



# SGM2019

## Low Power, Low Dropout, RF - Linear Regulators

### GENERAL DESCRIPTION

The SGM2019 series low-power, low-noise, low-dropout, CMOS linear voltage regulators operate from a 2.5V to 5.5V input voltage. They are the perfect choice for low voltage, low power applications. A low ground current makes this part attractive for battery operated power systems. The SGM2019 series also offer ultra low dropout voltage to prolong battery life in portable electronics. Systems requiring a quiet voltage source, such as RF applications, will benefit from the SGM2019 series' ultra low output noise ( $30\mu\text{V}_{\text{RMS}}$ ) and high PSRR. An external noise bypass capacitor connected to the device's BP pin can further reduce the noise level.

The output voltage is preset to voltages in the range of 0.8V to 5.0V. Other features include a 10nA logic-controlled shutdown mode, foldback current limit and thermal shut-down protection.

The SGM2019 has Green SC70-5 and SOT23-5 packages. It operates over an ambient temperature range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

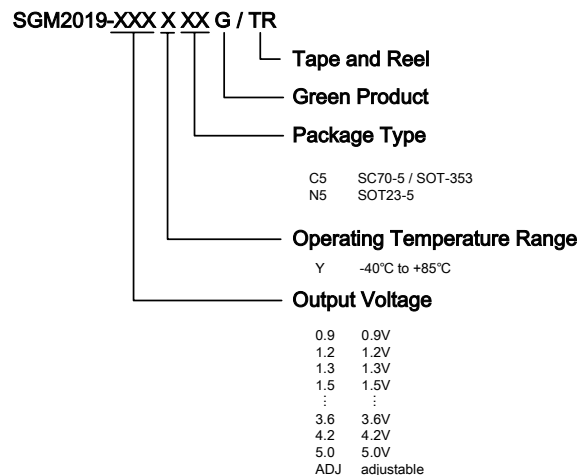
### APPLICATIONS

Cellular Telephones  
Cordless Telephones  
PHS Telephones  
PCMCIA Cards  
Modems  
MP3 Player  
Hand-Held Instruments  
Palmtop Computers  
Electronic Planners  
Portable/Battery-Powered Equipment

### FEATURES

- Low Output Noise
- Low Dropout Voltage
- Thermal-Overload Protection
- Output Current Limit
- High PSRR (68dB at 1kHz)
- 10nA Logic-Controlled Shutdown
- Available in Multiple Output Voltage Versions
- Fixed Outputs of 0.9V, 1.2V, 1.3V, 1.5V, 1.8V, 2.1V, 2.5V, 2.6V, 2.7V, 2.8V, 2.85V, 2.9V, 3.0V, 3.1V, 3.2V, 3.3V, 3.6V, 4.2V, 5.0V
- Adjustable Output from 0.8V to 5.0V
- $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Operating Temperature Range
- Green SC70-5 and SOT23-5 Packages

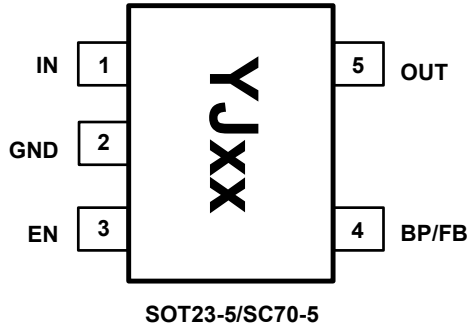
### PRODUCT NAME STRUCTURE



SG Micro Limited  
www.sg-micro.com

REV. A

**PIN CONFIGURATIONS (TOP VIEW)**



Note1: The location of pin 1 on the YJxx is determined by orienting the package marking as shown.  
 Note2: "xx" is the output voltage code. (For Example: when the output voltage is 1.2V, it is expressed as 12.)  
 Note3: When the output voltage is 2.85V, it is expressed as YJ2J.

**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.

**PIN DESCRIPTION**

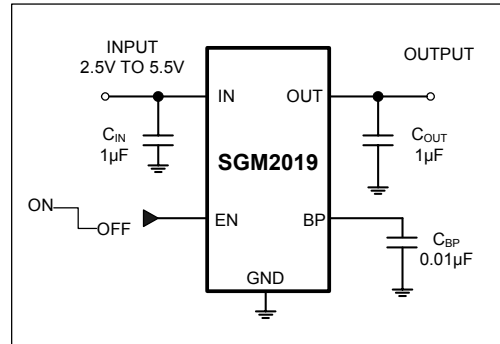
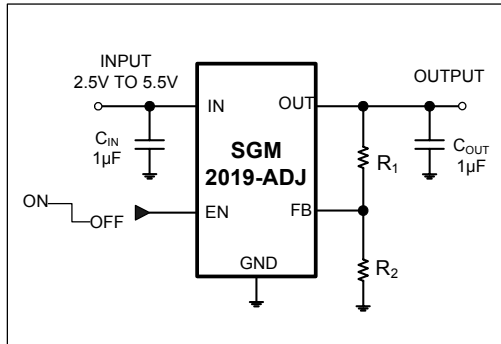
PIN	NAME	FUNCTION
<b>SC70-5 / SOT23-5</b>		
1	IN	Regulator Input. Supply voltage can range from 2.5V to 5.5V. Bypass with a 1µF capacitor to GND.
2	GND	Ground.
3	EN	Shutdown Input. A logic low reduces the supply current to 10nA. Connect to IN for normal operation.
4	BP	Reference-Noise Bypass (fixed voltage version only). Bypass with a low-leakage 0.01µF ceramic capacitor for reduced noise at the output.
4	FB	Adjustable voltage version only—this is used to set the output voltage of the device.
5	OUT	Regulator Output.

**ABSOLUTE MAXIMUM RATINGS**

IN to GND.....	-0.3V to 6V
Output Short-Circuit Duration .....	Infinite
EN to GND.....	-0.3V to V <sub>IN</sub>
OUT, BP/FB to GND.....	-0.3V to (V <sub>IN</sub> + 0.3V)
Power Dissipation, P <sub>D</sub> @ T <sub>A</sub> = 25°C	
SOT23-5.....	0.34W
SC70-5 .....	0.175W
Package Thermal Resistance	
SOT23-5, θ <sub>JA</sub> .....	366.7°C/W
SC70-5, θ <sub>JA</sub> .....	710.1°C/W
Operating Temperature Range.....	-40°C to +85°C
Junction Temperature.....	150°C
Storage Temperature.....	-65°C to +150°C
Lead Temperature (soldering, 10s).....	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.

TYPICAL OPERATION CIRCUIT



Standard 1% Resistor Values for Common Output Voltages of Adjustable Voltage Version

V <sub>OUT</sub> (V)	R <sub>1</sub> (kΩ)	R <sub>2</sub> (kΩ)
0.8	0	40.2
1.0	10.5	40.2
1.5	35.7	40.2
1.8	51.1	40.2
2.5	86.6	40.2
2.7	95.3	40.2
2.85	97.6	37.4
2.9	97.6	37.0
3.0	97.6	35.7
3.6	97.6	28.0

Note:  $V_{OUT} = (R_1 + R_2) / R_2 \times 0.8$

**ELECTRICAL CHARACTERISTICS**(V<sub>IN</sub> = V<sub>OUT (NOMINAL)</sub> + 0.5V<sup>(1)</sup>, Full = -40°C to +85°C, unless otherwise noted.)

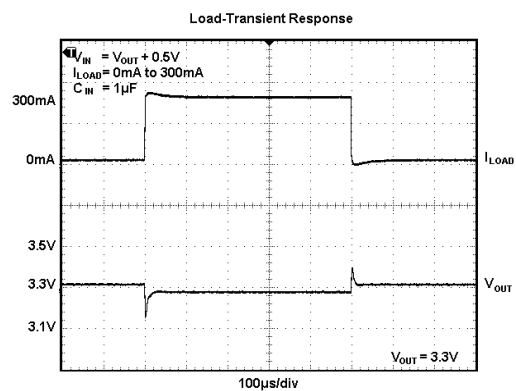
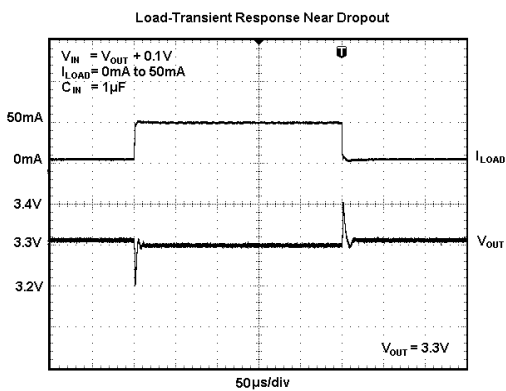
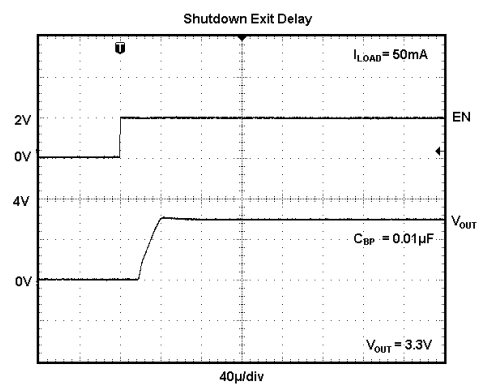
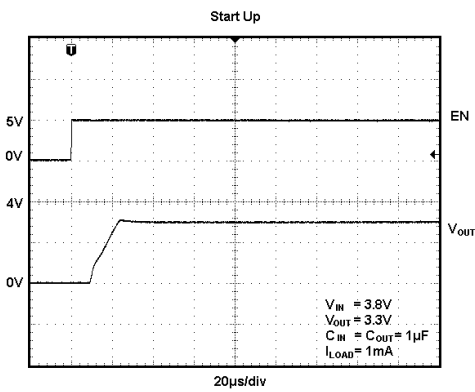
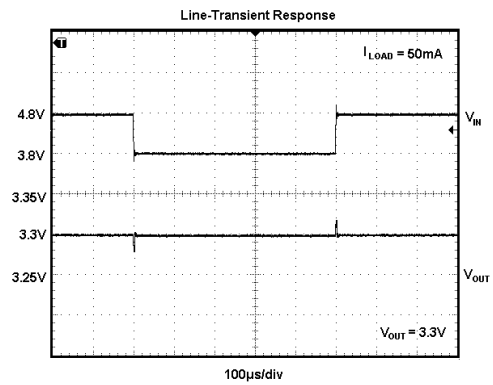
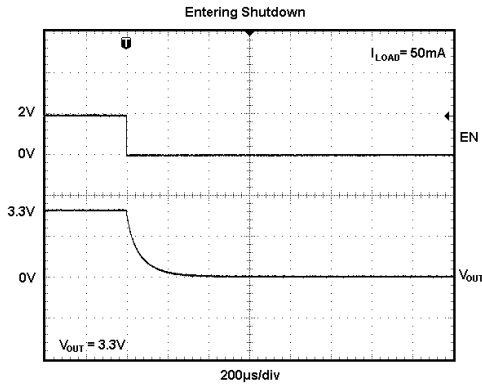
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS	
Input Voltage	V <sub>IN</sub>		+25°C	2.5		5.5	V	
Output Voltage Accuracy <sup>(1)</sup>			+25°C	-2		+2	%	
Maximum Output Current		SOT23-5	+25°C	300			mA	
		V <sub>OUT</sub> < 1V, SC70-5 <sup>(1)</sup>		120				
		V <sub>OUT</sub> = 1.2V, 1.3V, 1.5V, 1.8V, SC70-5 <sup>(1)</sup>		150				
		V <sub>OUT</sub> > 2V, SC70-5 <sup>(1)</sup>		250				
Current Limit	I <sub>LIM</sub>		+25°C	310	500		mA	
Ground Pin Current	I <sub>Q</sub>	No load, EN = 2V	+25°C		120	220	µA	
Dropout Voltage <sup>(2)</sup>		I <sub>OUT</sub> = 1mA	+25°C		0.9		mV	
		I <sub>OUT</sub> = 300mA			270	400		
Line Regulation <sup>(1)</sup>	ΔV <sub>LNR</sub>	V <sub>IN</sub> = 2.5V or (V <sub>OUT</sub> + 0.5V) to 5.5V, I <sub>OUT</sub> = 1mA	+25°C		0.02	0.05	%/V	
Load Regulation	ΔV <sub>LDR</sub>	I <sub>OUT</sub> = 0.1mA to 300mA, C <sub>OUT</sub> = 1µF, V <sub>OUT</sub> > 2V	+25°C		0.002	0.005	%/mA	
		I <sub>OUT</sub> = 0.1mA to 300mA, C <sub>OUT</sub> = 1µF, V <sub>OUT</sub> ≤ 2V			0.004	0.008		
Output Voltage Noise	e <sub>n</sub>	f = 10Hz to 100kHz, C <sub>BP</sub> = 0.01µF, C <sub>OUT</sub> = 10µF	+25°C		30		µV <sub>RMS</sub>	
Power Supply Rejection Ratio	PSRR	C <sub>BP</sub> = 0.1µF, I <sub>LOAD</sub> = 50mA, C <sub>OUT</sub> = 1µF, V <sub>IN</sub> = V <sub>OUT</sub> +1V	f = 217Hz	+25°C		74		dB
			f = 1kHz	+25°C		68		dB
<b>SHUTDOWN<sup>(3)</sup></b>								
EN Input Threshold	V <sub>IH</sub>	V <sub>IN</sub> = 2.5V to 5.5V, V <sub>EN</sub> = -0.3V to V <sub>IN</sub>	Full	1.5			V	
	V <sub>IL</sub>		Full			0.3		
EN Input Bias Current	I <sub>B(SHDN)</sub>	EN = 0V and EN = 5.5V	+25°C		0.01	1	µA	
			Full		0.01			
Shutdown Supply Current	I <sub>Q(SHDN)</sub>	EN = 0.4V	+25°C		0.01	1	µA	
			Full		0.01			
Shutdown Exit Delay <sup>(4)</sup>		C <sub>BP</sub> = 0.01µF, C <sub>OUT</sub> =1µF, No Load	+25°C		30		µs	
<b>THERMAL PROTECTION</b>								
Thermal Shutdown Temperature	T <sub>SHDN</sub>				150		°C	
Thermal Shutdown Hysteresis	ΔT <sub>SHDN</sub>				15		°C	

Note 1: V<sub>IN</sub> = V<sub>OUT (NOMINAL)</sub> + 0.5V or 2.5V, whichever is greater.Note 2: The dropout voltage is defined as V<sub>IN</sub> - V<sub>OUT</sub>, when V<sub>OUT</sub> is 100mV below the value of V<sub>OUT</sub> for V<sub>IN</sub> = V<sub>OUT</sub> + 0.5V.  
(Only applicable for V<sub>OUT</sub> = +2.5V to +5.0V.)Note 3: V<sub>EN</sub> = -0.3V to V<sub>IN</sub>Note 4: Time needed for V<sub>OUT</sub> to reach 90% of final value.

Specifications subject to changes without notice.

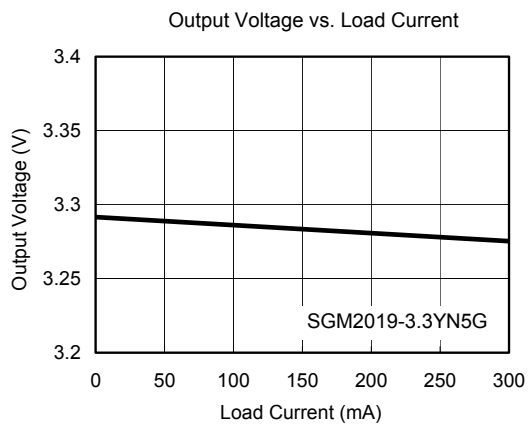
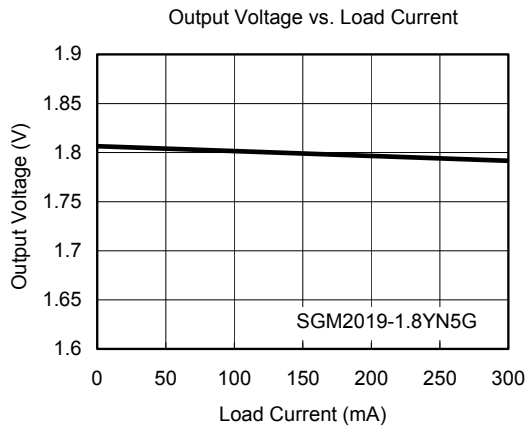
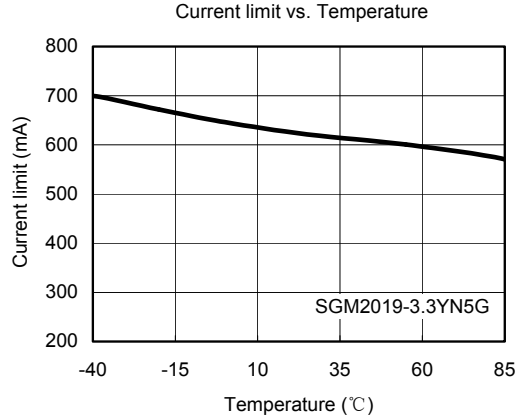
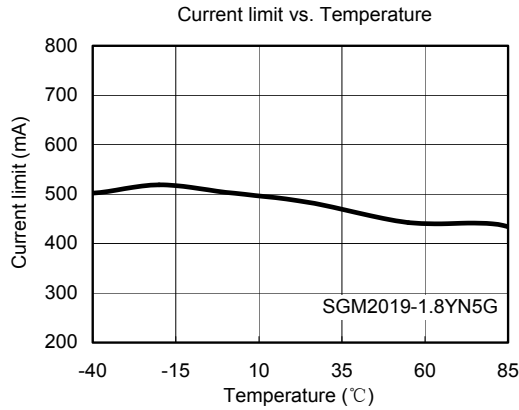
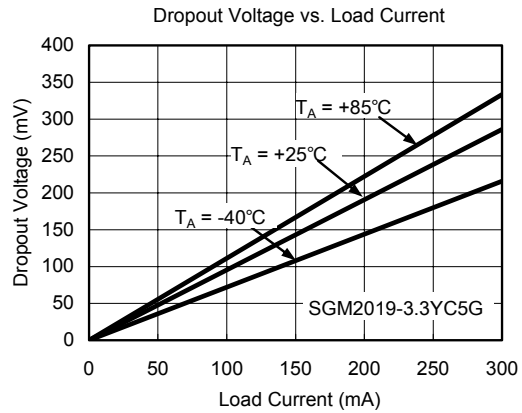
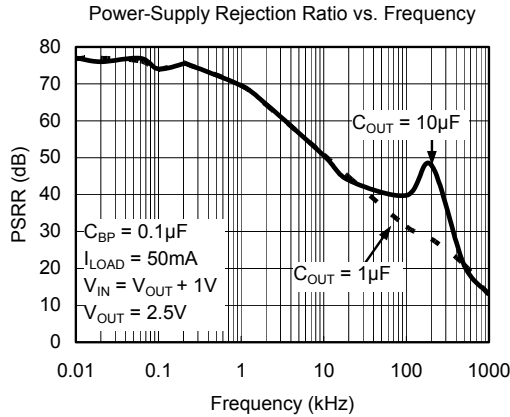
**TYPICAL OPERATING CHARACTERISTICS**

$V_{IN} = V_{OUT(NOMINAL)} + 0.5V$  or  $2.5V$  (whichever is greater),  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 1\mu F$ ,  $C_{BP} = 0.01\mu F$ ,  $T_A = +25^\circ C$ , unless otherwise noted.



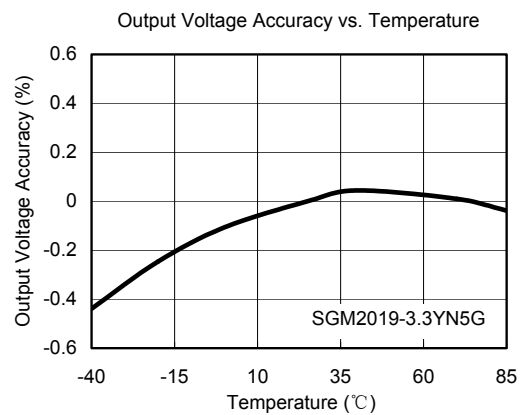
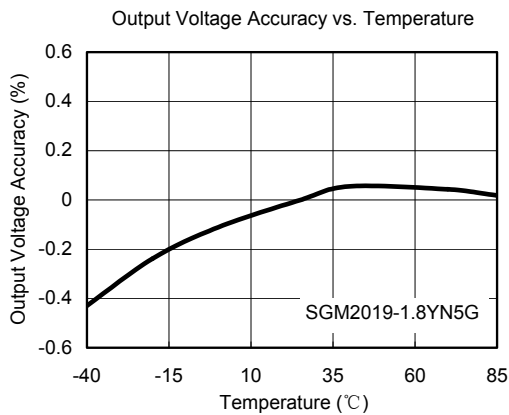
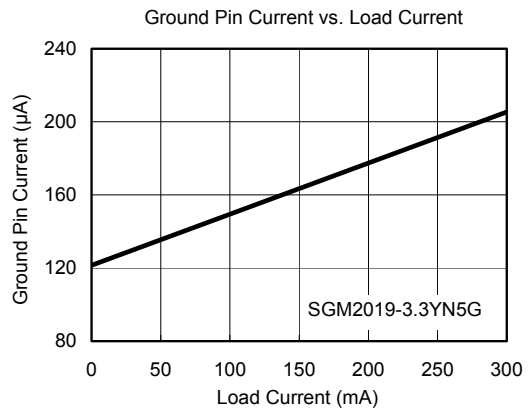
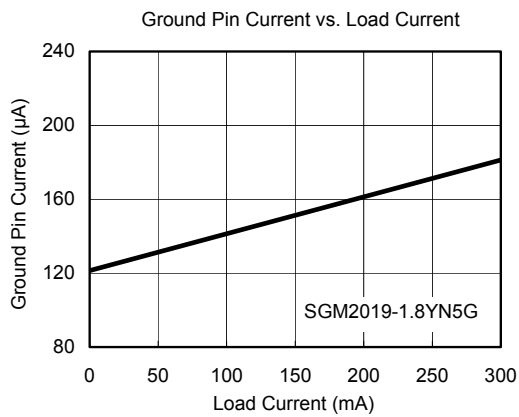
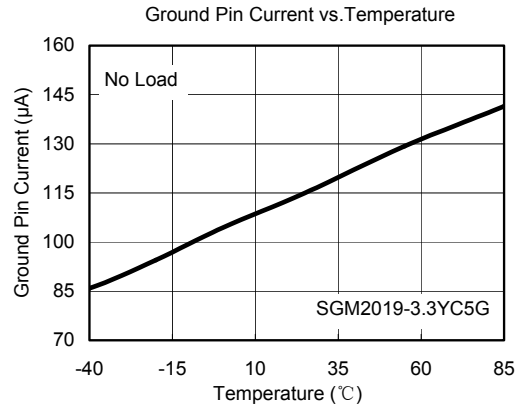
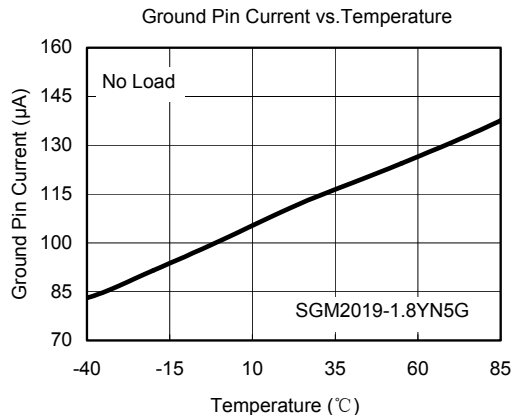
TYPICAL OPERATING CHARACTERISTICS

$V_{IN} = V_{OUT(NOMINAL)} + 0.5V$  or  $2.5V$  (whichever is greater),  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 1\mu F$ ,  $C_{BP} = 0.01\mu F$ ,  $T_A = +25^\circ C$ , unless otherwise noted.



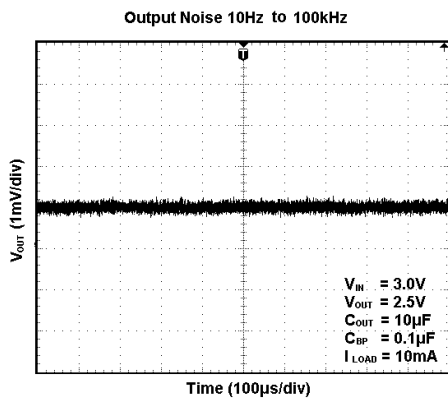
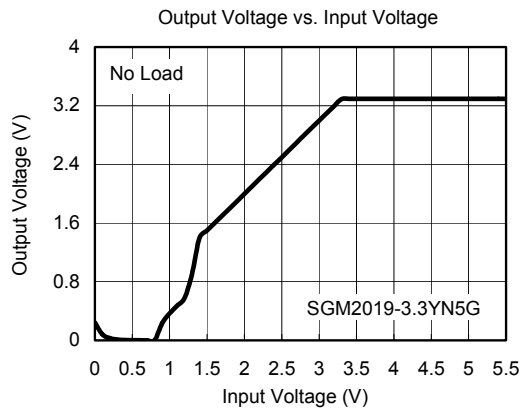
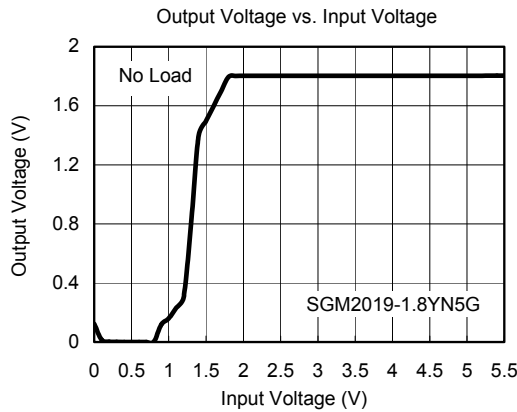
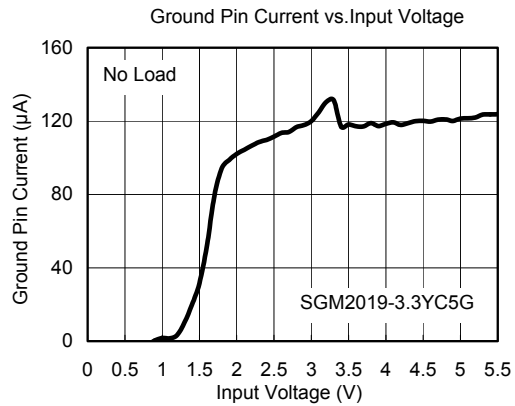
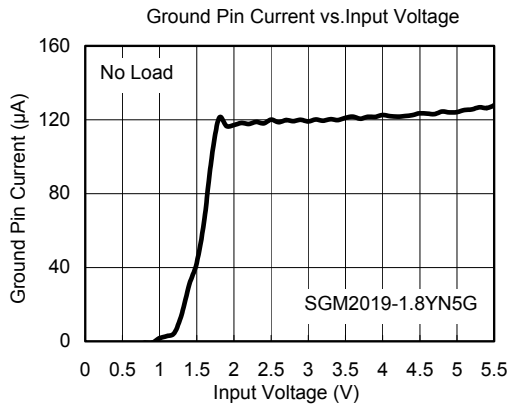
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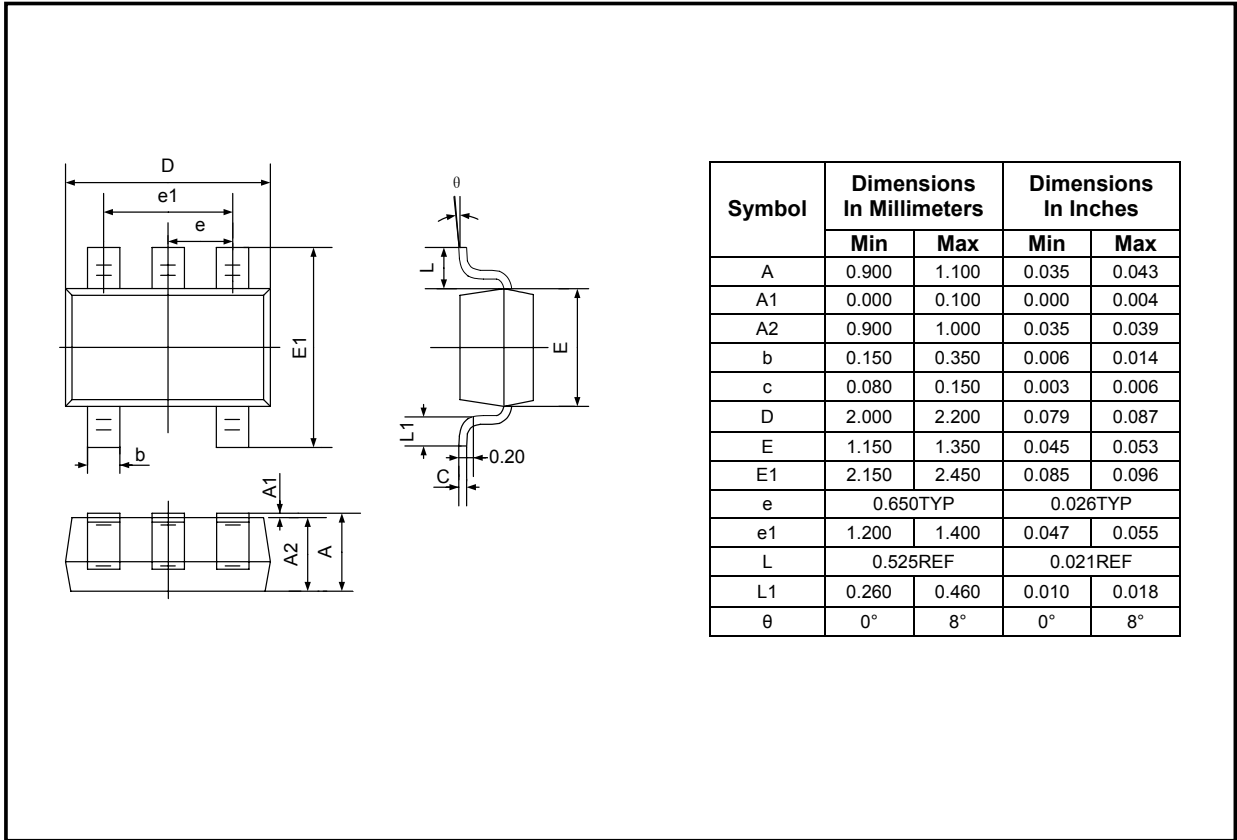
## EXPANDED ORDERING INFORMATION

MODEL	V <sub>out</sub> (V)	PIN-PACKAGE	ORDERING NUMBER	PACKAGE MARKING	PACKAGE OPTION
SGM2019-0.9	0.9V	SC70-5	SGM2019-0.9YC5G/TR	YJ09	Tape and Reel, 3000
SGM2019-0.9	0.9V	SOT23-5	SGM2019-0.9YN5G/TR	YJ09	Tape and Reel, 3000
SGM2019-1.2	1.2V	SC70-5	SGM2019-1.2YC5G/TR	YJ12	Tape and Reel, 3000
SGM2019-1.2	1.2V	SOT23-5	SGM2019-1.2YN5G/TR	YJ12	Tape and Reel, 3000
SGM2019-1.3	1.3V	SC70-5	SGM2019-1.3YC5G/TR	YJ13	Tape and Reel, 3000
SGM2019-1.3	1.3V	SOT23-5	SGM2019-1.3YN5G/TR	YJ13	Tape and Reel, 3000
SGM2019-1.5	1.5V	SC70-5	SGM2019-1.5YC5G/TR	YJ15	Tape and Reel, 3000
SGM2019-1.5	1.5V	SOT23-5	SGM2019-1.5YN5G/TR	YJ15	Tape and Reel, 3000
SGM2019-1.8	1.8V	SC70-5	SGM2019-1.8YC5G/TR	YJ18	Tape and Reel, 3000
SGM2019-1.8	1.8V	SOT23-5	SGM2019-1.8YN5G/TR	YJ18	Tape and Reel, 3000
SGM2019-2.1	2.1V	SC70-5	SGM2019-2.1YC5G/TR	YJ21	Tape and Reel, 3000
SGM2019-2.1	2.1V	SOT23-5	SGM2019-2.1YN5G/TR	YJ21	Tape and Reel, 3000
SGM2019-2.5	2.5V	SC70-5	SGM2019-2.5YC5G/TR	YJ25	Tape and Reel, 3000
SGM2019-2.5	2.5V	SOT23-5	SGM2019-2.5YN5G/TR	YJ25	Tape and Reel, 3000
SGM2019-2.6	2.6V	SC70-5	SGM2019-2.6YC5G/TR	YJ26	Tape and Reel, 3000
SGM2019-2.6	2.6V	SOT23-5	SGM2019-2.6YN5G/TR	YJ26	Tape and Reel, 3000
SGM2019-2.7	2.7V	SC70-5	SGM2019-2.7YC5G/TR	YJ27	Tape and Reel, 3000
SGM2019-2.7	2.7V	SOT23-5	SGM2019-2.7YN5G/TR	YJ27	Tape and Reel, 3000
SGM2019-2.8	2.8V	SC70-5	SGM2019-2.8YC5G/TR	YJ28	Tape and Reel, 3000
SGM2019-2.8	2.8V	SOT23-5	SGM2019-2.8YN5G/TR	YJ28	Tape and Reel, 3000
SGM2019-2.85	2.85V	SC70-5	SGM2019-2.85YC5G/TR	YJ2J	Tape and Reel, 3000
SGM2019-2.85	2.85V	SOT23-5	SGM2019-2.85YN5G/TR	YJ2J	Tape and Reel, 3000
SGM2019-2.9	2.9V	SC70-5	SGM2019-2.9YC5G/TR	YJ29	Tape and Reel, 3000
SGM2019-2.9	2.9V	SOT23-5	SGM2019-2.9YN5G/TR	YJ29	Tape and Reel, 3000
SGM2019-3.0	3.0V	SC70-5	SGM2019-3.0YC5G/TR	YJ30	Tape and Reel, 3000
SGM2019-3.0	3.0V	SOT23-5	SGM2019-3.0YN5G/TR	YJ30	Tape and Reel, 3000
SGM2019-3.1	3.1V	SC70-5	SGM2019-3.1YC5G/TR	YJ31	Tape and Reel, 3000
SGM2019-3.1	3.1V	SOT23-5	SGM2019-3.1YN5G/TR	YJ31	Tape and Reel, 3000
SGM2019-3.2	3.2V	SC70-5	SGM2019-3.2YC5G/TR	YJ32	Tape and Reel, 3000
SGM2019-3.2	3.2V	SOT23-5	SGM2019-3.2YN5G/TR	YJ32	Tape and Reel, 3000
SGM2019-3.3	3.3V	SC70-5	SGM2019-3.3YC5G/TR	YJ33	Tape and Reel, 3000
SGM2019-3.3	3.3V	SOT23-5	SGM2019-3.3YN5G/TR	YJ33	Tape and Reel, 3000
SGM2019-3.6	3.6V	SC70-5	SGM2019-3.6YC5G/TR	YJ36	Tape and Reel, 3000
SGM2019-3.6	3.6V	SOT23-5	SGM2019-3.6YN5G/TR	YJ36	Tape and Reel, 3000
SGM2019-4.2	4.2V	SC70-5	SGM2019-4.2YC5G/TR	YJ42	Tape and Reel, 3000
SGM2019-4.2	4.2V	SOT23-5	SGM2019-4.2YN5G/TR	YJ42	Tape and Reel, 3000
SGM2019-5.0	5.0V	SC70-5	SGM2019-5.0YC5G/TR	YJ50	Tape and Reel, 3000
SGM2019-5.0	5.0V	SOT23-5	SGM2019-5.0YN5G/TR	YJ50	Tape and Reel, 3000
SGM2019-ADJ	adjustable	SC70-5	SGM2019-ADJYC5G/TR	YJAA	Tape and Reel, 3000
SGM2019-ADJ	adjustable	SOT23-5	SGM2019-ADJYN5G/TR	YJAA	Tape and Reel, 3000

Notes: SC70-5 package is same as SOT-353 package.

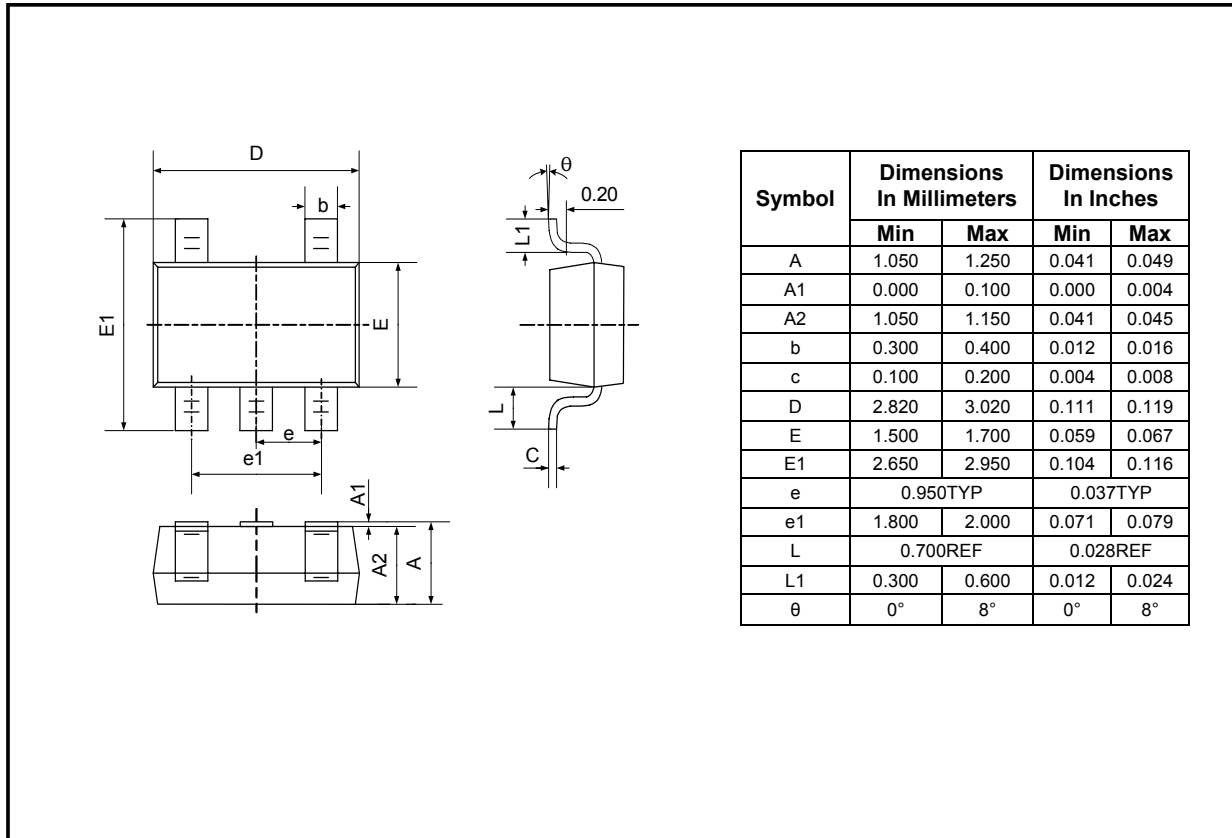
PACKAGE OUTLINE DIMENSIONS

SC70-5 / SOT-353



PACKAGE OUTLINE DIMENSIONS

SOT23-5



04/2009 REV. A

SGMICRO is dedicated to provide high quality and high performance analog IC products to customers. All SGMICRO products meet the highest industry standards with strict and comprehensive test and quality control systems to achieve world-class consistency and reliability.

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