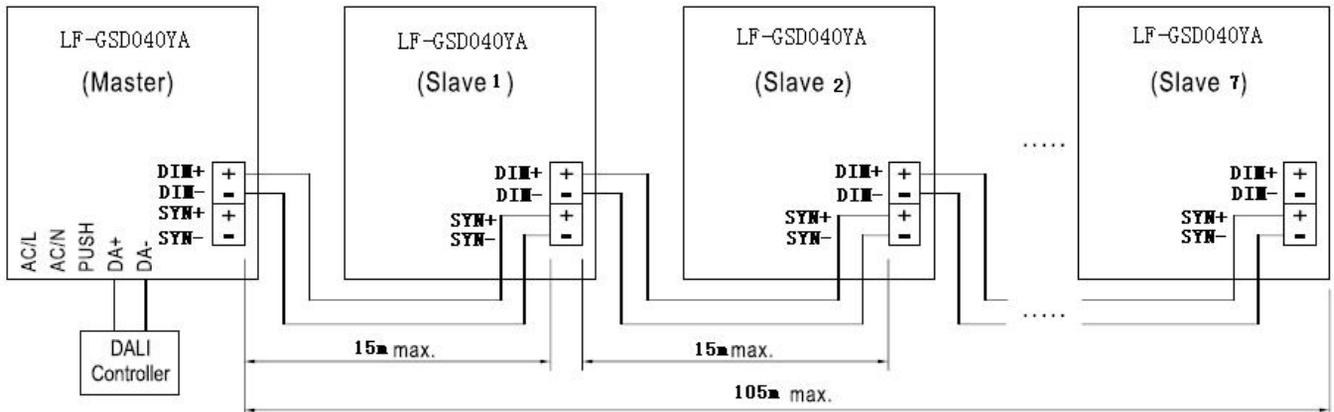
Model	Series	AC220-240V, DALI 1.0, PUSH Dim, DIP Switch & Flicker-Free
LF-GSD040YA		

## II. DALI Dimming

- (I) Connect the DALI signal to the DA+ and DA- terminals.
- (II) The DALI protocol includes 16 bytes, 64 bits, of IP address.
- (III) The least dimming depth of DALI is of  $8\% \cdot I_{out}$ .

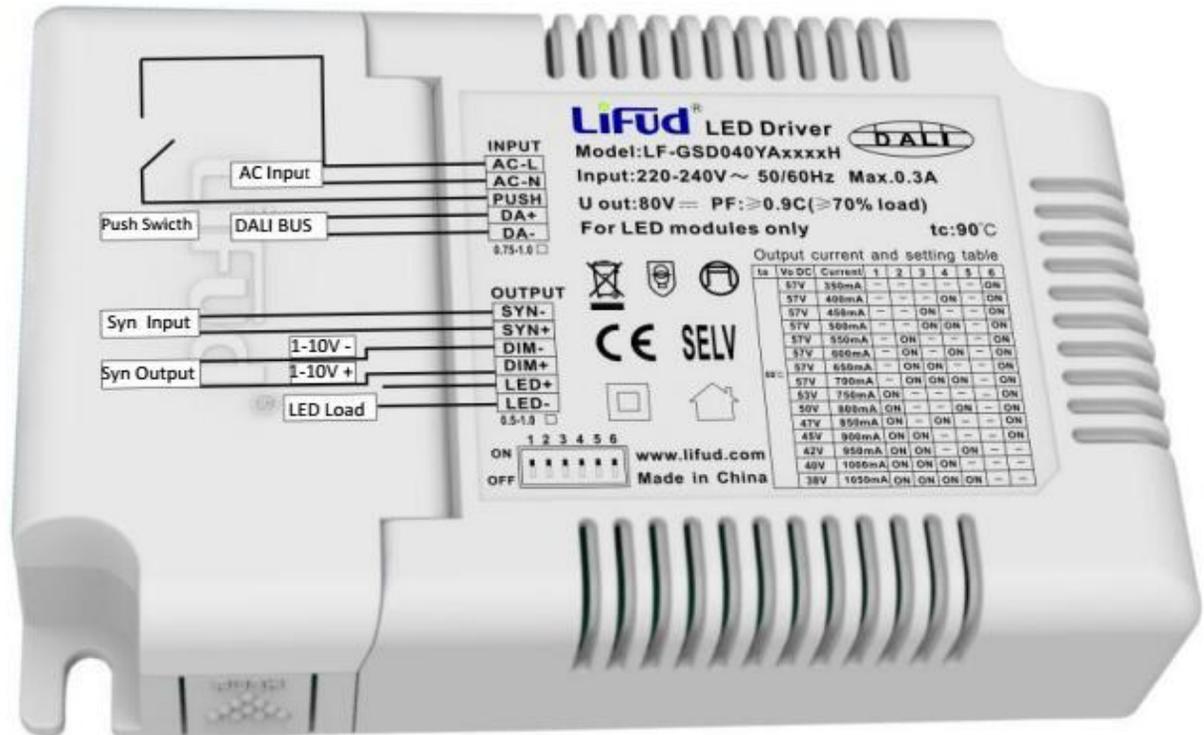
## III. Synchronous Dimming

- (I) Max. 8 pcs of LF-GSD040YA work synchronously. One is the master and the others are slaves.
- (II) The lead wire (AWG16-22) between every two drivers can be up to 15 meters (max.).
- (III) The lead wire (AWG16-22) between the master and the farthest slave can be up to 105 meters (max.).
- (IV) LF-GSD040YA can achieve synchronous dimming by directly controlling the slaves with DALI and PUSH.
- (V) Wire connection diagram for synchronous dimming is as below:
- (VI) Please make sure all the drivers of LF-GSD040YA are of 100% output before using the synchronous dimming function.



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## WIRE CONNECTION DIAGRAM



## TEST DESCRIPTION

Test Item	Testing Phase				
	R&D Design	Small-batch Production	After Small-batch Production	Batch Production	
Electrical Function Test	Input Output Characteristic Test	√	√	√	√
	Dimming Test	√	√	√	√
	I/O Curve comparison	√	×	√	√
	Input Inrush Current Test	√	√	√	√
	Over Shoot Test	√	×	√	√
	Ripple & Noise Test	√	√	√	√
	Short Protection Test	√	√	√	√
	Turn On Time Test	√	√	√	√
	Open Circuit Protection Test	√	√	√	√
	Component Stress Test	√	×	√	√
Reliability Test	H.T. & L.T. Storage Test	√	×	√	√
	H.T. & H.H. Storage Test	√	×	√	√
	H.T. & H.H. Cycle Test	√	×	√	√
	Cold & Heat Impact Test	√	×	√	√
	Low Temperature Start Test	√	×	√	√
	ON/OFF Test	√	×	√	√

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	Burn-in Test	√	×	√	√
	Thermal Test	√	×	√	√
	MTBF/Accelerated Life Test	√	×	√	×
	Withstand Voltage Test	√	√	√	√
EMC/Safety Test	Hi-pot Test	√	×	√	×
	Surge Test	√	×	√	√
	Electrostatic Discharge Test	√	×	√	√
	Electrical Fast Transient Test	√	×	√	√
	Harmonic current Test	√	×	√	√
	Conducted Emission on AC Test	√	×	√	√
	Radiated Emission Test	√	×	√	√
Others	Drop Test	√	√	√	√
	Vibration test	√	√	√	√
Test by		RD DQE	PD QC	RD DQE	QA