

GENERAL DESCRIPTION

The SGM2101L is a high accuracy, low noise, very low dropout linear regulator. It is capable of supplying 4A output current with typical dropout voltage of only 140mV. The operating input voltage range is from 1.1V to 7V with BIAS and 1.4V to 7V without BIAS. The output voltage of the SGM2101L can be set from 0.8V to 3.95V in pin-selectable operation and adjusted from 0.8V to 5.2V by using an external resistor divider.

Other features include logic-controlled shutdown mode, current limit and thermal shutdown protection. The SGM2101L has automatic discharge function to quickly discharge V_{OUT} in the disabled status.

The SGM2101L is suitable for application which needs high accuracy, low noise and high current power supply, such as analog-to-digital converters (ADCs), digital-to-analog converters (DACs) and RF components.

With very high accuracy, remote sensing, and soft-start capabilities to reduce inrush current, the SGM2101L ensures the optimal system performance for powering digital loads such as FPGAs, DSPs and ASICs.

The SGM2101L is available in a Green TQFN-3.5×3.5-20L package. It operates over an operating temperature range of -40°C to +125°C.

APPLICATIONS

Wireless Equipment

Industrial, Instrumentation and Medical

ADC and DAC

ATE

FEATURES

- **Operating Input Voltage Range:**
 - ♦ With BIAS: 1.1V to 7V
 - ♦ Without BIAS: 1.4V to 7V
- **Output Voltage Range:**
 - ♦ Adjustable Operation: 0.8V to 5.2V
 - ♦ Pin-Selectable Operation: 0.8V to 3.95V
- **Output Voltage Accuracy: $\pm 1\%$ at +25°C**
- **Low Dropout Voltage: 140mV (TYP) at 4A**
- **Low Noise: $6\mu V_{RMS}$ with BIAS**
- **Excellent Load and Line Transient Responses**
- **With Output Automatic Discharge**
- **Adjustable Soft-Start Inrush Control**
- **Support Power-Good Indicator Function**
- **-40°C to +125°C Operating Temperature Range**
- **Available in a Green TQFN-3.5×3.5-20L Package**

TYPICAL APPLICATION

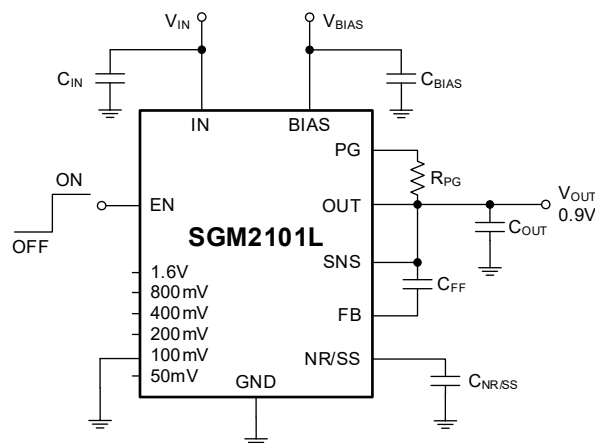


Figure 1. Typical Application Circuit

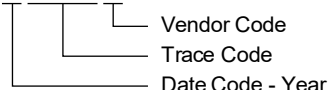
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2101L	TQFN-3.5×3.5-20L	-40°C to +125°C	SGM2101LXTRL20G/TR	SGM2VE XTRL20 XXXXXX	Tape and Reel, 4000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.

XXXXXX



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

IN, BIAS, PG, EN to GND -0.3V to 8V
 SNS, OUT to GND -0.3V to MIN ($V_{IN} + 0.3V$, 8V)
 NR/SS, FB to GND -0.3V to 3.6V
 50mV, 100mV, 200mV, 400mV, 800mV, 1.6V to GND
 -0.3V to ($V_{OUT} + 0.3V$)
 PG Current (Sink Current into Device) 5mA
 Package Thermal Resistance
 TQFN-3.5×3.5-20L, θ_{JA} 43.6°C/W
 TQFN-3.5×3.5-20L, θ_{JB} 12.3°C/W
 TQFN-3.5×3.5-20L, θ_{JC} (TOP) 30.3°C/W
 TQFN-3.5×3.5-20L, θ_{JC} (BOT) 1.8°C/W
 Junction Temperature +150°C
 Storage Temperature Range -65°C to +150°C
 Lead Temperature (Soldering, 10s) +260°C
 ESD Susceptibility ⁽¹⁾⁽²⁾
 HBM ±6000V
 CDM ±1000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Input Supply Voltage Range 1.1V to 7V
 Bias Supply Voltage Range ⁽¹⁾ 3V to 7V
 Output Voltage Range 0.8V to 5.2V
 Enable Voltage Range 0V to V_{IN}
 Output Current 0A to 4A
 Input Effective Capacitance, C_{IN} 5μF (MIN)

Output Effective Capacitance, C_{OUT} 10μF to 1000μF
 Bias Effective Capacitance, C_{BIAS} 5μF (MIN)
 Power-Good Pull-Up Resistance 10kΩ to 100kΩ
 Operating Ambient Temperature Range -40°C to +125°C
 Operating Junction Temperature Range -40°C to +125°C

NOTE:

1. Bias supply voltage is required when $V_{IN} < 1.4V$ and not required when $V_{IN} \geq 1.4V$.

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

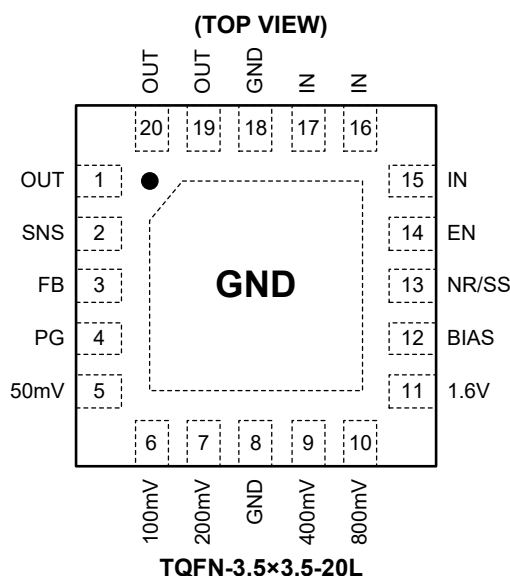
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. 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 even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATION

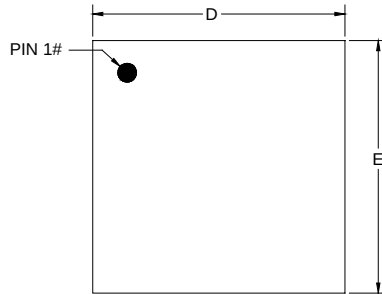


PIN DESCRIPTION

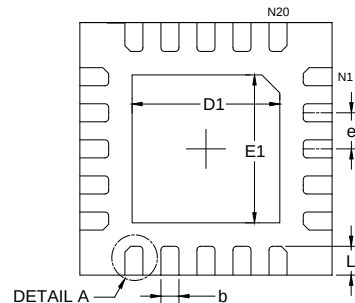
PIN	NAME	FUNCTION
1, 19, 20	OUT	Regulator Output Pin. It is recommended to use an output capacitor with effective capacitance in the range of 10 μ F to 1000 μ F to ensure stability. This ceramic capacitor should be placed as close as possible to OUT pin.
2	SNS	Output Voltage Sense Input Pin. The SNS pin is connected to the load side of the output trace only when the pin-selectable programming mode is used. Keep SNS pin floating if the V _{OUT} voltage is set by external resistor.
3	FB	Feedback Voltage Input Pin. Connect this pin to the midpoint of an external resistor divider to adjust the output voltage. Place the resistors as close as possible to this pin.
4	PG	Power-Good Indicator Output Pin. An open-drain, active-high output that indicates the status of V _{OUT} . When the output voltage reaches V _{IT(PG)} of the target, the PG pin goes into a high-impedance state.
5	50mV	Output Voltage Setting Pins. Select the desired output voltage by connecting these pins to the ground. Connecting these pins to the ground increases the output voltage value corresponding to the pin name. Multiple pins can be connected to GND at the same time. When V _{OUT} is set by an external resistor, leave these pins floating (open).
6	100mV	
7	200mV	
9	400mV	
10	800mV	
11	1.6V	
12	BIAS	Bias Supply Voltage Pin for Internal Control Circuits. This pin is monitored by internal under-voltage lockout circuit and enables the use of low-input voltage, low-output voltage conditions (V _{IN} < 1.4V).
13	NR/SS	Noise-Reduction and Soft-Start Pin. Using an external capacitor C _{NR/SS} to decouple this pin to GND can not only reduce output noise to very low level but also slow down the V _{OUT} rise like a soft-start behavior.
14	EN	Enable Pin. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator. This pin must be connected to IN or BIAS pin if enable functionality is not used.
15, 16, 17	IN	Input Supply Voltage Pin. It is recommended to use a 10 μ F or larger ceramic capacitor from IN pin to ground to get good power supply decoupling. This ceramic capacitor should be placed as close as possible to IN pin.
8, 18	GND	Ground.
Exposed Pad	GND	Exposed Pad. Connect it to GND internally. Connect it to a large ground plane to maximize thermal performance. This pad is not an electrical connection point.

PACKAGE OUTLINE DIMENSIONS

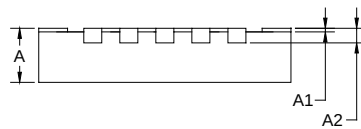
TQFN-3.5×3.5-20L



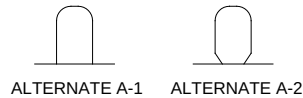
TOP VIEW



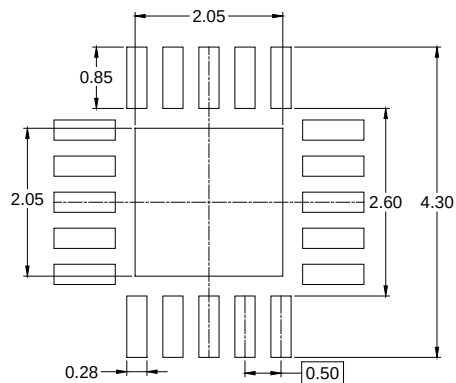
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL
CONSTRUCTION



RECOMMENDED LAND PATTERN (Unit: mm)

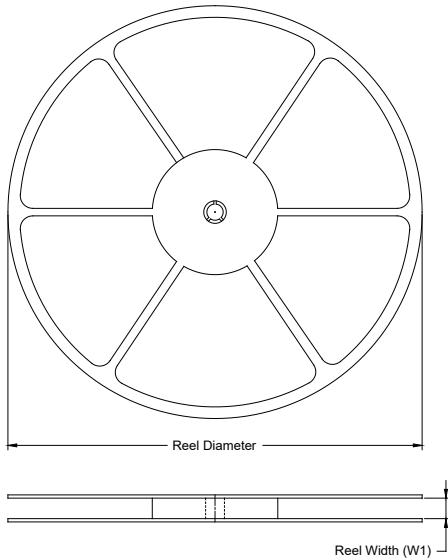
Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.700	0.750	0.800
A1	-	-	0.050
A2	0.203 REF		
D	3.450	3.500	3.550
D1	2.000	2.050	2.100
E	3.450	3.500	3.550
E1	2.000	2.050	2.100
b	0.200	0.250	0.300
e	0.500 BSC		
L	0.350	0.400	0.450

NOTE: This drawing is subject to change without notice.

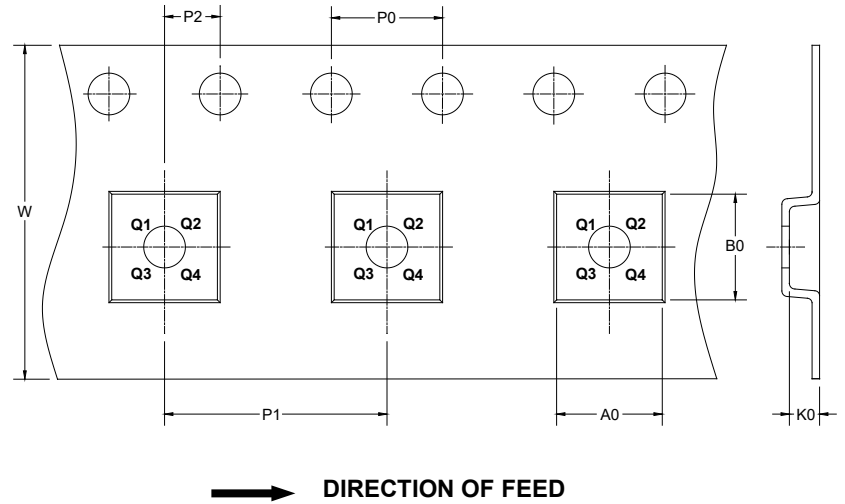
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

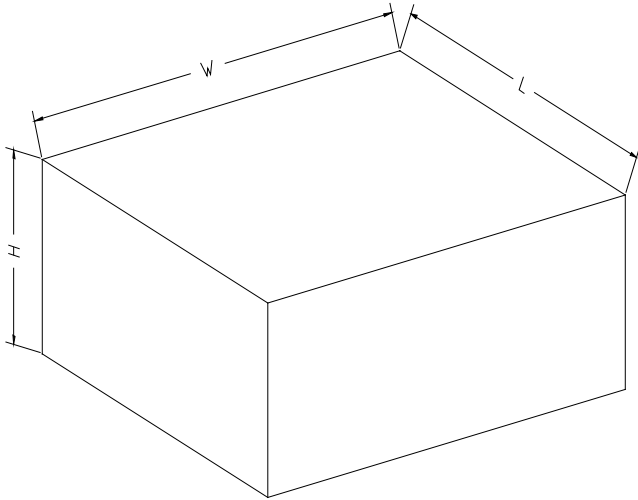
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TQFN-3.5×3.5-20L	13"	12.4	3.80	3.80	0.95	4.0	8.0	2.0	12.0	Q2

DD00001

PACKAGE INFORMATION

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
13"	386	280	370	5

DD0002