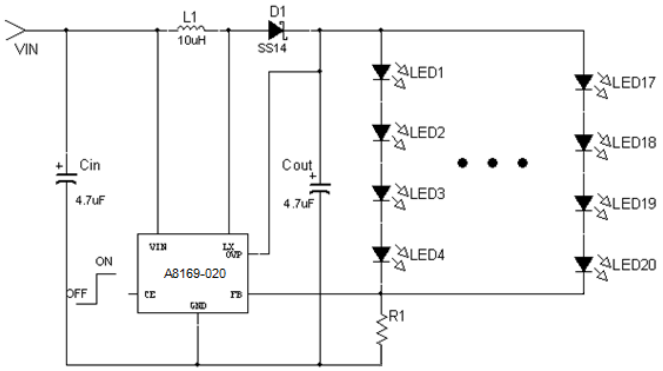
DESCRIPTION

The A8169-020 variable frequency step-up Converter drives white LEDs with a constant current to provide backlight in cell phones, PDAs, and other hand-held devices. It features allowing series connection of the white LEDs so that the LED currents are identical for uniform brightness. An enable input can be pulsed repeatedly to adjust LEDs brightness. The fast 3MHz operation frequency allows for smaller capacitor and inductor. Fault condition protection uses cycle-by cycle current limiting to sense maximum inductor current and over-voltage protection. The 0.2V low reference voltage minimized the power loss across the current sense resistor.

The converter can operate from 2V to 6V, and capable of delivering maximum 250mA output current at 4-LEDs application with 3V input voltage. Quiescent current drawn from power source is as low as 120uA. All of these features make A8169-020 be suitable for the portable devices, which are supplied by a single battery.

The A8169-020 is available in SOT-26 Package.

TYPICAL APPLICATION



FEATURES

- Up to 19V Output Voltage
- Wide Operation Range: 2V to 6V
- Maximum 3MHz Operating Frequency
- PWM Dimming Control
- Shutdown Current <1uA
- Current Limit Cycle-by-Cycle
- Low Current Sense Threshold: 200mV
- 19V Over Output Voltage Protection
- Available in SOT-26 package

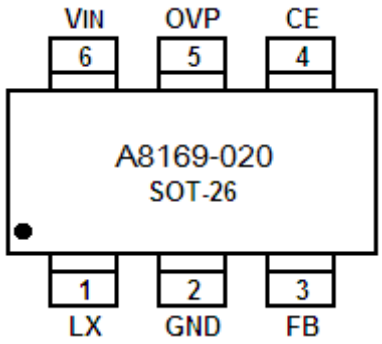
APPLICATIONS

- Compact Back Light Module
- Power Source for LED
- Constant Current Source

ORDERING INFORMATION

Package Type	Part Number	
SOT-26	E6	A8169E6R-020
		A8169E6VR-020
Note	R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS free products Suffix " V " means Halogen free Package		

PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	LX	Switching node
2	GND	Ground
3	FB	Pin for Feedback Voltage
4	CE	Chip Enable Pin (Active with “H”), connect to V_{IN} if not used.
5	OVP	Over Voltage Protection
6	V_{IN}	Power Supply

ABSOLUTE MAXIMUM RATINGS

Max Input Voltage		-0.3V to 8V
CE Pin Voltage		-0.3V to (V_{IN}+0.3V)
LX Pin Output Current		1.8A
LX Pin Voltage		19.4V
T_J, Operating Junction Temperature		125°C
T_A, Ambient Temperature		-40°C to 85°C
Power Dissipation	SOT-26	400mW
T_S, Storage Temperature		-40°C to 150°C
Lead Temperature & Time		260°C, 10Sec

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

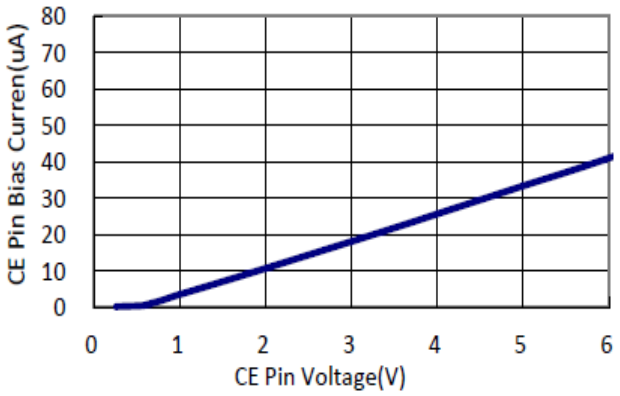
ELECTRICAL CHARACTERISTICS

T_A=25°C, V_{IN}=3V V_{CE}=3V, unless otherwise noted

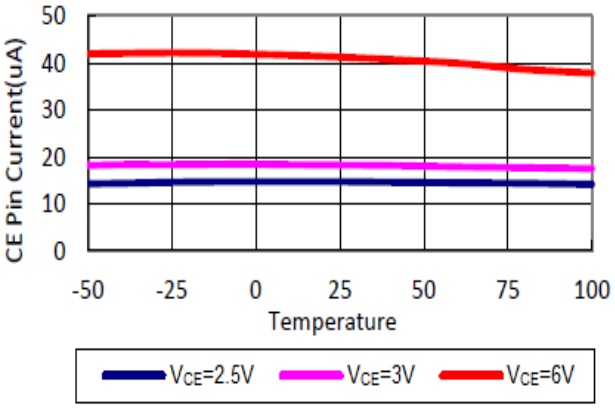
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Input Voltage	V_{IN}		2	-	6	V
Feedback Voltage	V_{FB}		0.190	0.200	0.210	V
FB Pin Bias Current	I_{FB}		10	45	100	nA
Quiescent Current	I_Q	V_{FB}=0.3V	-	93	120	uA
		V_{CE}=0V	-	0.4	1.0	uA
Maximum Switching Frequency	F_{MAX}	V_{FB}=0V, Floating OVP Pin	-	3	-	MHz
Switching Current Limit	I_{LIMIT}		-	1.8	-	A
Switching Saturation Voltage	V_{CESAT}	I_{LX}=300mA	-	260	-	mV
Switching pin Leak Current	I_{LX}	V_{LX}=5V	-	0.11	-	uA
CE Voltage High	V_{CEH}	V_{CE}=0 to 3V	1.5	-	-	V
CE Voltage Low	V_{CEL}	V_{CE}=3 to 0V	-	-	0.4	V
CE Pin Bias Current	I_{CE}	V_{IN}=V_{CE}=3V	-	18	-	uA
Over Voltage Protection	V_{OVP}		-	19	-	V

TYPICAL PERFORMANCE CHARACTERISTICS

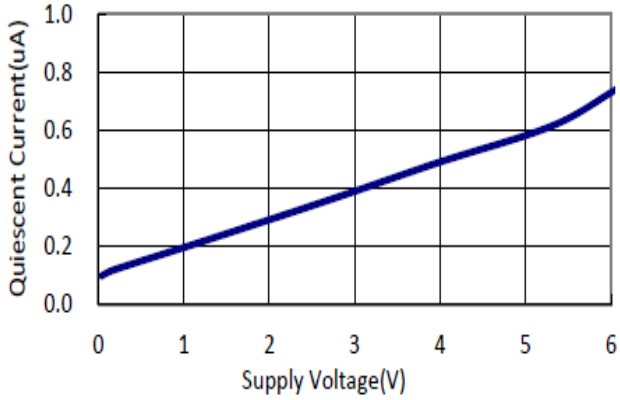
1. CE Pin Bias Current vs. EN pin Voltage
$V_{IN}=V_{CE}$



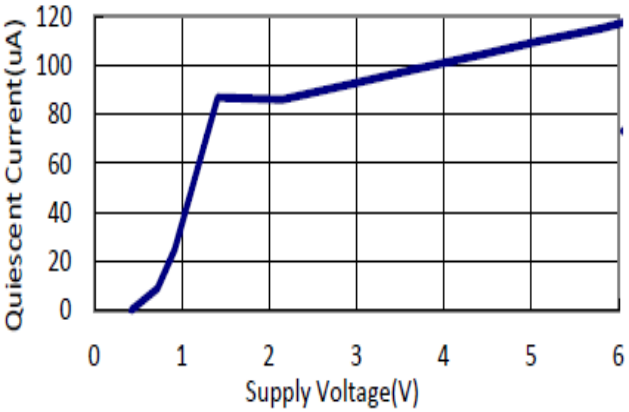
2. CE Pin Current vs. Temperature
$V_{IN}=V_{CE}$



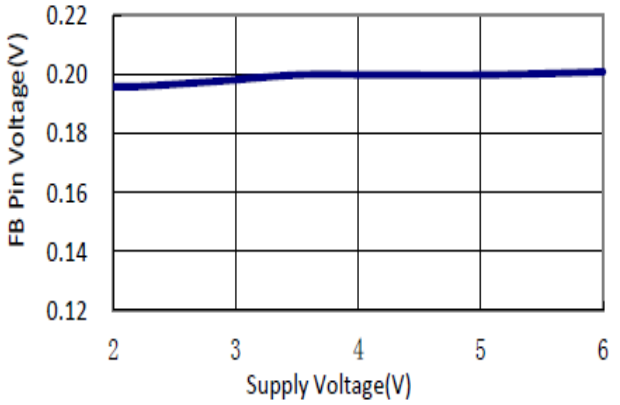
3. Quiescent Current vs. Supply Voltage
$V_{CE}=0V$



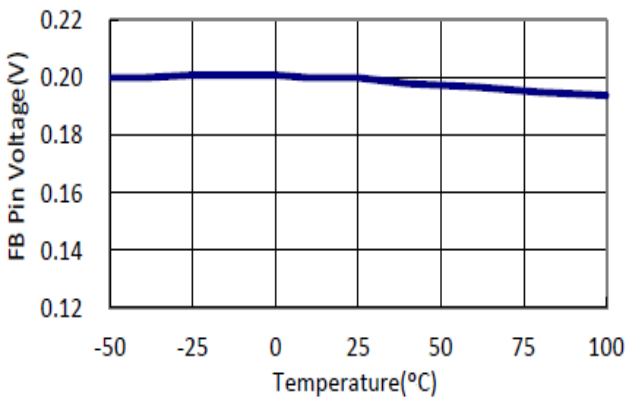
4. Quiescent Current vs. Supply Voltage
$V_{CE}=V_{IN}, V_{FB}=0.3V$



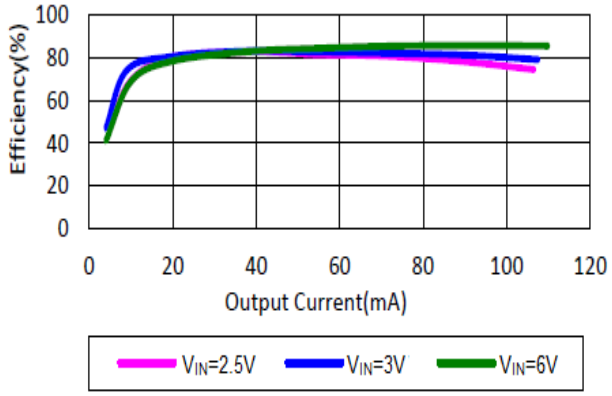
5. FB Pin Voltage vs. Supply Voltage



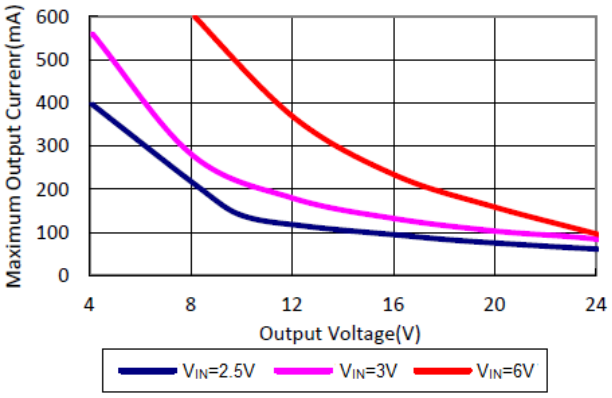
6. FB Pin Voltage vs. Temperature



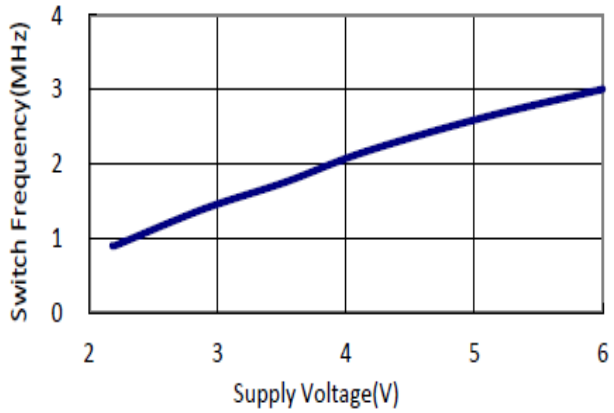
7. Efficiency vs. Output Current
4LEDs



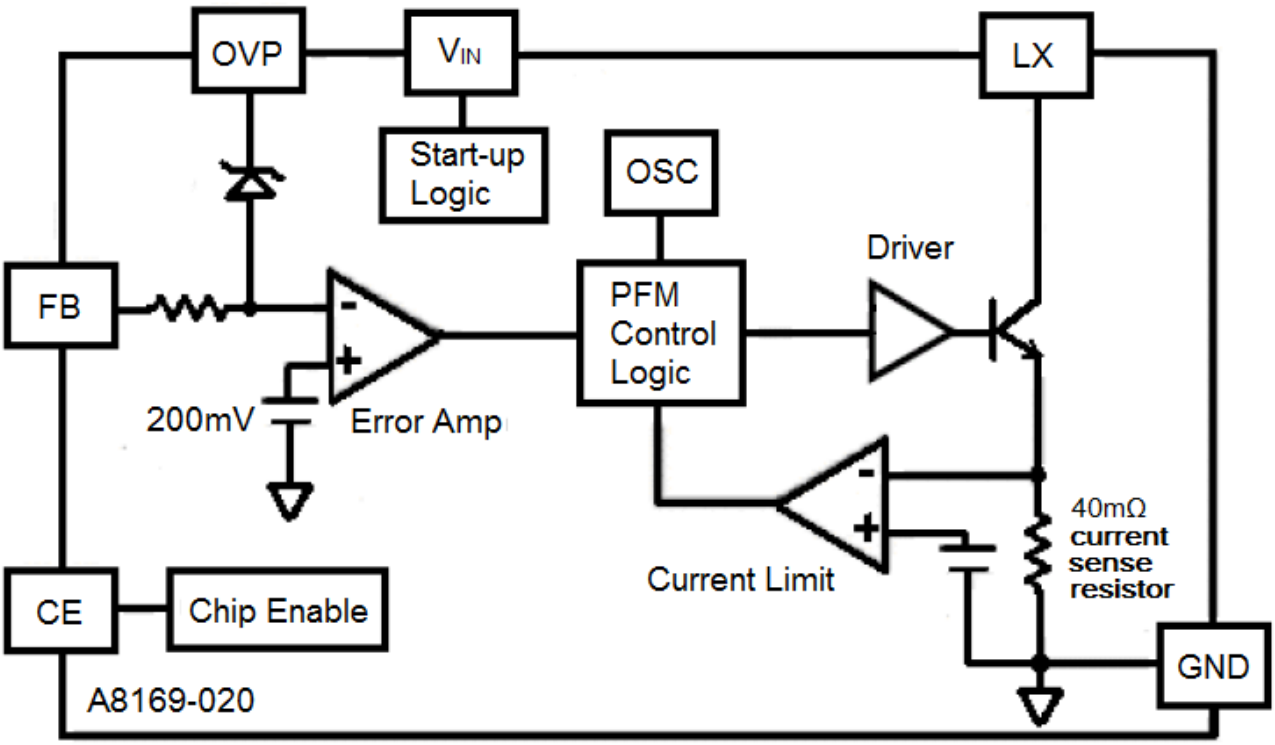
8. Maximum Output Current vs. Output Voltage



9. Switch Frequency vs. Supply Voltage
4LEDs*100mA



BLOCK DIAGRAM



DETAILED INFORMATION

Dimming Control

1 Using a PWM Signal to CE Pin

When adding the PWM signal to CE pin, the A8169-020 is turned on or off by the PWM signal, so the LEDs operate at either zero or full current. The average LED current increase proportionally with the duty cycle of the PWM signal.

2 Using a DC Voltage to FB Pin

From the Figure 1, we can add a DC voltage to FB pin, we adjust the LED current by Changing the DC voltage, which control the brightness, DC voltage range is from 0V to 2V.

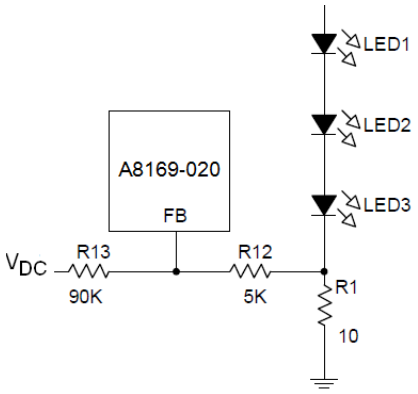


Figure 1 Dimming Control Using a DC Voltage

3 Using a Filtered PWM Signal to FB Pin

The filtered PWM signal can be considered as an adjustable DC voltage. It can be used to replace the variable DC voltage source in dimming control. The circuit is shown in Figure 2.

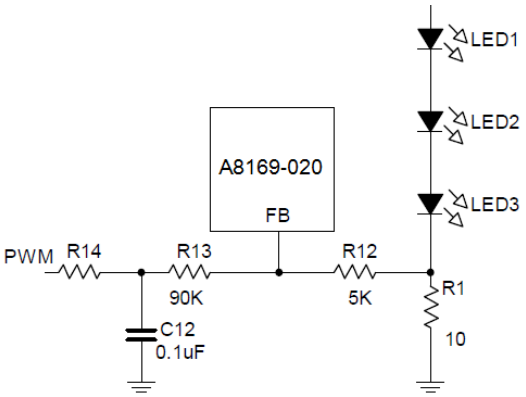
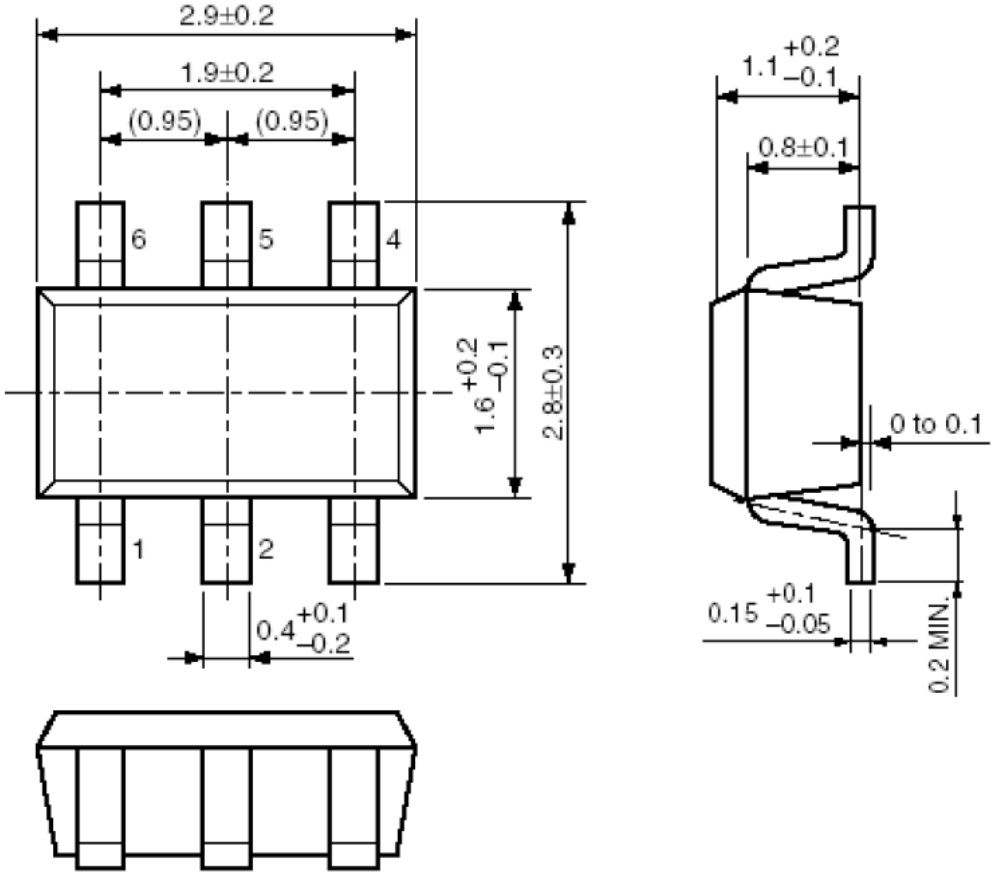


Figure 2 Dimming Control Using a Filtered PWM Signal

PACKAGING INFORMATION

Dimension in SOT-26 Package (Unit: mm)



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