

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

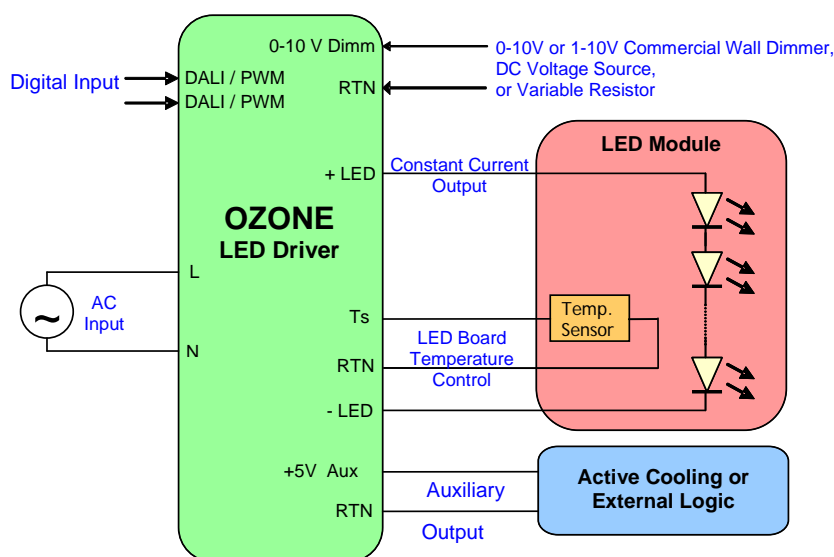
Ozone is designed for directly powering LEDs in Indoor Lighting for Big Areas, Street & Urban Lighting, Industrial lighting.

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.
- Digital Input allows direct interface with PWM input or DALI controls
- 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-Full	Model RSOZ070-120-Full	Model RSOZ070-200-Full
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, 80% load. >0.9@ up to 230Vac, 50% load		
Total Harmonic Distortion Current THD	<20% @any nominal Input Voltage, full load		
Inrush current @ 277 Vac	< 25A		
Inrush half time @ 277 Vac (typ.)	0.4ms		
Typ. Efficiency@ Max output Voltage, full load	0.88@120Vac 0.90@230Vac 0.90@277Vac	0.89@120Vac 0.91@230Vac 0.91@277Vac	0.89@120Vac 0.91@230Vac 0.91@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	
Output Voltage	From 30 to 56	From 60 to 115	From 120 to 195
Output Current Setting	From 350 to 2100 (in 50mA steps)	From 350 to 1100 (in 50mA steps)	From 350 to 550 (in 50mA steps)
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.		
Auxiliary Output (Aux)			
+5V Aux	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 PTot= PLED + PAux	P Tot = 70W maximum (See Note 1)		

Note 1: This limit is applied to the Total Output Power delivered by Ozone. When the Auxiliary output is providing 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-Full	Model RSOZ070-120-Full	Model RSOZ070-200-Full
Standard Output Controls			
0-10V Dimm	<p>The 0-10V Dim is a dimming input that can be used to dim the output current via a standard commercial wall dimmer (0 to 10Vdc or 1 to 10Vdc, IEC/EN 60929), or an external control voltage source (0 to 10Vdc or 1 to 10Vdc).</p> <ul style="list-style-type: none"> The 0-10V Dimm input permits dimming from 100%Iset to Idim min as specified below <p>See Application Note 2 "AN2_Ozone Temperature Sense & 0-10V Dimming" for further details.</p>		
	Idim min=50±15mA if Iset ≤ 650mA Idim min=10%Iset if Iset > 650mA	Idim min=10%Iset	Idim 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>See Application Note 2 "AN2_Ozone Temperature Sense & 0-10V Dimming" for further details.</p>		
Adjustable Dimmer	Ozone can be programmed to execute a five periods custom dimming profile. See "AN3_Ozone Setting" and "UM_Ozone Adjustable dimmer"		
Digital Input			
DALI / PWM	<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).</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. See Application Note 4 "AN4_Ozone DALI e PWM Dimming" for further details.</p>		

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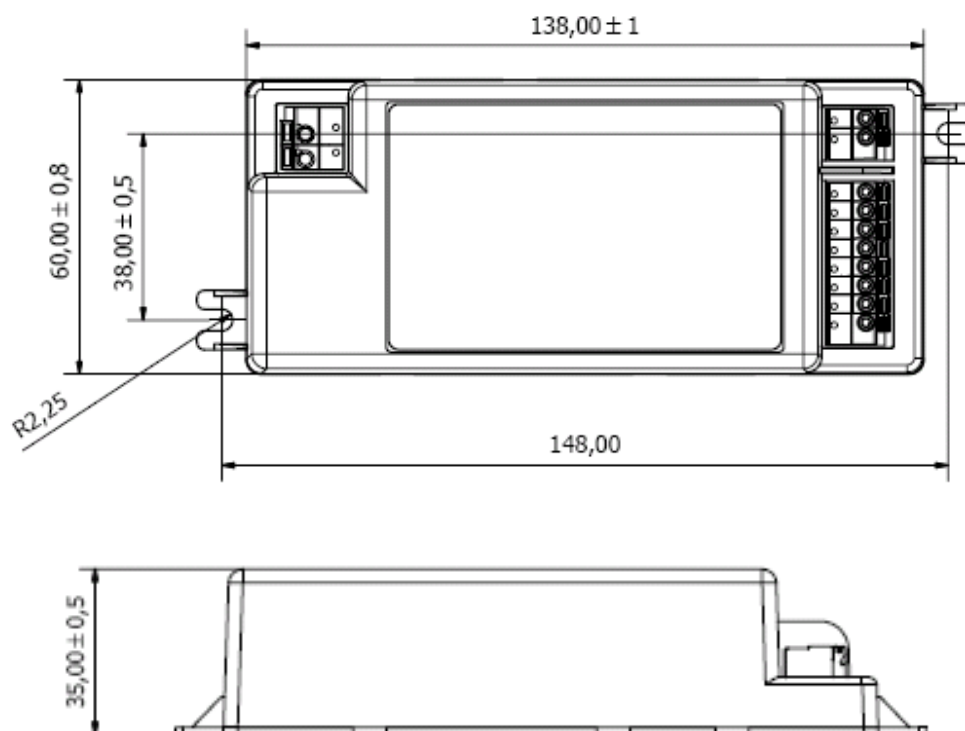
Mechanical Details

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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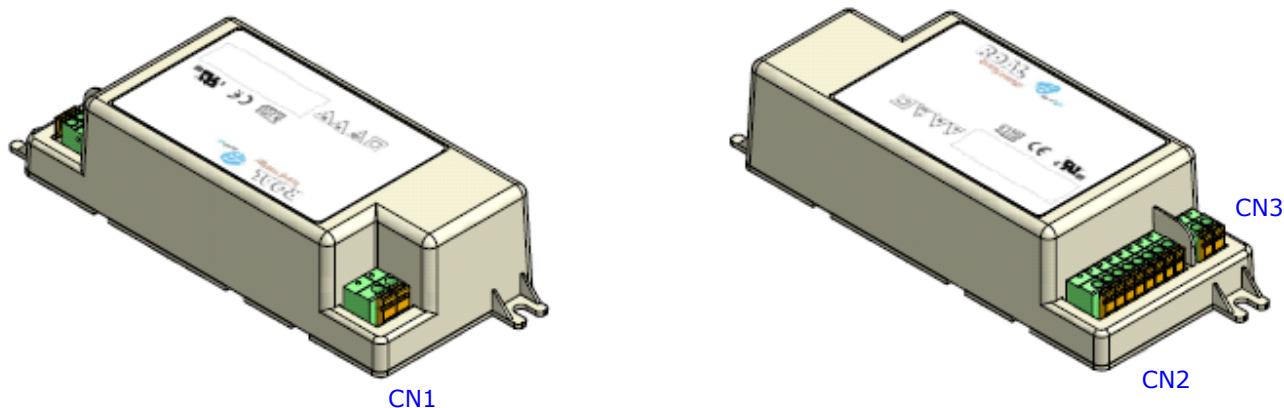
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Input/Output Connectors



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	DALI or PWM Connector (DALI/PWM, DALI/PWM)	2

See Application Note 1 "[AN1_Ozone Wiring Diagram](#)" for wiring and fixing details.

Environmental

Max Operating Case Temperature (Tc point)	+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	

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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

Safety Agency Approvals

UL Recognized ANSI / UL8750, 1st Ed., CAN/CSA C22.2 N°337, 7th Ed.  E330583
 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



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Model Table

Model Number (Ordering Code) <small>Note 6</small>		Total Pout max	Output Voltage Range (Under Regulation) <small>Note 3</small>	Absolute Maximum Vout (Under any condition) <small>Note 4</small>	Iout min; Iout Max <small>Note 5</small>
Package	Dash #	W	Vdc	Vdc	mA
RSOZ070	-200-Full	70	From 120 to 195	200	From 350 to 550
RSOZ070	-120-Full	70	From 60 to 115	120	From 350 to 1100
RSOZ070	-60-Full	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.

Note 6: The Purchasing Order has to specify the Ordering Code showed in the model table. For example:

- **RSOZ070-60-Full** for the 60V model.
- **RSOZ070-120-Full** for the 120V model.
- **RSOZ070-200-Full** for the 200V model.

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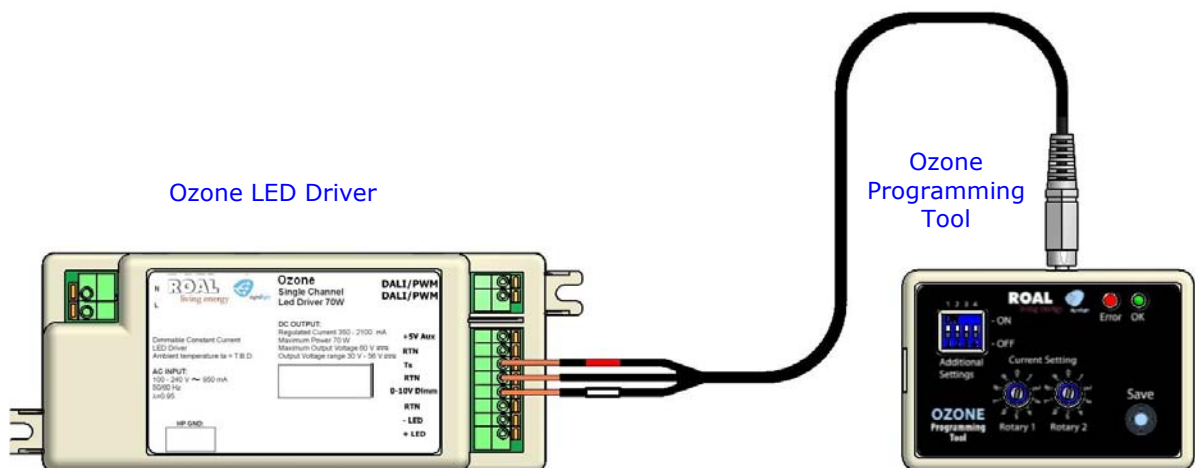
Ozone Programming Tool (available as optional)

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 and an USB cable (for PC connection) are 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 Ozone LED Driver 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 to the positions of the Rotary Switches.

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		RSOZ070-60-Full		RSOZ070-120-Full		RSOZ070-200-Full	
Output Current Set (Iset)	Rotary Position	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	195,0
400	0-1	30	56	60	115	120	175,0
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
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
User Manual	File Name	Topics
1	UM_Ozone Adjustable dimmer	Adjustable dimmer SW installation and settings

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