

### 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

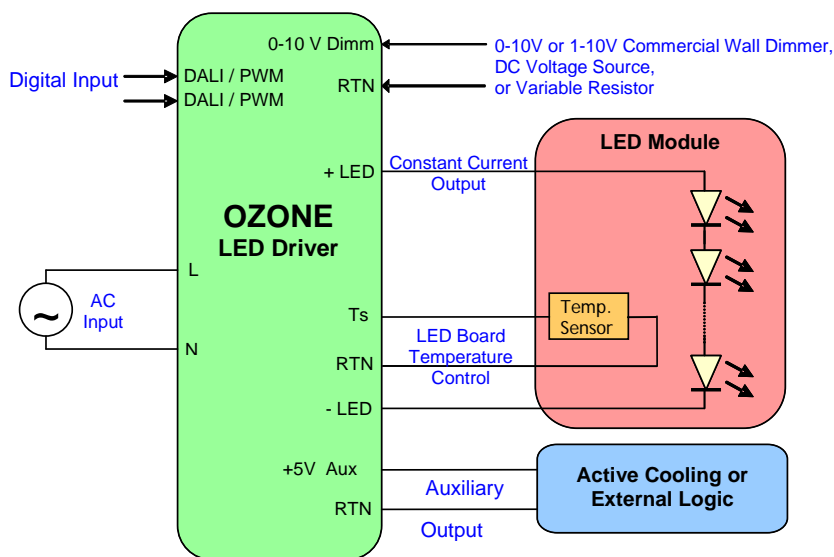
Ozone is designed for directly powering LEDs in Indoor Lighting for Big Areas, Street & Urban Lighting, Industrial lighting.

#### 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<br>RSOZ070-60-Full   | Model<br>RSOZ070-120-Full                 | Model<br>RSOZ070-200-Full                 |
|--|--|---|---|
| <b>Input Characteristics</b>                   |  |   |   |
| 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.<br>>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<br>0.90@230Vac<br>0.90@277Vac  | 0.89@120Vac<br>0.91@230Vac<br>0.91@277Vac | 0.89@120Vac<br>0.91@230Vac<br>0.91@277Vac |
| Isolation                                      | Reinforced/double insulation meets IEC/EN61347-2-13 Class II   |   |   |
| <b>Output Characteristics (LEDs)</b>           |  |   |   |
| 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)   |   |   |
| <b>Protections</b>                             | 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 <a href="#">LED Driver Controls</a> section for details. |   |   |
| <b>Auxiliary Output (Aux)</b>                  |  |   |   |
| +5V Aux  | A +5V Auxiliary output provides power for active LED cooling.<br>Vout Aux from 4.75 to 5.25 Vdc      Output Vaux Ripple: 150 mVpk-pk<br>P Aux = 3.75 W maximum      Protected against overload and over voltage<br><b>Compatible with Nuventix MR16, PAR20, PAR25, PAR30, and PAR38 SynJet Coolers</b>   |   |   |
| Total Output Power<br>PTot= PLED + PAux        | P Tot = 70W maximum ( <a href="#">See Note 1</a> )   |   |   |

**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<br>RSOZ070-60-Full   | Model<br>RSOZ070-120-Full | Model<br>RSOZ070-200-Full |
|---------------------------------|--|---------------------------|---------------------------|
| <b>Standard Output Controls</b> |  |                           |                           |
| 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"> <li>The 0-10V Dimm input permits dimming from 100%Iset to Idim min as specified below</li> </ul> <p>See <a href="#">Application Note 2 "AN2_Ozone Temperature Sense &amp; 0-10V Dimming"</a> for further details.</p>                            |                           |                           |
|                                 | Idim min=50±15mA if Iset ≤ 650mA<br>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 <a href="#">Application Note 2 "AN2_Ozone Temperature Sense &amp; 0-10V Dimming"</a> for further details.</p> |                           |                           |
| Adjustable Dimmer               | <p>Ozone can be programmed to execute a five periods custom dimming profile. See <a href="#">"AN3_Ozone Setting"</a> and <a href="#">"UM_Ozone Adjustable dimmer"</a></p>  |                           |                           |
| <b>Digital Input</b>            |  |                           |                           |
| DALI / PWM                      | <p>The same Digital Input (<b>DALI/PWM</b>) 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 <a href="#">Ozone Programming Tool</a> section.</p>   |                           |                           |
|                                 | <p><b>DALI:</b> The DALI input can be used to control the output of LED Driver. It is compatible with DALI Standard (IEC 62386).<br/> <b>PWM:</b> 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.<br/>           See <a href="#">Application Note 4 "AN4_Ozone DALI e PWM Dimming"</a> for further details.</p>  |                           |                           |

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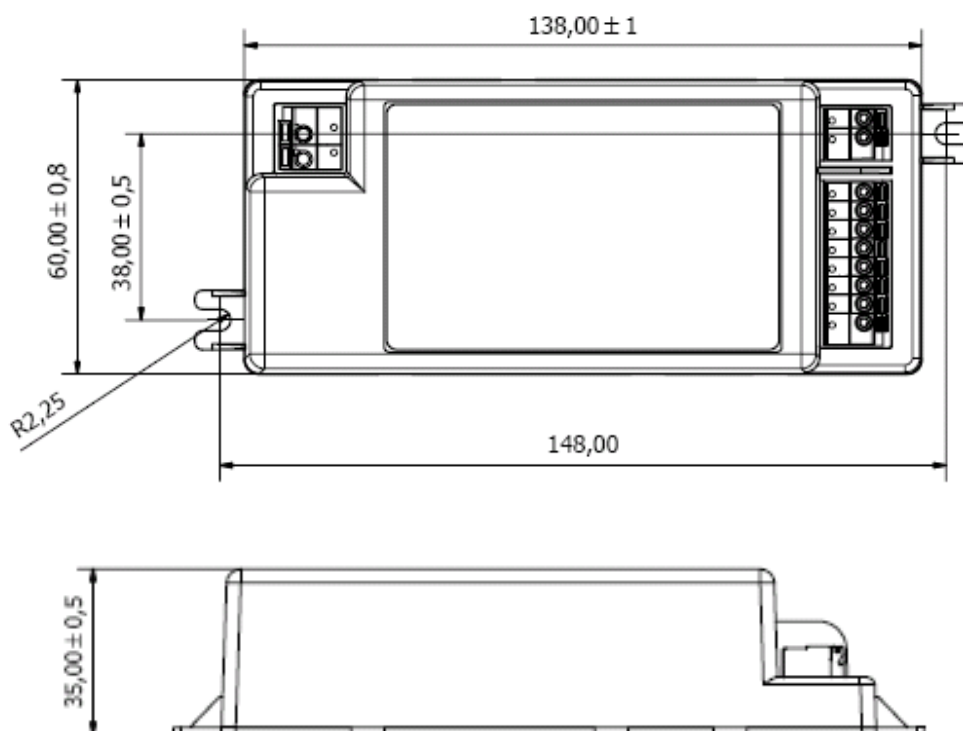
### Mechanical Details

|                      |   |
|----------------------|---|
| 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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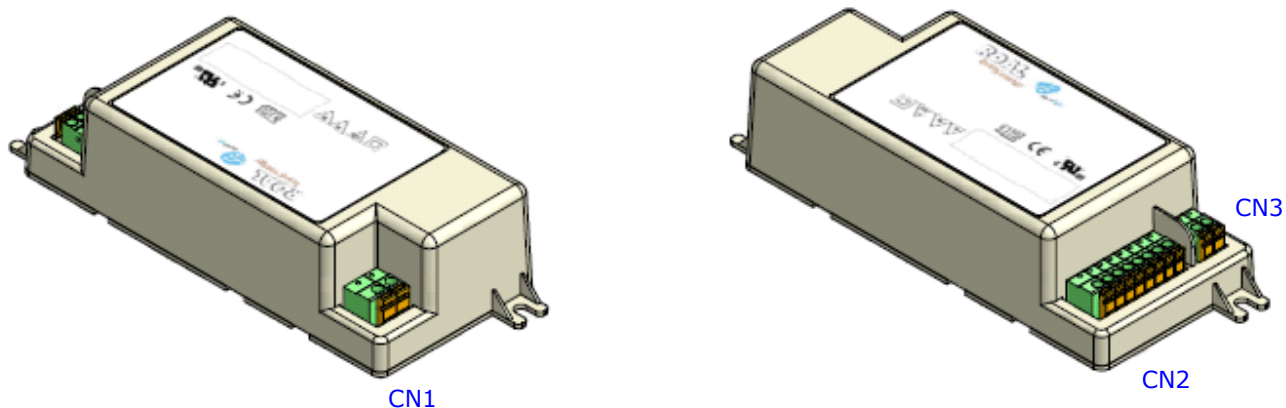
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### Input/Output Connectors



| Part | Description  | # vie |
|------|--|-------|
| CN1  | AC Main Connector<br>(Line, Neutral)   | 2     |
| CN2  | Output Connector and Controls<br>(LEDs; 0-10V Dimming; Temperature Sense ; Auxiliary Output) | 8     |
| CN3  | DALI or PWM Connector<br>(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 $\pm 2.0$ 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, 1<sup>st</sup> Ed., CAN/CSA C22.2 N°337, 7<sup>th</sup> Ed.  E330583  
 Construction as per UL60950-1, 2<sup>nd</sup> 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<br>(Ordering Code)<br><i>Note 6</i> |               | Total<br>Pout max | Output Voltage Range<br>(Under Regulation)<br><i>Note 3</i> | Absolute Maximum Vout<br>(Under any condition)<br><i>Note 4</i> | Iout min; Iout Max<br><i>Note 5</i> |
|--|---------------|-------------------|---|---|-------------------------------------|
| <i>Package</i>                                   | <i>Dash #</i> | <i>W</i>          | <i>Vdc</i>  | <i>Vdc</i>  | <i>mA</i>                           |
| 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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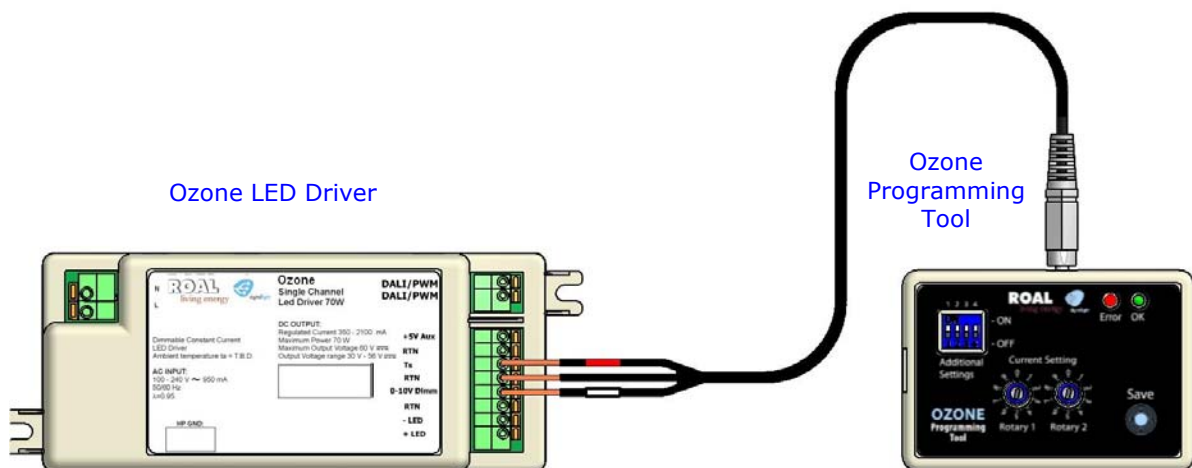
### Ozone Programming Tool (available as optional)

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<br>Note 8 | Vout max<br>Note 8 | Vout min<br>Note 8 | Vout max<br>Note 8 | Vout min<br>Note 8 | Vout max<br>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                       | <a href="#">AN1_Ozone Wiring Diagram</a>                        | Wiring Connections and LED Driver fixing  |
| 2                       | <a href="#">AN2_Ozone Temperature Sense &amp; 0-10V Dimming</a> | LED Board Over Temperature protection and 0-10V or 1-10V Dimming                        |
| 3                       | <a href="#">AN3_Ozone Setting</a>                               | LED Driver Settings through the Ozone Programming Tool                                  |
| 4                       | <a href="#">AN4_Ozone DALI &amp; PWM Dimming</a>                | DALI/PWM Digital Input: Control through the DALI standard communication and PWM Dimming |
| User Manual             | File Name   | Topics  |
| 1                       | <a href="#">UM_Ozone Adjustable dimmer</a>                      | Adjustable dimmer SW installation and settings  |

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