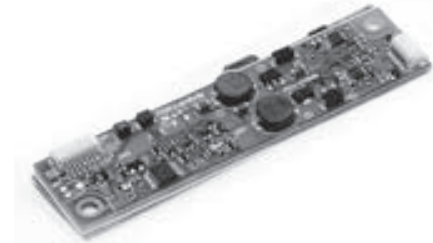


ALD-310012PJ125

DC-DC Converter for LC Panels
with LED Backlights



Features

- Three Outputs
- Low profile and compact
- High efficiency
- Usable in a wide range of temperatures
- Applicable panel size: 8 to 15 inches (rough guide)
- Combined use of PWM modulated light and analog modulated light (ADIM) assures universality
- Equipped with load (LED) open detection (alarm output) function

Applications



ALD-310012PJ125 Specifications (Please refer to each specification before use)

Electrical Characteristics

Item	Unit	Symbol	Specification			Condition						Remarks
			min	typ	max	Vin(V)	Vrmt(V)	Vbr1(V)	Rbr2(kΩ)	Ta(°C)	RL1-3(Ω)	
Output Current	mA	lout1,2,3 (Maximum dimmer)	85	100	115	12±0.5	5±0.25	2.5	10	25±10	380	(*1)
		lout1,2,3 (when modulating light)	25	40	55	12±0.5	5±0.25	2.5	10	25±10	380	PWM modulated light (*1)(*2) ADIM modulated light (*1)(*2)
Input Current	A	lin1	-	1.1	1.5	12±0.5	5±0.25	2.5	10	25±10	380	Remote ON
	mA	lin2	-	-	1	12±0.5	0	2.5	10	25±10	380	Remote OFF
Modulated light frequency	Hz	F	180	225	270	12±0.5	5±0.25	1	10	25±10	380	
Alarm Signal	V	Vst	-	-	1	12±0.5	5±0.25	2.5	10	25±10	380	On a normal operation (*3)
			4.5	5.0	5.5	12±0.5	5±0.25	2.5	10	25±10	∞	In case of lamp anomaly (*3)

Other Specifications

Modulated light system		PWM/ADIM (*2)
Operating Temperature	°C	-30 to +80
Storage Temperature	°C	-40 to +85
Operating Humidity Ratio	RH%	95Max
Weight	g	9 max.
Dimensions (WxDxH)	mm	85x21.5x5.5 (*4)
Fused Input		Yes
Remote ON / OFF		Yes
Lamp open detection function		Yes

Conformity to RoHs Directive

This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

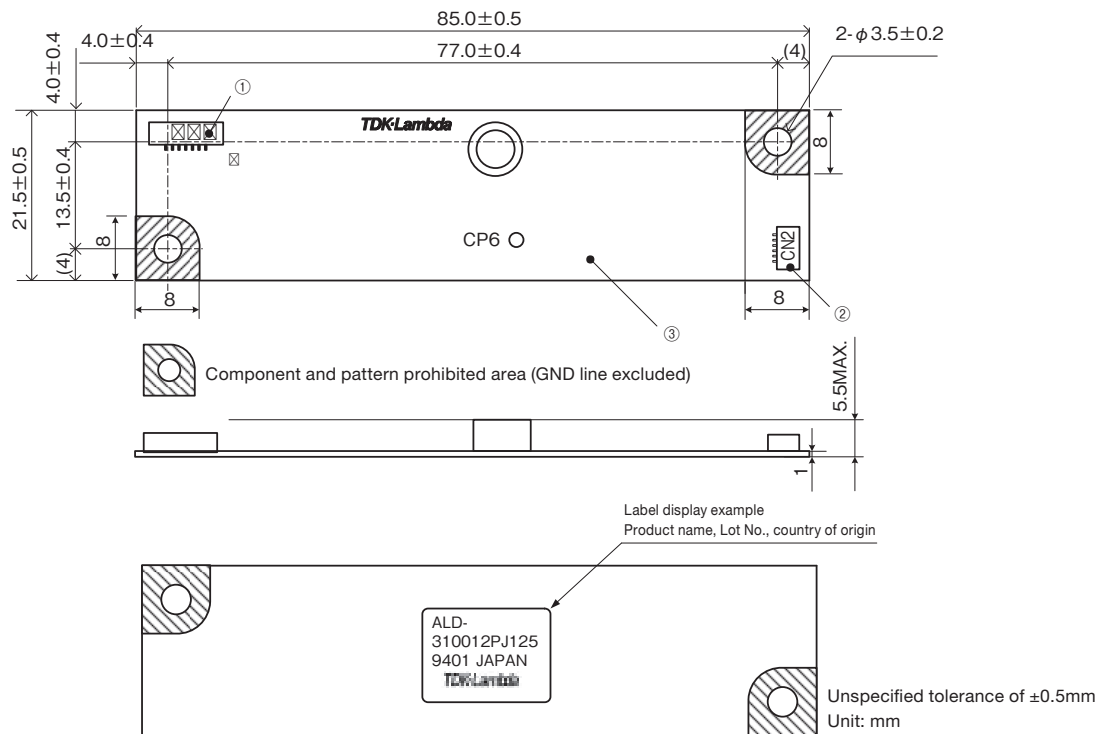
(*1) When output is open, the output voltage of that series is restricted, and other series operate normally.

(*2) See "Connections" as well as "Analog Modulation Light (ADIM) and PWM Modulation Light" for details about modulation light.

(*3) See "Connections" for details about alarm output.

(*4) These dimensions are indicated the maximum only H. Others are typical values.

Outline Drawing



Connector

No.	Component name	Type name	Qty	Remarks	Recommended suitable connector
①	Input connector CN1	53261-0871	1	Molex	51021-0800
②	Output connector CN2	SM06B-SRSS-TB(LF)(SN)	1	J.S.T Mfg., Co., Ltd	SHR-06V-S-B
③	Printed circuit board PCB	Glass epoxy (FR-4)	1	UL94V-0 t=1.0mm	—

Terminal Number & Function

Input side CN1

Terminal No.	Symbol	Rating	Remarks
CN1-1	Vin	12±1.2V	Power source input
CN1-2			
CN1-3	GND	0V	Ground
CN1-4			
CN1-5	Vrmt	0-0.4(V)/2.5-Vin(V)	OFF / ON
CN1-6	Vbr1	0(V)/2.5(V)	PWM modulated light MIN/MAX Modulated light function using output PWM modulation
	Vpwm* /Rbr1	0(%)/100(%) 0kΩ/10kΩ	
CN1-7	ADIM	0(V)/4.0(V) 0kΩ/10kΩ	ADIM modulated light MIN/MAX Modulated light function using output current variation
CN1-8	Vst	0(V)/5.0(V)	At time of normal load/ at time of abnormal load

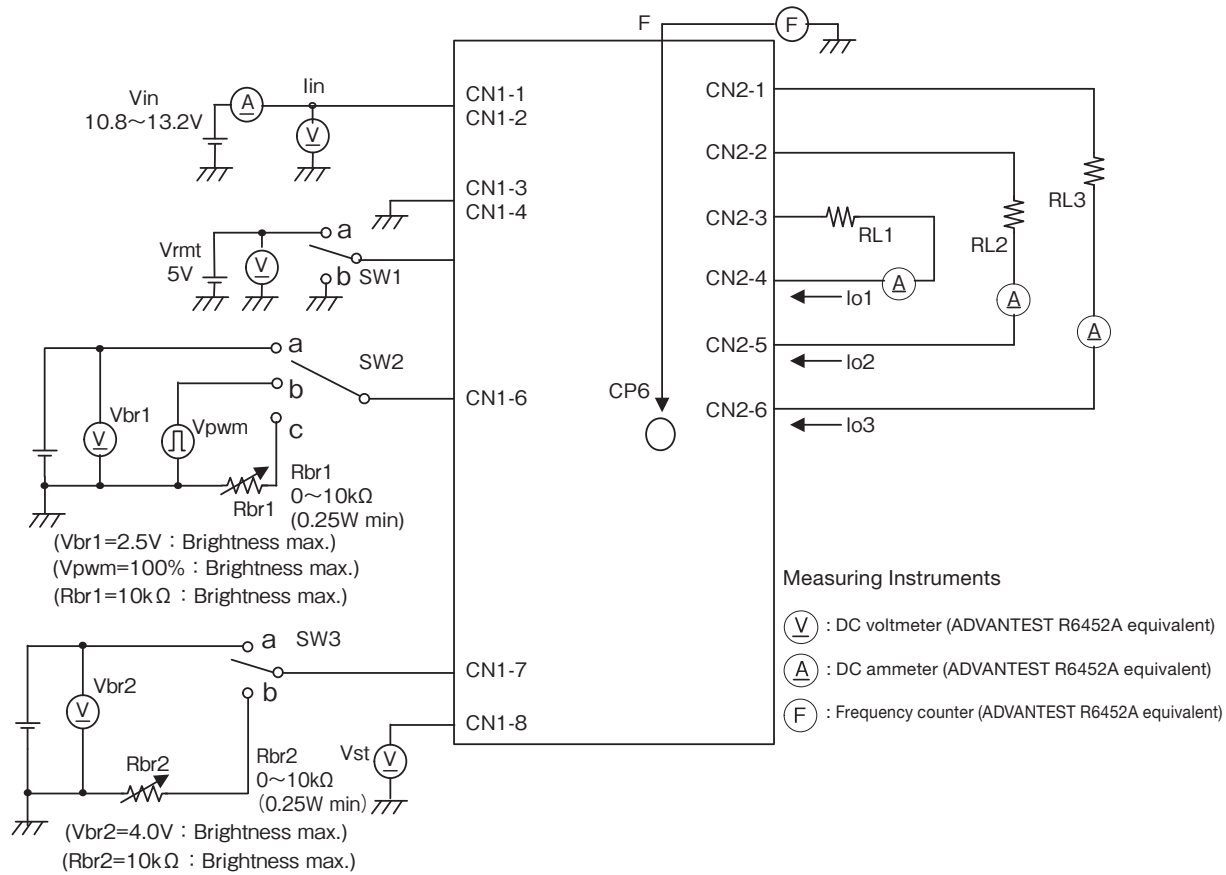
Output side CN2

Terminal No.	Symbol	Remarks
CN2-1	+CH3	CH3 – anode side
CN2-2	+CH2	CH2 – anode side
CN2-3	+CH1	CH1 – anode side
CN2-4	-CH1	CH1 – cathode side
CN2-5	-CH2	CH2 – cathode side
CN2-6	-CH3	CH3 – cathode side

*With Vpwm, 0(V) is OFF and 3.3(V) is ON.

*Using variable resistance (Rbr2) is recommended for modulating light. Depending on the power source, there is a possibility that voltage will not drop to 0V.

Connections



Operate by ON-OFF of SW1 as follows.

SW1	Unit operates
a	Operates
b	Does not operate
Open	Does not operate

Operate as follows by switching a SW2.

SW2	Unit operates
a	Voltage dimmer Vbr1=0 to 2.5V (2.5V : Maximum brightness)
b	Rectangular wave voltage modulated light Vpwm=0 to 100% (100% : Maximum brightness)
c	Volume dimmer Rbr1=0 to 10kΩ (10kΩ : Maximum brightness)
Open	Brightness max.

Operate as follows by switching a SW3.

SW3	Unit operates
a	Voltage dimmer Vbr2=0 to 4.0V (4.0V : Maximum brightness)
b	Volume dimmer Rbr2=0 to 10kΩ (10kΩ : Maximum brightness)

*Do not open SW3.

Protection Circuit Operation

Load condition	Alarm output (CN1-6)*1	Remarks
Load at normal time	1V max.	Operating normally
1 output open	4.5V min.	Other output operating normally
2 outputs open	4.5V min.	Other output operating normally
3 outputs open	4.5V min.	Operating at minimum duty

Alarm output Vst may be output when there is excessive ON/OFF of Vin and Vrmt. Check operation with power source actually used.

*1. Alarm output is approximately 0V when load is normal and approximately 5V when load is abnormal.

Analog Modulated Light (ADIM) and PWM Modulated Light Combination Example

Determines maximum value for output current in analog modulated light, to enable brightness control at that range, using PWM modulated light.

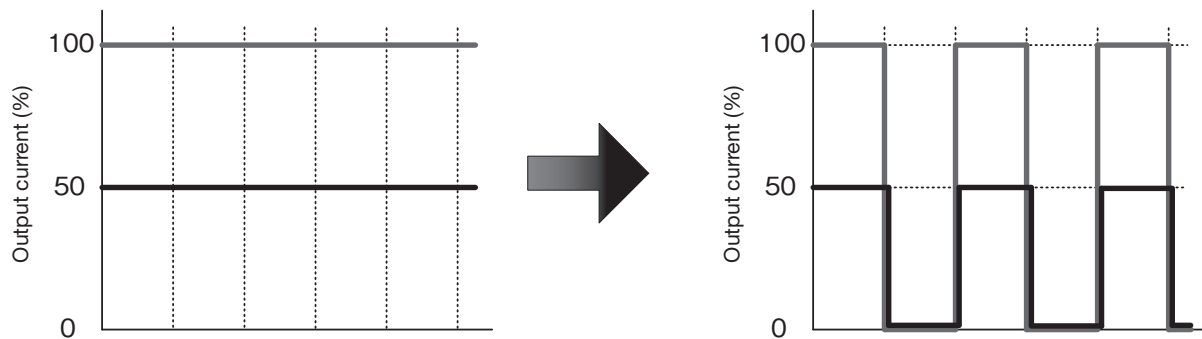
<Modulated Light Example 1 (blue in diagram below)>

Set output current value to 100%, in cases where PWM modulated light is desired at a modulated light range of 100% to 0%

<Modulated Light Example 2 (red in diagram below)>

Set output current value to 50%, in cases where PWM modulated light is desired at a modulated light range of 100% to 0%

PWM Modulated Light Voltage and Output Current Examples



Analog modulated light is the modulated light system for changing current amplitude. The benefits this system offer are that low frequency noise hardly occurs because it does not have an intermittent action and input power source load is small because input current variation is small. Conversely, because it changes the LED action point, chromaticity varies according to the modulated light.

PWM modulated light is the system where intermittent actions are made at low frequency in the range of 100Hz to 1kHz, and this on duty is varied to modulate light. Although this system leaves concern about low frequency noise and the demand for excessive answering to accommodate input power source, it offers the benefit of small chromaticity variations according to the modulated light because the LED action point does not change. PWM modulated light comes in two forms: a built-in PWM modulated light system (this is inside the LED driver generating chopping and sawtooth waves, which are compared against the external DC voltage to form a modulated light pulse) and an external PWM modulated light system (this directly applies the pulse from outside to modulate light).

The ALD Series combines analog modulated light and PWM modulated light to enable the generation of modulated light that suits your needs.