AP3064EV1 User Guide

General Description

This demonstration board utilizes the AP3064 high efficiency boost controller with 4-string current sources for driving WLED backlight. The AP3064 operates over a wide input voltage range from 4.5V to 33V.

The current of 4 strings are simply programmed from 20mA to 220mA with an external resistor. The current matching between each string is 1.5% (Typ). Its operating frequency can be adjusted from 0.1MHz to 1MHz, which allows trade-offs between external component size and system efficiency. The AP3064 supports external Pulse Width Modulation (PWM) Dimming Control with a wide dimming frequency range from 100Hz to 20kHz.

The AP3064 features cycle-by-cycle current limit, soft-start, under voltage lockout (UVLO) protection, programmable OVP, over temperature protection (OTP), open/short LED protection, VOUT short/Schottky diode open protection and Schottky Diode / Inductor short-circuit protection.

Applications

- LCD Monitor
- LCD Display Module
- LCD TV

Key Features

- Input Voltage Range: 4.5V to 33V
- Drives up to 4 Strings in Parallel, Up to 220mA per string
- Programmable WLED Current from 20mA to220mA
- Adjustable Operating Frequency: 100kHz to1MHz
- String-to-string Current Matching Accuracy: 1.5%
- Built-in OCP, OTP, UVLO
- External PWM Dimming
- Open/Short LED Protection
- Programmable Soft-start
- Programmable OVP
- Schottky Diode/Inductor Short-circuit Protection
- VOUT Short/Schottky Diode Open Protection

AP3064EV1 Specifications

Parameter	Value
Input Voltage	24VDC
LED Current	120mA * 4Channel
Number of LEDs	13 LEDs in series per string, 4 strings
XY Dimension	103mm x 56mm

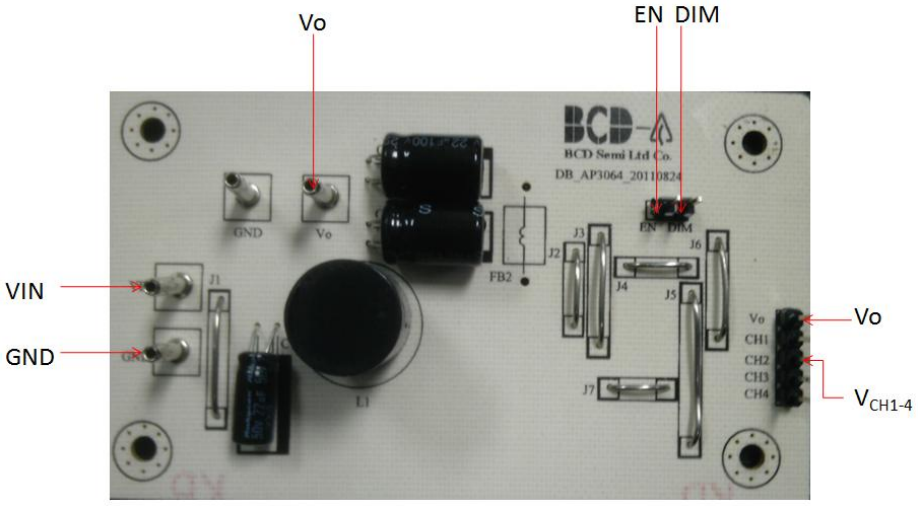


Figure 1: Top View

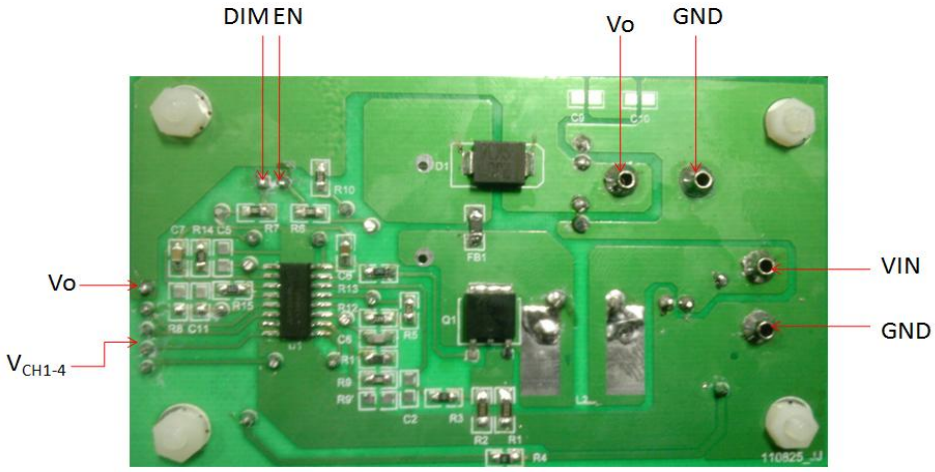


Figure 2: Bottom View

Connection Instructions

Power Supply Input: 24VDC (VIN, GND)
Enable Signal Input: 5V DC (EN, GND)
PWM Signal Input: (DIM, GND)
LED Outputs: LED+ (Vo), LED- (VCH1~VCH4)

Evaluation Board Schematic

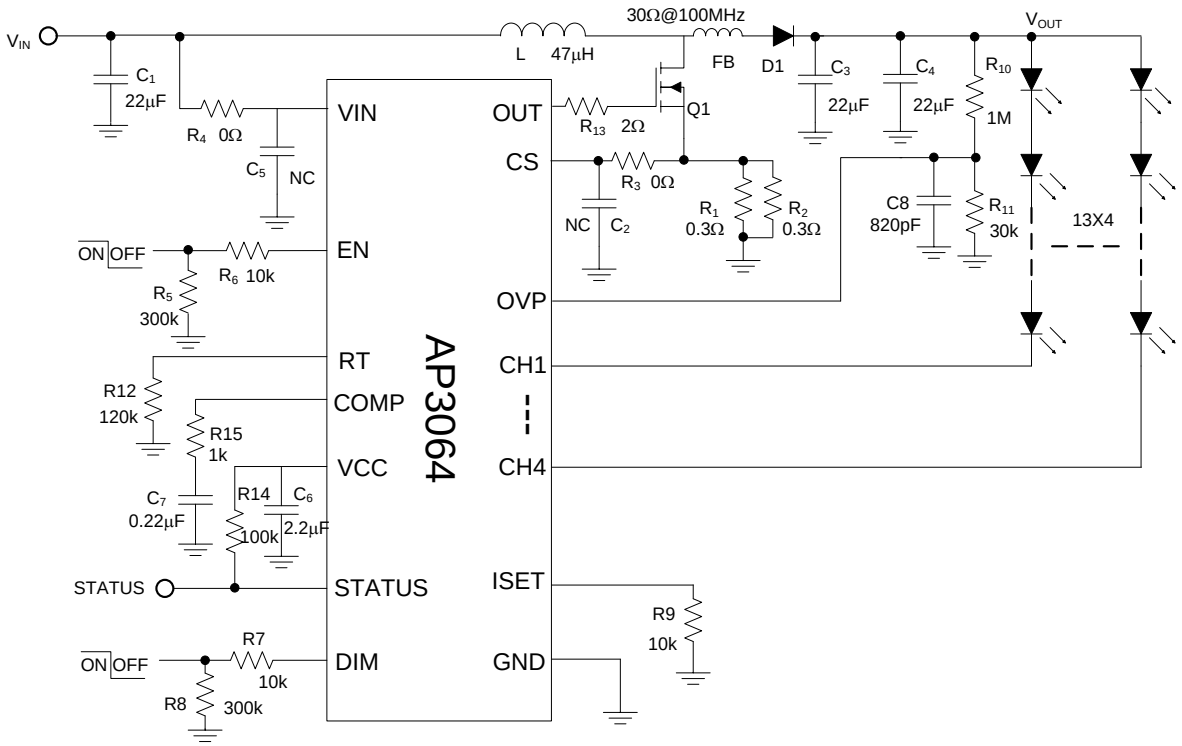


Figure 3: Evaluation Board Schematic

Evaluation Board Layout

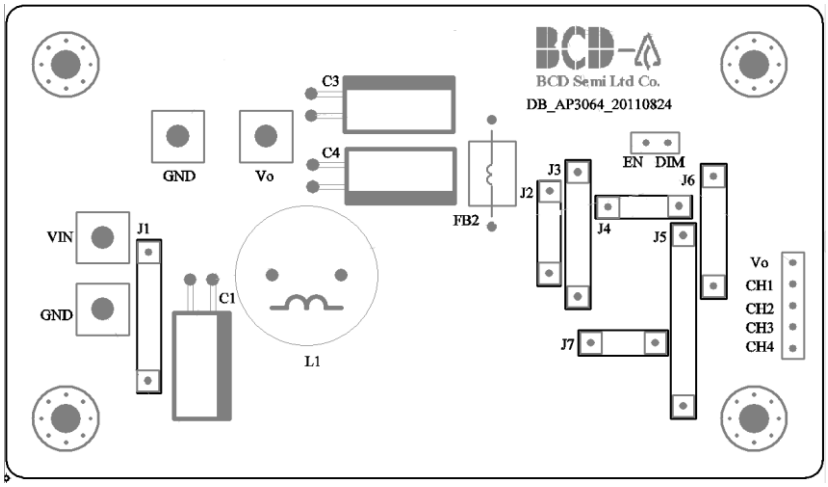


Figure 4: PCB Board Layout Top View

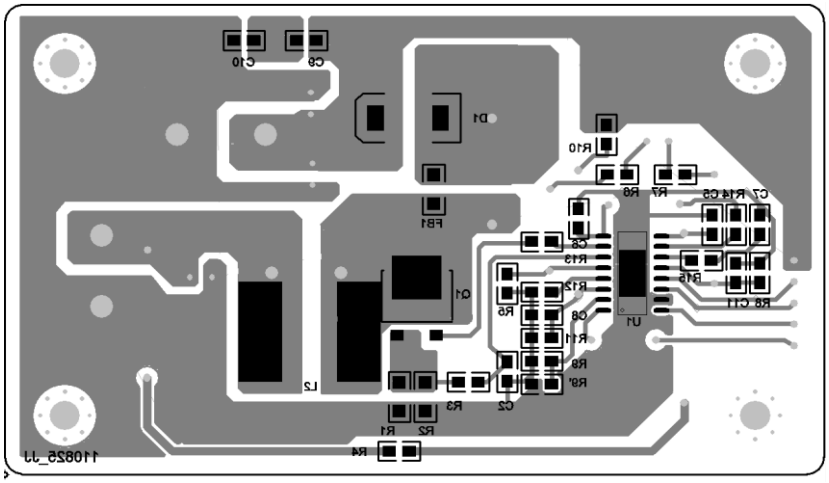


Figure 5: PCB Board Layout Bottom View

Quick Start Guide

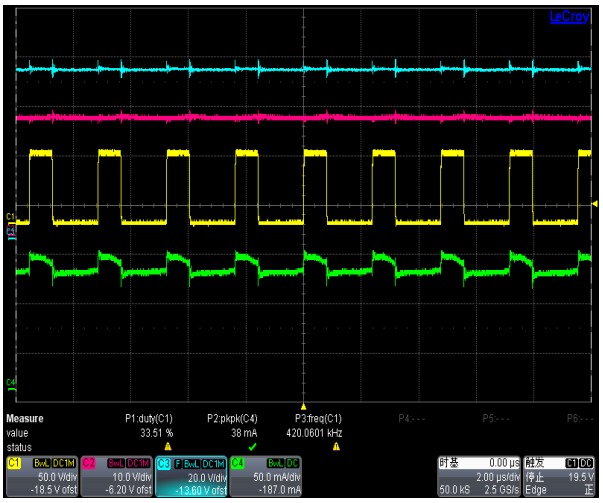
1. By default, the evaluation board is preset at 120mA LED Current per channel by R9.
2. Connect the anode wire of external LED string to Vo pin.
3. Connect the cathode wire of external LED string to CH1~CH4 pins.
4. Power Supply: Connect the 24VDC to Vin & GND pin to supply AP3064
5. Enable the IC: Connect 5 VDC to EN & GND pin to enable the circuit.
6. PWM Dimming: Connect a synchronal PWM signal (Vpp=5V) to PWM pin to dim the LEDs.
7. LED string should light up after 4~6 steps.

Bill of Material

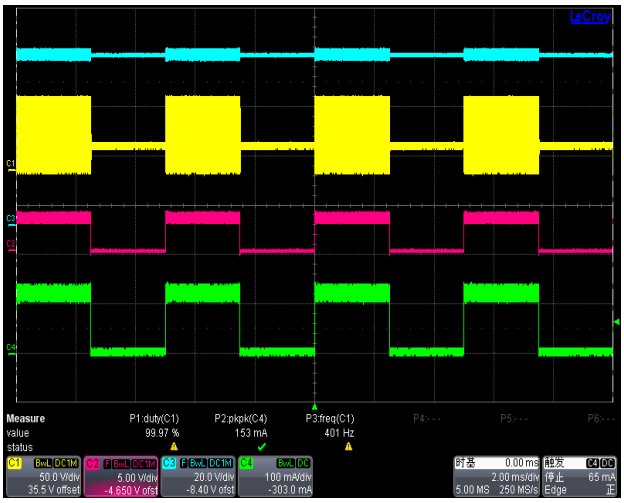
#	Name	Quantity	Package	Description
1	U1	1	SOP-16	AP3064
2	L1	1	DIP-2	47uH/3A
3	Q1	1	TO-252(DPAK)	100V/7.7A; ZXMN10A09K
4	D1	1	SMC	100V/3A; B3100
5	C1	1	Φ6	22uF/50V
6	C3,C4	2	Φ6	22uF/100V
7	R1,R2	2	1206	300mΩ, 5% Precision
8	R3,R4	2	0805	0Ω, 5% Precision
9	R5	1	0805	300kΩ, 5% Precision
10	R6,R7	2	0805	10kΩ, 5% Precision
11	R9	1	0805	10kΩ, 1% Precision
12	R10	1	0805	1MΩ, 5% Precision
13	R11	1	0805	30kΩ , 5% Precision
14	R12	1	0805	120kΩ, 5% Precision
15	R13	1	0805	2Ω, 5% Precision
16	R14	1	0805	100kΩ, 5% Precision
17	R15	1	0805	1kΩ, 5% Precision
18	C6	1	0805	2.2uF/16V, Ceramic X7R
19	C7	1	0805	0.22uF/16V, Ceramic X7R
20	C8	1	0805	820pF/16V, Ceramic X7R
21	FB	1	1206	30Ω@100M Hz, AEM:MCP1206F300PT-T

Functional Waveforms

Waveforms:

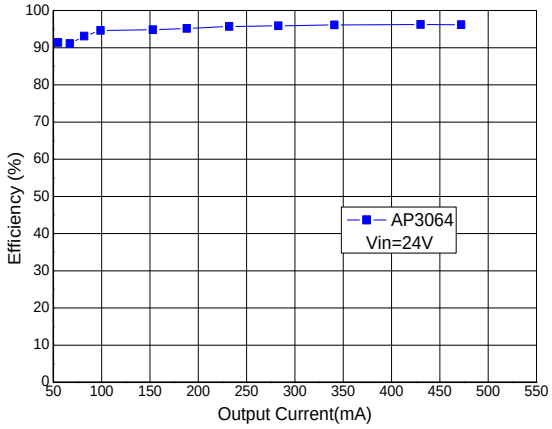


Operation Waveform (100% Duty)

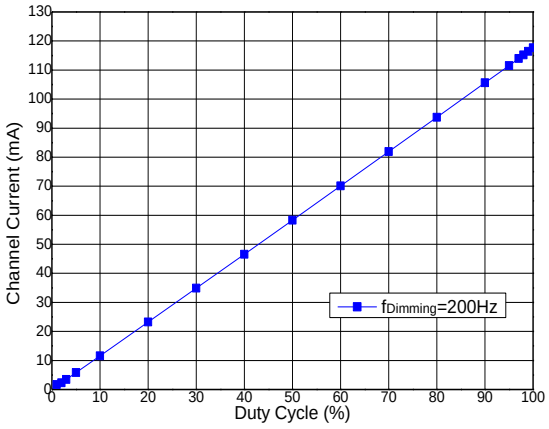


Dimming Waveform (fPWM=200Hz ,50% Duty)

Functional Data Curves

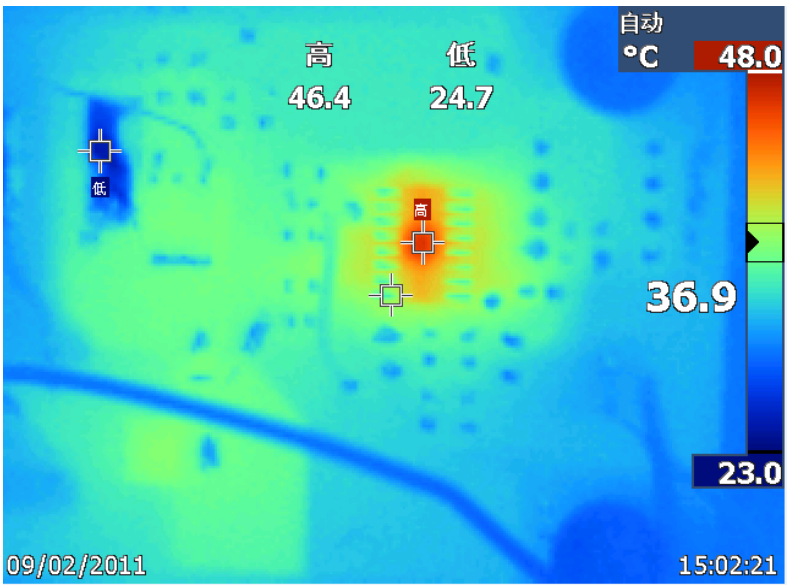


Efficiency VS Output current



Channel Current VS Duty cycle

Thermal Test



Thermal Test of AP3064

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