



## 20W DALI-2 'Dim to Dark' LED Driver

### SOLOdrive

SOLOdrive offers industry-best Natural Dimming to dark - LED dimming made beautiful! With any dimmer, in any application. Symbiosis on SOLOdrive stands for unity, for the SOLOdrive working seamlessly together with LED modules, controls and intelligent luminaire elements.

### Product offering



### SOLOdrive 20MA-E1Z0D

|                     |  |
|---------------------|--|
| Part number (P/N)   | SL20MA-E1Z0D2  |
| Product description | SOLOdrive, 20W, DALI-2, Pulse dimming, 1 control channel, constant current, 1x 40V output, side feed, long plastic |

### Features & benefits

|                              |  |
|------------------------------|--|
| Natural dimming              | Dim to dark, smooth brightness changes, excellent flicker performance, adaptable dimming curves, configurable minimum dimming level  |
| Ceiling cut-out requirements | LED driver fits through ceiling cut-out diameter of 45mm for recessed downlight luminaires   |
| LEDcode                      | LEDcode2 connects to integrated digital accessories, supports location-based IoT applications and enables wired and wireless lighting control through LEDcode peripheral devices |
| Programmable                 | Fine-tune your driver for any application  |
| Performance                  | Low inrush current and total harmonic distortion (THD), high power factor and efficiency   |
| Camera compatibility         | Hybrid HydraDrive technology is proven to work in TV studios and security camera environments  |
| Pulse dimming                | Different switching and dimming functions are initiated by pressing and holding the standard mains voltage switch for varying lengths of time                                    |

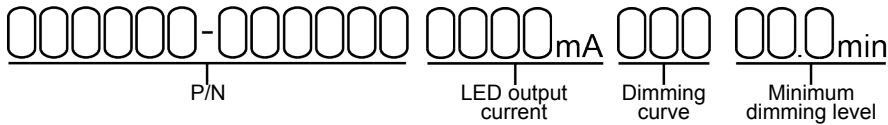
**Programming tools**

|                                     |   |
|-------------------------------------|---|
| Programming interface               | <a href="#">TOOLbox pro (TLU20504)</a>  |
| Programming cable set               | <a href="#">TOOLbox pro to LED driver, programming cable, 5pcs (TLC03051)</a> |
| Programming Hand-held, Touch-and-Go | <a href="#">PJ0035HH1</a>   |
| Programming jig                     | <a href="#">PJ0200A1</a>  |
| Programming software                | <a href="#">FluxTool</a>  |

**Warranty**

|                 |  |
|-----------------|--|
| Warranty period | <a href="#">General Terms and Conditions</a> |
|-----------------|--|

**Order number configurator**



|                       |   |
|-----------------------|---|
| P/N                   | LED driver part number  |
| LED output current    | Enter value in 1mA increments, e.g. "811" for 811mA   |
| Dimming curve         | "LOG" for logarithmic (default)<br>"LIN" for linear   |
| Minimum dimming level | Leave blank for default minimum dimming level of 0.1%. Specify in 0.1% increments, e.g. "10.5" for 10.5%. |

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### Input characteristics

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|                                |                   |
|--------------------------------|-------------------|
| Nominal input voltage range AC | 220 - 240V (ENEC) |
|--------------------------------|-------------------|

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|                                 |            |
|---------------------------------|------------|
| Absolute input voltage range AC | 198 - 264V |
|---------------------------------|------------|

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|                                |            |
|--------------------------------|------------|
| Nominal input voltage range DC | 176 - 250V |
|--------------------------------|------------|

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|                          |              |
|--------------------------|--------------|
| Maximum input current AC | 0.15A @ 230V |
|--------------------------|--------------|

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|                       |           |
|-----------------------|-----------|
| Input frequency range | 50 - 60Hz |
|-----------------------|-----------|

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|                         |     |
|-------------------------|-----|
| Efficiency at full load | 80% |
|-------------------------|-----|

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|                           |        |
|---------------------------|--------|
| Power factor at full load | > 0.95 |
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|                  |       |
|------------------|-------|
| THD at full load | < 20% |
|------------------|-------|

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|                           |                               |
|---------------------------|-------------------------------|
| Maximum inrush current AC | < 200mA <sup>2</sup> s @ 230V |
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|                  |  |
|------------------|--|
| Surge protection | 2kV differential mode (DM)<br>2kV common mode (CM) |
|------------------|--|

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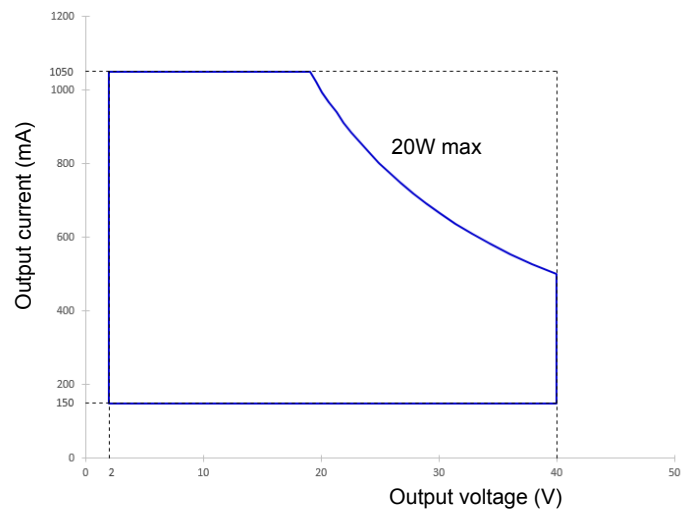
|                       |       |
|-----------------------|-------|
| Maximum standby power | <0.5W |
|-----------------------|-------|

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**Output characteristics**

|                                       |   |
|---------------------------------------|---|
| Maximum LED output power              | 20W   |
| Number of LED outputs                 | 1   |
| Programmable LED output current range | 150 - 1400mA  |
| LED output type                       | Programmable in 1mA increments within specified current range |
| LED output current tolerance          | +/- 5% at programmed LED output current                       |
| LED output voltage range              | 2 - 40V   |

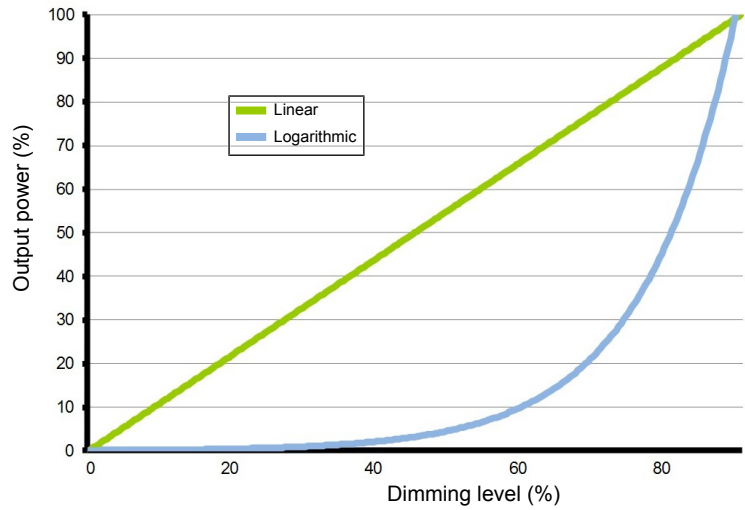
Operating window



**Control characteristics**

|                       |  |
|-----------------------|--|
| Control channels      | 1  |
| Control protocol      | LEDcode2<br>DALI-2 Device type 6 & Pulse dimming |
| Dimming range         | 100% - 0.1%                                      |
| Dimming curve options | Logarithmic (default)<br>Linear                  |
| Dimming method        | Hybrid HydraDrive                                |
| Time delay to standby | <60s   |

Dimming curves



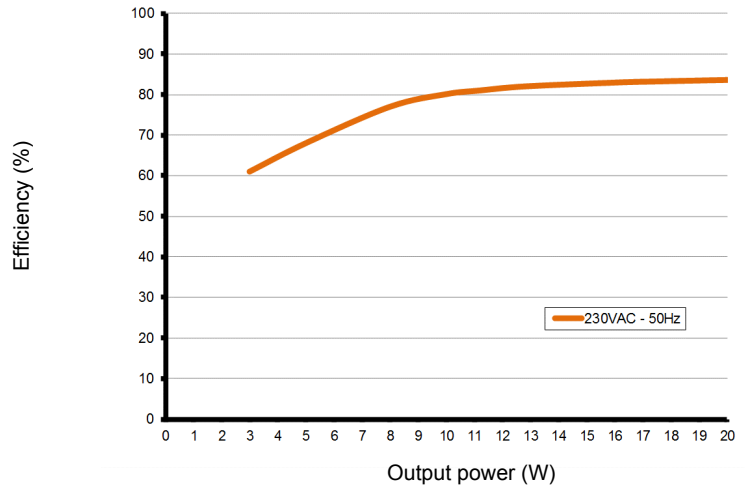
**Pulse dimming control**

|  |   |
|--|---|
| End-user functionality & Installation requirements | Detailed explanation in the eldoLED Quick Start Guide   |
| LEDcode compatibility                              | In an installation using Pulse dimming, LEDcode functionality cannot be used with a Bluetooth radio, sensor, or other LEDcode devices |
| Supported input voltage range AC                   | 100 – 250V  |

**Performance**

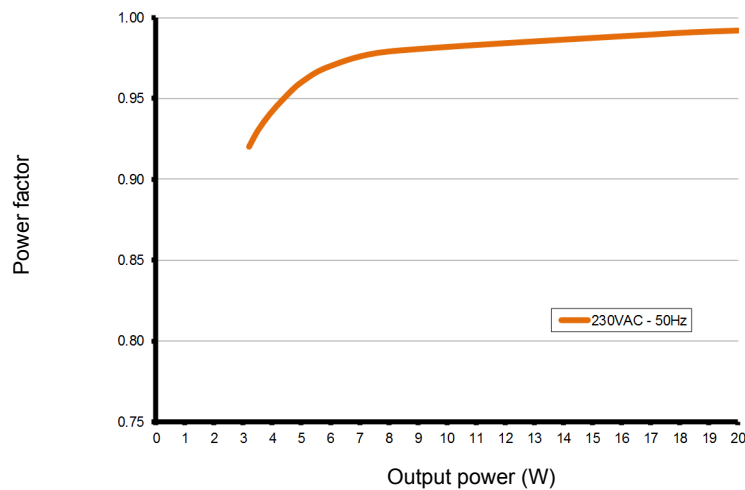
Typical efficiency vs load

Tested with a load of 12 LEDs in series, programmed for 500mA and at 25 °C ambient temperature. The measurements below 20W were performed by dimming the light output.



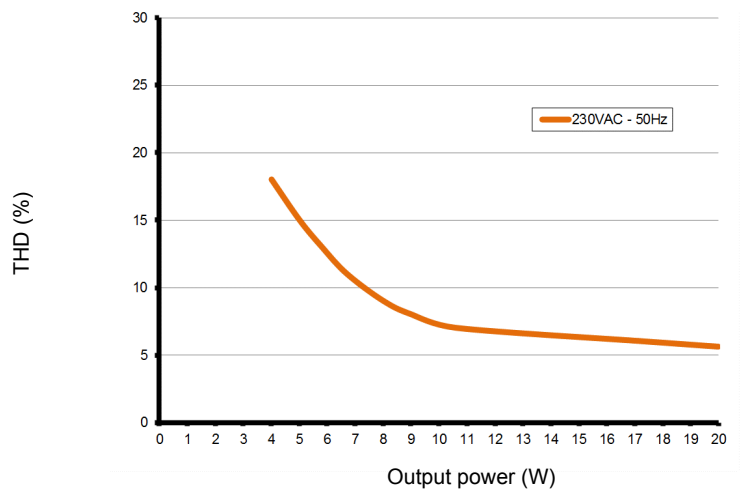
Typical power factor vs load

Tested with a load of 12 LEDs in series, programmed for 500mA and at 25 °C ambient temperature. The measurements below 20W were performed by dimming the light output.



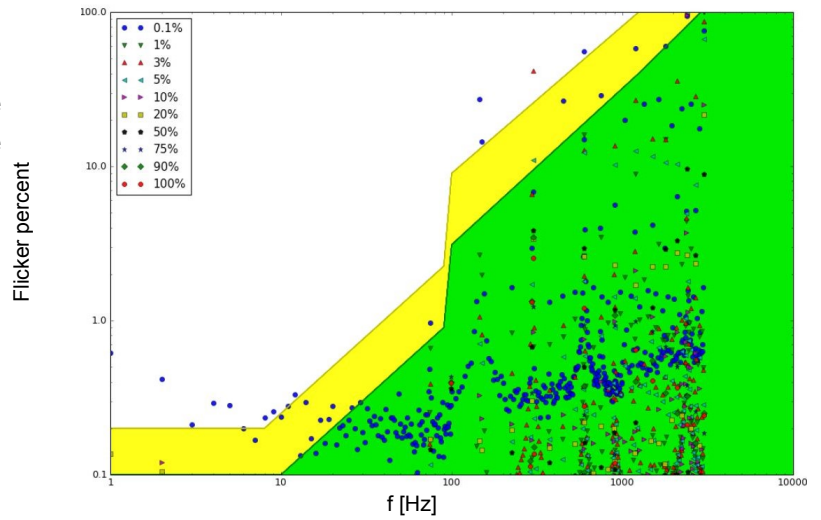
Typical THD vs load

Tested with a load of 12 LEDs in series, programmed for 500mA and at 25 °C ambient temperature. The measurements below 20W were performed by dimming the light output.



Typical flicker performance

Typical flicker percent as a function of frequency, measured across the dimming range. The results are overlaid with the low-risk (yellow) and no observable effect (green) levels as defined in IEEE P1789.



Environmental conditions

Operating ambient temperature (Ta) range

-20 °C to +50 °C

for output current ≤ 900mA

-20 °C to +43 °C for output current >900mA

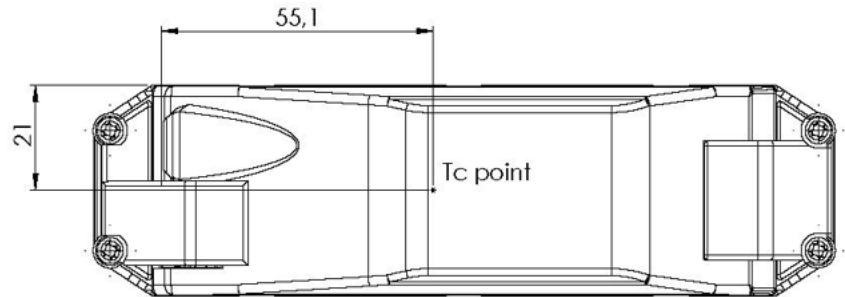
Maximum operating case temperature (Tc max)

85 °C

Lifetime

50,000 hours at a maximum case temperature (Tc) of 85 °C

TC point location



## LED driver protection

|                          |   |
|--------------------------|---|
| Thermal                  | The LED output current is decreased whenever the internal LED driver temperature exceeds factory preset temperature. The LED output current is increased again once the internal LED driver temperature drops below this internal temperature threshold. If the internal LED driver temperature continues to increase, despite a decrease in output current, the LED driver will shut down. |
| LED output short circuit | The LED output current is cut off whenever the LED driver detects a short-circuit. The LED driver will attempt a restart every 400ms after a short-circuit is detected.   |
| LED output overload      | The LED driver decreases the LED output current sequentially, until it reaches its maximum rated power, whenever a load that exceeds the LED driver's maximum rated power is connected to the LED output.   |
| Reverse polarity         | The LED driver will not yield any current if the polarity of the load on the LED output is reversed. This situation will not damage the LED driver but may damage the LED load.   |

## LED protection

|                        |   |
|------------------------|---|
| Thermal protection LED | An external NTC thermistor, which is placed on a PCB near the LEDs, can be connected to the driver via the LEDcode/NTC terminals. The output current to the LEDs is then decreased by 75% whenever the NTC exceeds a maximum allowable temperature, which is specified by the user in the FluxTool software. The default NTC temperature limit is set to 70 °C. |
| Thermistor value       | 47kΩ  |
| Suitable thermistors   | Leaded: Vishay, P/N 238164063473<br>Screw: Vishay, P/N NTCASCWE3473J  |





## Connector layout



## Input wiring specifications

|                               |                                      |
|-------------------------------|--------------------------------------|
| Connector type                | screw terminals                      |
| Connector supplier and series | TE-Connectivity 2-796683             |
| Wire type                     | solid or stranded copper             |
| Wire core cross section       | 0.5 - 3mm <sup>2</sup> / AWG 20 - 12 |
| Wire strip length             | 9.0mm / 11/32"                       |
| Input-cable shape             | Round                                |

## Output wiring specifications

|  |  |
|--|--|
| Connector type                               | push-in terminals  |
| Connector supplier and series                | Wago 250 series  |
| Wire type                                    | solid or stranded copper   |
| Wire core cross section                      | 0.5 - 1.5mm <sup>2</sup> / AWG 20 – 16   |
| Wire strip length                            | 9.0mm / 11/32"   |
| Output-cable shape                           | Round  |
| Maximum remote mounting distance of LED load | For independent use: 2 m / 6.5 ft<br>For in-fixture use:<br>AWG 20 (0.52 mm <sup>2</sup> ) - 14 m / 46 ft<br>AWG 19 (0.65 mm <sup>2</sup> ) - 18 m / 59 ft<br>AWG 18 (0.82 mm <sup>2</sup> ) - 22 m / 72 ft<br>AWG 17 (1.04 mm <sup>2</sup> ) - 28 m / 92 ft<br>AWG 16 (1.31 mm <sup>2</sup> ) - 36 m / 118 ft |

**Automatic circuit breakers (MCB)**

| Maximum loading | MCB type              | B10 | B13 | B16 | C10 | C13 | C16 |
|-----------------|-----------------------|-----|-----|-----|-----|-----|-----|
|                 | Number of LED drivers |     | 66  | 86  | 106 | 66  | 86  |

**Standards and compliance**

|                                     |   |
|-------------------------------------|---|
| ENEC safety                         | EN 61347-1<br>EN 61347-2-13 (Emergency lighting)                              |
| ENEC performance                    | EN 62384  |
| Conducted emissions                 | EN 55015  |
| Radiated emissions                  | EN 55015  |
| Radio disturbance characteristics   | EN 55022  |
| Harmonic current emissions          | EN 61000-3-2  |
| Electrostatic discharge             | EN 61000-4-2  |
| RFE field susceptibility            | EN 61000-4-3  |
| Electrical fast transient           | EN 61000-4-4  |
| Surge immunity                      | EN 61000-4-5  |
| Conducted radio frequency           | EN 61000-4-6  |
| Voltage dips                        | EN 61000-4-11   |
| Electromagnetic immunity            | EN 61547  |
| DALI-2                              | IEC 62386-101 Edition 2.0, IEC 62386-102 Edition 2.0, IEC 62386-207 Edition 1 |
| Restriction of hazardous substances | RoHS3 (Directives 2011/65/EU-2015/863/EU)                                     |
| SVHC-list substances                | REACH Art.33  |

**Certifications**



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**Safety**

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Risk of electrical shock. May result in serious injury or death. Disconnect power before servicing or installing.

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The LED driver may only be connected and installed by a qualified electrician. All applicable regulations, legislation, and building codes must be observed. Incorrect installation of the LED driver can cause irreparable damage to the LED driver and the connected LEDs.

Pay attention when connecting the LEDs: polarity reversal results in no light output and often damages the LEDs.

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LED drivers are designed and intended to operate LED loads only. Powering non-LED loads may push the LED driver outside its specified design limits and is, therefore, not covered by any warranty.

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eldoLED products are designed to meet the performance specifications as outlined at certain operating conditions in the data sheet. It is the responsibility of the fixture manufacturer to test and validate the design and operation of the system under expected and potential use cases, including faults.

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Please observe voltage drop over long cable lengths. Longer cable lengths increase EMI susceptibility.

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Product renderings and dimensional drawings are generic for the housing type. Product label, connector type and quantity may vary.

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