

FEATURES

- ◆ Dimmable Constant Current LED DRIVER
- ◆ Power Supply (IN): 5-12-24 Vdc
- ◆ Constant Current Output (OUT): 350, 500 or 700 mA for dimmable Spotlight and LED module
- ◆ Dimming PWM input frequency up to 4 kHz
- ◆ Zero-Noise System
- ◆ Limited In-rush current
- ◆ WHITE and MONOCHROME Light Control
- ◆ Extended temperature range
- ◆ 100% Functional Test - 5 Years warranty

PRODUCT DESCRIPTION

NANODRIVER-1CC is a 1-channel Constant Current (CC) LED Driver, which can be powered by a Constant Voltage SELV Power Supply (5, 12, 24) Vdc or by a Pulse Width Modulation (PWM) voltage (5 ÷ 24) Vdc. The driver is suitable for driving loads such as Spotlight and white, single-colour, LED modules at constant current. NANODRIVER-1CC can deliver a maximum output current of 700 mA and is suitable for driving Constant Current dimmable LED loads starting from a PWM modulated voltage, for example by a Constant Voltage LED dimmer. NANODRIVER-1CC is available in four versions, one for each Constant Current set plus a customizable version where the final user can select the desired Constant Current (350, 500 or 700 mA) by soldering the dedicated current selection pads.

→ For the up-to-date manual, please consult our website www.dalcnet.com or scan the QR Code from your smartphone



PRODUCT CODE

CODE	POWER SUPPLY	OUTPUT CURRENT ¹	N° of CHANNELS	PWM FREQUENCY IN
NANODRIVER-1CC	5-12-24 Vdc	1 x 350, 500 or 700 mA (max, customizable)	1	600 ÷ 4000 Hz
NANODRIVER-1CC350	5-12-24 Vdc	1 x 350 mA (max)	1	600 ÷ 4000 Hz
NANODRIVER-1CC500	5-12-24 Vdc	1 x 500 mA (max)	1	600 ÷ 4000 Hz
NANODRIVER-1CC700	5-12-24 Vdc	1 x 700 mA (max)	1	600 ÷ 4000 Hz

Table 1: Product Code

¹ The maximum total output current depends on the operating conditions and ambient temperature of the system. For the correct configuration, check the maximum current that can be delivered in the §[Technical specifications](#) and in the §[Thermal Characterization](#) sections.

REFERENCE STANDARDS

NANODRIVER-1CC complies with the regulations shown in the table below.

STANDARD	TITLE
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61547	Equipment for general lighting purposes – EMC immunity requirement

Table 2: Reference standards

TECHNICAL SPECIFICATIONS

Description	Name	Values			Unit of Measure	Note
		Min		Max		
INPUT (Power Supply DC IN)						
Nominal Supply Voltage	V_{IN}	5	12	24	Vdc	-
Efficiency at full load	E_{FF}	> 95			%	-
Standby power absorption	P_{STBY}	< 0.5			W	-
OUTPUT (Channel L1)						
Output Current	I_{OUT}	350, 500, 700 ($\pm 10\%$)			mA	Depends to Product Code version
Output Current (max)	$I_{OUT-max}$	$45 \leq T_A < 60$		$T_A < 45$	$^{\circ}C$	-
		500	÷	700	mA	-
Maximum Output Voltage	$V_{OUT-max}$	@ $V_{IN}=5$	@ $V_{IN}=12$	@ $V_{IN}=24$	V	$I_{OUT} = 700mA$
		3.5	10	22		
Load type	L_{TYPE}	Constant Current LED			-	Defined by design
DIMMING						
Dimming Input Frequency	F_{DIM}	600	÷	4000	Hz	Pulse Width Modulation (PWM)
Minimum dimming level	$LV_{DIM-min}$	0.2	÷	0.6	%	-
ENVIRONMENTAL						
Storage temperature	T_{STORE}	-40	÷	+60	$^{\circ}C$	Minimum values defined by design
Working Ambient temperature	T_A	-10	÷	+60	$^{\circ}C$	
Max Temperature @ T_c point	T_C	-	-	+115	$^{\circ}C$	-
Wiring Section	WS_{SOLID}	0.5	÷	1.024	mm ²	Recommended
	WS_{STRAND}	20	÷	18	AWG	
Strip length	WS_{STRIP}	3			mm	-
Connector Type	CON_{TYPE}	Solder pads			-	-
Mechanical Dimensions	-	L	H	D		
	MD	33	7	8	mm	
Weight	W	1.5			g	Excluded packaging

Table 3: Technical specification

T_c POINT POSITIONING

The figure below shows the positioning of the maximum temperature point (T_c point, highlighted in red) reached by the electronics inside the enclosure. It is located on the front side (Top) near the LED output connector.



Figure 1: T_c point position

INSTALLATION



ATTENTION! Installation and maintenance must always be carried out in the absence of voltage.

Before proceeding with the connection of the device to the power supply, make sure that the voltage of the power source is disconnected from the system.



The device should only be connected and installed by qualified personnel. All applicable regulations, legislation, standards, and building codes must be adhered to. Incorrect installation of the device may cause irreparable damage to the device and connected loads.

The following paragraphs show the diagrams of the dimmer's connection to the load, the local/sync control, and the supply voltage. It is recommended to follow these steps to install the product safely:

0. Current setting: to set the output current, connect the selection pad pair corresponding to the desired output current (350, 500 or 700 mA) with a drop of solder. (Only for NANODRIVER-1CC product code)
1. Load wiring: connect the LED load positive wire to the "OUT" soldering pad with the "+" symbol, and the LED load negative wire to the "OUT" soldering pad with the "-" symbol.
2. Power Supply / Dimmer wiring: connect a 5 Vdc, 12 Vdc, or 24 Vdc Power Supply or Dimmer output to the "+" and "-" pads of the "IN" soldering section.



CURRENT SETTING

To set the output current on NANODRIVER-1CC, perform one of the following solder connections on the selection pad pair bottom side depending to the output current desired.



Do not connect multiple selection pad pairs at the same time, the current selection is unique and must be made only on one pad pairs.

This selection is required only for NANODRIVER-1CC product code. For all other product codes in this family, the selection is applied at manufacturing time.

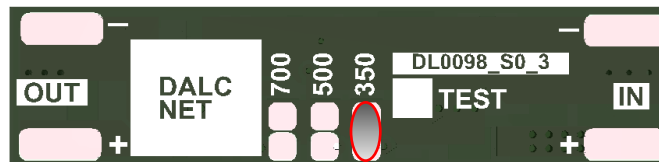


Figure 2: Solder connection for 350 mA Output Current

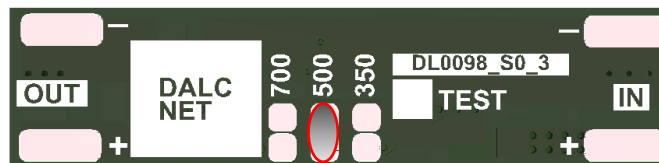


Figure 3: Solder connection for 500 mA Output Current

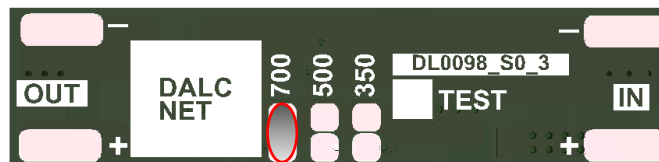


Figure 4: Solder connection for 700 mA Output Current

LOAD WIRING

NANODRIVER-1CC has 1 output channels that can drive single-color LED strips or white light temperature. The following connection diagram (Figure 5) allows you to drive white or single-color Constant Current LED load.

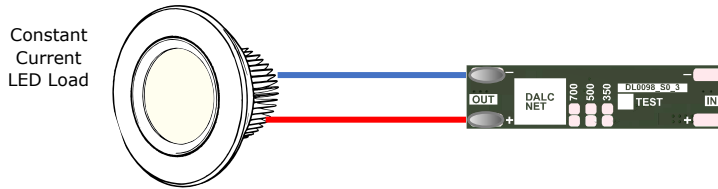


Figure 5: White or Single-Color CC LED load wiring diagram

POWER SUPPLY / DIMMER WIRING

NANO-DRIVER-1CC can be powered by a 5 Vdc, 12 Vdc, or 24 Vdc or by a PWM modulated dimming voltage coming from a Constant Voltage LED Dimmer. Following figures depict the wiring diagram with both the supply solutions.

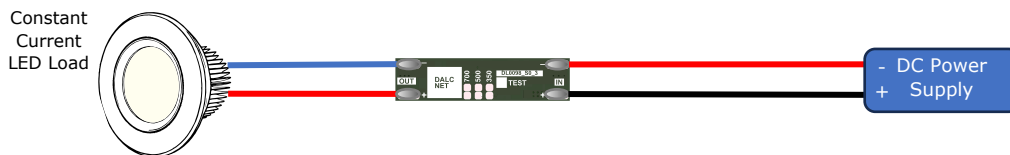


Figure 6: Power Supply wiring diagram



Once the load and LED dimmer are wired to the NANODRIVER-1CC, connect the power supply to the "+" and "-" terminals of the LED Dimmer DC input.

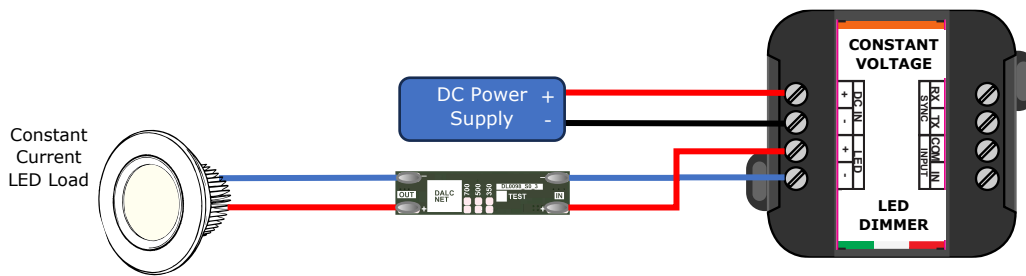


Figure 7: Dimmer wiring diagram

FLICKER PERFORMANCE

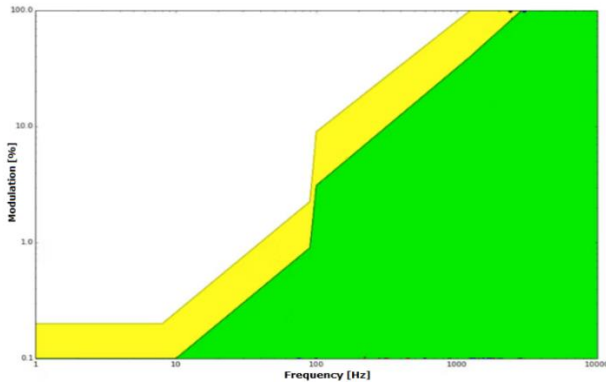


Figure 8: Flickering Perception Threshold

Thanks to its 4 kHz capable dimming frequency input, the NANODRIVER-1CC effectively reduces the occurrence of the Flicker phenomenon. Depending on an individual's sensitivity and the nature of their activities, flickering can impact one's well-being, even if the changes in luminance are beyond the threshold detectable by the human eye.

The graph shows the phenomenon of Flickering in function at the frequency, measured throughout the dimming range.

The results show the low-risk zone (yellow) and the no-effect zone (green). Defined by IEEE 1789-2015²

THERMAL CHARACTERIZATION

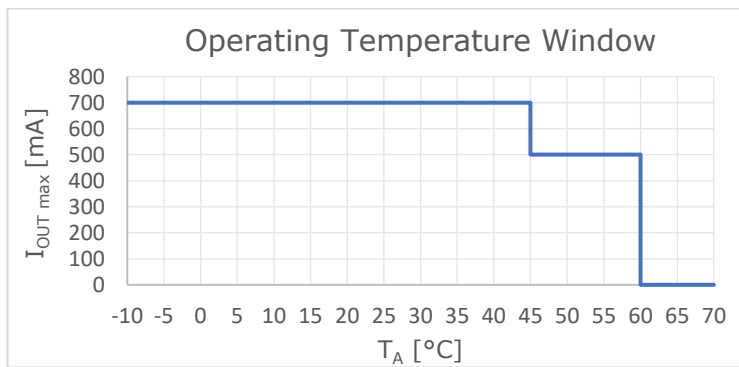


Figure 9: Operating Temperature Window

Figure 9 shows the maximum output current values that are recommended for NANODRIVER-1CC as a function of the operating temperature³ (or ambient temperature, T_A) of the operation, summarized below:

- ◆ $T_A = (-10 \div +45)^\circ\text{C} \rightarrow I_{\text{OUT}} \leq 700 \text{ mA}$
- ◆ $T_A = (45 \div 60)^\circ\text{C} \rightarrow I_{\text{OUT}} \leq 500 \text{ mA}$

These maximum current (total) values can only be applied under proper ventilation conditions.

MECHANICAL DIMENSIONS

Figure 10 details the mechanical measurements and the overall dimensions [mm] of the outer casing.

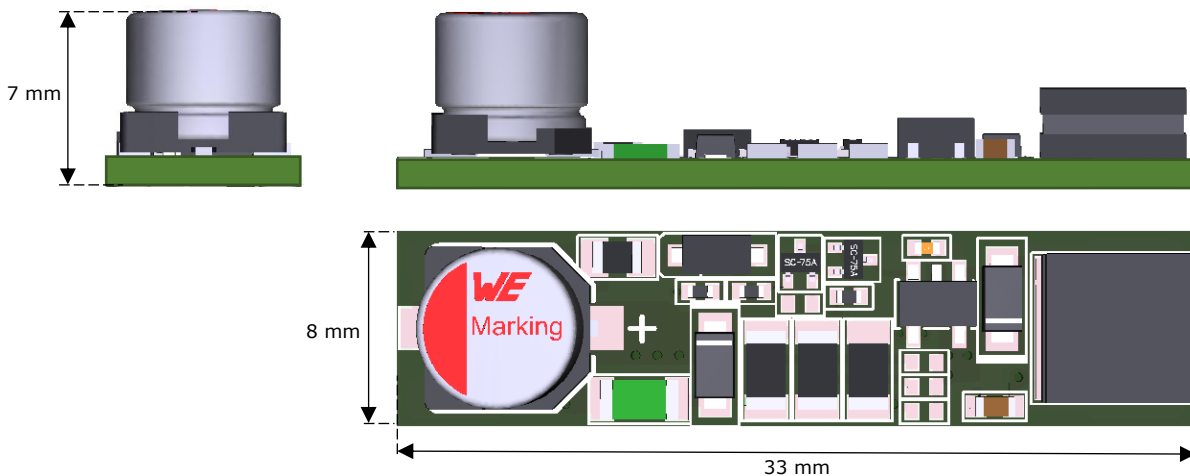


Figure 10: Mechanical dimensions

² Institute of Electrical and Electronics Engineers (IEEE). *IEEE std 1789: Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers.*

³ If the product is installed inside an electrical panel and/or junction box, T_A refers to the temperature inside the panel/box.

TECHNICAL NOTES

INSTALLATION



ATTENTION! Installation and maintenance should always be carried out in the absence of DC voltage. Before proceeding with the installation, adjustment and connection of the device to the power supply, make sure that the voltage is disconnected from the system.



The device should only be connected and installed by qualified personnel. All applicable regulations, legislation, standards, and building codes in force in the respective countries must be adhered to. Incorrect installation of the device may cause irreparable damage to the device and connected loads.

Maintenance must only be carried out by qualified personnel in compliance with current regulations.

The product must be installed inside an electrical panel and/or junction box that is protected against overvoltage.

The external power supply must be protected. The product must be protected by a properly sized circuit breaker with overcurrent protection.

Keep 230 Vac (LV) circuits and non-SELV circuits separate from SELV safety ultra-low voltage circuits and any product connections. It is strictly forbidden to connect, for any reason, directly or indirectly, the 230 Vac mains voltage to the product (control terminals included).

The product is sold as an electronic board only and does not have a plastic or insulating case. Make sure that during installation the metal parts of the driver do not come into contact with other conductive elements.

During installation, it is recommended to reserve adequate space around the device to facilitate its accessibility in case of future maintenance.



Use in thermally harsh environments may limit the output power of the product.

For devices embedded within luminaires, the T_A ambient temperature range is a guideline to be carefully observed for the optimal operating environment. However, the integration of the device within the luminaire must always ensure proper thermal management (e.g. correct mounting of the device, proper ventilation, etc.) so that the temperature at the T_C point does not exceed its maximum limit under any circumstances. Proper operation and durability are only guaranteed if the maximum temperature of the T_C point is not exceeded under the conditions of use.

POWER SUPPLY & LOAD



The device must be powered only with constant voltage LED dimmers or SELV power supplies with limited current at constant voltage, short-circuit protection and suitably sized power according to the specifications indicated in the product data sheet. No other types of power supply are permitted.

Size the power of the power supply respect to the load connected to the device. If the power supply is oversized compared to the maximum current drawn, insert an overcurrent protection between the power supply and the device.

Connecting to an unsuitable power supply may cause the device to operate outside of the specified design limits, voiding its warranty.

In the case of power supplies equipped with earth terminals, it is mandatory to connect ALL the protection earth points (PE= Protection Earth) to a state-of-the-art and certified earthing system.

The power cables of the device must be correctly sized with reference to the connected load and must be isolated from any wiring or equal to non-SELV voltage. It is recommended not to exceed 10m of connection between the power source and the product. Use double-insulated cables. If you want to use connection cables between the power source and the product longer than 10m, the installer must ensure the correct operation of the system. In any case, the connection between the power supply and the product must not exceed 30m.



The device has been designed to work with LED loads only. Connecting and powering unsuitable loads may cause the device to operate outside of the specified design limits, voiding its warranty. In general, the operating conditions of the device should never exceed the specifications indicated in the product data sheet.


Observe the intended polarity between the LED module and the device. Any polarity reversal results in no light emission and can often damage the LED modules.

It is recommended that the connection cables between the product and the LED module be less than 3m long. Cables must be properly sized and should be insulated from any non-SELV wiring or parts. It is recommended to use double-insulated cables. If you want to use connection cables between the product and the LED module longer than 3m, the installer must ensure the correct operation of the system. In any case, the connection between the product and the LED module must not exceed 30m.

It is not allowed to connect different types of loads in the same output channel.

LEGAL NOTES




TERMS OF USE

 Dalcnet (hereinafter referred to as "the Company") reserves the right to make changes to this device, in whole or in part, without prior notice to the customer. Such changes may affect technical aspects, functionality, design, or any other element of the device. The company is not required to notify you of such changes and that your continued use of the device will constitute your acceptance of the changes.

The company is committed to ensuring that any changes do not compromise the essential functionality of the device and that they comply with applicable laws and regulations. In the event of substantial changes, the company undertakes to provide clear and timely information on the same.

The customer is advised to periodically consult the www.dalcnet.com website or other official sources to check for any updates or changes to the device.

SYMBOLS

	All products are manufactured in compliance with European Regulations, as reported in the Declaration of Conformity.
	"Very Low Safety Voltage" in a circuit isolated from the mains supply by insulation not less than that between the primary and secondary circuits of a safety isolation transformer according to IEC 61558-2-6.
	At the end of its useful life, the product described in this data sheet is classified as waste from electronic equipment and cannot be disposed of as unsorted municipal solid waste. Warning! Improper disposal of the product may cause serious harm to the environment and human health. For proper disposal, inquire about the collection and treatment methods provided by the local authorities.