

## Philips Lumiblade OLED driver, low voltage Driver D024V 10W/0.1-0.4A/28V DMX



Enabling future proof OLED technology.

This driver detects the power and voltage needs of the attached OLED and drives the attached OLED Panel accordingly. This one-driver-fits-all-panels approach eases the life of the customers and makes this driver also compatible for future developments.

By actively monitoring the attached OLED, this driver can optimally drive the OLED in a safe way under all circumstances.

### Benefits

- Extreme compact housing enables new design possibilities
- Create highly dynamic dimming effects down to very low light levels
- Cascade multiple drivers and reduce transformer costs

### Product Features

- Small dimensions
- Current controlled output from 100 to 400 mA
- Voltage operating window output from 5 to 28V
- DMX512 control interface, setup via RDM protocol or DIP switches
- 24 Volt DC input
- Protection circuit for the OLED

### Applications

- OLED lighting installations
- Integrated lighting solutions

## Electrical input data

Specification item	Value	Unit	Condition
Nominal input voltage	24	Vdc	
Input voltage range	21.6 ... 26.4	Vdc	Performance range
Maximal input current	500	mA	Input voltage = 24Vdc
Maximal input power	12	W	Input voltage = 24Vdc
Efficiency	81	%	Input voltage = 24Vdc @ 0.4A 25V load
Max cascaded inputs	8	pieces	

**Attention:** For safe operation, the 24V input must only be connected to SELV or class 2 (according to US national electrical code) circuits.

## Electrical output data

Specification item	Value	Unit	Condition
Regulation method	Constant current		
Output voltage	5 ... 28	Vdc	
Output voltage max	33	Vdc	Peak voltage at open load
Output current	100 ... 400	mA	Adjusted by $R_{set}$
Output current tolerance	$\pm 5$	%	100% dim level
Output current ripple	30	%	Ripple = peak-peak/average, 100% dim level
Output power	10	W	Full output

## Electrical data controls input

Specification item	Value	Unit	Condition
Control Method	DMX512 RDM over DMX512		ANSI E1.11-2008 ANSI E1.20-2010
Dimming range	1 ... 100	%	
Galvanic isolation	2350Vac		

## Wiring

Specification item	Value	Unit	Condition
Input wire cross-section	0.2 ... 0.75 24 ... 18	mm <sup>2</sup> AWG	WAGO 2060-series, solid wire, 5A max.
Input wire strip length	6...7	mm	
Output connector	5	pin	0532610571 Molex PicoBlade

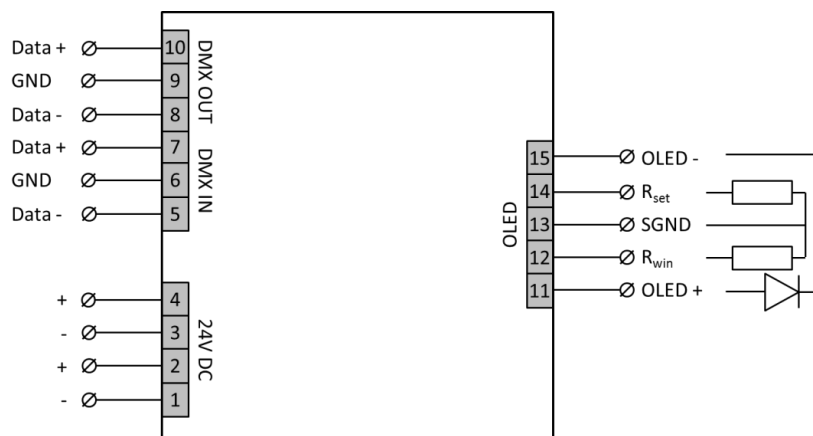


Figure 1: Port assignment

## Dimensions and weight

Specification item	Value	Unit	Condition
Length	57	mm	
Width	58.3	mm	
Height	11.5	mm	
Fixing hole diameter	3.2	mm	Fixing with M3 screws
Fixing hole distance	70.4	mm	
Weight	27	g	

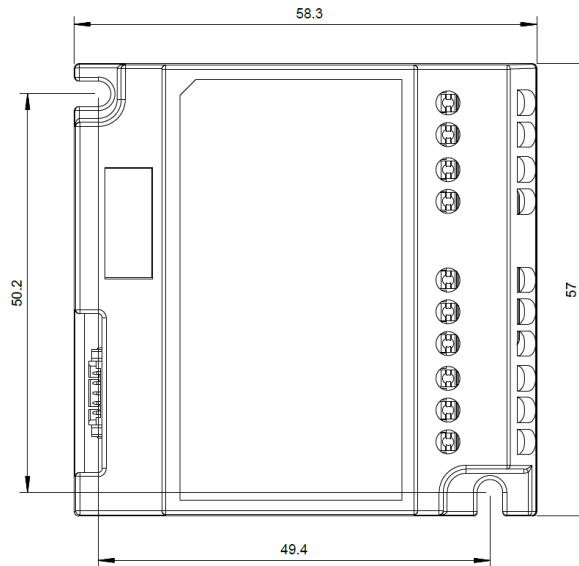


Figure 2: Dimensions

## Operational temperature and humidity

Specification item	Value	Unit	Condition
Ambient temperature	-20 ... +50	°C	
T <sub>case-max</sub>	85	°C	Maximum temperature measured at T <sub>c</sub> -point (lifetime reduced by 50%)
T <sub>case-life</sub>	75	°C	Measured at T <sub>c</sub> point
Relative humidity	5 ... 85	%	Non condensing

## Storage temperature and humidity

Specification item	Value	Unit	Condition
Ambient temperature	-40 ... +85	°C	
Relative humidity	5 ... 95	%	Non condensing

## Lifetime

Specification item	Value	Unit	Condition
Driver lifetime	50,000	hours	Measured temperature at T <sub>c</sub> -point is T <sub>case-life</sub> . Maximum failures is 10%

## Features

Specification item	Value	Unit	Condition
Open load protection	Yes		Reset by DMX off or Rset/Rwin resistor plug
Short circuit protection	Yes		Reset by DMX off or Rset/Rwin resistor plug
Over power protection	Yes		Output power limit at 10W max
Hot wiring	Yes		
Suitable for fixtures with protection class	Class I, Class II and Class III		
Set output current	Rset	See functional description. Default output current: 350 mA	
Set output voltage window	Rwin	See functional description. OLED reference voltage: 9V	
Constant lumen over lifetime	No		

## Certificates and standards

Specification item	Value	Unit	Condition
Approval marks	ENEC, CE, UL (E337648), CQC		IEC61347-2-13 IEC62384 UL8750 GB19510.14 GB17743
Ingress Protection classification	IP20		
RoHS	Yes		2011/65/EU

## Inrush current

Specification item	Value	Unit	Condition
Inrush current I <sub>peak</sub>	35	A	Input voltage 24V DC, load 0.4A@25V
I <sup>2</sup> t-value	0.035	A <sup>2</sup> s	Input voltage 24V DC, load 0.4A@25V

## Operating window

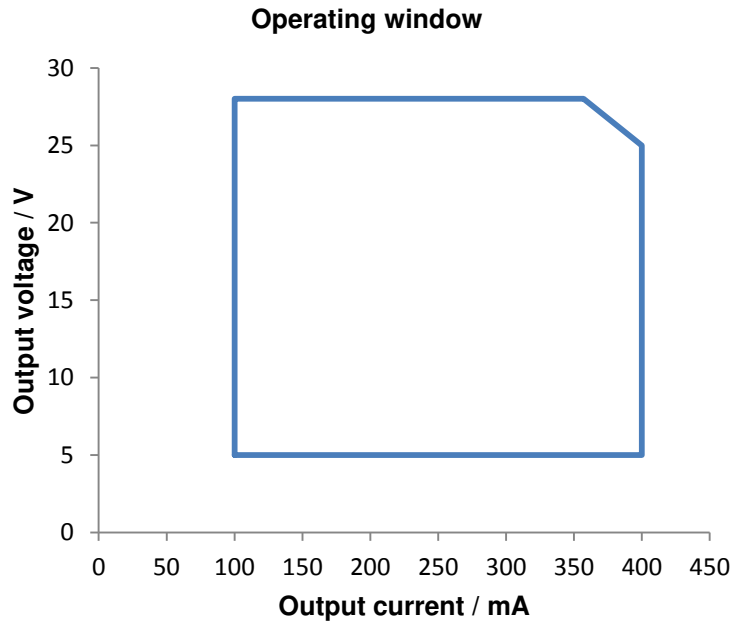


Figure 3: Operating window

## Efficiency versus output power

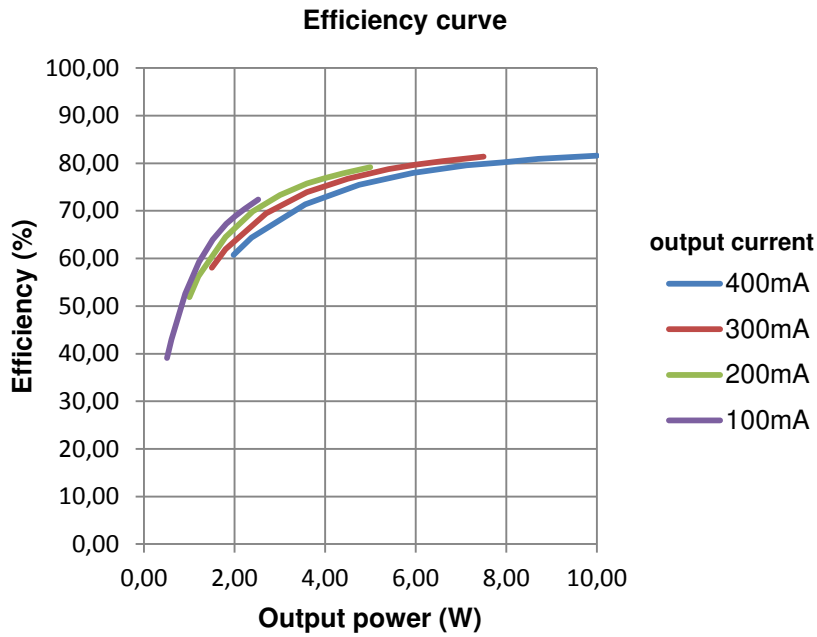


Figure 4: Efficiency

## Functional Description

The driver is easy to use. It will start working after applying 24V at input. The OLED can be connected via a connector. The Rset resistor value is used to define the OLED current. Value less than 100 Ohm will cause output disable. The output current is limited to 400mA.

R <sub>SET</sub> [Ω]	I <sub>SET</sub> [mA]
0	100
100	100
110	105
120	111
130	116
150	125
160	130
180	138
200	146
220	155
240	166
270	176
300	190

R <sub>SET</sub> [Ω]	I <sub>SET</sub> [mA]
330	204
360	215
390	228
430	245
470	261
510	277
560	297
620	318
680	340
750	368
820	392
910	422

Use R<sub>win</sub> to set the OLED protection voltage level. The R<sub>win</sub> resistor value is used to set the short trigger level and the end of lifetime (EOL) trigger level. The output voltage is limited to 28V.

R <sub>WIN</sub> [Ω]	V <sub>OLED</sub> [V]	V <sub>short</sub> [V]	V <sub>EOL</sub> [V]
200	3	2	9
400	6	4	15
600	9	6	21
800	12	8	27
1000	15	10	33
1200	18	12	39
1400	21	14	45
1600	24	16	51
1800	27	18	57

#### Attention:

Even if the output current is limited to 400mA and/or the output voltage is limited to 28V by hardware, it is necessary to use the correct R<sub>set</sub>/R<sub>win</sub> values for a safe OLED operation. The internal protection mode setting is always based on the set working point.

## Application setup

The driver allows two different operation modes:

#### Stand-alone (no dimming)

In this mode, the driver can be switched on/off by the 24V DC power supply. No further control connection is necessary. By default, all OLEDs will light up to their maximum brightness. The brightness level can be set by RDM configuration tool (0x0141, DMX\_FAIL\_MODE).

#### Dimmable control via DMX

Figure 5 presents the typical wiring for a DMX installation. The connection clamps allow a simple daisy chain of the power and control lines. Up to 8 drivers can be connected in series for the 24V power supply.

The DMX control signal requires a booster/splitter after every 32 DMX devices. RDM functionality is only given, if the used booster/splitter also supports RDM commands. The last DMX devices of a DMX universe needs a 120Ω terminal resistor. It is possible to push an axial resistor directly between the output clamps of Data+/Data-. This resistor is delivered within the driver package.

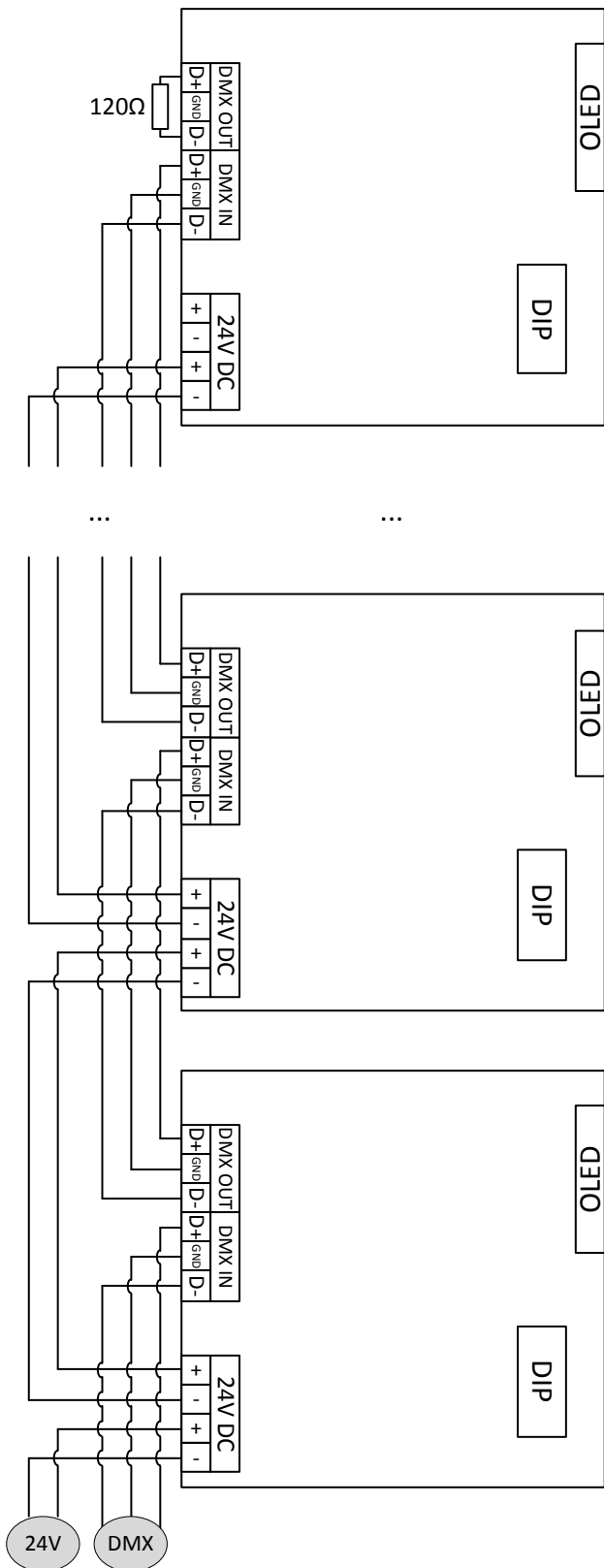


Figure 5: Typical DMX installation

## DMX address setting

The driver allows two ways to set the DMX address:

### RDM (default)

The DMX address can be configured by an RDM configuration tool. If switch 1 is set to RDM position, the driver always uses the DMX address which is stored in its memory. By factory default, the driver is set to DMX address 1 with activated RDM mode.

### DIP switch

The DMX address can also be set by DIP switches. In this case, switch 1 must be set to DIP position. The address itself is set by switches 10-2 acc. to appendix "DMX address setting". The driver will reply the DMX address set by DIP switches if it receives a request from RDM configuration tool.

RDM	DIP	256	128	64	32	16	8	4	2	1
DMX address + 1										
1	2	3	4	5	6	7	8	9	10	

## Dimming control with DMX

Dimming curve

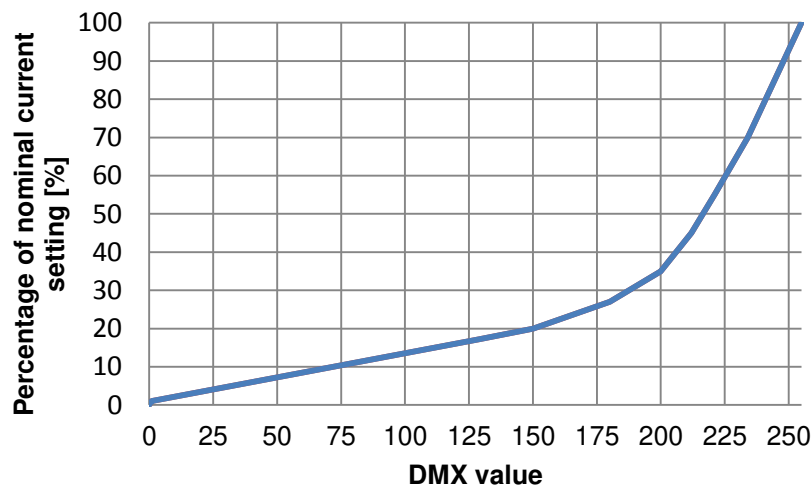


Figure 6: Dimming curve

## Application Information

### Driver requirements

For safe operation, the 24V input must only be connected to SELV or class 2 (according to US national electrical code) circuits. It is necessary to switch of the 24V power supply before connect/disconnect any driver to the 24V line.

## Logistical data

Specification item	Value
Product name	Driver D024V 10W/0.1-0.4A/28V DMX
Order code	379778 36
Logistics code I2nc	9254 000 I2002
EAN3	087 27900 37986 0
Pieces per box	16



#### Standards, compliance and sustainability

Philips Lumiblade products are environmentally friendly by avoiding the use of hazardous materials and by providing efficient illumination. These products are RoHS (EU directive 2011/65/EU) compliant.



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