HM2126
WHITE LED DRIVER

General Description

The HM2126 is a 1.3MHz PWM boost switching regulator designed for constant-current white LED driver applications.

The HM2126 can drive a string of up to 4 white LEDs from a 3.2V supply or 6 white LEDs from a 5V supply in series, ensuring uniform brightness and eliminating several ballast resistors. The HM2126 implements a constant frequency 1.3MHz PWM control scheme. The high frequency PWM operation also saves board space by reducing external component sizes. To improve efficiency, the feedback voltage is set to 95 mV, which reduces the power dissipation in the current setting resistor.

The HM2126 is equipped with OVP protection ability, the SW pin monitors the output voltage and will turn off the device if an overvoltage condition is present to prevent damage from an open circuit condition.

The HM2126 is available in SOT-23-5 package.

Features

- Inherently Uniform LED Current
- High Efficiency up to 84%
- Drives up to 4 LEDs from a 3.2V Supply or 6 LEDs from a 5V Supply
- 1.3MHz PWM Operation Frequency
- Requires Only 0.22μF Output Capacitor
- Shutdown Current: < 1μA
- Built-in Output Overvoltage Protection

Applications

- Digital Cameras
- LCD modules
- GPS Receivers
- Cellular Phones
- PDAs, Handheld Computers

SOT-23-5

Figure 1. Package Type of HM2126

Pin Configuration

(SOT-23-5)

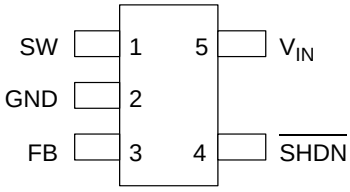

Figure 2. Pin Configuration of HM2126 (Top View)

Pin Description

Pin Number	Pin Name	Function
1	SW	Switch Pin. Connect inductor/diode here. The output voltage can range up to 29V but not extend this limit. If the voltage on this pin is higher than the overvoltage protection threshold (OVP), the device comes back to shutdown mode. To restart the chip, one must then send a low to high sequence on shutdown pin or switch off the V_{IN} supply.
2	GND	Ground Pin.
3	FB	Voltage Feedback. Reference voltage is 95mV.
4	$\overline{SHDN}$	Shutdown Pin. Connect to 1.5V or higher to enable device; Connect to 0.4V or less to disable device.
5	V_{IN}	Input Supply Pin. Must be locally bypassed.

Functional Block Diagram

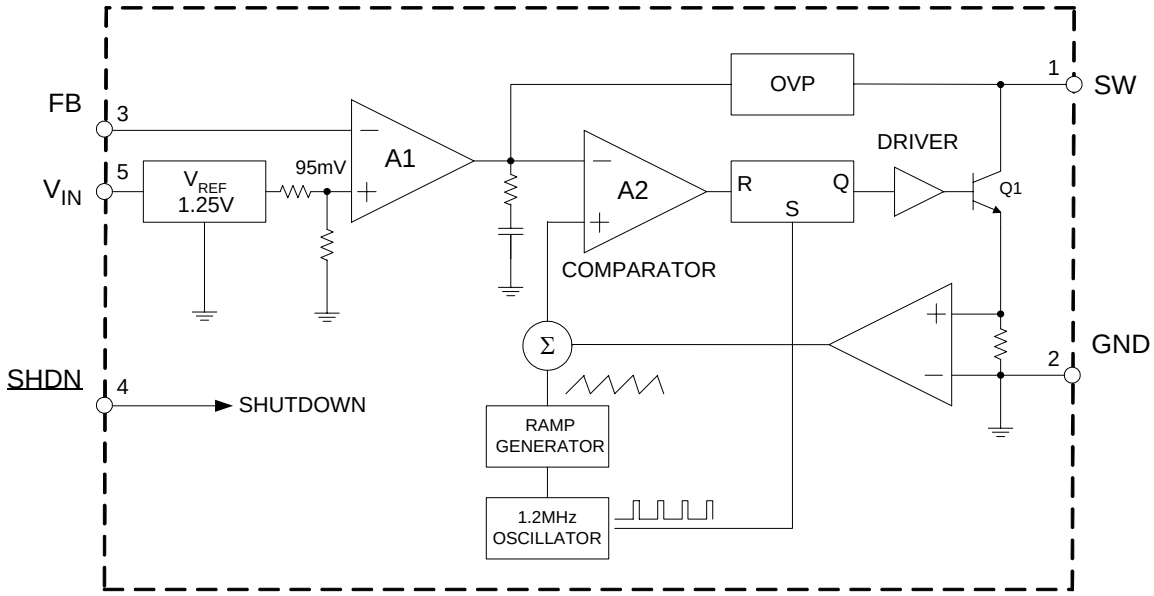

Figure 3. Functional Block Diagram of HM2126

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Input Voltage	V_{IN}	10	V
SW Voltage		36	V
FB Voltage		10	V
$\overline{SHDN}$ Voltage		10	V
Maximum Junction Temperature		125	^oC
Storage Temperature Range	T_{STG}	-65 to 150	^oC
Lead Temperature (Soldering, 10sec)	T_{LEAD}	300	^oC
ESD (Machine Model)		250	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" 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 under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating Temperature Range	T_{OP}	-40	85	^oC
Operating Voltage Range		2.5	10	V

Electrical Characteristics

(V_{IN}=3V, $V_{\overline{SHDN}}$=3V, T_A=25°C, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Feedback Voltage	V_{FB}	I_{SW}=100mA, Duty Cycle=66%	86	95	104	mV
FB Pin Bias Current				45	100	nA
Supply Current				1.9	2.5	mA
		$V_{\overline{SHDN}}$=0V		0.1	1.0	μA
Switch Frequency			0.9	1.3	1.7	MHz
Maximum Duty Cycle			83	88		%
Switch Current Limit				320		mA
Switch V_{CESAT}		I_{SW}=250mA		350		mV
Switch Leakage Current		V_{SW}=5V		0.01	5	μA
$\overline{SHDN}$ Voltage		High	1.5			V
		Low			0.4	
$\overline{SHDN}$ Pin Bias Current				50		μA
OVP Voltage				29		V

Typical Performance Characteristics

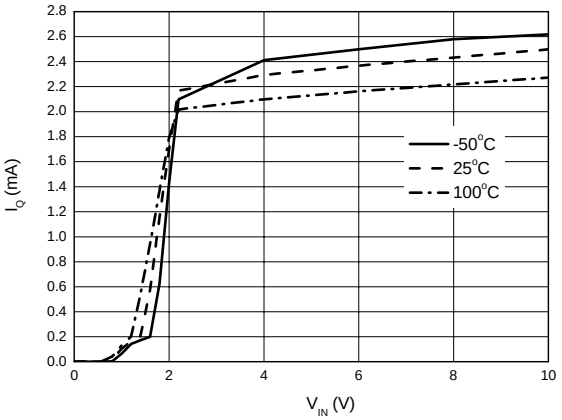

Figure 4. Quiescent Current vs. V_{IN}

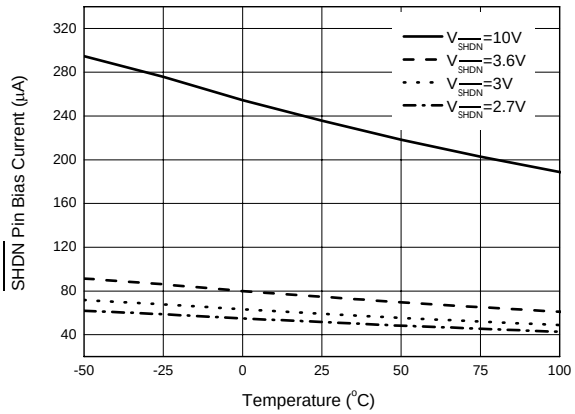

Figure 5. $\overline{SHDN}$ Pin Bias Current vs. Temperature

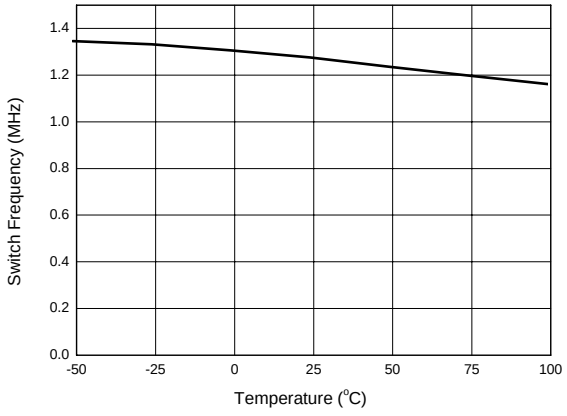

Figure 6. Switch Frequency vs. Temperature

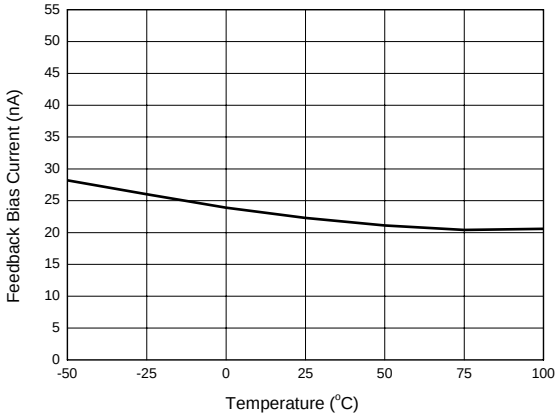

Figure 7. Feedback Bias Current vs. Temperature

Typical Performance Characteristics (Continued)

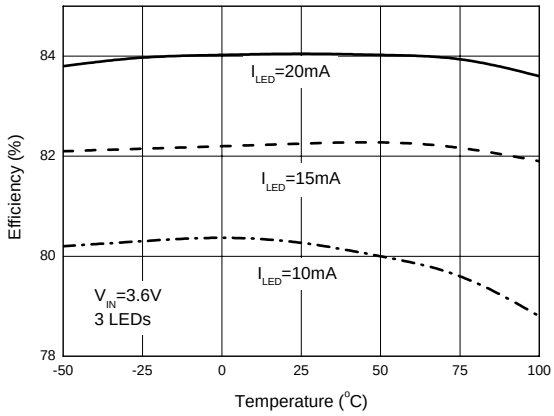

Figure 8. Efficiency vs. Temperature

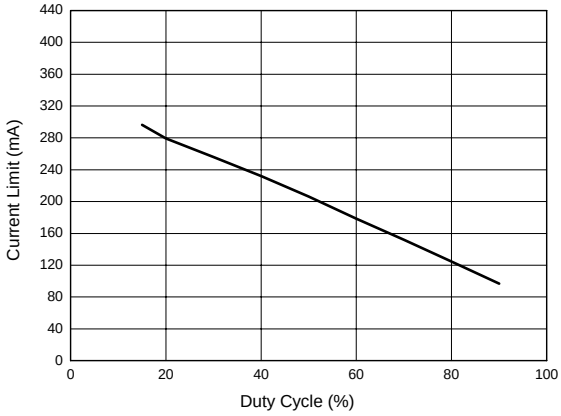

Figure 9. Switch Current vs. Duty Cycle

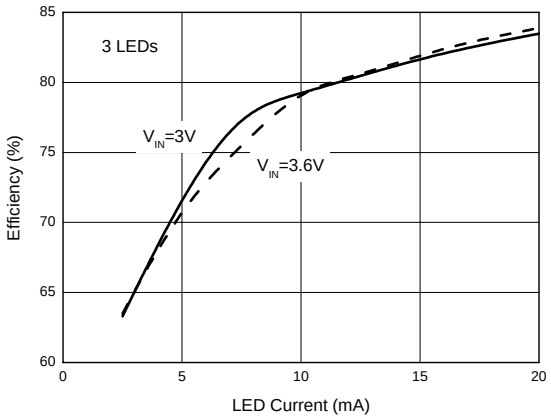

Figure 10. Efficiency vs. LED Current

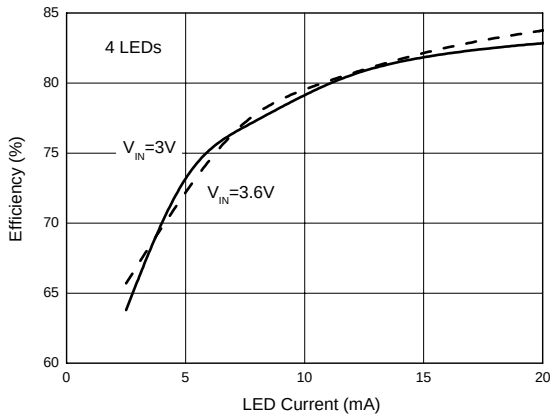

Figure 11. Efficiency vs. LED Current

Typical Application

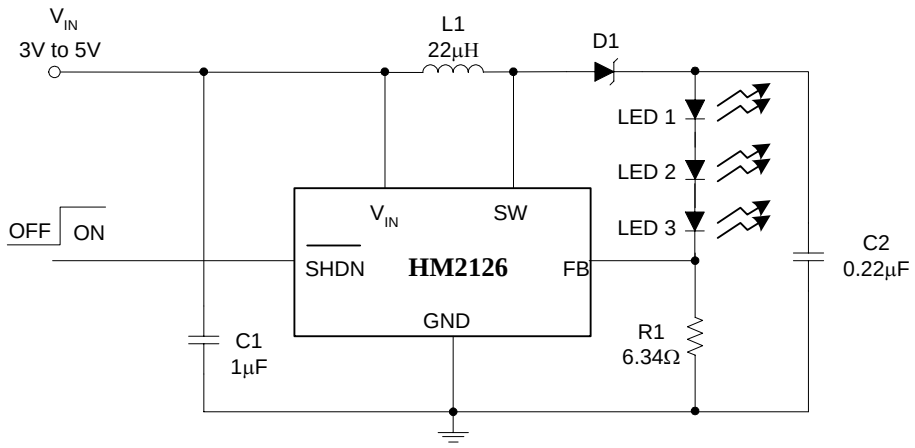

Figure 12. Three White LEDs Driver

Mechanical Dimensions

SOT-23-5 **Unit: mm(inch)**