



# SGM3128

## 3-Channel Low Dropout Low Side White LED Driver

### GENERAL DESCRIPTION

The SGM3128 driver provides a simple solution for a matched current source for common Anode LED configuration.

The SGM3128 can drive three LEDs or one LED at three times the current. The factory preset current value is 30mA per channel.

The SGM3128 requires only a 50mV dropout voltage at a 30mA load on each output to match the LED brightness.

The SGM3128 is available in Green SOT-23-6 package. It operates over an ambient temperature range of -40°C to +85°C.

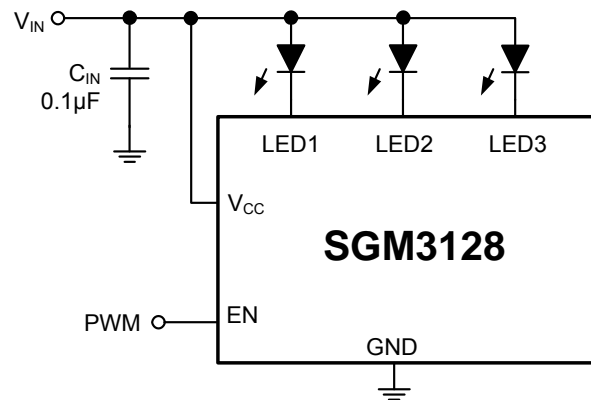
### APPLICATIONS

Wireless Handsets  
MP3, MP4, and PMP  
Cellular Phones  
Portable Communication Devices  
Digital Cameras, Camcorders  
PDAs, Palmtops, and Handy Terminals  
LED/Display Back Light Driver  
LEDs for Camera Flash  
Battery-Powered Equipment

### FEATURES

- Support up to 3 LEDs
- Low 50mV Dropout at 30mA
- Less than  $\pm 5\%$  LED Current Matching
- Simple LED Brightness Control
- Low Shutdown Current
- 2.5V to 5.5V Supply Voltage Range
- Low EMI and Switching Noise
- Enable/Shutdown Control
- Operating Temperature Range: -40°C to +85°C
- Available in Green SOT-23-6 Package

### TYPICAL APPLICATION

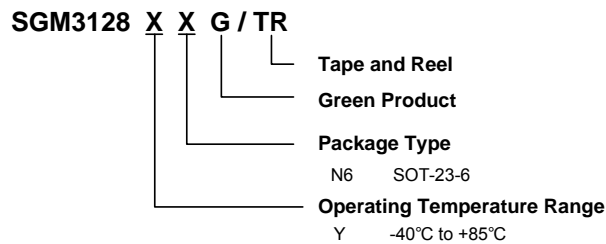


**PACKAGE/ORDERING INFORMATION**

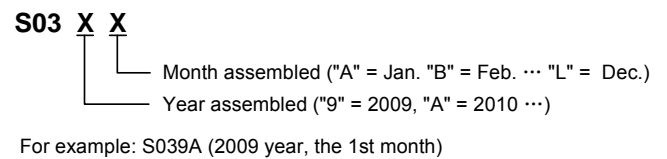
MODEL	ORDER NUMBER	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	PACKAGE OPTION	MARKING INFORMATION
SGM3128	SGM3128YN6G/TR	SOT-23-6	-40°C to +85°C	Tape and Reel, 3000	S03XX

NOTE: Order number and package marking are defined as the follow:

**ORDER NUMBER**



**MARKING INFORMATION**



**ABSOLUTE MAXIMUM RATINGS**

V <sub>CC</sub> to GND .....	-0.3V to 6V
The Other Pins to GND.....	-0.3V to 6V
Storage Temperature Range.....	-65°C to +150°C
Junction Temperature.....	150°C
Operating Temperature Range.....	-40°C to +85°C
Power Dissipation, P <sub>D</sub> @ T <sub>A</sub> = 25°C	
SOT-23-6.....	0.5W
Package Thermal Resistance	
SOT-23-6, θ <sub>JA</sub> .....	250°C/W
Lead Temperature (Soldering 10 sec)	
.....	260°C
ESD Susceptibility	
HBM.....	4000V
MM.....	400V

**NOTE:**

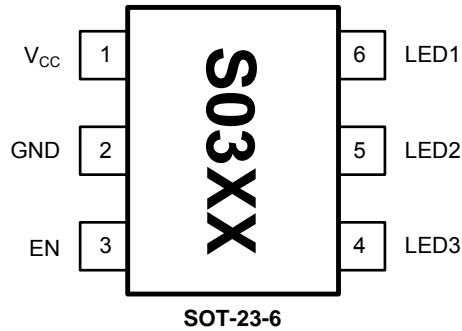
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**CAUTION**

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

SGMICRO reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact SGMICRO sales office to get the latest datasheet.

**PIN CONFIGURATION (TOP VIEW)**



NOTE: The location of pin 1 on the S03XX is determined by orienting the package marking as shown.

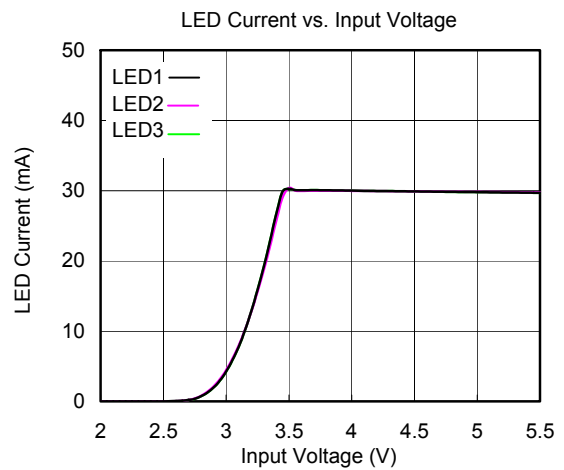
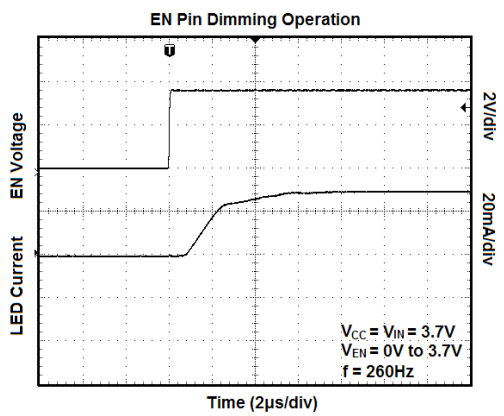
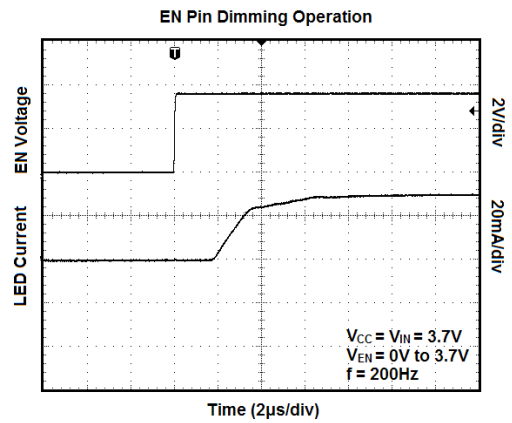
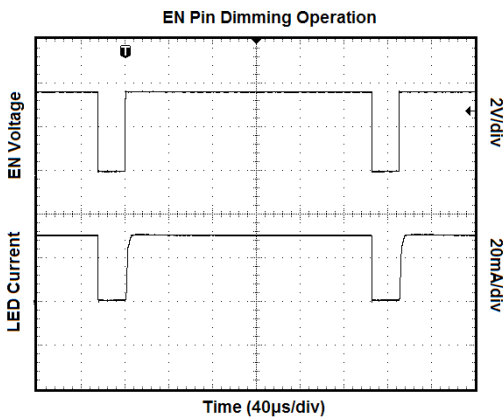
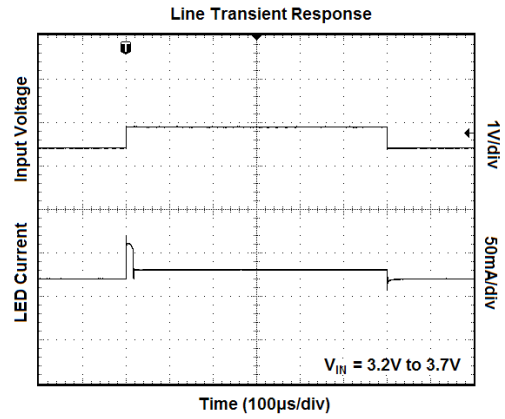
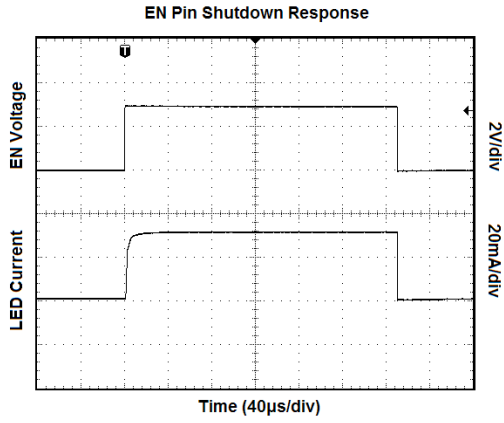
**PIN DESCRIPTION**

PIN	NAME	FUNCTION
1	V <sub>CC</sub>	Power Input.
2	GND	Ground.
3	EN	Enable Input. (Active High).
4	LED3	LED3 Output Pin. Connect to LED3's cathode. 30mA constant current output. LED3 is high impedance when EN is low.
5	LED2	LED2 Output Pin. Connect to LED2's cathode. 30mA constant current output. LED2 is high impedance when EN is low.
6	LED1	LED1 Output Pin. Connect to LED1's cathode. 30mA constant current output. LED1 is high impedance when EN is low.

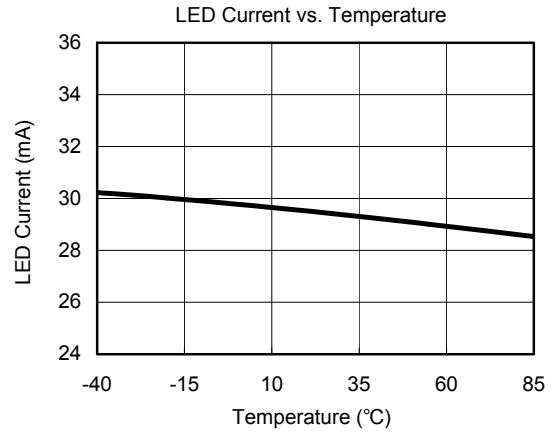
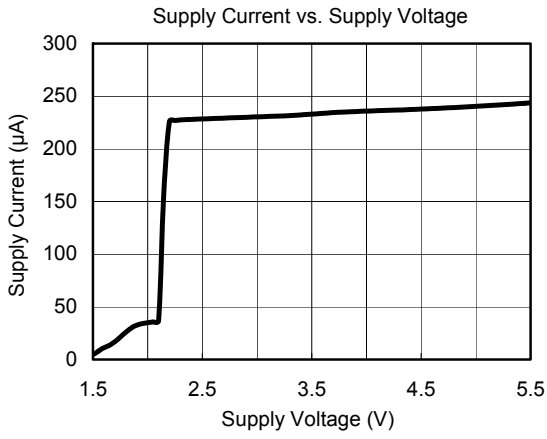
**ELECTRICAL CHARACTERISTICS**(T<sub>A</sub> = +25°C, V<sub>IN</sub> = 3.7V, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operation Voltage Range	V <sub>CC</sub>		2.5		5.5	V
Shutdown Supply Current	I <sub>SHDN</sub>	V <sub>EN</sub> < 0.4V		1		μA
LED Sink Current	I <sub>LED</sub>		27	30	33	mA
Quiescent Power Supply Current	I <sub>Q</sub>	I <sub>LED</sub> = 0		240		μA
LED Dropout Voltage		I <sub>LED</sub> = 30mA, V <sub>LED</sub> @ I <sub>LEDn</sub> =90% × I <sub>LED</sub>		50		mV
LED Current Deviation Matching	D <sub>LED</sub>		-5		+5	%
Input High Voltage at EN	V <sub>IH</sub>	V <sub>EN</sub> > V <sub>IH</sub> for enable IH	1.5			V
Input Low Voltage at EN	V <sub>IL</sub>	V <sub>EN</sub> < V <sub>IL</sub> for disable IL			0.4	V
OTP				145		°C
OTP Hysteresis				10		°C

TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS



**APPLICATION INFORMATION****Enable Input**

Drive EN high to enable the device; drive EN low to force LED1, LED2 and LED3 into a high-impedance state. When driven high, EN draws 240 $\mu$ A to power the IC. Driving EN low longer than 3ms will disable the device and the typical supply current will be less than 1 $\mu$ A.

**Input UVLO**

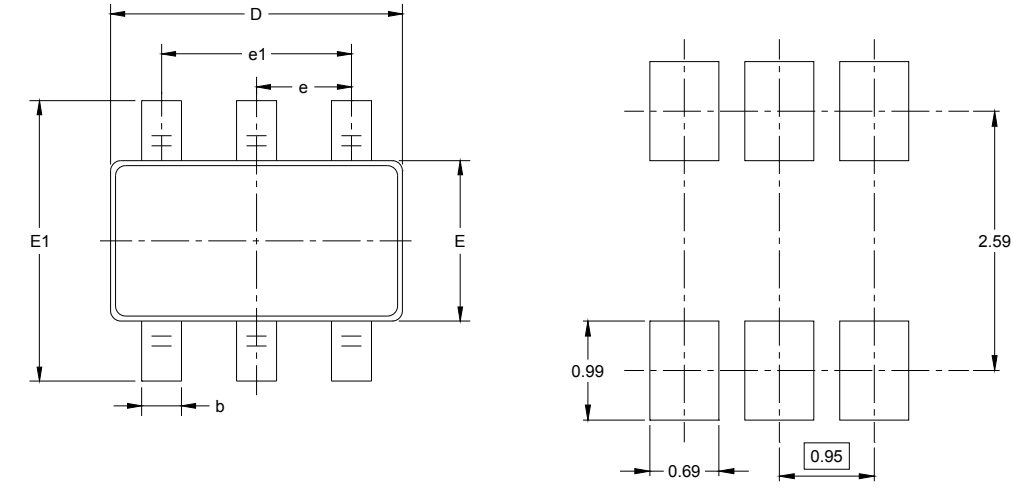
The input operating voltage range of the SGM3128 is 2.5V to 5.5V. An input capacitor at the V<sub>CC</sub> pin could reduce ripple voltage. It is recommended to use a ceramic 0.1 $\mu$ F or larger capacitance as the input capacitor. This IC provides an under voltage lockout (UVLO) function to prevent it from unstable issue when startup. The UVLO threshold of input rising voltage is set at 2.1V typically with a hysteresis 0.11V.

**LED Brightness Dimming Control**

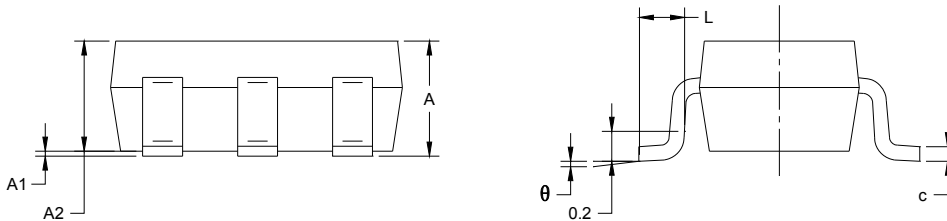
For controlling the LED brightness, the SGM3128 can perform the dimming control by applying a PWM signal to EN pin. When an external PWM signal is applied to the EN pin, brightness of white LED is adjusted by the duty cycle. The average LED current is proportional to the PWM signal duty cycle. The magnitude of the PWM signal must be higher than the minimum level of enable input high level, in order to let the dimming control perform correctly. The suggested PWM frequency range is 20kHz to 200Hz.

PACKAGE OUTLINE DIMENSIONS

SOT-23-6



RECOMMENDED LAND PATTERN (Unit: mm)

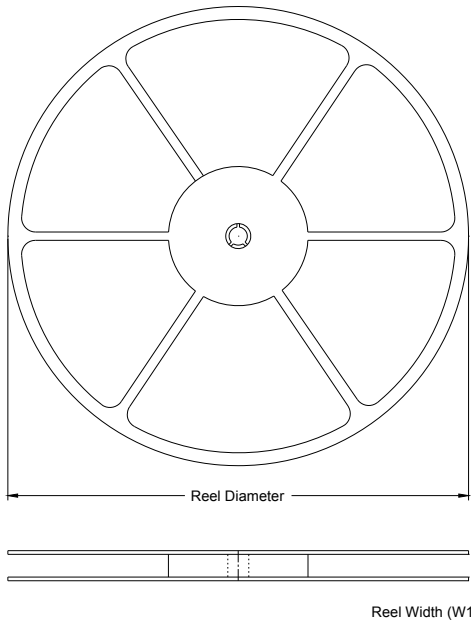


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

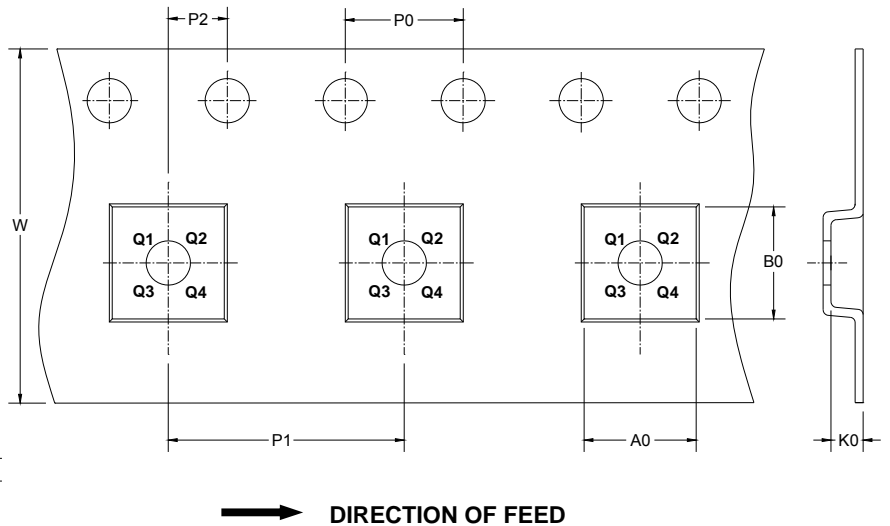


**TAPE AND REEL INFORMATION**

**REEL DIMENSIONS**



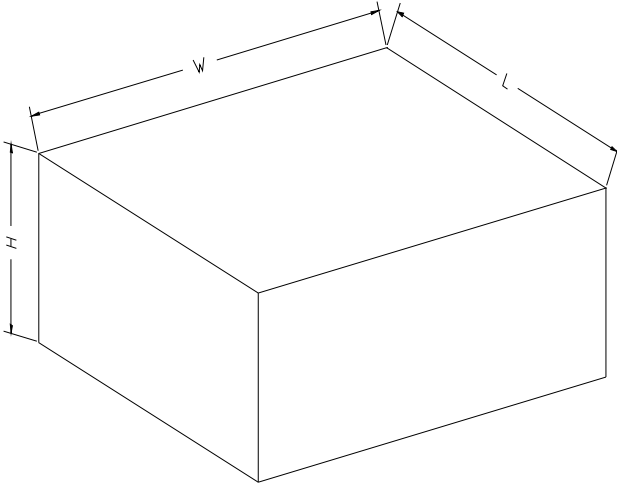
**TAPE DIMENSIONS**



NOTE: The picture is only for reference. Please make the object as the standard.

**KEY PARAMETER LIST OF TAPE AND REEL**

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT-23-6	7"	9.5	3.17	3.23	1.37	4.0	4.0	2.0	8.0	Q3

**CARTON BOX DIMENSIONS**

NOTE: The picture is only for reference. Please make the object as the standard.

**KEY PARAMETER LIST OF CARTON BOX**

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18