

Data Sheet

BIT3821

Universal High Brightness LED Driver

Version: A1

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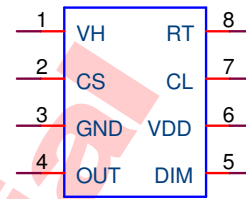
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Features:

- Constant current LED driver
- Constant frequency operation
- 15V ~ 500Vdc input range
- Support PWM dimming control
- Over temperature protection, OTP
- SOP 8 Package

Pin Layout:



Applications:

- LED lighting
- MR16
- LED backlight
- General purpose constant current source
- LCD Monitor
- LCD TV

Recommended Operating Condition:

Supply Voltage (VH).....15V ~ 500 V
 Operating Frequency.....10K ~ 300K Hz
 Operating Ambient Temperature.....-20 ~ 85 °C

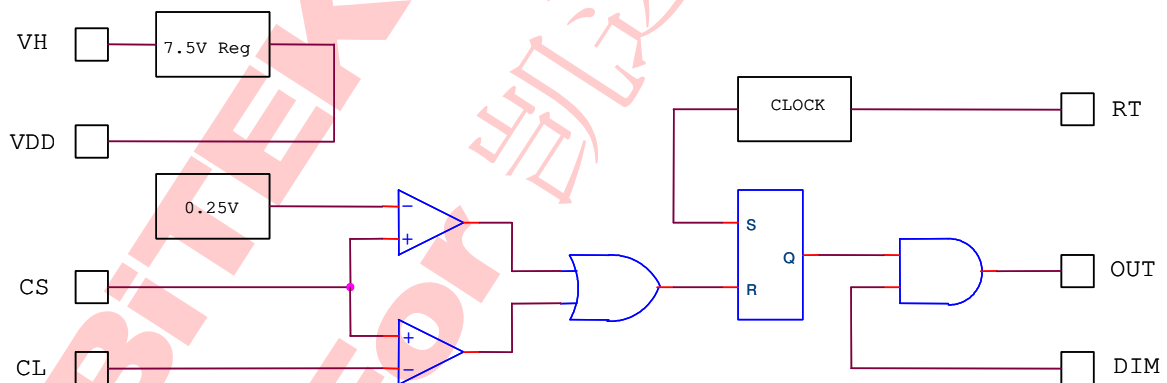
General Description:

To aim at the constant current application, BIT3821 is efficiently operated of constant current from 15V ~ 500V input voltage and fixed frequency operation. BIT3821 adopts current limit operation which current is operated between maximum current and minimum current. BIT3821 can support both external PWM dimming with 0~ 100% duty cycle of up to kilohertz and analog dimming in a SOP8 package.

Absolute Ratings: (if Ta=25 °C)

VH.....-0.3 ~ +500 V
 GND.....±0.3 V
 Input Voltage.....-0.3 ~ VH+0.3 V
 Operating Ambient Temperature.....-20 ~ +85 °C
 Operating Junction Temperature.....+150 °C
 Storage Temperature.....-55~+150°C

Functional Block Diagram:

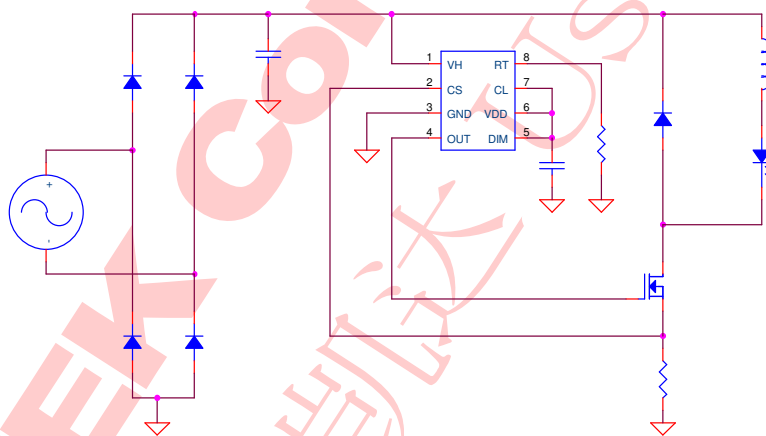


Pin Definition:

Pin No.	Symbol	I/O	Descriptions
1	VH	I	Supply voltage pin.
2	CS	I	Current sense.
3	GND	O	Ground pin.
4	OUT	I	Active high output driver
5	DIM	I	PWM dimming pin, can also been used as On/Off control.
6	VDD	O	Regulated 7.5V output pin.
7	CL	I	Current limit of current sense.
8	RT	I/O	Operation frequency control.

Operation description:**MR16 application circuit:**

Following is a MR16 application circuit when input is a 24V sinusoidal wave.

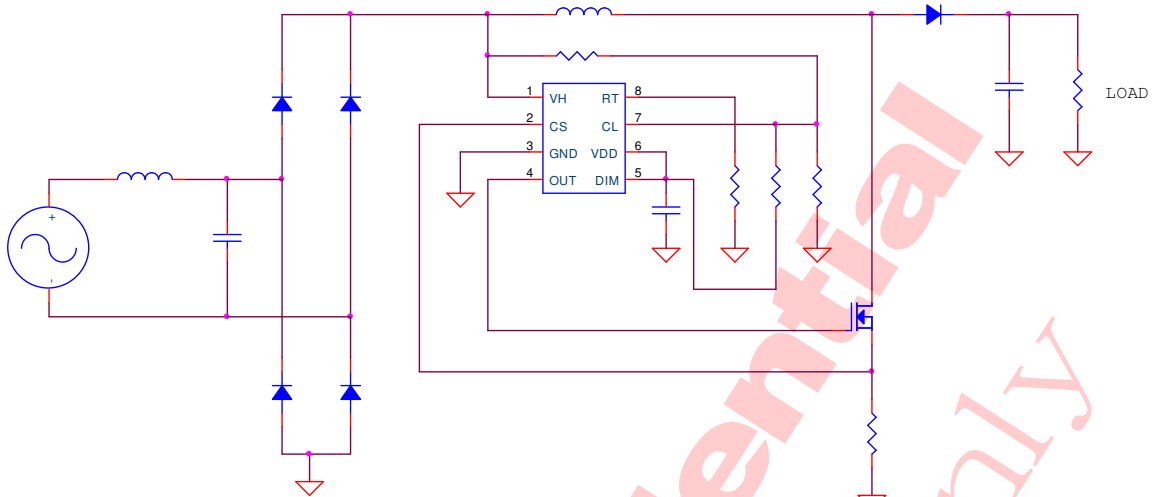


The supplied 24V AC voltage rectified by bridge diodes can output a DC level for the LED driving system. When VH pin of BIT3821 receiving this DC voltage, it will outputs an about 7.5V DC in VDD pin. The VDD connected to the CL pin can set the current limit level of sensed current. DIM pin can set the brightness when it receives a PWM signal. It is high on and low off operation. The RT pin is used to set the PWM frequency in the OUT pin.

A stable LED current control of MR16 in this application circuit is operated like a buck-boost topology. When switch is been turned on and turn off, the inductor will be charged and discharged a current. Therefore we can choose a proper inductor to smooth the its current, so that we can have a stable LED operation current.

PFC controlled in constant current output

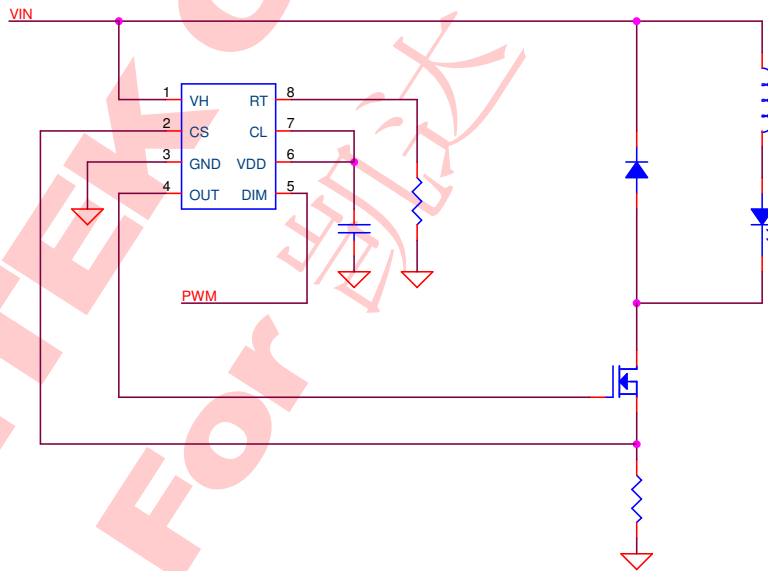
Another application of BIT3821 is as following figure that is a constant current output of a Power Factor Correction (PFC) system.



When the CL pin received the sinusoidal wave of line voltage, the input current waveform follows the line voltage. Because the controlled current waveform is the same phase and shape with input line voltage, we can expect the PFC will be very good for the utility. This circuit is for some specific application if the PFC function is needed.

Universal input (85VAC ~ 265VAC)

Following application circuit is high voltage DC application circuit rectified universal input. VH pin can accept an up to 550V DC voltage and VDD outputs a 7.5V.



When VDD pin is connected to CL pin, it can regulate the LED current in a preset value. The DIM pin received a PWM signal can directly control the OUT pin, so that it can function as a PWM dimming. CS pin senses the regulated current and RT pin connected a resistor can set the OUT pin operation frequency.

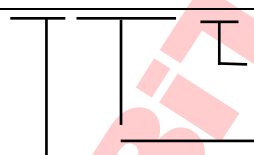
DC/AC Characteristics:

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Supply Voltages					
Pin VH input	DC input voltage	15		500	V
Chip Consumed Current	15V Supply Voltage Ta=25°C		0.4	1	mA
Under Voltage Look Out					
Positive Going Threshold	Ta=25°C	6.4	6.7	7	V
Hysteresis	Note3		500		mV
VDD Voltage					
VDD voltage	VH = 15V ~ 500V	7	7.5	8	V
VDD current	VH = 15V ~ 500V			1	mA
Oscillator frequency					
Oscillator frequency	RT = 1M ohm	20	24	30	kHz
	RT = 226k ohm	80	96	120	kHz
Duty cycle	CS=0V			100	%
PWM					
Turn on Threshold	15V ~ 500V	2.4			V
Turn off Threshold				1.0	V
CS					
Current sense pull-in threshold voltage	Ta=25°C	225	250	275	mV
Gate output					
Output high	Io=10mA			VDD	V
Output low	Io=-10mA	0			V
Rising Time	Load=500pF, Note. 1		50		nS
Falling Time			50		nS
Protection					
Thermal shutdown	Note. 1		150		°C

Note 1. Only guaranteed by simulation or sampled evaluation during -20~+85°C. Not 100% tested.

Order Information:

BIT3821-SO



SOP type packing

Part number

Beyond Innovation Technology Co., Ltd.

P/N	Package	MOQ	SPQ	Remarks
BIT3821-SO	SOP-8	2500	2500 / Reel	Green
BIT3821-DP	DIP-8	3600	60 / Tube	Green

Soldering Information

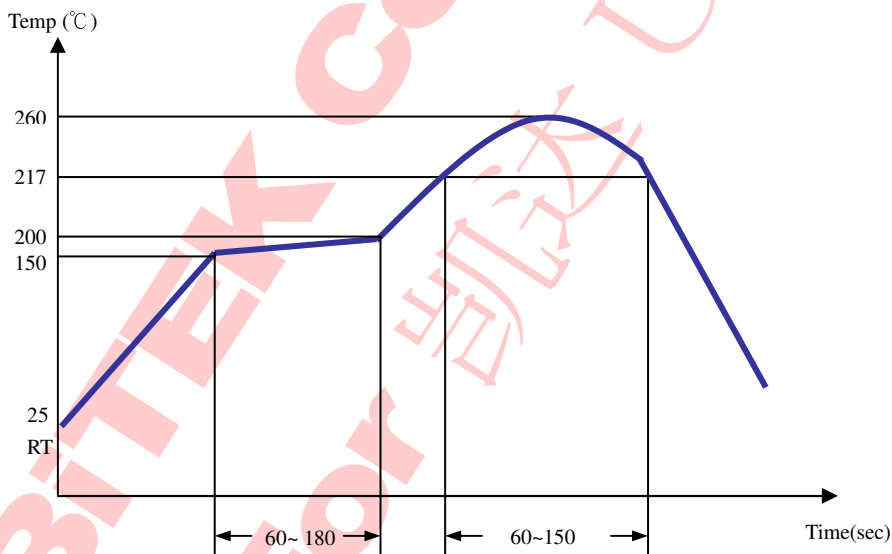
Reflow Soldering:

The choice of heating method may be influenced by plastic QFP package). If infrared or vapor phase heating is used and the package is not absolutely dry (less than 0.1% moisture content by weight), vaporization of the small amount of moisture in them can cause cracking of the plastic body. Preheating is necessary to dry the paste and evaporate the binding agent. Preheating duration: 45 minutes at 45 °C.

Reflow soldering requires solder paste (a suspension of fine solder particles, flux and binding agent) to be applied to the printed-circuit board by screen printing, stenciling or pressure-syringe dispensing before package placement. Several methods exist for reflowing; for example, convection or convection/infrared heating in a conveyor type oven. Throughput times (preheating, soldering and cooling) vary between 100 and 200 seconds depending on heating method.

Typical reflow peak temperatures range from 215 to 270 °C depending on solder paste material. The top-surface temperature of the packages should preferably be kept below 245 °C for thick/large packages (packages with a thickness ≥ 2.5 mm or with a volume ≥ 350 mm³ so called thick/large packages). The top-surface temperature of the packages should preferably be kept below 260 °C for thin/small packages (packages with a thickness < 2.5 mm and a volume < 350 mm³ so called thin/small packages).

Stage	Condition	Duration
1 st Ram Up Rate	max3.0+/-2°C/sec	-
Preheat	150°C~200°C	60~180 sec
2 nd Ram Up	max3.0+/-2°C/sec	-
Solder Joint	217°C above	60~150 sec
Peak Temp	260 +0/-5°C	20~40 sec
Ram Down rate	6°C/sec max	-



Wave Soldering:

Conventional single wave soldering is not recommended for surface mount devices (SMDs) or printed-circuit boards with a high component density, as solder bridging and non-wetting can present major problems.

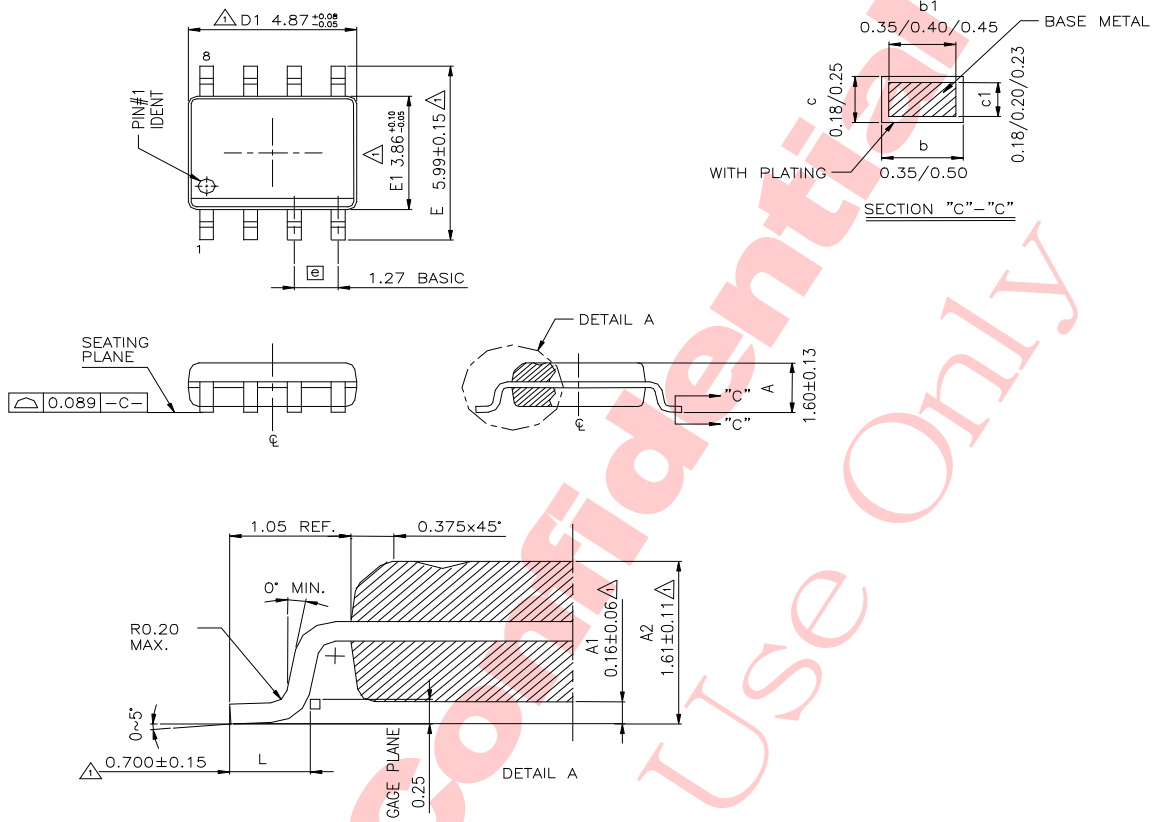
Manual Soldering:

Fix the component by first soldering two diagonally-opposite end leads. Use a low voltage (24 V or less) soldering iron applied to the flat part of the lead. Contact time must be limited to 10 seconds at up to 300 °C. When using a dedicated tool, all other leads can be soldered in one operation within 2 to 5 seconds between 270 and 320 °C.

Package Information :

Unit: mm

SOP type :



DIP type : (For any inquiry of this special offer, please consult with BiTEK distributor)

