Data Sheet

BIT3269

White LED step-up converter

Version: A4

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Features:

- **Drives up to 27 LEDs from a 5V supply**
- **36V power switch**
- **Current mode control**
- **650mA current limitation**
- **Fast 1.2MHz switching frequency**
- **SOT-236 package**

Pin layout:

General description:

BIT3269 integrated circuit provides essential PWM features for white LED driver. It can drive up to 27 LEDs from a 5V supply. BIT3269 built-in 36V power switch with current mode control provides fast response. There is an internal 650mA current detection can provide the protection of internal switch. Due to 1.2MHz operation frequency, BIT3269 can reduce the size of external inductor and capacitor. All the functions are combined in a small SOT-236 package.

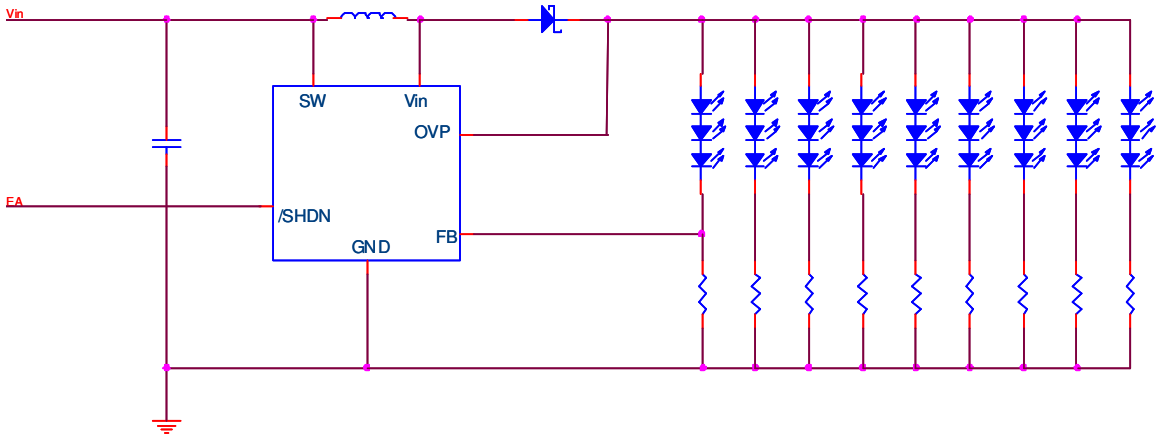
Recommended operating condition:

Supply voltage……2.5V ~ 8V
Max. SW voltage……..……36V
Operating Ambient Temperature…..... -40˚C ~ 85˚C
Operating Frequency (typ.)…….....1.2MHz

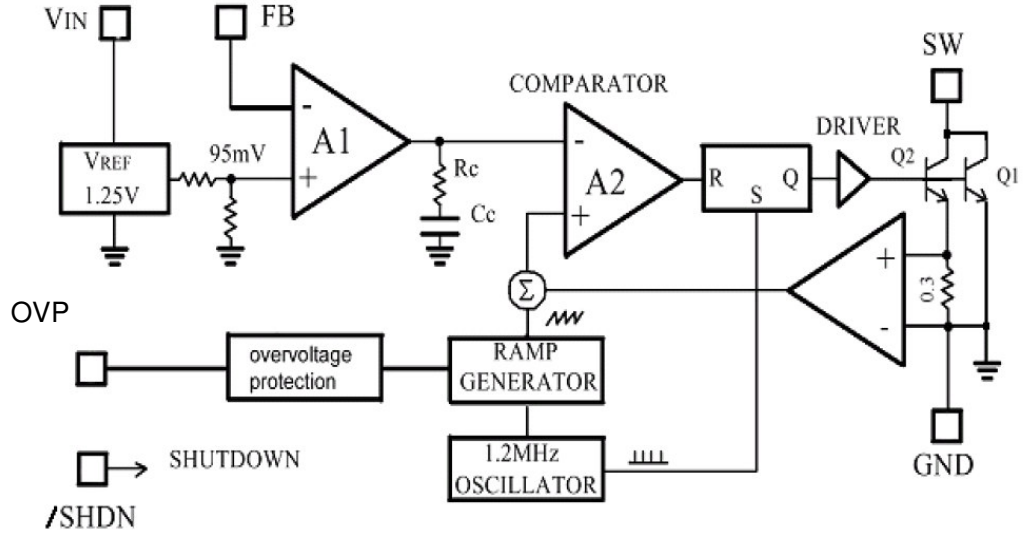
Absolute ratings

Supply Voltage……10V
Operating Ambient Temperature…….....-40˚C ~ 85˚C
Operating Junction Temperature…….....+125˚C
Storage Temperature……..-55˚C ~ 150˚C

Typical application:



Functional block diagram:



Pin description:

Pin No.	Symbol	I/O	Descriptions
1	SW	I	Switch pin. (Minimize trace area at this pin to reduce EMI.)
2	GND	I/O	Ground pin. (Connect directly to local ground plane.)
3	FB	I	Feedback pin. Reference voltage is 95 mV. (Calculate resistor value according to the formula: RFB=95 mV / ILED.)
4	/SHDN	O	Shutdown pin. (Connect to 1.5 V or higher to enable device; 0.4 V or less to disable device.)
5	OVP	I	Over voltage protection.
6	Vin	I/O	Input Supply Pin.

Functional description:

OPERATION

The BIT3269 uses a constant frequency, current mode control scheme to provide excellent line and load regulation. Please refer the functional block diagram, at the start of each oscillator cycle, the SR latch is set, which turns on the power switch Q1. A voltage proportional to the switch current is added to a stabilizing ramp and the resulting sum is fed into the positive terminal of the PWM comparator A2. When this voltage exceeds the level at the negative input of A2, the SR latch is reset turning off the power switch. The level at the negative input of A2 is set by the error amplifier A1, and is simply an amplified version of the difference between the feedback voltage and the reference voltage of 95mV. In this manner, the error amplifier sets the correct peak current level to keep the output in regulation. If the error amplifier's output increases, more current is delivered to the output; if it decreases, less current is delivered.

APPLICATIONS INFORMATION

Inductor selection

A 10uH inductor is recommended for most BIT3269 applications. Although small size and high efficiency are major concerns, the inductor should have low core losses at 1.2MHz and low DCR (copper wire resistance).

Capacitor selection

The small size of ceramic capacitors makes them ideal for BIT3269 applications. X5R and X7R types are recommended because they retain their capacitance over wider voltage and temperature ranges than other types such as Y5V or Z5U. A 4.7μF input capacitor and a 4.7μF output capacitor are sufficient for most BIT3269 applications.

Diode selection

Schottky diodes, with their low forward voltage drop and fast reverse recovery, are the ideal choices for BIT3269 applications. The forward voltage drop of a Schottky diode represents the conduction losses in the diode, while the diode capacitance (CT or CD) represents the switching losses. For diode selection, both forward voltage drop and diode capacitance need to be considered. Schottky diodes with higher current ratings usually have lower forward voltage drop and larger diode capacitance, which can cause significant switching losses at the 1.2MHz switching frequency of the BIT3269. A Schottky diode rated at 1000mA is sufficient for most BIT3269 applications.

DC/AC characteristics:

Ta=25℃ unless otherwise specified.

Parameter	Test conditions	Min.	Typ.	Max.	Unit
Pin VCC input		2.5		10	V
FB voltage	I_{SW} = 100mA, Duty Cycle = 66%	86	95	104	mV
FB Pin Bias Current	Note 1	10	45	100	nA
Supply Current			1.9	2.5	mA
	/SHDN = 0V		0.1	1	uA
Switching Frequency		0.8	1.2	1.6	MHz
Maximum Duty Cycle		85	90		%
Switch Current Limit			650		mA
Switch V_{CESAT}	I_{SW} = 250mA		350		mV
Switch Leakage Current	V_{SW} = 5V		0.01	5	uA
/SHDN Voltage High		1.5			V
/SHDN Voltage Low				0.4	V
/SHDN Pin Bias Current			65		uA
OVP threshold			29		V

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

Soldering information

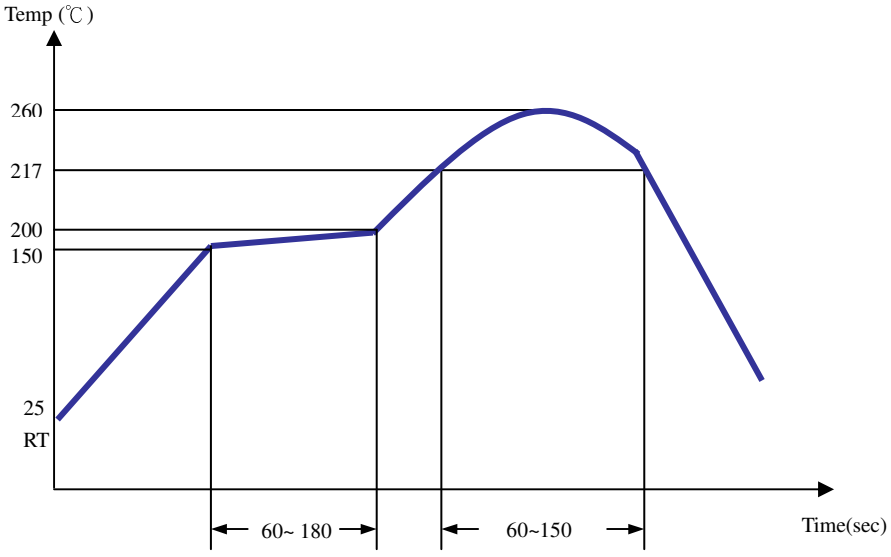
Reflow soldering:

The choice of heating method may be influenced by plastic 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 ℃.

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 ℃ depending on solder paste material. The top-surface temperature of the packages should preferable be kept below 245 ℃ 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 ℃ 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	-



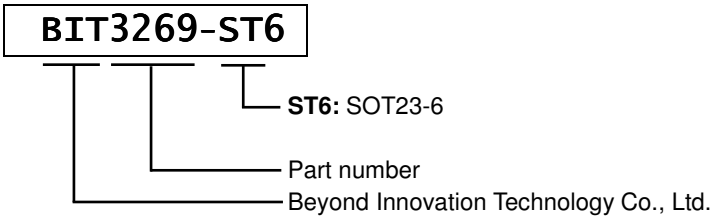
Wave soldering:

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 ℃. When using a dedicated tool, all other leads can be soldered in one operation within 2 to 5 seconds between 270 and 320 ℃.

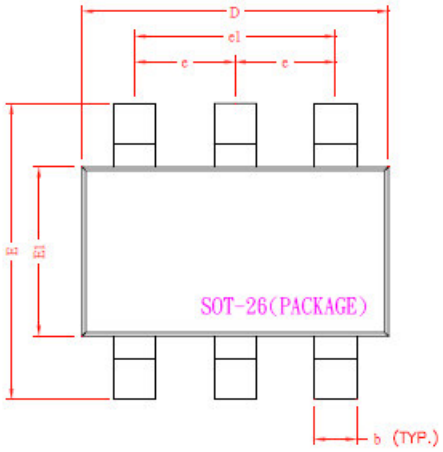
Order information:

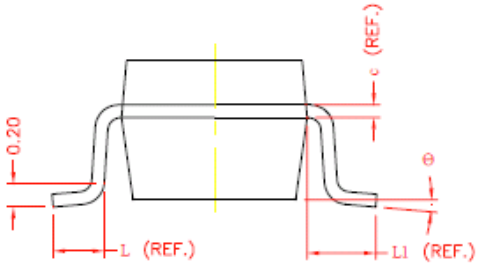


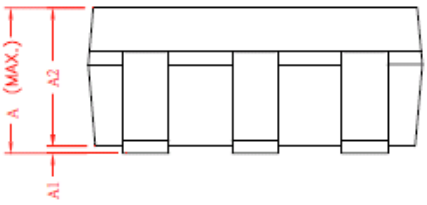
P/N	Package	MOQ	SPQ
BIT3269	SOT23-6	3000	3000/Reel

Package Information:

SOT23-6







REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	1.45 MAX.		L	0.37 REF.	
A1	0	0.10	L1	0.60 REF.	
A2	1.10	1.30	θ	0°	10°
c	0.12 REF.		b	0.30	0.50
D	2.70	3.10	e	0.95 REF.	
E	2.60	3.00	e1	1.90 REF.	
E1	1.40	1.80			