SGM8198
High-side Measurement Current Shunt Monitor

GENERAL DESCRIPTION

The SGM8198 is a high-side, unipolar, current shunt monitor. Wide input common mode voltage range, high-speed, low quiescent current and tiny packaging enable SGM8198 to be used in a variety of applications.

Input common mode voltage can range from V_{CC} to 26V for the SGM8198. Quiescent current is only 60μA, which permits connecting the power supply to either side of the current measurement shunt with minimal error.

The device converts a differential input voltage to a current output. This current is converted back to a voltage with an external load resistor that sets any gain from 1 to over 100. Although designed for current shunt measurement, the circuit invites creative applications in measurement and level shifting.

The SGM8198 is available in Green SOT-23-5 package. It is specified for the -40℃ to +85℃ temperature range.

FEATURES

- **Unipolar High-side Current Measurement Circuit**
- **Wide Supply Voltage Range: 2.7V to 26V**
- **Wide Input Common Mode Voltage Range: V_{CC} to 26V**
- **Single Resistor Gain Set**
- **Low Quiescent Current: 60μA (TYP)**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in Green SOT-23-5 Package**

APPLICATIONS

Current Shunt Measurement
Portable and Battery-Backup Systems
Battery Chargers
Power Management
Cell Phones
Precision Current Source

TYPICAL APPLICATION

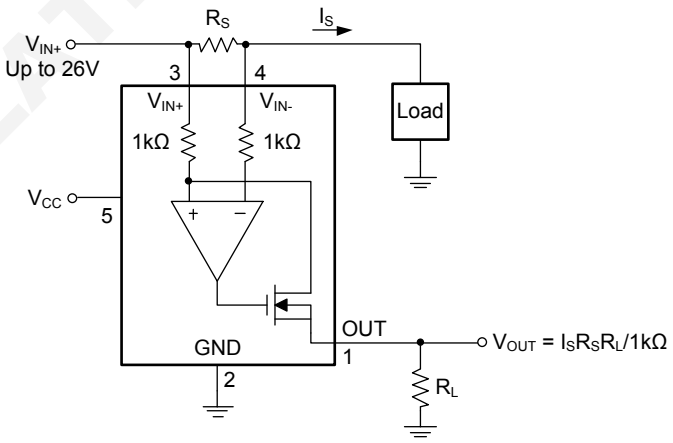


Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8198	SOT-23-5	-40℃ to +85℃	SGM8198YN5G/TR	GMCXX	Tape and Reel, 3000

NOTE: XX = Date Code.

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.

MARKING INFORMATION

GMC X X

- Date code - Month ("A" = Jan. "B" = Feb. ··· "L" = Dec.)
- Date code - Year ("A" = 2010, "B" = 2011 ···)
- Chip I.D.

For example: GMCHA (2017, January)

ABSOLUTE MAXIMUM RATINGS

Supply Voltage Range .... -0.3V to 26.4V
Analog Inputs (V_{IN+}, V_{IN-}) Common Mode Voltage Range
.... -0.3V to 26.4V
Analog Output, Out .... -0.3V to 26.4V
Input Current into Any Pin 10mA
Storage Temperature Range........................ -65℃ to +150℃
Junction Temperature .... +150℃
Lead Temperature (Soldering 10sec).......................... +260℃

RECOMMENDED OPERATING CONDITIONS

Operating Voltage Range..................................... 2.7V to 26V
Operating Temperature Range .... -40℃ to +85℃

OVERSTRESS CAUTION

Stresses beyond those listed may cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational section of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

ESD SENSITIVITY CAUTION

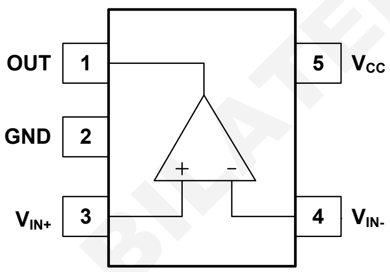
This integrated circuit can be damaged by ESD if you don’t pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time.

PIN CONFIGURATION

SGM8198 (TOP VIEW)



SOT-23-5

ELECTRICAL CHARACTERISTICS

(At T_A = 25℃, V_{CC} = 5V, V_{IN+} = 12V and R_{OUT} = 25kΩ, unless otherwise noted.)

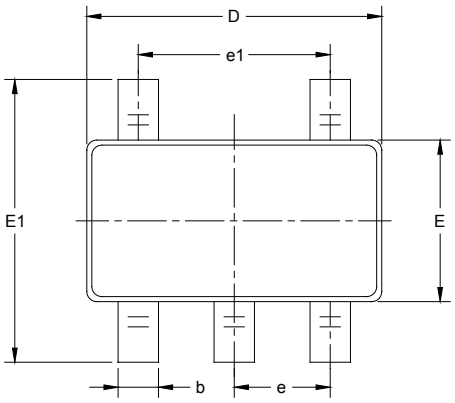
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
POWER SUPPLY						
Operating Voltage Range	V_{CC}		2.7		26	V
Quiescent Current	I_Q	V_{SENSE} = 0, I_{OUT} = 0		60		μA
Power Supply Rejection Ratio	PSRR	V_{CC} = 2.7V to 26V, V_{SENSE} = 50mV		1		μV/V
INPUT CHARACTERISTICS						
Full-Scale Sense Voltage		V_{SENSE} = V_{IN+} - V_{IN-}		100		mV
Input Common Mode Voltage Range	V_{CM}		V_{CC}		26	V
Common Mode Rejection Ratio	CMRR	V_{IN+} = V_{CC} to 26V, V_{SENSE} = 50mV		100		dB
Input Offset Voltage, RTI (1)	V_{OS}			±200		μV
Input Bias Current	I_B			10		μA
OUTPUT CHARACTERISTICS						
Transconductance		V_{SENSE} = 10mV - 150mV		1000		μA/V
Nonlinearity Error		V_{SENSE} = 10mV to 150mV		±0.05		%
Total Output Error		V_{SENSE} = 100mV		±0.5		%
Output Voltage (Swing to Power Supply, V_{CC})				V_{CC} - 0.9		V
FREQUENCY RESPONSE						
Bandwidth	BW	R_{OUT} = 10kΩ		95		kHz
		R_{OUT} = 20kΩ		54		kHz
NOISE						
Output-Current Noise Density		f = 1kHz		25		pA/$\sqrt{HZ}$

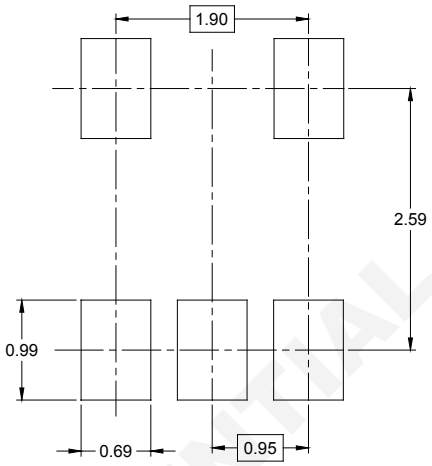
NOTE:

1. Defined as the amount of input voltage, V_{SENSE}, to drive the output to zero.

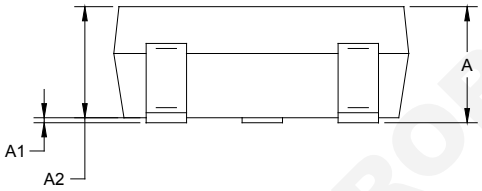
PACKAGE OUTLINE DIMENSIONS

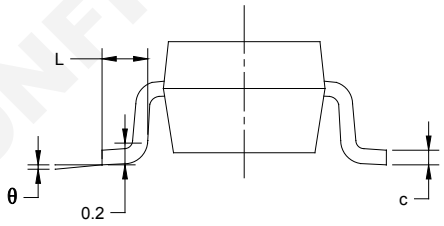
SOT-23-5





RECOMMENDED LAND PATTERN (Unit: mm)

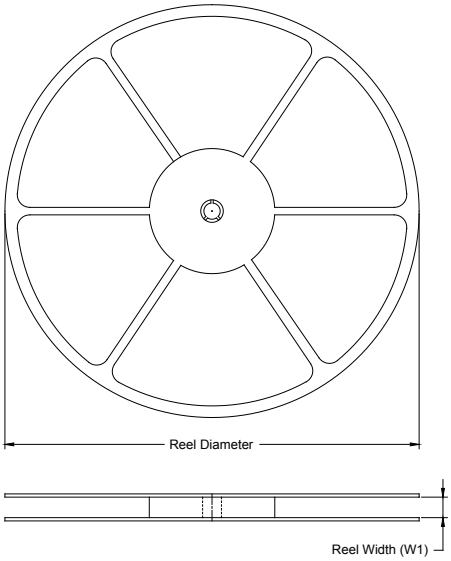




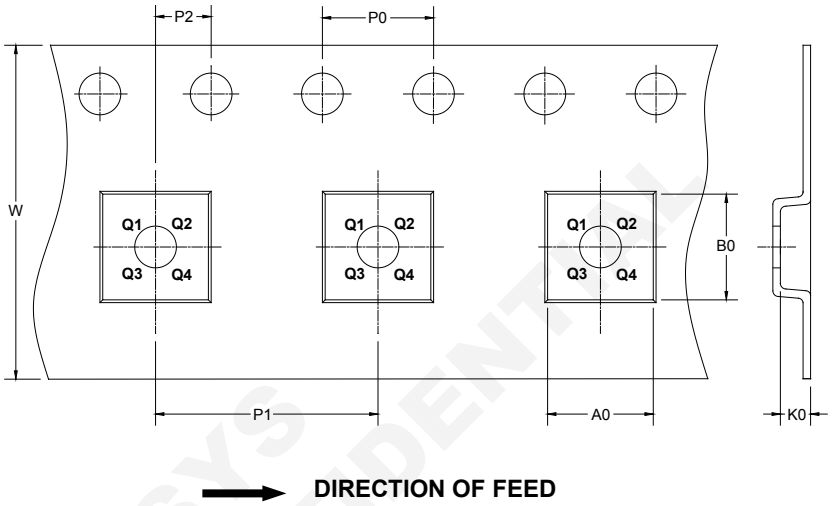
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037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



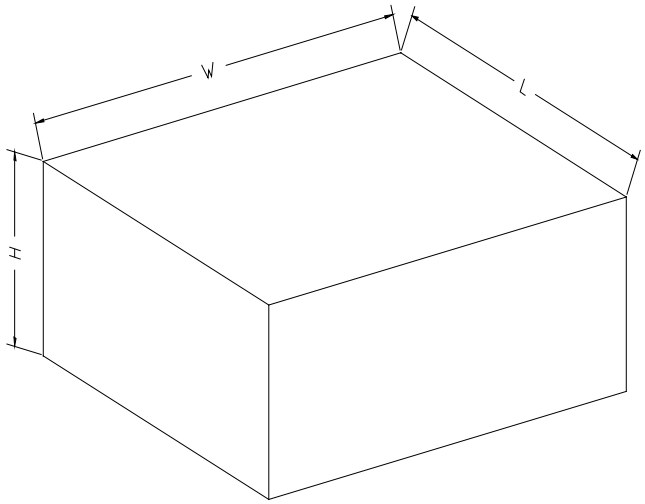
NOTE: The picture is only for reference. Please make the object as the standard.

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-23-5	7″	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3

DD0001

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

DD0002