BITEK New LED Controller

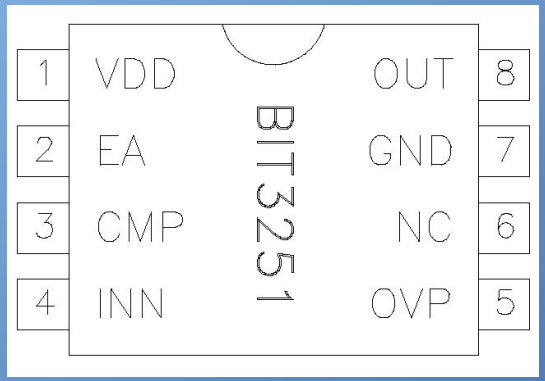
Introduction

Speaker：Afa Kao

Date：2006/06/30

System Design BU

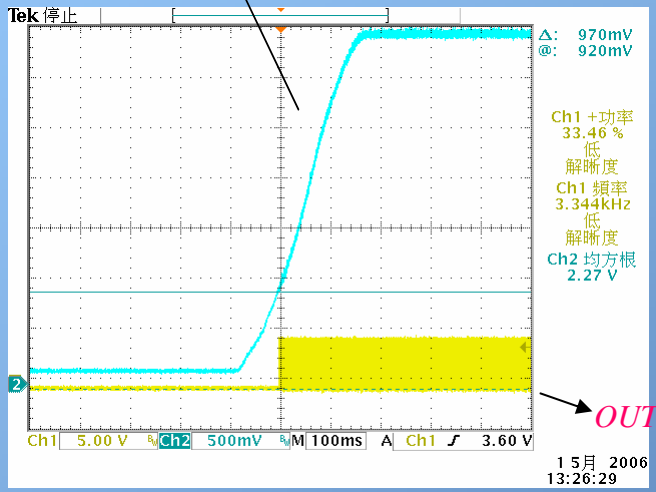
Feature



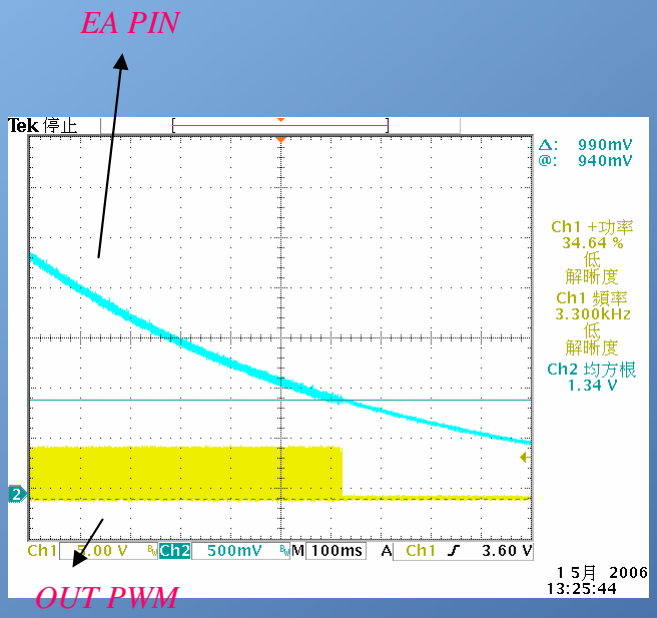
- SOP8 Package
- VDD 4～8V
- ON/OFF Pin Control
- UVLO（Under Voltage Latch Off）
- Adjustable Compensator
- Excellent Low Vref voltage (0.2V typical)
- OVP function
- Internal Fixed frequency 330KHz
- Maximum duty cycle 92%
- Soft start
- PWM Dimming available

Feature

- Flexible EA Pin to control PWM signal.



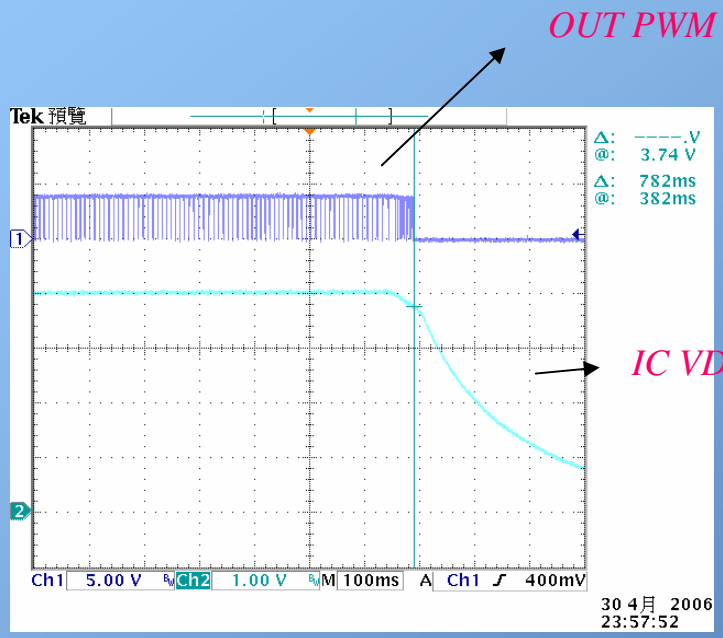
(a) EA>1V

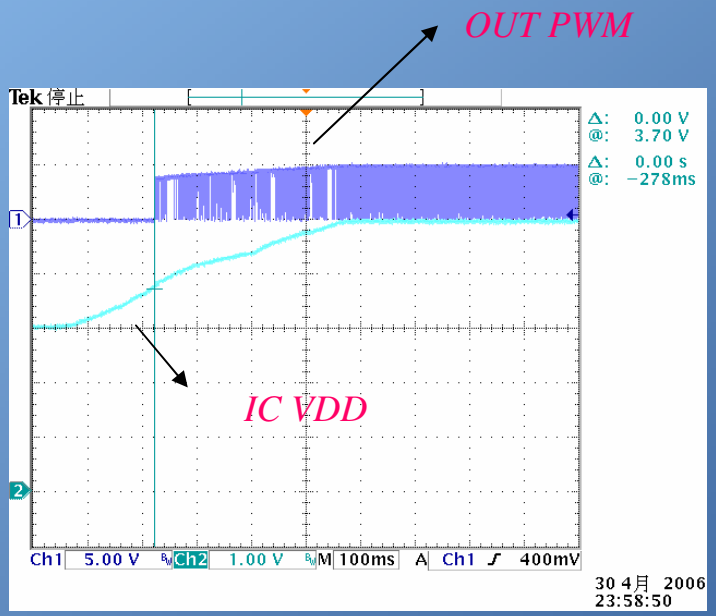


(b) EA<1V

Feature

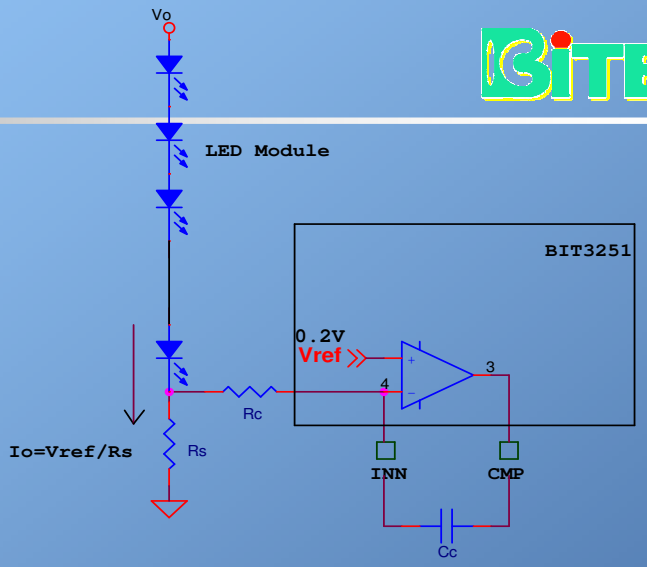
- UVLO to ensure the reliability of system.

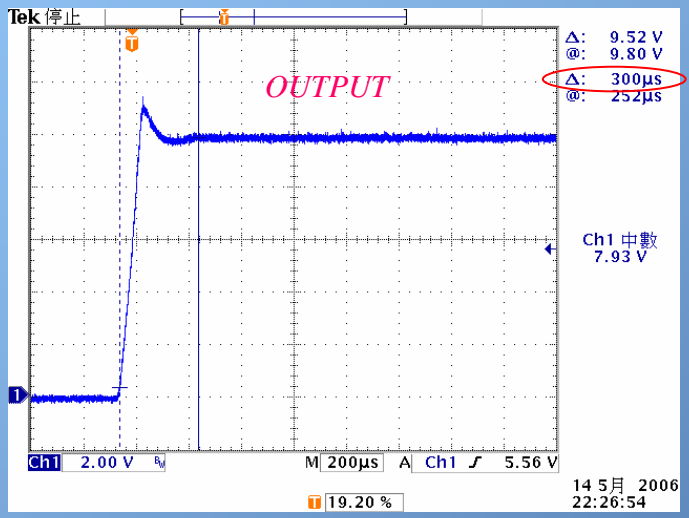




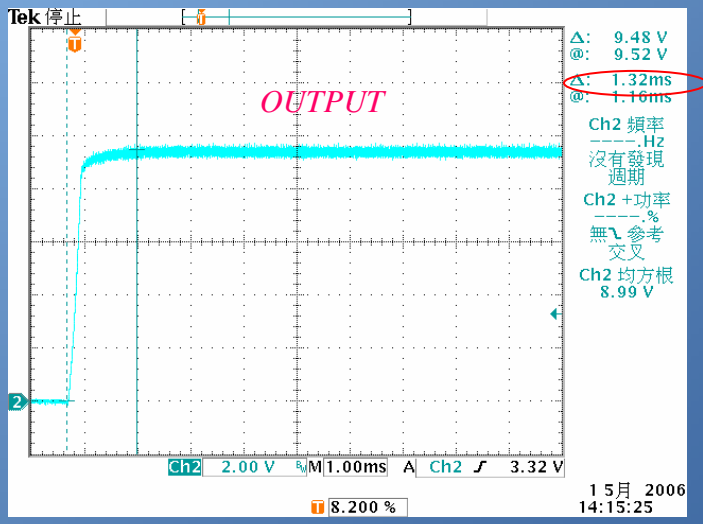
Feature

- Adjustable compensator makes programmable transient response.





(a) faster start up

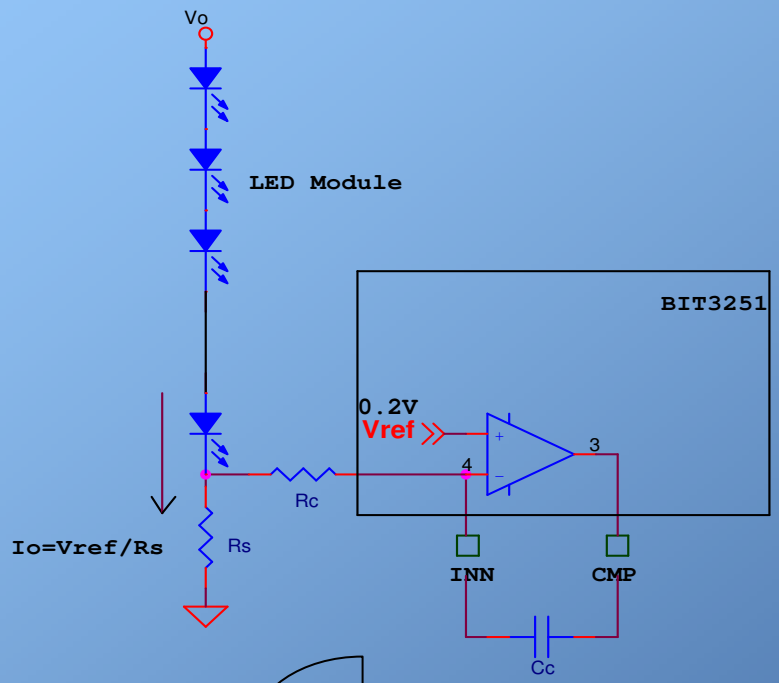


(b) lower start up

System Design BU

Feature

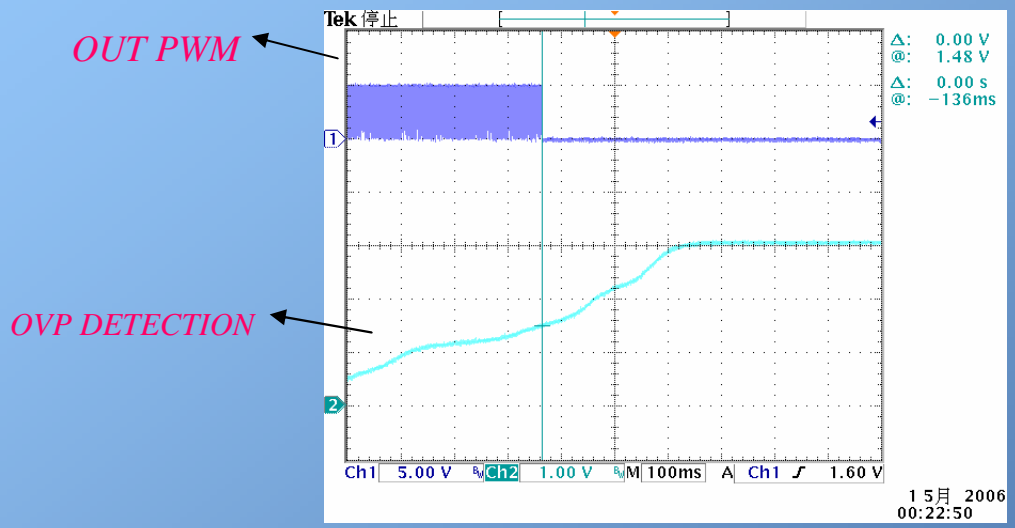
- Excellent Low Vref voltage(0.2V) to get higher efficiency.



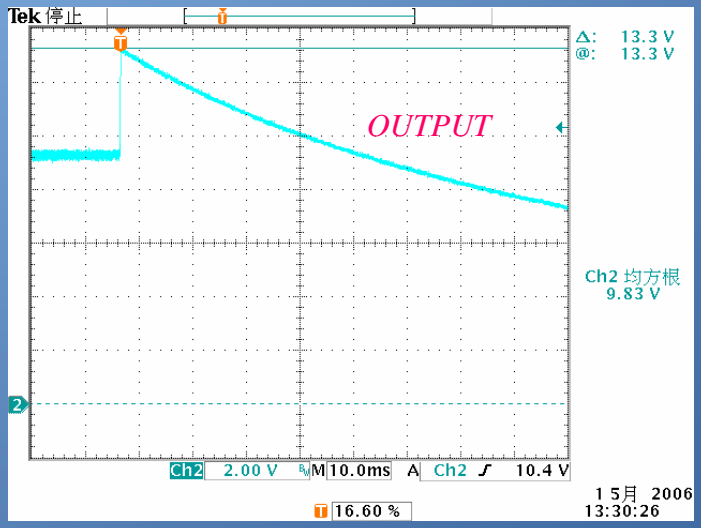
$$P_{Rs} = I_o \cdot V_{ref} \propto V_{ref}$$

Feature

- OVP(Over Voltage Protection) to make sure LEDs keep away damage.



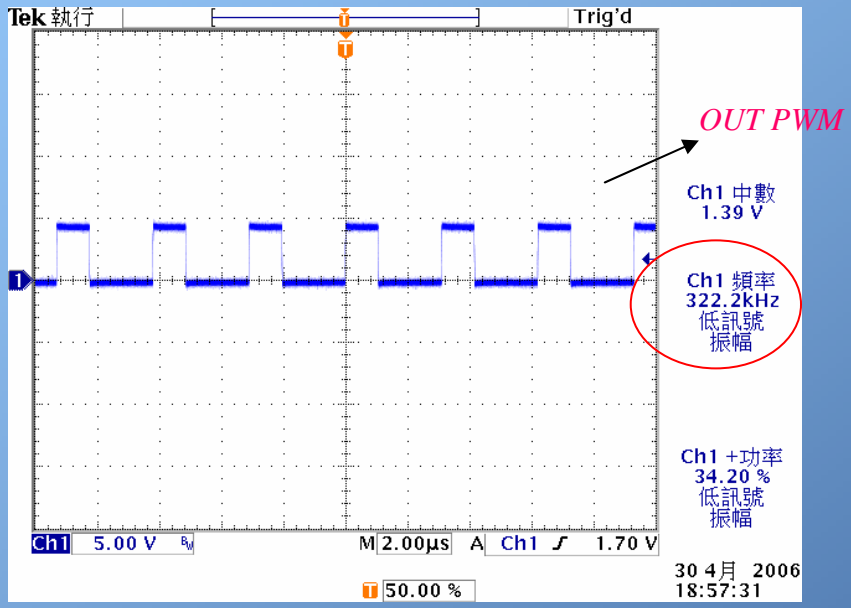
(a) OUT PWM will be latched off when OVP is detected.



(b)Output will be clamped when OVP happens

Feature

- No component is needed to program frequency.

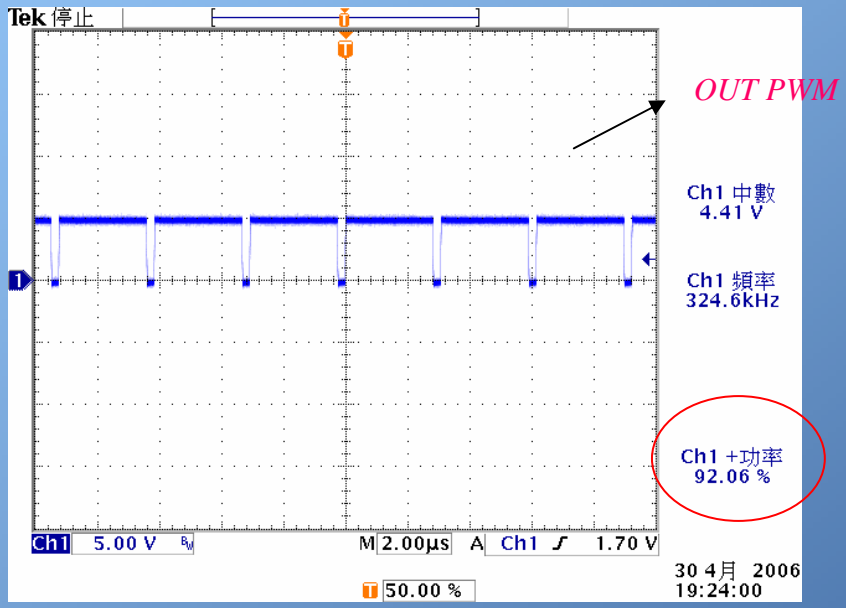


Internal fixed frequency 330KHz available

System Design BU

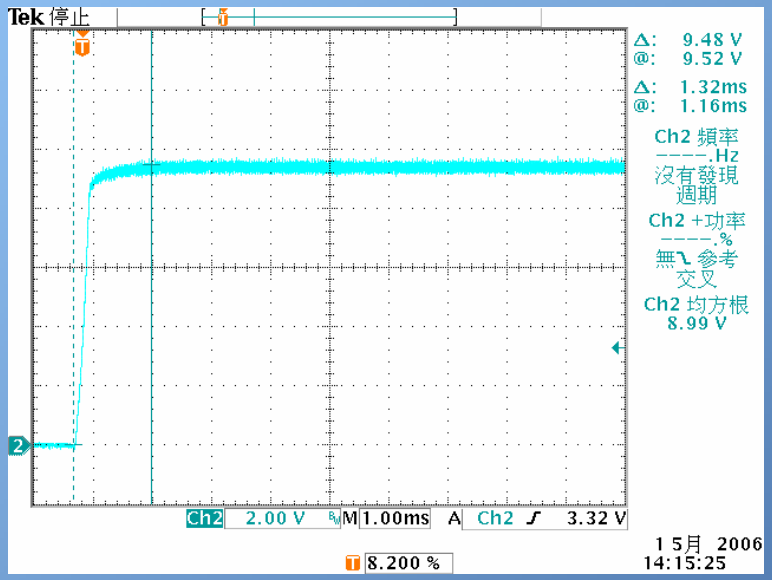
Feature

- Maximum duty cycle (92%) is set to grantee the reliability and avoid short through.



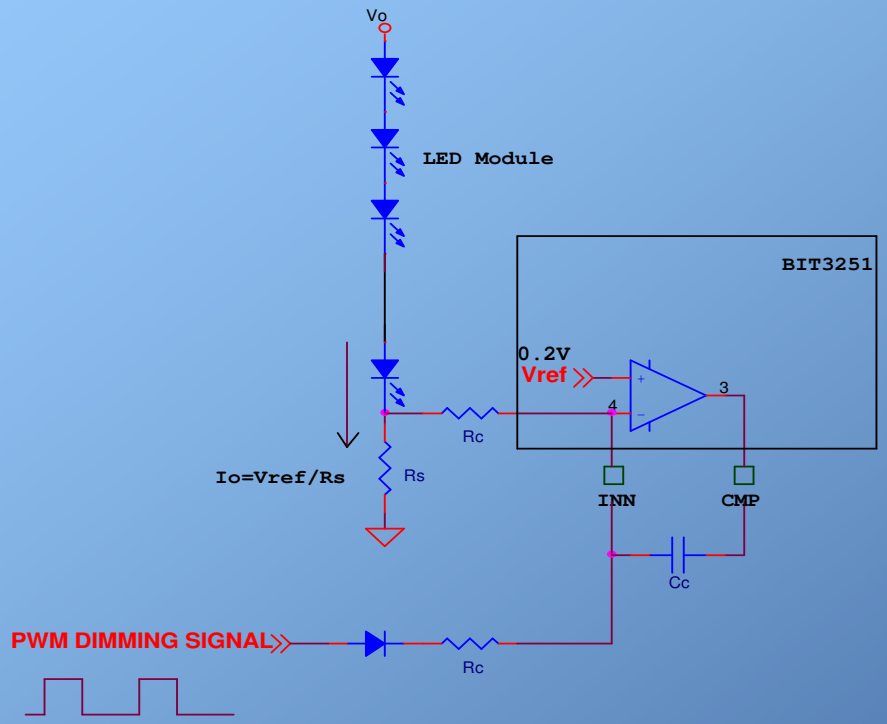
Feature

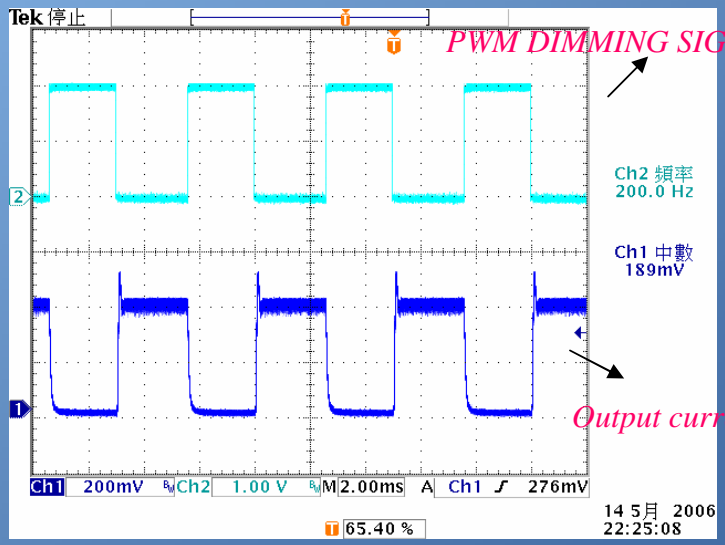
- Soft start function to avoid output overshot.



Feature

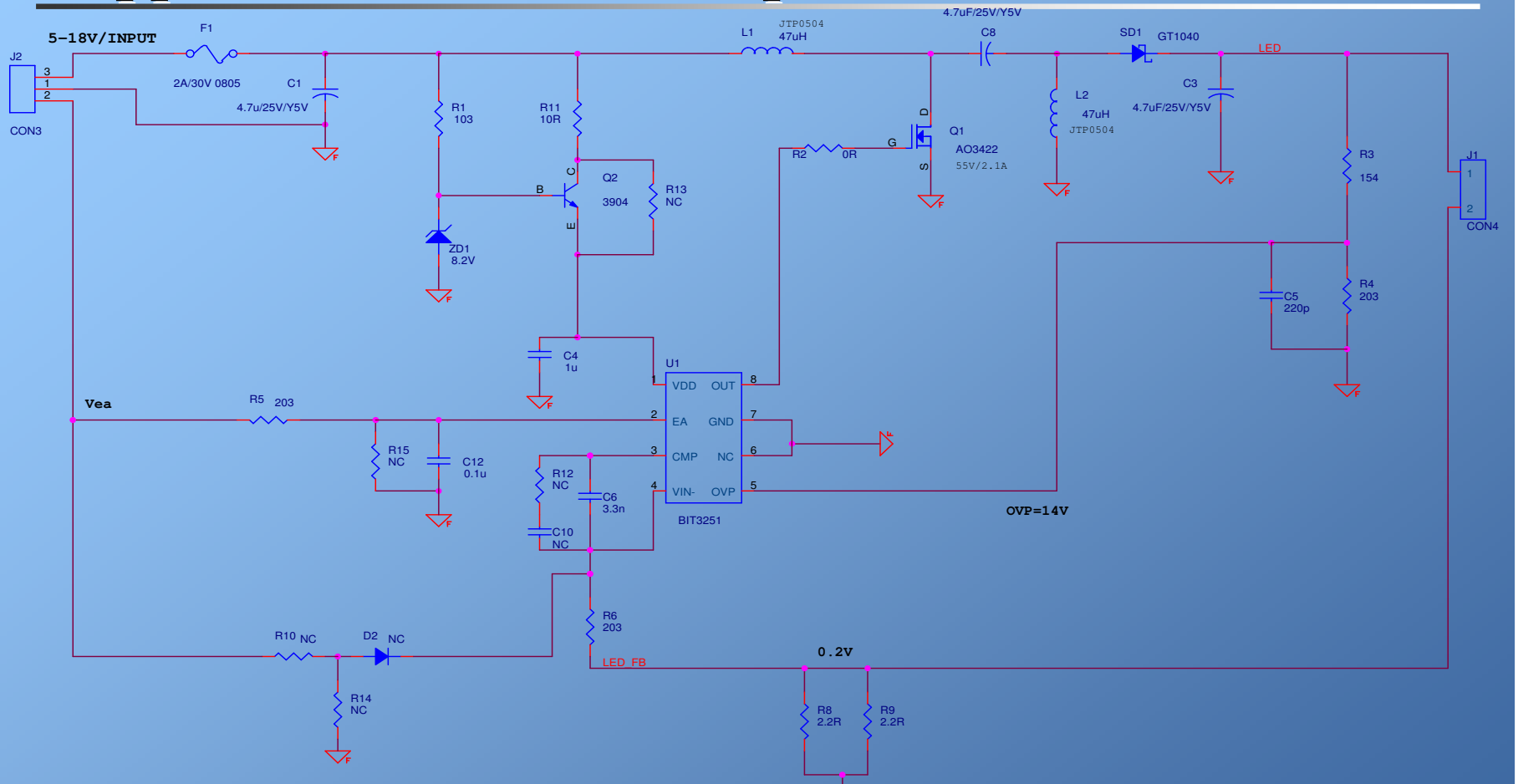
- PWM Dimming function is available.





System Design BU

Application Circuit for Sepic

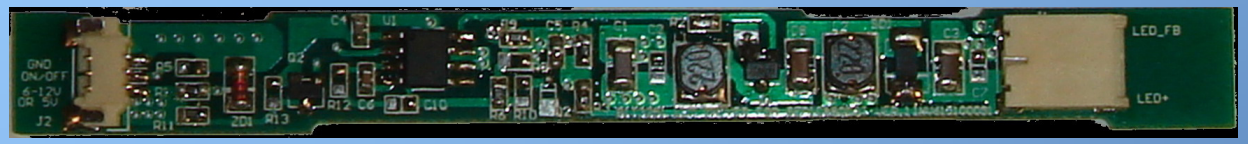


- *Input voltage Vi:6～12Vdc*
- *Output:10.5Vdc/180mA typically(300mA MAX)*
- *Switching frequency(fixed):330KHz*
- *Sepic converter type(buck-boost)*

System Design BU

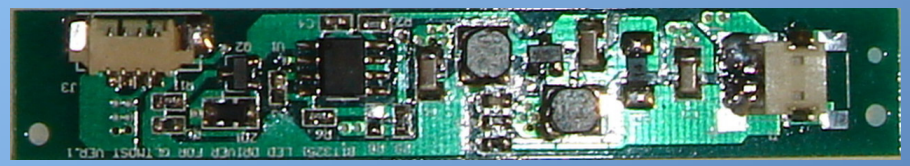
Application Circuit for Sepic

120mm



10mm

74mm

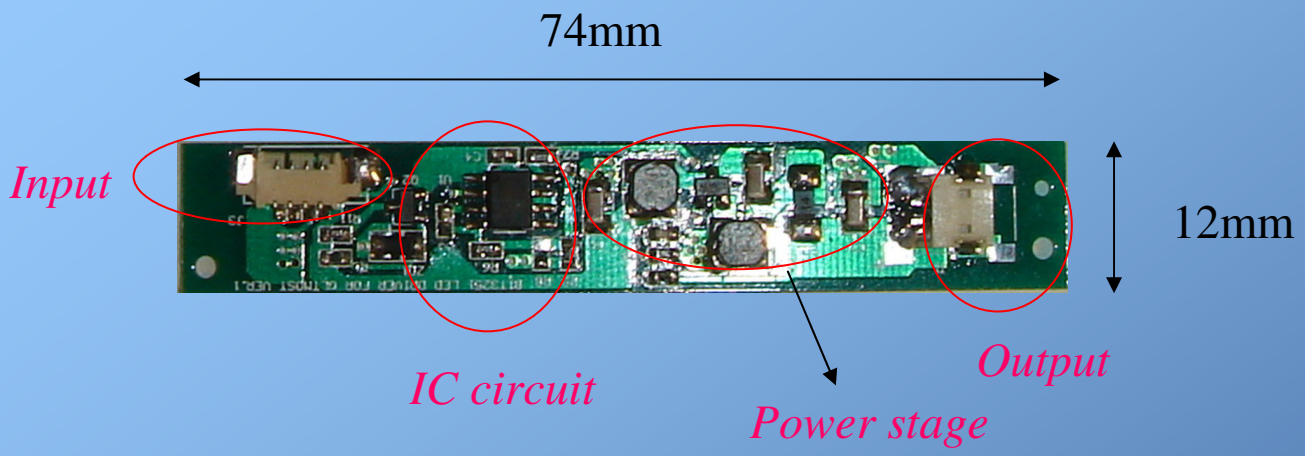


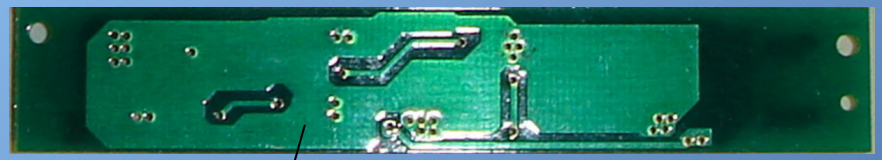
12mm

- *Input voltage Vi:6～12Vdc*
- *Output:10.5Vdc/180mA typically(300mA MAX)*
- *Switching frequency(fixed):330KHz*
- *Sepic converter type(buck-boost)*

System Design BU

Application Circuit for Sepic





- Input voltage Vi:6～12Vdc
- Output:10.5Vdc/180mA typically(300mA MAX)
- Switching frequency(fixed):330KHz
- Sepic converter type(buck-boost)

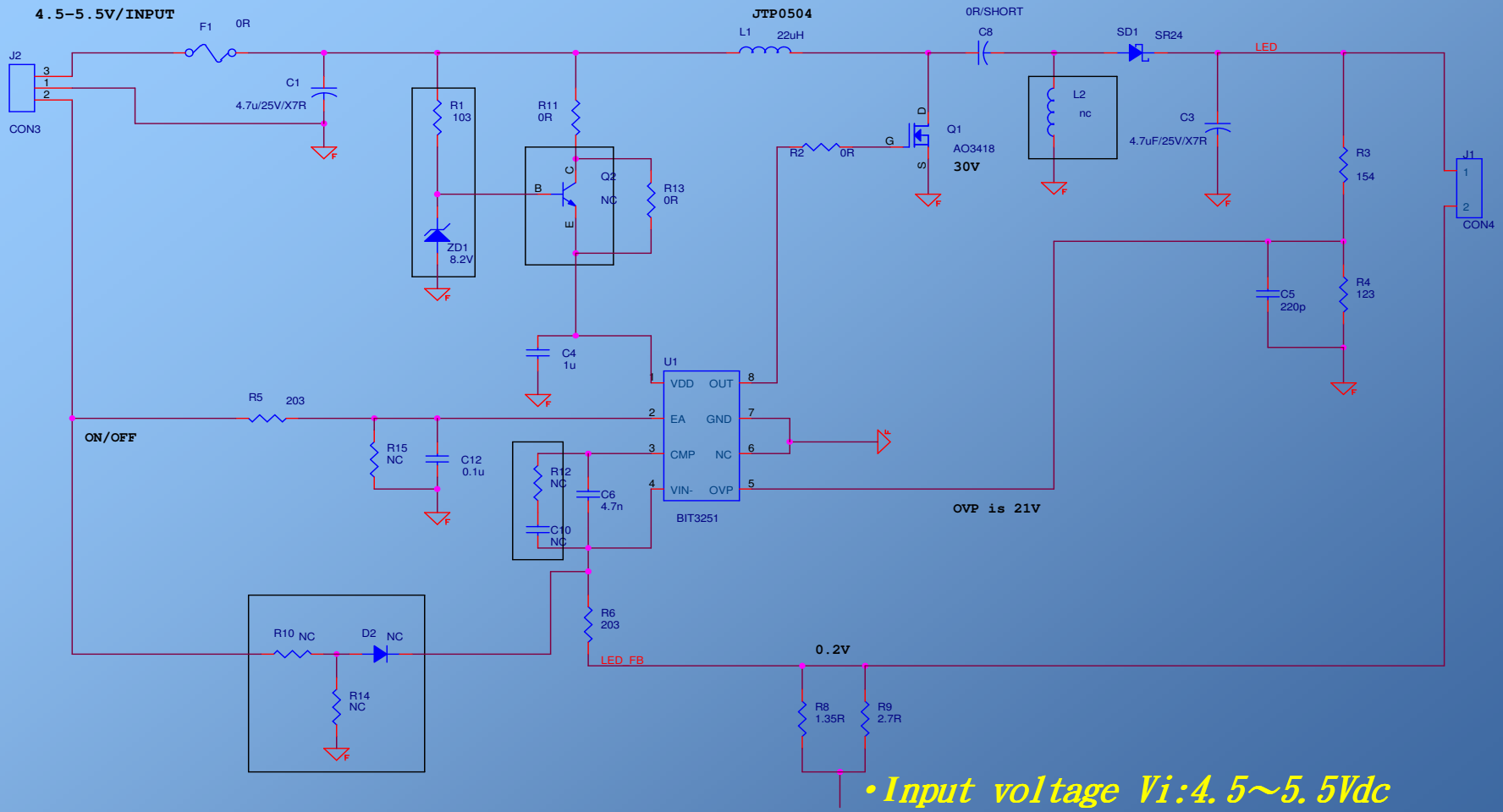
Application Circuit for Sepic

- **Efficiency measurement**

(a)Io=180mA(7‘ Panel)

Vin (V)	Iin (mA)	Pi (W)	Vout (V)	Iout (mA)	Po (W)	Efficiency (%)
5	406	2.03	9.68	183.6	1.78	87.68
8	251	2.01	9.68	182.7	1.77	88.06
12	172	2.06	9.67	182.7	1.77	85.92
18	119	2.14	9.66	181.8	1.76	82.24

Application Circuit for Boost



- Input voltage Vi:4.5～5.5Vdc
- Output:17.5Vdc/220mA typically
- Switching frequency(fixed):330KHz
- Boost converter type

System Design BU

Application Circuit for Boost

- **Efficiency measurement**

Io=220mA

Vi(V)	Ii(mA)	Vo(V)	Io(mA)	效率（%）
4.46	844	15.04	224.1	89.5
5.025	741	15.04	224.2	90.6
5.486	674	15.04	224.2	91.2

Compare with BIT3102 for LED backlight application

	BIT3251	BIT3102	The advantage of BIT3251
Vref(V)	LOW(0.2)	HIGH(1.5)	Lower Vref makes higher efficiency
Efficiency	Good	Poor	Improve 10% efficiency at least
Operating voltage	4～8V	4.5～13.2V	Fair
Maximum duty cycle(%)	92	100	Avoid short-through
Protection	OVP	OLP	OVP is suitable for LED application
ON/OFF PIN	YES	NO	Flexible ON/OFF control.
Internal fixed frequency	YES	NO	No component is needed