

Tiny Package, Nano-Power, Precision Current-Sense Amplifier

GENERAL DESCRIPTION

The SGM8188 series is a nano-power, high precision, high-side current-sense amplifier. The device consumes only 1.2 μ A (MAX) quiescent current. It features a 60 μ V (MAX) low offset voltage, which allows for 12-bit resolution at a very low 50mV full-scale current measurement. The device can sense the voltage across a current-sense resistor in a common mode voltage range from 1.6V to 28V. The SGM8188 series provides four fixed gains: 25V/V, 50V/V, 100V/V and 200V/V, which allows flexible selection of the external current-sense resistor.

The SGM8188 is available in a Green WLCSP-1×1-4B-A package. The tiny package makes the device an excellent choice for portable and battery-powered applications with limited size. The SGM8188 is rated over the -40°C to +125°C temperature range.

FEATURES

Ultra-Low Quiescent Current: 1.2μA (MAX)

• Input Common Mode Range: 1.6V to 28V

Low Input Offset Voltage: 60μV (MAX)

• Choice of Gains:

SGM8188A0 Gain: 25V/V
SGM8188A1 Gain: 50V/V
SGM8188A2 Gain: 100V/V

• SGM8188A3 Gain: 200V/V

• Low Gain Error: ±0.4% (MAX)

Voltage Output

• -40°C to +125°C Operating Temperature Range

• Available in a Green WLCSP-1×1-4B-A Package

APPLICATIONS

Portable Equipment
Battery-Powered Equipment
Mobile Phones
Laptops
Personal Digital Assistants

Power Management

TYPICAL APPLICATION

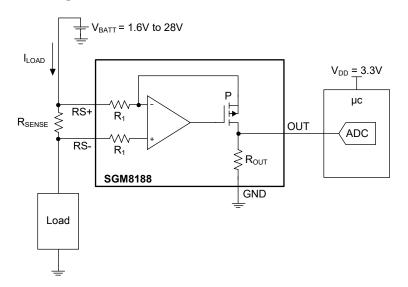
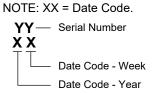


Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8188A0 (Gain = 25V/V)	WLCSP-1×1-4B-A	-40°C to +125°C	SGM8188A0XG/TR	01 XX	Tape and Reel, 3000
SGM8188A1 (Gain = 50V/V)	WLCSP-1×1-4B-A	-40°C to +125°C	SGM8188A1XG/TR	02 XX	Tape and Reel, 3000
SGM8188A2 (Gain = 100V/V)	WLCSP-1×1-4B-A	-40°C to +125°C	SGM8188A2XG/TR	00 XX	Tape and Reel, 3000
SGM8188A3 (Gain = 200V/V)	WLCSP-1×1-4B-A	-40°C to +125°C	SGM8188A3XG/TR	03 XX	Tape and Reel, 3000

MARKING INFORMATION



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

RS+, RS- to GND	0.3V to +30V
OUT to GND	0.3V to +6V
RS+ to RS	±30V
Short-Circuit Duration, OUT to GND	Continuous
Continuous Input Current (Any Pin)	±20mA
Package Thermal Resistance	
WLCSP-1×1-4B-A, θ _{JA}	232°C/W
Junction Temperature	+150°C
Storage Temperature Range	65°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility	
HBM	4000V
CDM	1000V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range-40°C to +125°C

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

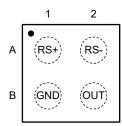
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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



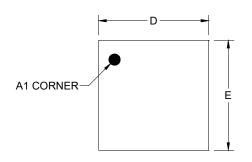


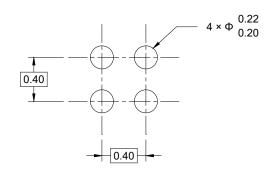
WLCSP-1×1-4B-A

PIN DESCRIPTION

PIN	NAME	FUNCTION			
A1	RS+	Power-Side Pin for the Sense Resistor.			
A2	RS-	Load-Side Pin for the Sense Resistor.			
B1	GND	Ground.			
B2	OUT	Output Voltage. V_{OUT} and $V_{SENSE} = V_{RS+} - V_{RS-}$ are in direct proportion.			

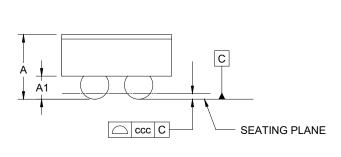
PACKAGE OUTLINE DIMENSIONS WLCSP-1×1-4B-A

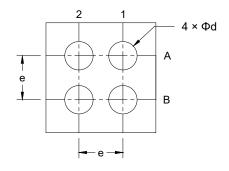




TOP VIEW

RECOMMENDED LAND PATTERN (Unit: mm)





SIDE VIEW

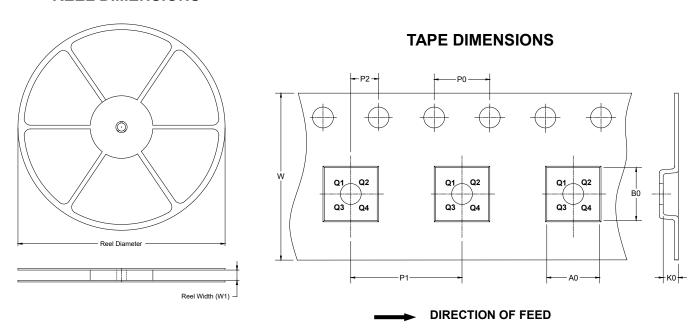
BOTTOM VIEW

Symbol	Dimensions In Millimeters					
	MIN	MOD	MAX			
Α	-	-	0.625			
A1	0.190	-	0.230			
D	0.975	-	1.035			
E	0.975	-	1.035			
d	0.228 - 0.288					
е	0.400 BSC					
ccc	0.050					

NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

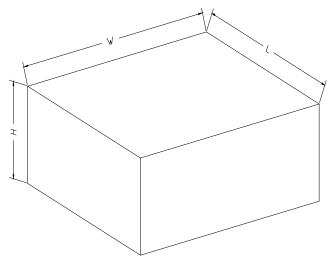


NOTE: The picture is only for reference. Please make the object as the standard.

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
WLCSP-1×1-4B-A	7"	9.5	1.07	1.07	0.72	4.0	4.0	2.0	8.0	Q1

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