NIPPON PRECISION CIRCUITS INC.

SM8120AH

White LED Driver IC

OVERVIEW

The SM8120AH is a high efficiency step-up DC-DC converter. Due to high voltage CMOS process realizing 24V output supply as maximum value, white LED of 2–4 lights connected in series can be lighted. By connecting in series, current variation among LED is eliminated. Current value sent to white LED can be set by external resistors. In addition, brightness can also be adjusted by PWM control to CE (chip enable) pin.

FEATURES

- Boost-up control using PFM
- White LED of 2-4 lights (connected in series) lighted
- Output current value can be set by external resistors (51Ω: 9.8mA, 33Ω: 15.2mA, 24Ω: 20.8mA)
- Brightness adjustable by PWM control of CE pin
- Current variation among LED decreased by high precision
- High efficient drive by step-up model
- Supply voltage range: 2.4 to 5.5V
- Maximum output voltage: 24V
- Quiescent current: 80µA (typ)
- Standby current: 1.0µA (max)
- R_{ON} (Switching MOS-Tr): 2Ω (typ)
- Switching frequency: 500kHz (typ)
- Output current detection accuracy: ± 2%
- Small package: SOT23-5

APPLICATIONS

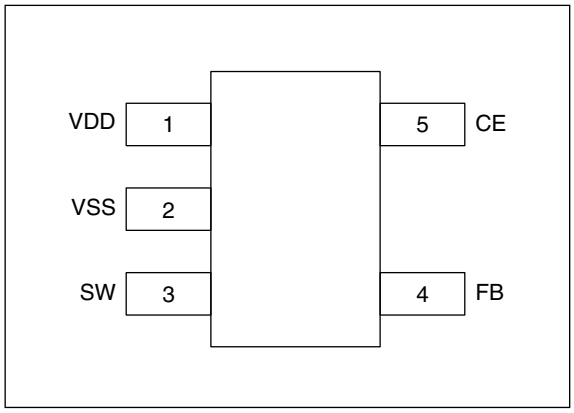
- Cellular phone
- Pager
- Digital still camera
- Handy terminal
- PDAs
- Portable games
- White LED drive
- LCD bias supply
- Flash memory supply

ORDERING INFORMATION

Device	Package
SM8120AH	SOT23-5

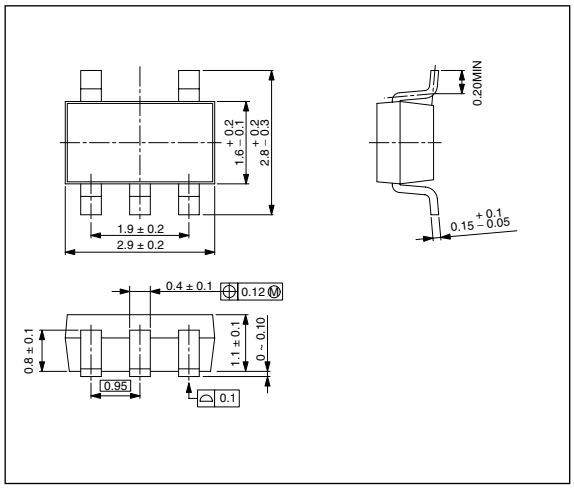
PINOUT

(Top view)

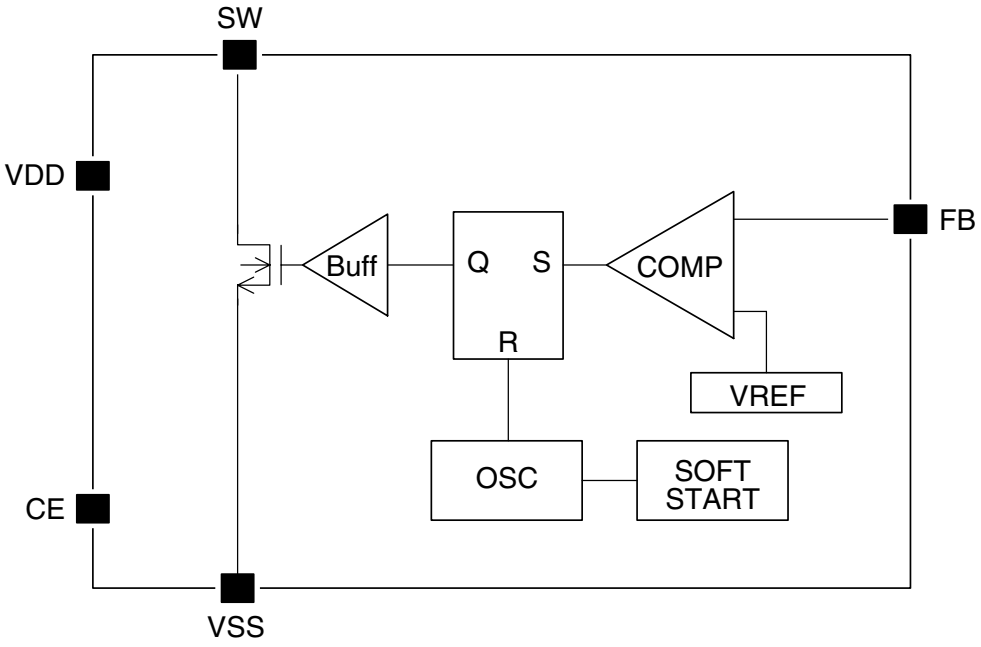


PACKAGE DIMENSIONS

(Unit: mm)



BLOCK DIAGRAM



PIN DESCRIPTION

Number	Name	I/O	Description
1	VDD	–	Power supply
2	VSS	–	GND
3	SW	O	Coil switching
4	FB	I	Feed back (Output current detection)
5	CE	Ip[1]	Chip enable (High active)

1. Input with built-in pull-down resistor

SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage range	V_{DD}	–0.3 to 6.5	V
Input voltage range	V_{IN}	V_{SS} – 0.3 to V_{DD} + 0.3	V
SW output voltage range	V_{SW}	–0.3 to 27	V
SW input current	I_{SW}	250	mA
Power dissipation	P_D	250 (Ta = 25°C)	mW
Operating temperature range	T_{opr}	–40 to 85	°C
Storage temperature range	T_{stg}	–55 to 125	°C

Electrical Characteristics

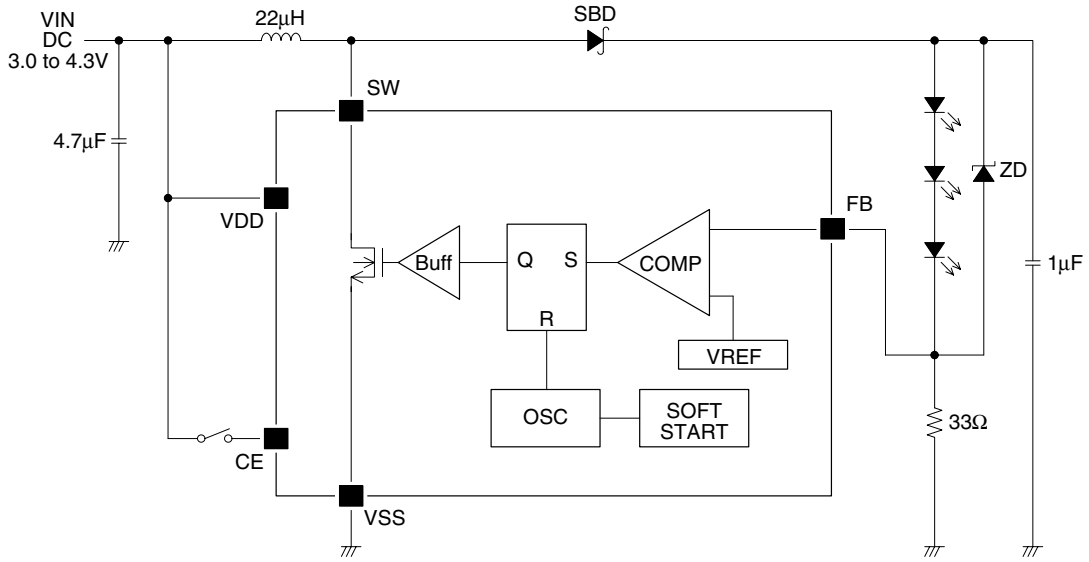
V_{DD} = 3.6V, V_{SS} = 0V, Ta = 25°C unless otherwise noted

Parameter	Pin	Symbol	Condition	Rating			Unit
				min	typ	max	
Supply voltage	VDD	V_{DD}		2.4	3.6	5.5	V
Standby current	VDD	I_{STB}	V_{CE} = 0V	–	–	1.0	µA
Quiescent current	VDD	I_{DD}	V_{FB} = 1.0V	–	80	120	µA
SW-Tr ON resister	SW	R_{ON}	I_{SW} = 100mA, V_{DD} = 3.6V	–	2.0	3.0	Ω
SW-Tr leak current	SW	I_{LEAK}	V_{SW} = V_{DD}	–	–	1.0	µA
Maximum oscillator frequency	SW	f_{OSC}	V_{FB} = 0V	450	500	550	kHz
Duty	SW	Duty	V_{FB} = 0V	53	60	67	%
Input voltage	CE	V_{IH}		2.0	–	–	V
		V_{IL}		–	–	0.6	V
Input current	CE	I_{CE}	V_{CE} = 3.6V	–	5.0	10	µA
	FB	I_{FB}	V_{FB} = 0.5V	–1.0	–	1.0	µA
Soft-start time	SW	T_{SS}		–	500	–	µs
FB voltage	FB	V_{FB}		0.49	0.50	0.51	V

TYPICAL APPLICATIONS

The SM8120AH can be light white LEDs of 2 to 4 in series by boosting up the input voltage using a switching regulator method. By comparing the voltage of FB pin with the internal reference voltage and using the PFM control, the IC supplies constant current to the LED.

Brightness can also be adjusted by PWM control to CE (chip enable) pin. The typical frequency range of the PWM signal is 100Hz to 400Hz, and duty cycle is 10% to 90%.



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