



Smart LED controller 2.0 For AOI

Model: SmartLED-0005

User's Manual

Version: 2.2 2022-12-01



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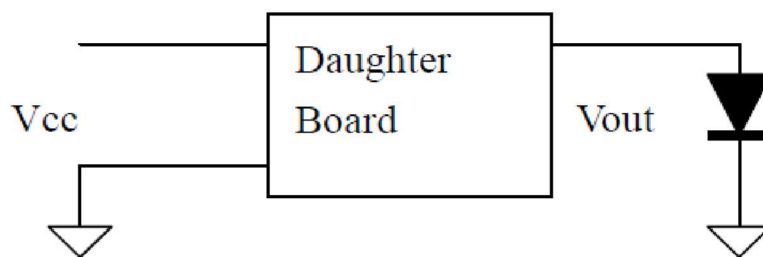
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1. Features

- A daughter driver board for modularized SmartLED controller.
- Designed for LED of forward voltage smaller than 5 Volt.
- Jumper 2 can select the maximal current of 350 mA or 700 mA for better resolution.
- When the LED current is larger than 200mA, the voltage difference at LED output terminal (Vout) and the power supply (Vcc) should not exceed 1 Volt. The method of using external resistor to comply this rule is described in Chapter 4. If the voltage difference is greater than 1 volt and the current larger than 200mA, this board may shut down due to over temperature.



2. Electrical Specification

Item	Value	Unit
Supply voltage Vcc	3.3~5.5	V
Maximal output current	350 / 700	mA
Maximal output voltage @ 700mA	Vcc-0.9	V
Maximal output voltage @ 350mA	Vcc-0.8	V
LED connection	Common cathode	
Operation condition	0~70 °C	20~90% Humidity

3.Pin definition

J2 : jumper for maximal current selection

Open: 350 mA

Close: 700 mA

J3: LED connector

Pin No.	Name	Function
1	VCC	Voltage source input (may not be connected if the power from V5 terminal of mother board)
2	LED	Output terminal to LED (LED+)
3	GND	Return terminal from LED (LED -) / Power ground (GND)



4. Calculation of external resistor to reduce voltage difference

When the voltage difference between forward voltage of LED and the power supply voltage is too large, there is considerable power need to be dissipated by the daughter board itself. This may lead to power stage shut down due to over temperature. The method to reduce this voltage difference is to add external resistor so that part of the power may dissipate by the resistor, not only by the power stage. An example is given as follows to show the detailed calculation.

LED: one 1Watt Red LED ($V_f=2.8V$)

LED forward voltage is $V_{ft} = 1 \times 2.8V = 2.8V$

LED current is $I_c: 1Watt/2.8V = 0.35A$

Power supply voltage is $V_{cc} = 5V$

Resistance of the external resistor for voltage difference **1V** can be deduced as

$$R=(V_{cc}-V_{ft}-1)/I_c = (5-2.8-1)/0.35=3.4\text{ohm}$$

Power rating of the external resistor is thus given as

$$W=I_c \times I_c \times R=0.35 \times 0.35 \times 3.4 =0.4 \text{ Watt (You can choose 0.5W package)}$$

5. Connection of common cathode LED module

When the LED module is composed of multiple series of LED branches with common cathode connection, you may use multiple daughter boards to drive the branches separately. The detailed connection is shown as follows.

