



20W LEDcode2 LED Driver with Smooth Dimming to 1%

ECOdrive

Programmable digital ECOdrive LED driver providing standard LED fixtures with the smoothest flicker-free dimming to 1% light output, delivering value to any application. The LED driver works seamlessly together with LED modules, controls and intelligent luminaire elements.

Product offering



ECOdrive 20U-M1A0Z

| | |
|---------------------|----------------------------------------------------------------------------------------------------------|
| Part number (P/N) | EC20U-M1A0Z1 |
| Product description | ECOdrive, 20W, LEDcode2 + AUX, 1 control channel, constant current, 1x 55V output, side feed, long metal |

Features & benefits

| | |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Natural dimming | Dim to 1%, smooth brightness changes, excellent flicker performance, adaptable dimming curves, configurable minimum dimming level |
| Symbiosis | Seamless interoperability with LED modules, controls and in-luminaire intelligent devices |
| 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 | Universal input voltage range, 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 |

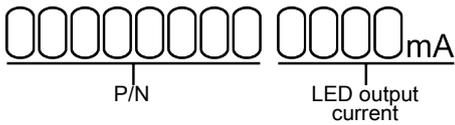
Programming tools

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|-------------------------------------|-------------------------------------------------------------------------------|
| Programming interface | TOOLbox pro (TLU20504) |
| Programming cable set | TOOLbox pro to LED driver, programming cable, 5pcs (TLC03051) |
| Programming Hand-held, Touch-and-Go | PJ0035HH1 |
| Programming jig | PJ0200U1 |
| Programming software | FluxTool |

Warranty

| | |
|-----------------|----------------------------------------------|
| Warranty period | General Terms and Conditions |
|-----------------|----------------------------------------------|

Order number configurator



| | |
|--------------------|-----------------------------------------------------|
| P/N | LED driver part number. |
| LED output current | Enter value in 1mA increments, e.g. "811" for 811mA |

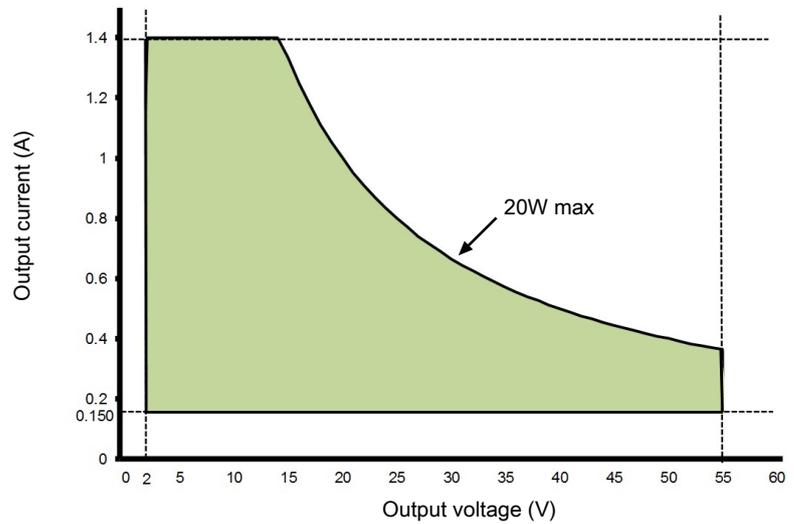
Input characteristics

| | |
|---------------------------------|------------------------------------------------------------------------------|
| Nominal input voltage range AC | 120 - 277V (UL) |
| Absolute input voltage range AC | 108 - 305V |
| Maximum input current | 0.3A @ 120V / 60Hz 0.12A @ 277V / 60Hz |
| Input frequency range | 50 - 60Hz |
| Efficiency at full load | 83% |
| Power factor at full load | 0.95 |
| THD at full load | < 20% |
| Maximum inrush current | < 200mA ² s @ 120V / 60Hz < 200mA ² s @ 277V / 60Hz |
| Surge protection | 2kV differential mode (DM) 2kV common mode (CM) |
| Maximum standby power | < 0.5W If no load connected to the AUX output |

Output characteristics

| | |
|---------------------------------------|---------------------------------------------------------------|
| Maximum LED output power | 22W |
| Number of LED outputs | 1 (UL Class 2) |
| 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 - 55V |
| Auxiliary output | 15.5 - 25V DC, 18mA max |

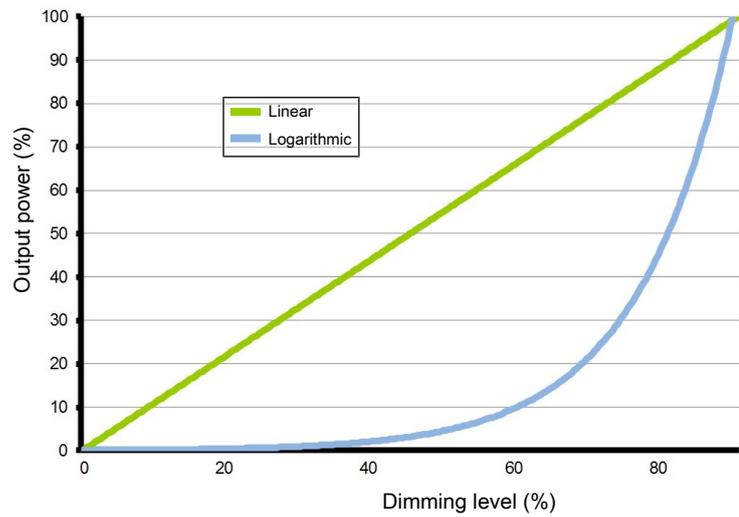
Operating window



Control characteristics

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|-----------------------|---------------------------------|
| Control channels | 1 |
| Control protocol | LEDcode2 |
| Dimming range | 100% - 1% |
| Dimming curve options | Logarithmic (default) Linear |
| Dimming method | Hybrid HydraDrive |
| Time delay to standby | <25s |

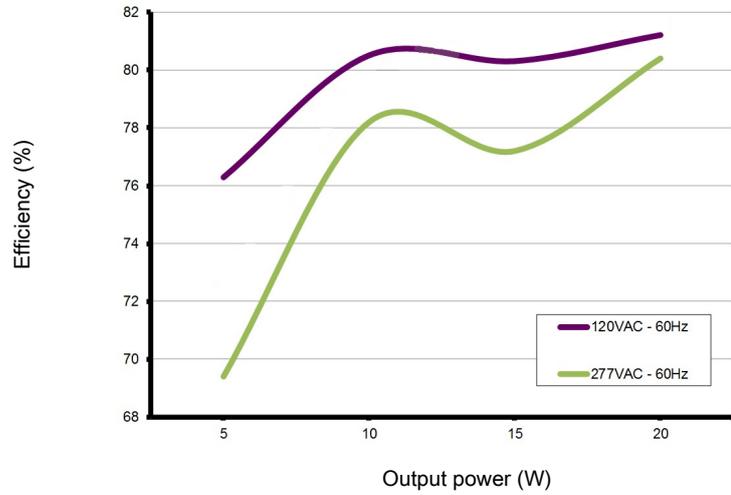
Dimming curves



Performance

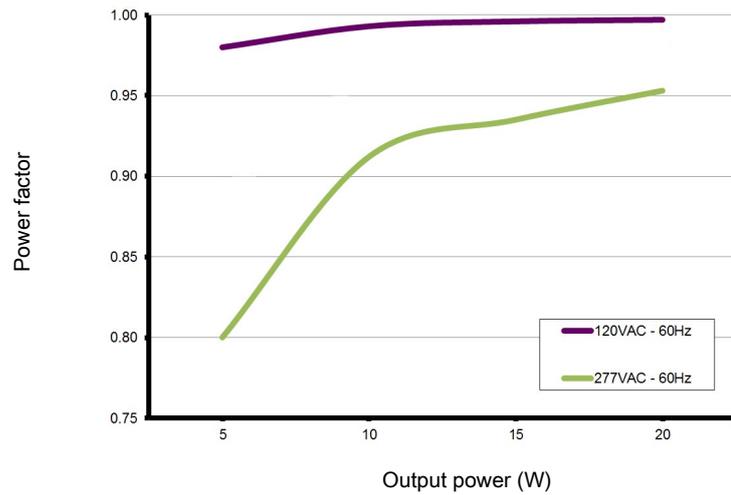
Typical efficiency vs load

Tested with a load of 4 LEDs in series, programmed for 1400mA and at 25 °C ambient temperature. The measurements below 22W were performed by dimming the light output.



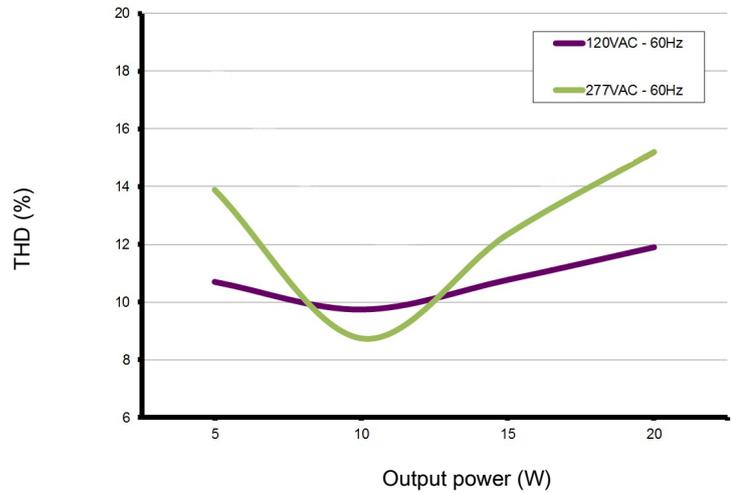
Typical power factor vs load

Tested with a load of 4 LEDs in series, programmed for 1400mA and at 25 °C ambient temperature. The measurements below 22W were performed by dimming the light output.



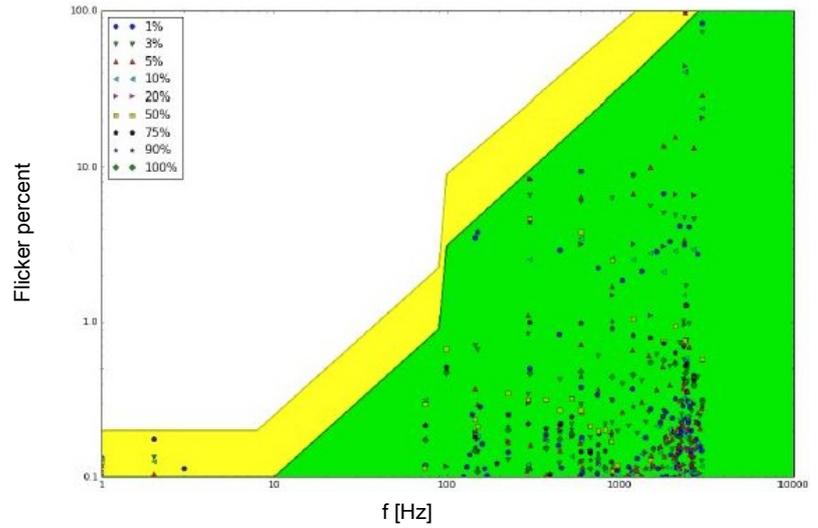
Typical THD vs load

Tested with a load of 4 LEDs in series, programmed for 1400mA and at 25 °C ambient temperature. The measurements below 22W 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

Maximum operating case temperature (Tc max) 70 °C

Acoustic noise – steady state <24dBA (Class A)

Lifetime 65000 hours at a maximum case temperature (Tc) of 70 °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 screw: Vishay, P/N NTCASCWE3473J |

Connector layout



Input wiring specifications

| | |
|-------------------------------|---------------------------------------|
| Connector type | push-in terminals |
| Connector supplier and series | Wago 250 series |
| Wire type | solid conductor only |
| Wire core cross section | 0.5 - 1.5 mm ² AWG 20 – 16 |
| Wire strip length | 9.0 mm |

Output wiring specifications

| | |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connector type | push-in terminals |
| Connector supplier and series | Wago 250 series |
| Wire type | solid conductor only |
| Wire core cross section | 0.5 - 1.5 mm ² AWG 20 – 16 |
| Wire strip length | 9.0 mm |
| Maximum remote mounting distance of LED load | AWG 20 (0.52 mm ²) - 14 m / 46 ft AWG 19 (0.65 mm ²) - 18 m / 59 ft AWG 18 (0.82 mm ²) - 22 m / 72 ft AWG 17 (1.04 mm ²) - 28 m / 92 ft AWG 16 (1.31 mm ²) - 36 m / 118 ft |

Automatic circuit breakers (MCB)

| | | | | | | | |
|-----------------|-----------------------|-----|-----|-----|-----|-----|-----|
| Maximum loading | MCB type | B10 | B13 | B16 | C10 | C13 | C16 |
| | Number of LED drivers | 33 | 43 | 53 | 33 | 43 | 53 |

Standards and compliance

| | |
|-------------------------------------|-------------------------------------------|
| UL Listed, Class P | UL 1310 UL 8750 (Class 2 output) |
| 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 |
| FCC | 47 CFR Part 15 class B |
| Restriction of hazardous substances | RoHS3 (Directives 2011/65/EU-2015/863/EU) |
| SVHC-list substances | REACH Art.33 |

Certifications



Safety



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



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.



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.



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.



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



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

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