

Features

Ozone LED drivers are designed to make LED fixture design easy. With universal input voltage, wide range output and a list of exceptional features, they take the trial and error out of LED fixture design.

- Universal Input Voltage: 120Vac / 240Vac / 277Vac
- Constant Current Output for Powering LEDs Directly
- High Efficiency, Compact Design
- Low Harmonic Distortion, Low Output Ripple Current
- Field Programmable Output Current
- DALI Compatible (IEC 62386)
- Dimmable Output Current (Linear or PWM Dimming)
- Multiple Device Protections and LEDs Over Temperature Protection
- Convection Cooled, Wide Operative Temperature Range
- Long Life
- ROHS Compliant



Applications and Benefits

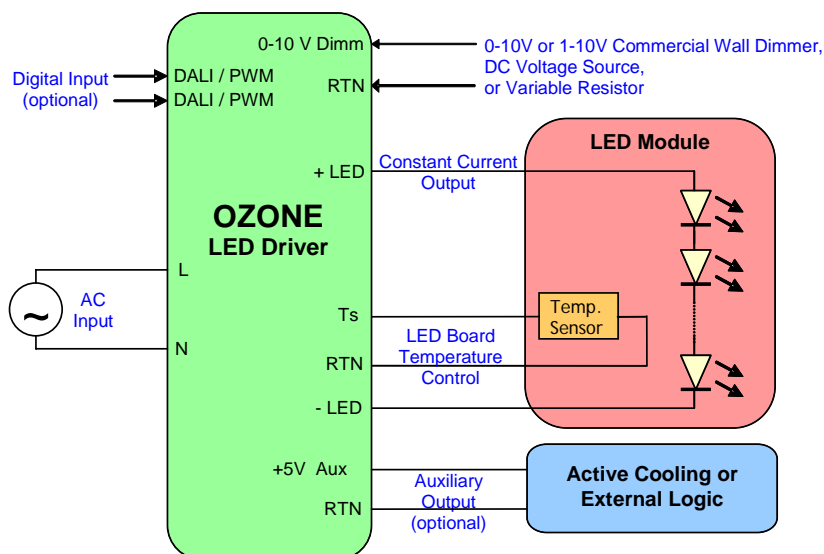
Ozone is designed for directly powering LEDs in Indoor Lighting for Big Areas, Street&Urban Lighting, Industrial lighting.

Features:

- Intelligent
- Robust Design
- Compact
- WW Safety Approvals

Benefits:

- Easy to use for the final customer with the Driver Setting module (Ozone Programming Tool, available as optional)
- Flexible and suitable for several applications
- Communication through DALI protocol
- Long Life Time
- Easy to be integrated in the LED Lamp
- Ease Safety Approvals Cycle on final Lamp



OZONE's versatile control features:

- Settable Output Current. Output current value can be set also by the user
- A 2 wire Dimming input provides 10-100% Iout Dimming function.
- A Temperature sensor (NTC thermistor) protects the LED from over-temperature.
- An Optional Digital Input allows direct interface with PWM input or DALI controls
- An Optional 5V AUX can be used to power external logic or auxiliary loads such as external logic or active cooling equipment (*SynJet® LED Coolers from Nuventix*)



Input and Output Specification

	Model RSOZ070-60-XXX	Model RSOZ070-120-XXX	Model RSOZ070-200-XXX
Input Characteristics			
Nominal Input Voltage	120 Vac / 240 Vac / 277 Vac		
Input Voltage Range	90Vac to 305Vac		
Input Voltage Frequency	47Hz to 63Hz		
PFC	>0.9 @ any nominal Input Voltage, full load		
Total Harmonic Distortion Current THD	<15% @any nominal Input Voltage, full load	<15% @any nominal Input Voltage, full load	--
Efficiency@ nominal Input Voltage, full load	0.87@120Vac 0.90@230Vac 0.91@277Vac	0.89@120Vac 0.91@230Vac 0.92@277Vac	--
Isolation	Reinforced/double insulation meets IEC/EN61347-2-13 Class II		
Output Characteristics (LEDs)			
Power Limitation (P LED)	Meets power limitation for NEC Class 2 rating	Not Applicable	Not Applicable
Output Voltage	From 30Vdc to 195Vdc with only 3 models; See Model Table for details.		
Output Current	From 350mA to 2100mA; See Current Setting section for details.		
Output Current Regulation	+/- 2% of the current set value (Iset)		
Ripple Current	<30% (P-P) of the current set value (Iset)		
Protections	NO Load Protection, Output Over Voltage Protection, Over LOAD Protection, Output Under Voltage Protection, Over Current and Short-Circuit Protection, Device Over-Temperature protection with current reduction and auto recovery; Soft start for LED Board hot plug; LED Board Over Temperature Protection; See also LED Driver Controls section for details.		
Optional Auxiliary Output (Aux)			
+5V Aux (optional)	A +5V Auxiliary output provides power for active LED cooling. Vout Aux from 4.75 to 5.25 Vdc Output Vaux Ripple: 150 mVpk-pk P Aux = 3.75 W maximum Protected against overload and over voltage Compatible with Nuventix MR16, PAR20, PAR25, PAR30, and PAR38 SynJet Coolers		
Total Output Power P Tot= P LED + P Aux	P Tot = 70W maximum (See Note 1)		

Note 1: This limit is applied to the Total Output Power delivered by Ozone. In case the LED Driver is equipped with the Auxiliary circuit that provides P Aux, this power has to be considered in the Total Output Power:
P Tot = P LED + P Aux.

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LED Driver Controls

	Model RSOZ070-60-XXX	Model RSOZ070-120-XXX	Model RSOZ070-200-XXX
Standard Output Controls			
0-10V Dimm	<p>The 0-10V Dimm is a dimming input that can be used to adjust the output setting via a standard commercial wall dimmer (0 to 10Vdc or 1 to 10Vdc, IEC/EN 60929), an external control voltage source (0 to 10Vdc or 1 to 10Vdc).</p> <p>This LED Driver input permits active control of the driver and may be used for trimming and dimming purposes (linear dimming).</p> <ul style="list-style-type: none"> The 0-10V Dimm input permits trimming and dimming from 100%Iset to Idimm min as specified below <p><u>See Application Note 2 "AN2_Ozone Temperature Sense & 0-10V Dimming"</u> for further details.</p>		
	Idimm min=50±15mA if Iset ≤ 650mA Idimm min=10%Iset if Iset > 650mA	Idimm min=10%Iset	--
Temperature Sense Ts	<p>The Temperature sense input may be connected to a thermistor (NTC) to realize a LED Board Over Temperature Protection.</p> <p>The thermistor should be located on the LED assembly to monitor its temperature. If the temperature exceeds a predetermined set point, the output current of the driver is automatically reduced to regulate the temperature of the LED Board at a safe level.</p> <p><u>See Application Note 2 "AN2_Ozone Temperature Sense & 0-10V Dimming"</u> for further details.</p>		
Optional Digital Input			
DALI / PWM (optional)	<p>The same Digital Input (DALI / PWM) can be used to control the LED Driver whether DALI Communication or PWM Signal. The selection of the functionality (DALI or PWM) of this input is made by using the Ozone Programming Tool. See also Ozone Programming Tool section.</p>		
	<p>DALI: The DALI input can be used to control the output of LED Driver. It is compatible with DALI Standard (IEC 62386) in the models RSOZ070-xxx-Full.</p> <p>PWM: The PWM input accepts a Pulsed Width Modulated signal. This signal allows a 0% to 100% PWM dimming of the Output Current. This input accepts a Signal compliant to the standard IEC/EN 60929.</p> <p><u>See Application Note 4 "AN4_Ozone DALI e PWM Dimming"</u> for further details.</p>		

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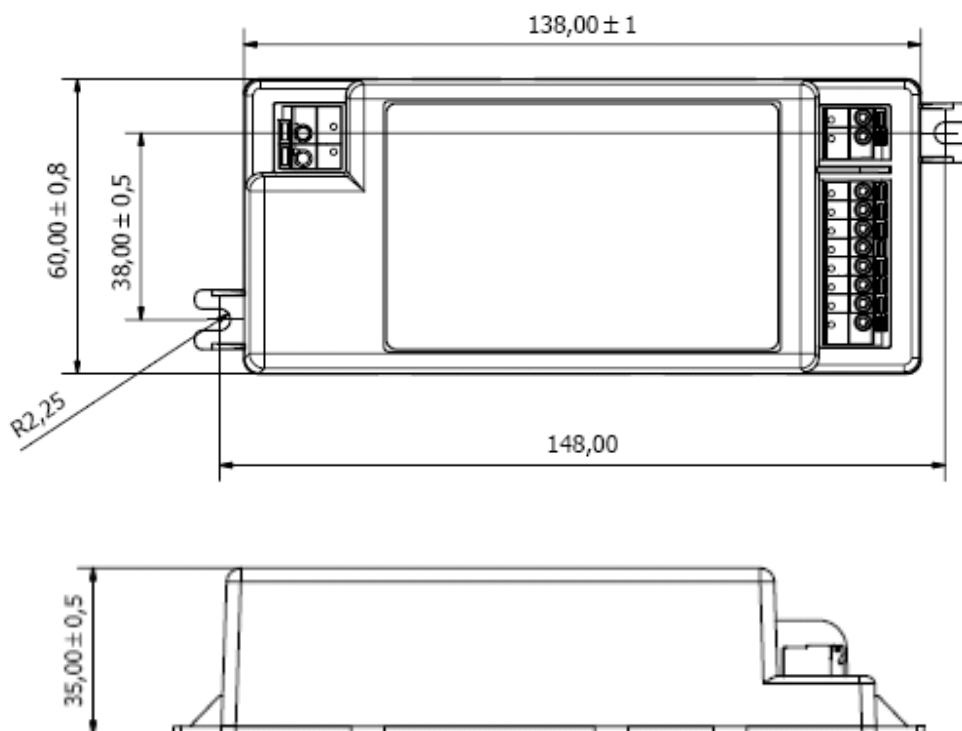
Mechanical Details

Enclosure Material	Plastic
Potting	Yes, half potted
I/O Connections	Push Pin Connector
Mounting Details	2 x Fixing holes for screws
Index of Protection	IP20
Weight	345 g = 0.76lb
Environmental Rating	LED Driver suitable for "Damp Location"

Outline Drawings

Dimensions (Lx W x H) 148mm x 60mm x35mm=5.82"x2.36"x1.37"

All Ozone Models RSOZ070-xxx-xxxx have the same dimensions: see drawing below



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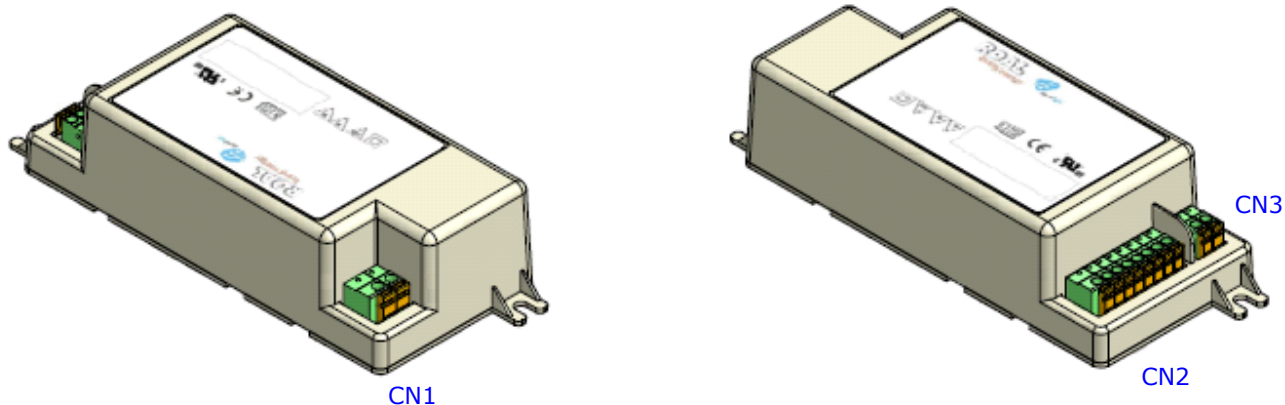
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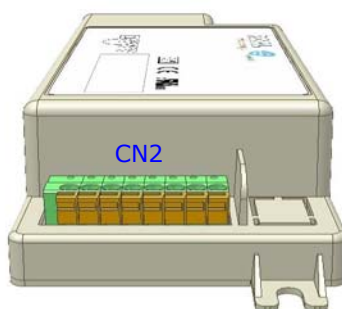
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Input/Output Connectors



Part	Description	# vie
CN1	AC Main Connector (Line, Neutral)	2
CN2	Output Connector and Controls (LEDs; 0-10V Dimming; Temperature Sense ; Auxiliary Output)	8
CN3 Note 2	DALI or PWM Connector (DALI/PWM, DALI/PWM)	2

Note 2 : The connector CN3 is mounted only when the Digital Input DALI/PWM (available as optional), is present (Models RSOZ070-xxx-DALI, RSOZ070-xxx-Full).
The figure below shows the enclosure of the LED Driver when the connector CN3 is not present (Models RSOZ070-xxx-Base, RSOZ070-xxx-Aux).



See Application Note 1 "AN1_Ozone Wiring Diagram" for wiring and fixing details.

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Environmental

Operating Case Temperature	-30°C to +85°C without derating
Operating Ambient Temperature	-30°C to 50°C without derating
Operating Relative Humidity	5% to 95%, non condensing
Storage Temperature	-40°C to +85°C
Cooling	Convection cooled
Shock Test	IEC 60068
Vibration Test	IEC 60068
Long Life Time	

EMC Compliance

Emission Tests

Conducted Emission 9kHz -30MHz	EN55015
Radiated Emission 9kHz -30MHz	EN55015
Radiated Emission 30MHz – 300MHz	EN55015
Harmonic Current Emissions	EN61000-3-2, Class C
Voltage Changes, Fluctuation and flicker	EN61000-3-3
Conducted and Radiated Emission measurement	FCC CFR47-part 15/subpart B

Immunity Tests

Equipment for general lighting purposes - EMC Immunity Requirements	EN61547
ESD (Electrostatic Discharge)	EN61000-4-2
Radiated Radio-Frequency electromagnetic field	EN61000-4-3
Electrical Fast Transient/burst	EN61000-4-4
Surge	EN61000-4-5 Level ±2.0 kV L-N
Conducted disturbances induced by Radio-Frequency fields	EN61000-4-6
Voltage Dips, short interruptions and Voltage Variations	EN61000-4-11
Non repetitive damped oscillatory transient, Ring wave	ANSI C.62.41 Category A1

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Safety Agency Approvals (Pending)

UL Recognized ANSI / UL8750, 1st Ed., CAN/CSA C22.2 N°337, 7th Ed.



Construction as per UL60950-1, 2nd Ed.

LED Driver suitable for "DAMP LOCATION"

IEC/EN61347-2-13 electronic control gear for LED Modules

IEC/EN 62384 DC or AC supplied electronic control gear for LED modules – Performance Requirements



ENEC and CE Mark

Model Table

Model Number (Ordering Code)		Total Pout max	Output Voltage Range (Under Regulation) Note 3	Absolute Maximum Vout (Under any condition) Note 4	Iout min ; Iout Max Note 5
Package	Dash #	W	Vdc	Vdc	mA
RSOZ070	-200	70	From 120 to 195	200	From 350 to 550
RSOZ070	-120	70	From 60 to 115	120	From 350 to 1100
RSOZ070	-60	70	From 30 to 56	60	From 350 to 2100

Note 3: It represents the Maximum Output Voltage Range of the LED Driver.
The LED Driver Output Voltage Range depends on the current value set (Iset). See also [Current Setting](#) section.

Note 4: It represents the Maximum Output Voltage under any condition.

Note 5: The LED Driver Output is a Constant Current Output. The Output current value can be set (Iset) between Iout min and Iout Max (with 50mA step), by using the Ozone Programming Tool (available as optional).
See [Ozone Programming Tool](#) section for more details.

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Options and how to order

Each Ozone Model (RSOZ070-60, RSOZ070-120, RSOZ070-200) can be equipped with DALI/PWM Input and with +5V Aux Output. These two options can be present or not in the product, combined as showed in the table below.

Model Number (Ordering Code) <i>Note 6</i>			Absolute Maximum Vout (Under any condition)	Auxiliary Output +5V Aux (Optional)	DALI/PWM (Optional)
Package	Dash #	Option	Vdc	Yes = Present NO = Absent	
RSOZ070	-200	-Base	200	NO	NO
RSOZ070	-200	-Aux	200	YES	NO
RSOZ070	-200	-DALI	200	NO	YES
RSOZ070	-200	-Full	200	YES	YES
RSOZ070	-120	-Base	120	NO	NO
RSOZ070	-120	-Aux	120	YES	NO
RSOZ070	-120	-DALI	120	NO	YES
RSOZ070	-120	-Full	120	YES	YES
RSOZ070	-60	-Base	60	NO	NO
RSOZ070	-60	-Aux	60	YES	NO
RSOZ070	-60	-DALI	60	NO	YES
RSOZ070	-60	-Full	60	YES	YES

Note 6: The Purchasing Order has to specify the Ordering Code composed according to the desired Ozone options.

For example:

- the Ozone model RSOZ070-60 equipped with both +5V Auxiliary Output and DALI/PWM options, can be ordered specifying the code **RSOZ070-60-Full**.
- the Ozone model RSOZ070-120 equipped only with +5V Auxiliary Output, can be ordered specifying the code **RSOZ070-120-Aux**.

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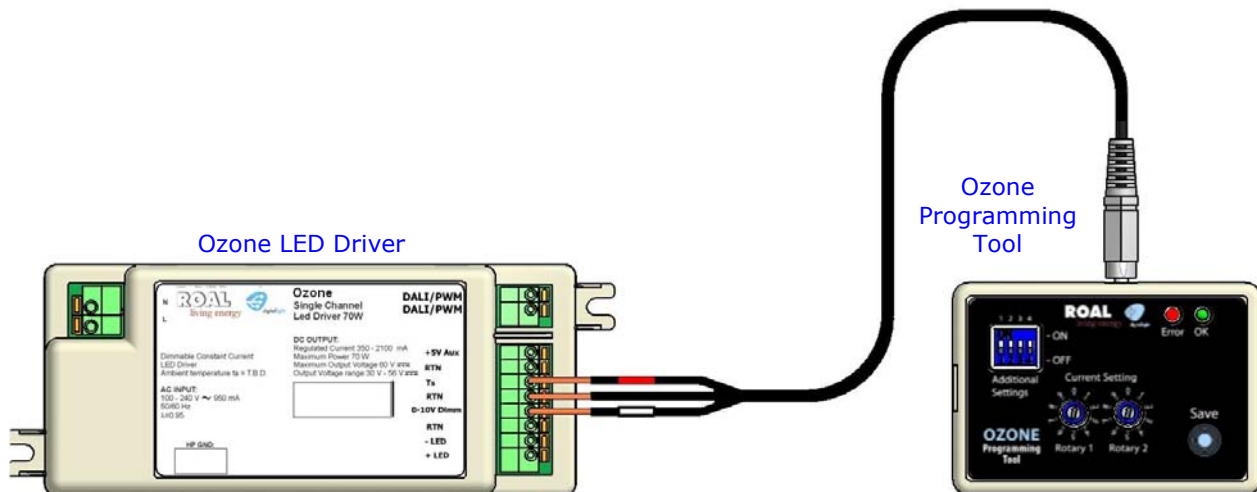
Ozone Programming Tool (available as optional)

Ozone LED Drivers can be easy set also by the Roal customer, for this reason they are extremely flexible and suitable for several applications. For this purpose an external Module (Ozone Programming Tool) is available as optional and can be ordered apart specifying its Ordering Code (See Note 7).

This external module is designed to be connected to the Ozone LED Driver output. The programming Tool is powered by a long-life battery; it is safe and easy to be used, therefore no particular technical skills are required to set the product.

The Ozone Programming Tool allows you to set the output current value (Current Setting) and to enable other functionalities (Fade Time Setting, DALI/PWM, Adjustable Dimmer). Please refer to Application Note 3 "AN3_Ozone Setting" for more details.

Note 7: The Ordering Code for the Ozone Programming Tool is **RSOZ070-PTOOL**. The 3-wire programming cable represented in the figure is included in the Tool.



Programming Tool Details:

Dimensions (L x W x H)	80mm x 55mm x19mm=3.15"x2.16"x0.75"
Weight	75g = 0.165lb
3-wire Programming Cable	Length 750mm = 29.5"

Current Setting

The LED Driver Output is a Constant Current Output device. The Current value can be easy set also by the customer using the Ozone Programming Tool, by moving 2 rotary switches (R1= Rotary 1, R2=Rotary 2), 10 positions each. The Table below shows the current set values (Iset) and the LED Driver Output Voltage Range, according the positions of the Rotary Switches.

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Output Current Set (Iset)	Rotary Position	Model RSOZ070-60-XXX		Model RSOZ070-120-XXX		Model RSOZ070-200-XXX	
		Vout min Note 8	Vout max Note 8	Vout min Note 8	Vout max Note 8	Vout min Note 8	Vout max Note 8
mA	R1 - R2	Vdc	Vdc	Vdc	Vdc	Vdc	Vdc
350 Note 9	0-0	30	56	60	115	120	195
400	0-1	30	56	60	115	120	175
450	0-2	30	56	60	115	120	155.6
500	0-3	30	56	60	115	120	140.0
550	0-4	30	56	60	115	120	127.3 (*)
600 Note 9	0-5	30	56	60	115		
650	0-6	30	56	60	107.7		
700	0-7	30	56	60	100		
750	0-8	30	56	60	93.3		
800	0-9	30	56	60	87.5		
850	1-0	30	56	60	82.4		
900	1-1	30	56	60	77.8		
950	1-2	30	56	60	73.7		
1000	1-3	30	56	60	70.0		
1050	1-4	30	56	60	66.7		
1100	1-5	30	56	60	63.6		
1150	1-6	30	56				
1200	1-7	30	56				
1250 Note 9	1-8	30	56				
1300	1-9	30	53.8				
1350	2-0	30	51.9				
1400	2-1	30	50.0				
1450	2-2	30	48.3				
1500	2-3	30	46.7				
1550	2-4	30	45.2				
1600	2-5	30	43.8				
1650	2-6	30	42.4				
1700	2-7	30	41.2				
1750	2-8	30	40.0				
1800	2-9	30	38.9				
1850	3-0	30	37.8				
1900	3-1	30	36.8				
1950	3-2	30	35.9				
2000	3-3	30	35.0				
2050	3-4	30	34.1				
2100	3-5	30	33.3				

Note 9: Ozone LED Drivers are factory pre-set to have the maximum output power in the widest Output Voltage Range (Iset=1250mA for RSOZ070-60, Iset=600mA for RSOZ070-120 and Iset=350mA for RSOZ070-200).

Note 8: Care should be taken during the design phase to assure the alignment between the Total Forward Voltage of the LED string (Vf total) when the Output is not dimmed and the LED Driver Output Voltage Range (Vout min, Vout max).

- The value (Vf total@NO dimming) has to be within the Output Voltage Range (Vout min, Vout max), considering also Vf modifications due to thermal effects and Vf tolerance.

Please note that when dimming is present the Driver works also below its Vout min.

In the conditions marked with (*) the Driver is still in the spec. but consider that they are difficult to maintain by the LED string due to the Vf variation caused by thermal effects and Vf tolerance.

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 **Ozone Correlated documents**

This document is the Ozone Preliminary Datasheet. The file is called "[DS1_Ozone LED Driver 70W Preliminary](#)".

During the Ozone adoption please consider that, to support you, there are also 4 dedicated Application Notes as showed in the table below.

Please contact Roal Sales Department or your local Distributor if you do not have them.

Application Note Number	File Name	Topics
1	AN1_Ozone Wiring Diagram	Wiring Connections and LED Driver fixing
2	AN2_Ozone Temperature Sense & 0-10V Dimming	LED Board Over Temperature protection and 0-10V or 1-10V Dimming
3	AN3_Ozone Setting	LED Driver Settings through the Ozone Programming Tool
4	AN4_Ozone DALI & PWM Dimming	DALI/PWM Digital Input: Control through the DALI standard communication and PWM Dimming

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