Data Sheet

BIT3252A

Low Cost PWM Controller

built in

55V NMOS

Version: A2

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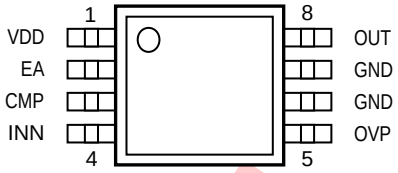
Features:

- **Voltage Mode PWM Controller**
- **Low 0.2V reference Voltage**
- **330KHz Operation**
- **Over Voltage Protection**
- **Internal Soft-Start**
- **Built-in 55V NMOS**
- **Internal UVLO (Under Voltage Lock Out)**
- **Limited Output Duty Cycle**
- **Low Shutdown current (0.1uA)**
- **SOP-8 Package**

General Description:

The BIT3252A is a high frequency PWM controller which integrates the required functions for a boost converter in a small SOP-8 package. A low 0.2V feedback voltage makes the system with high efficiency and its over voltage protection function makes the system reliable. Built-in 55V/1.2A NMOS save the space of PCB and simplify the circuit design. With CMOS process which greatly reduces the operating current, BIT3252A is very suitable for LED backlight application.

Pin Layout:



Absolute Ratings: *(if Ta=25℃)*

VDD……-0.3 ~ +8 V
GND……±0.3 V
Output Voltage……-0.3 ~ 55 V
Operating Ambient Temperature……0 ~ 70 ℃
Extreme Operating Ambient Temp……-40 ~ 85 ℃ ***
Operating Junction Temperature……+150 ℃
Storage Temperature……-55~ 150 ℃

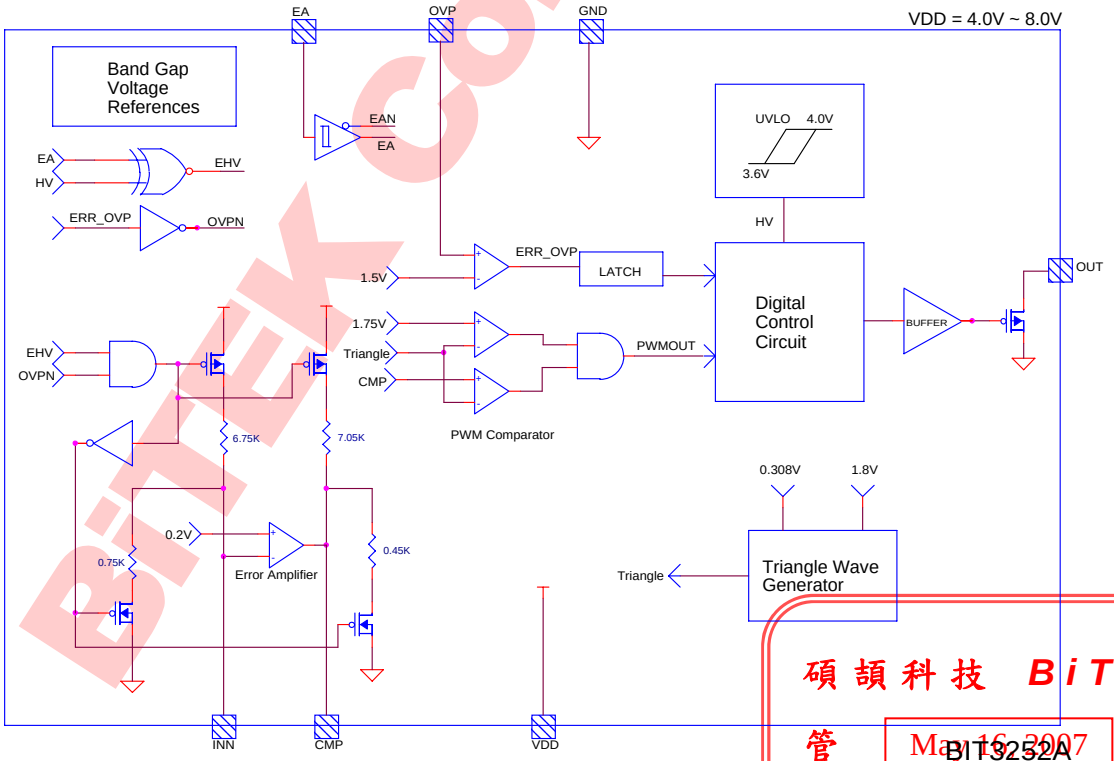
Recommended Operating Condition:

Supply Voltage……4~ 8 V
Operating Frequency……330KHz
Operating Ambient Temperature……0 ~ 70 ℃

Thermal Resistance θ_{JA} θ_{JC} :

	θ_{JA}	θ_{JC}
(SOP8)	105	50 ℃/W

Functional Block Diagram:



*** For Extreme Operating Ambient Temperature, the supply voltage should be limited. The recommended voltage range is from 4.5V to 7.5V.

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Pin Description:

Pin No.	Names	Description
1	VDD	Supply voltage input.
2	EA	Enable Control Pin
3	CMP	The output of the error amplifier. CMP is force to low when VDD < 3.6V.
4	INN	PWM controller input, the inverting input of error amplifier. INN is pulled high to reduce the CMP when VDD < 3.6V
5	OVP	Over Voltage detection pin
6	GND	Ground
7	GND	Ground
8	OUT	Output pin

Function Description:

The PWM Controller: The pulse width modulation control circuit includes a ramp wave generator, an error amplifier and a comparator. These devices provide the required functions for the PWM feedback control application. The inverting input of the error amplifier is pulled high to reduce its output CMP when VDD<3.6V. The maximum duty cycle of the PWM controller is limited to 93%

The Over Voltage Protection: BIT3252A has an OVP pin that is used to detect the converter output voltage, when there is a voltage higher than 1.5V sensed in this pin, BIT3252A will latch off its output This latch off function can make system operation more reliable. The latched off status can be released by reducing the supply voltage to lower than 3.6V.

UVLO: The Under-Voltage Lock-Out circuit turns the output driver off when the supplying voltage is lower than 3.6V

Enable Control: BIT3252A is enabled when V(EA) ≧ 1.2V and disabled when V(EA) ≦ 0.8V. In addition, BIT3252A has an internal 80K±15% ohm pull low resistor in this pin make itself normally in the OFF state or shutdown mode operation.

Initial Setting: BIT3252A provides the system a fast transient response by setting a suitably initial voltage in . Vinn and Vcmp that can be referred as below conditions.

Table 1. Initial setting Voltage

Voltage Setting(@5V)	V_{EA}	VDD	V_{OVP}
V_{INN} =0.68V, V_{CMP} =0.53V	V_{EA} > 1.2V	VDD < 3.6V	V_{OVP} < 1.5V
V_{INN} =0.68V, V_{CMP} =0.53V	V_{EA} < 0.8V	VDD > 4.0V	V_{OVP} < 1.5V
V_{INN} =0.68V, V_{CMP} =0.53V	V_{EA} > 1.2V	VDD > 4.0V	V_{OVP} > 1.5V

The Setting Equation is：

V_{INN} =0.68V+0.12V*(VDD-5) (1)

V_{CMP} =0.53V+0.08V*(VDD-5) (2)

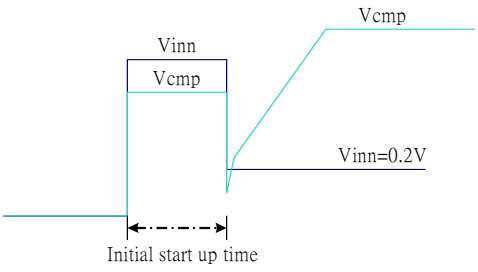

Figure 1. Initial transient response
(VDD=5V, V_{INN} =0.68V, V_{CMP} =0.53V)

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DC/AC Characteristics:

Parameter	Test Conditions	Min.	Typ.(Limits)	Max.	Unit
Reference Voltage					
Output voltage	Measured with shorted INN CMP pins VDD=5V, Ta=25°C	0.194	0.2	0.206	V
Line regulation	VDD=4 ~ 8V, Ta=25°C		2	20	mV
Under Voltage Look Out					
Upper threshold voltage	Ta=25°C Note2	3.6	3.8	4.0	V
Hysteresis		0.1	0.2	0.3	V
Ramp Wave Generator					
Frequency		300	330	360	KHz
Output peak (Internal)	Note 1	1.7	1.8	1.9	V
Output valley (Internal)		0.25	0.308	0.35	V
Error Amplifier					
Open loop gain	Note 1	60	80		dB
Unit gain band width		1	1.5		MHz
Over Voltage Protection					
OVP threshold voltage	VDD=5V, Ta=25°C	1.45	1.55	1.65	V
Enable Control					
Turn on Threshold	VDD=5V, Note 1	1.2			V
Turn off Threshold				0.8	V
Internal MOS					
Switch Leakage	VDD=5V, Ta=25°C, Note 1, Note 2			10	uA
Drain-Source Voltage	Note1			55	V
Drain-Source Breakdown Voltage	Turn-off, Ids=250uA	55			V
Drain Current - Continuous	Note1		1.2		A
Output					
Maximum Duty Cycle	VDD=5V, Ta=25°C, 330KHz.	90	93	95	%

Ta: ambient temperature.

Note 1. Only guaranteed by simulation or sampled evaluation during –40~+85°C. Not 100% tested.

Note 2. The voltages of the output drivers are pulled to GND in each off states.

* Please note that EA pin should be pulled low, then VDD power could be shut off.

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Layout Notice:

Some of the pins are very sensitive to noise. Please follow the bellowing guideline to make the layout:

Note 1. Please keep the capacitor between VDD and GND as close as possible. Noisy IC VDD may trigger UVLO.

Note 2. Figure 2 is an example of making shortest traces between VDD and GND. The layout traces are under the IC.

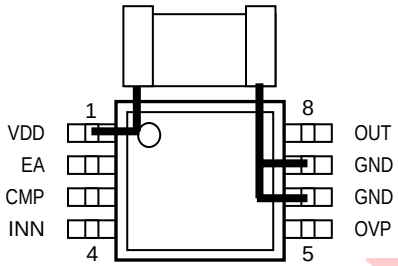
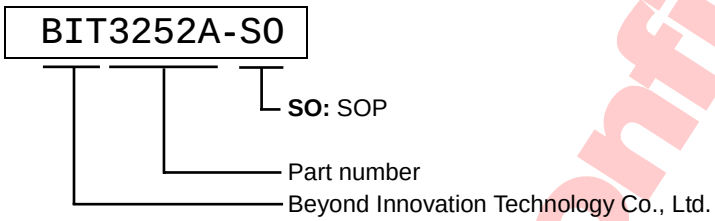


Figure 2

Order Information:



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Soldering Information

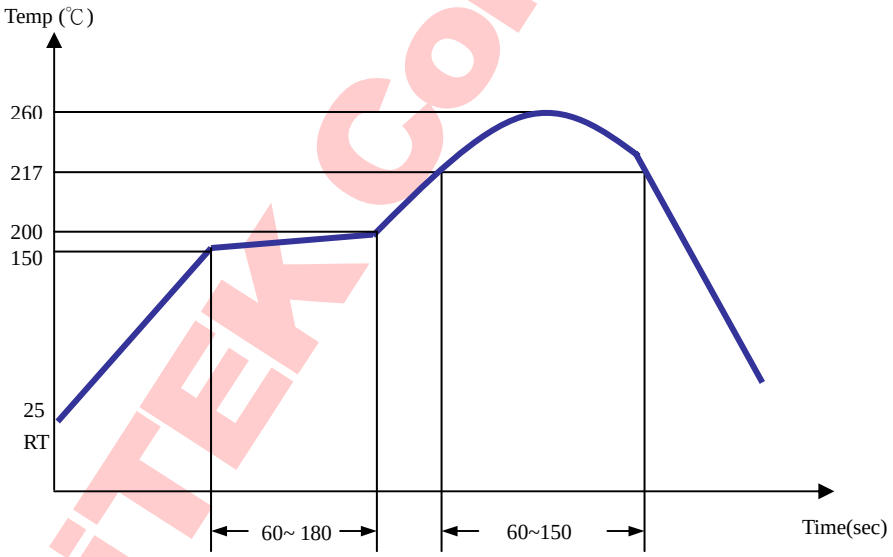
Reflow Soldering:

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 preferable be kept below 245 °C for thick/large packages (packages with a thickness ≧ 2.5 mm or with a volume ≧ 350 mm^3 so called thick/large packages). The top-surface temperature of the packages should preferable be kept below 260 °C for thin/small packages (packages with a thickness < 2.5 mm and a volume < 350 mm^3 so called thin/small packages).

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

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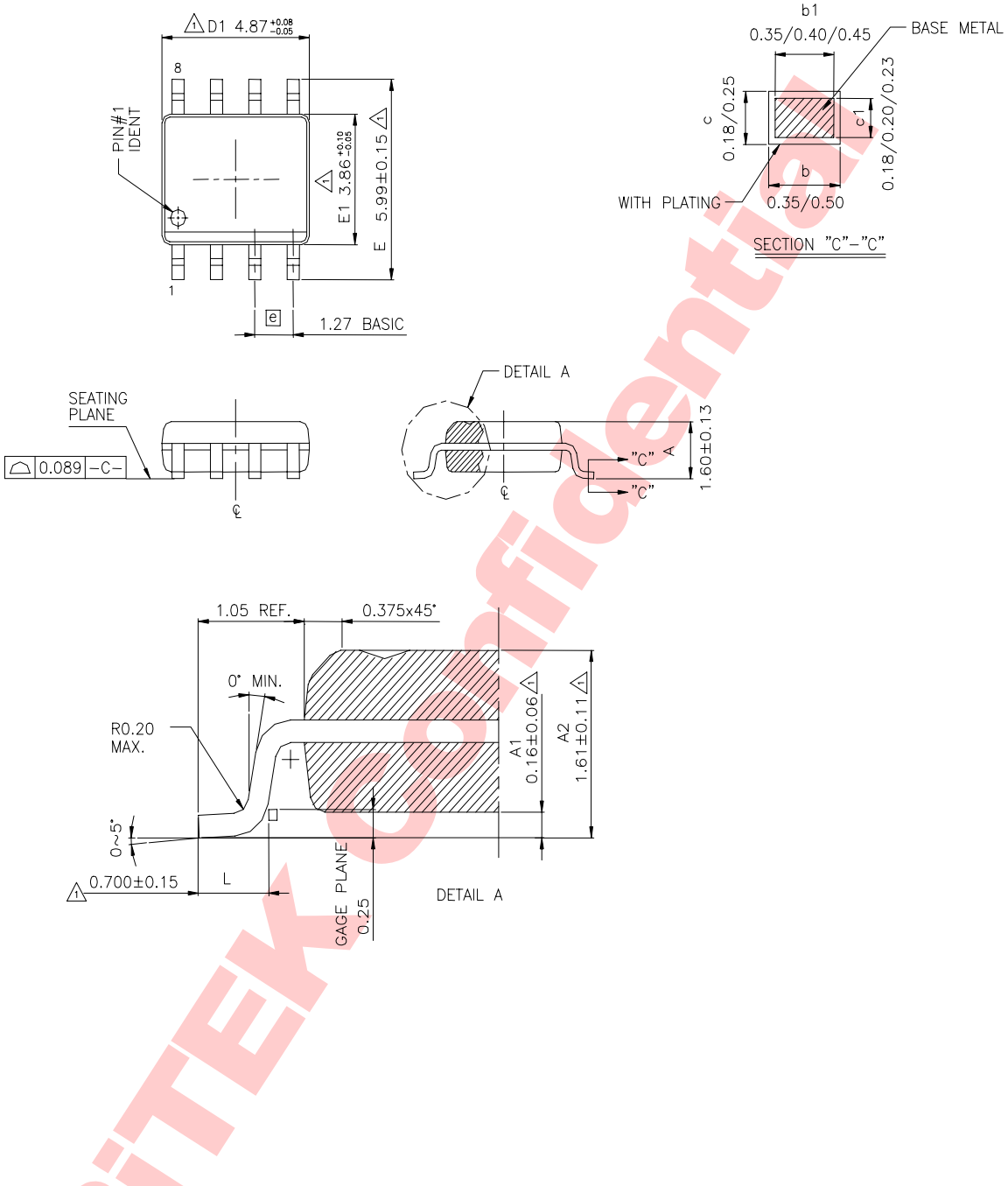
Package Information :

Unit: mm

SOP type :



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