

### GENERAL DESCRIPTION

The SGM2021 is a low power, low noise and low dropout voltage RF linear regulator. It is capable of supplying 300mA output current with typical dropout voltage of only 270mV. The operating input voltage range is from 2.5V to 5.5V. The fixed output voltage range is from 0.9V to 5.0V.

Other features include output current limit and thermal shutdown protection.

The SGM2020 is suitable for application which needs low noise and low power supply, such as MP3 players, palmtop computers, etc.

The SGM2021 is available in a Green SOT-23-3 package. It operates over an operating temperature range of -40°C to +85°C.

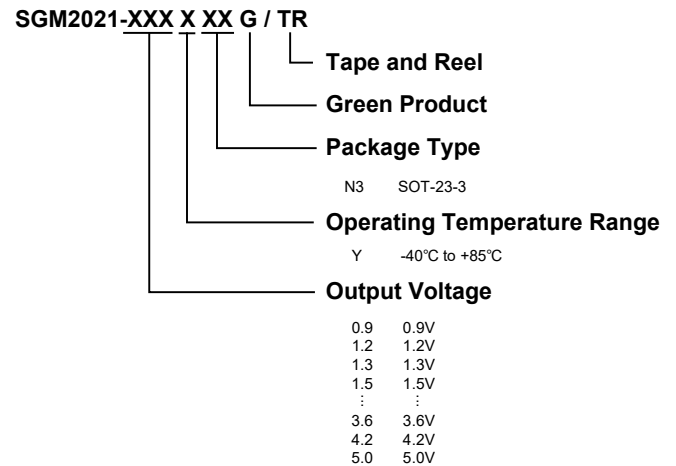
### FEATURES

- **Operating Input Voltage Range: 2.5V to 5.5V**
- **Fixed Output Voltages:**  
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 and 5.0V
- **Output Voltage Accuracy: ±2.5% at +25°C**
- **Low Output Noise: 140µV<sub>RMS</sub> (TYP)**
- **Low Dropout Voltage: 270mV (TYP) at 300mA**
- **High PSRR: 69dB (TYP) at 100Hz**
- **Low No Load Supply Current: 120µA (TYP)**
- **Thermal Shutdown Protection**
- **Output Current Limit**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green SOT-23-3 Package**

### APPLICATIONS

- Modems
- MP3 Players
- Cellular Telephones
- PCMCIA Cards
- Palmtop Computers
- Portable Electronics

### PRODUCT NAME STRUCTURE



### TYPICAL APPLICATION

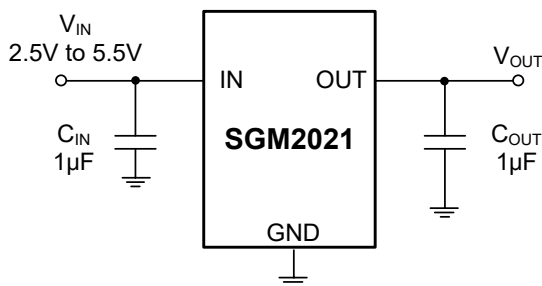


Figure 1. Typical Application Circuit

## PACKAGE/ORDERING INFORMATION

| MODEL        | V <sub>OUT</sub><br>(V) | PACKAGE<br>DESCRIPTION | SPECIFIED<br>TEMPERATURE<br>RANGE | ORDERING<br>NUMBER  | PACKAGE<br>MARKING | PACKING<br>OPTION   |
|--------------|-------------------------|------------------------|-----------------------------------|---------------------|--------------------|---------------------|
| SGM2021-0.9  | 0.9V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-0.9YN3G/TR  | YL09               | Tape and Reel, 3000 |
| SGM2021-1.2  | 1.2V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-1.2YN3G/TR  | YL12               | Tape and Reel, 3000 |
| SGM2021-1.3  | 1.3V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-1.3YN3G/TR  | YL13               | Tape and Reel, 3000 |
| SGM2021-1.5  | 1.5V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-1.5YN3G/TR  | YL15               | Tape and Reel, 3000 |
| SGM2021-1.8  | 1.8V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-1.8YN3G/TR  | YL18               | Tape and Reel, 3000 |
| SGM2021-2.1  | 2.1V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-2.1YN3G/TR  | YL21               | Tape and Reel, 3000 |
| SGM2021-2.5  | 2.5V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-2.5YN3G/TR  | YL25               | Tape and Reel, 3000 |
| SGM2021-2.6  | 2.6V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-2.6YN3G/TR  | YL26               | Tape and Reel, 3000 |
| SGM2021-2.7  | 2.7V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-2.7YN3G/TR  | YL27               | Tape and Reel, 3000 |
| SGM2021-2.8  | 2.8V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-2.8YN3G/TR  | YL28               | Tape and Reel, 3000 |
| SGM2021-2.85 | 2.85V                   | SOT-23-3               | -40°C to +85°C                    | SGM2021-2.85YN3G/TR | YL2J               | Tape and Reel, 3000 |
| SGM2021-2.9  | 2.9V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-2.9YN3G/TR  | YL29               | Tape and Reel, 3000 |
| SGM2021-3.0  | 3.0V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-3.0YN3G/TR  | YL30               | Tape and Reel, 3000 |
| SGM2021-3.1  | 3.1V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-3.1YN3G/TR  | YL31               | Tape and Reel, 3000 |
| SGM2021-3.2  | 3.2V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-3.2YN3G/TR  | YL32               | Tape and Reel, 3000 |
| SGM2021-3.3  | 3.3V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-3.3YN3G/TR  | YL33               | Tape and Reel, 3000 |
| SGM2021-3.6  | 3.6V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-3.6YN3G/TR  | YL36               | Tape and Reel, 3000 |
| SGM2021-4.2  | 4.2V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-4.2YN3G/TR  | YL42               | Tape and Reel, 3000 |
| SGM2021-5.0  | 5.0V                    | SOT-23-3               | -40°C to +85°C                    | SGM2021-5.0YN3G/TR  | YL50               | Tape and Reel, 3000 |

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.

## SGM2021

### ABSOLUTE MAXIMUM RATINGS

|   |                                   |
|---|-----------------------------------|
| IN to GND .....   | -0.3V to 6V                       |
| Output Short-Circuit Duration.....                        | Infinite                          |
| OUT to GND .....  | -0.3V to (V <sub>IN</sub> + 0.3V) |
| Power Dissipation, P <sub>D</sub> @ T <sub>A</sub> = 25°C |                                   |
| SOT-23-3 .....  | 0.4W                              |
| Package Thermal Resistance                                |                                   |
| SOT-23-3, θ <sub>JA</sub> .....                           | 250°C/W                           |
| Junction Temperature.....                                 | +150°C                            |
| Storage Temperature Range .....                           | -65°C to +150°C                   |
| Lead Temperature (Soldering, 10s).....                    | +260°C                            |
| ESD Susceptibility  |                                   |
| HBM.....  | 4000V                             |
| MM.....   | 400V                              |

### RECOMMENDED OPERATING CONDITIONS

|                                   |                |
|-----------------------------------|----------------|
| Operating Temperature Range ..... | -40°C to +85°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.

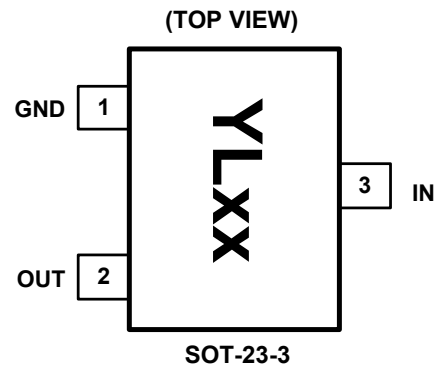
### ESD SENSITIVITY CAUTION

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



#### NOTE:

- (1) The location of pin 1 on the YLxx is determined by orienting the package marking as shown.
- (2) "xx" is the output voltage code. (For example: when the output voltage is 1.8V, it is expressed as 18.)

### PIN DESCRIPTION

| PIN | NAME | FUNCTION  |
|-----|------|---|
| 1   | GND  | Ground.   |
| 2   | OUT  | Regulator Output Pin.   |
| 3   | IN   | Regulator Input Pin. It is recommended to use a 10µF or larger ceramic capacitor from IN pin to ground. |

**ELECTRICAL CHARACTERISTICS**(V<sub>IN</sub> = V<sub>OUT (NOMINAL)</sub> + 0.5V or 2.5V, whichever is greater, T<sub>A</sub> = +25°C, unless otherwise noted.)

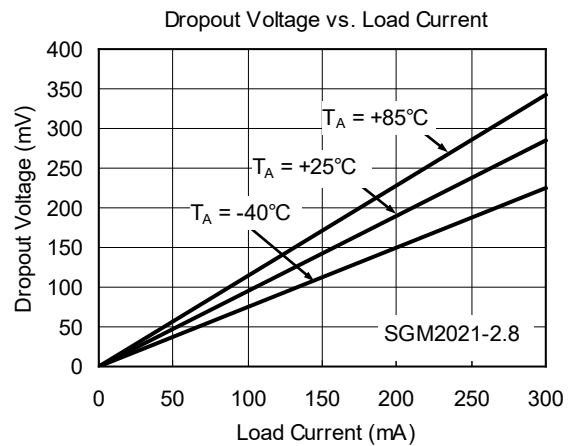
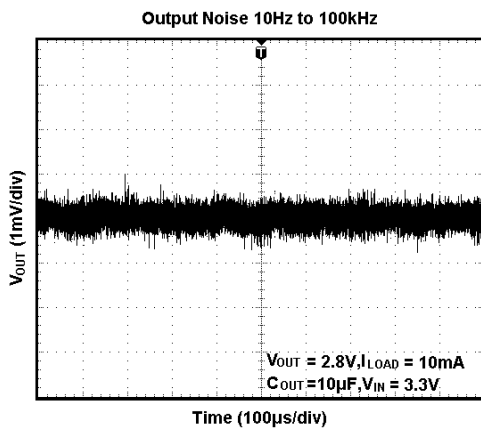
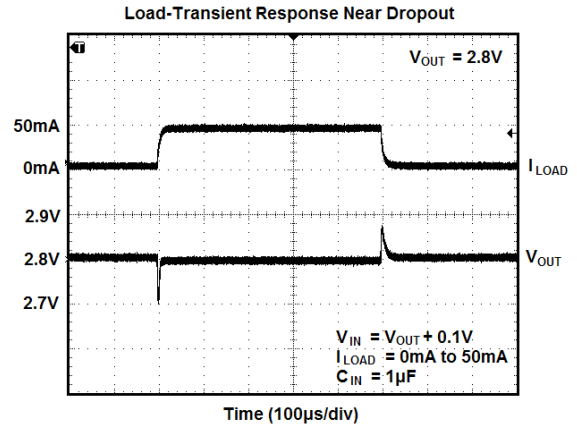
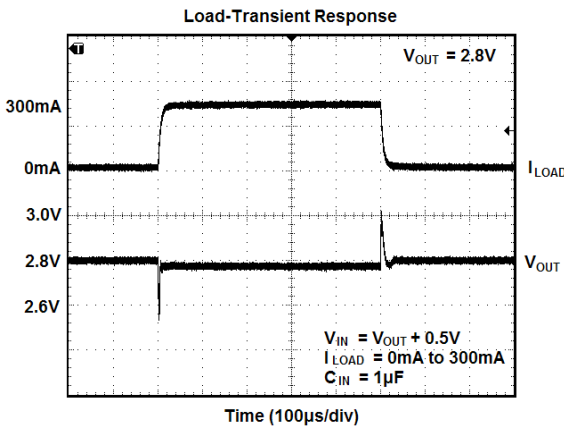
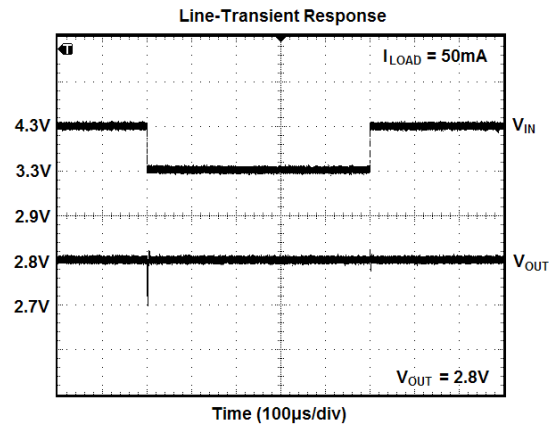
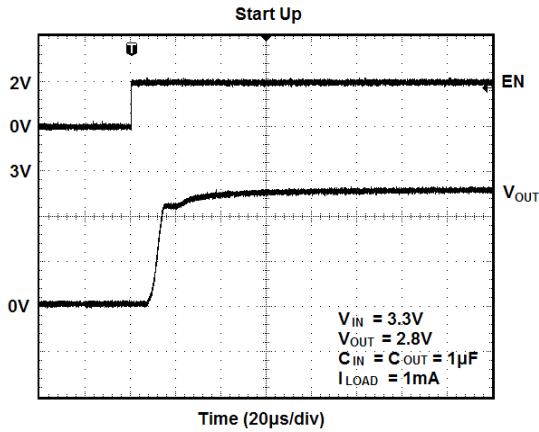
| PARAMETER                      | SYMBOL             | CONDITIONS  | MIN       | TYP   | MAX   | UNITS             |    |
|--------------------------------|--------------------|---|-----------|-------|-------|-------------------|----|
| Input Voltage                  | V <sub>IN</sub>    |   | 2.5       |       | 5.5   | V                 |    |
| Output Voltage Accuracy        |                    | I <sub>OUT</sub> = 0.1mA, T <sub>A</sub> = +25°C  | -2.5      |       | 2.5   | %                 |    |
| Maximum Output Current         |                    |   | 300       |       |       | mA                |    |
| Current Limit                  | I <sub>LIM</sub>   |   | 310       | 500   |       | mA                |    |
| Ground Pin Current             | I <sub>Q</sub>     | No load   |           | 120   | 220   | μA                |    |
| Dropout Voltage <sup>(1)</sup> |                    | I <sub>OUT</sub> = 1mA  |           | 0.9   |       | mV                |    |
|                                |                    | I <sub>OUT</sub> = 300mA  |           | 270   | 400   |                   |    |
| Line Regulation                | 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         |           | 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            |           | 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>OUT</sub> = 10μF   |           | 140   |       | μV <sub>RMS</sub> |    |
| Power Supply Rejection Rate    | PSRR               | I <sub>OUT</sub> = 50mA,<br>C <sub>OUT</sub> = 1μF, V <sub>IN</sub> = V <sub>OUT</sub> + 1V | f = 217Hz |       | 62    |                   | dB |
|                                |                    |   | f = 100Hz |       | 69    |                   | dB |
| <b>Thermal Protection</b>      |                    |   |           |       |       |                   |    |
| Thermal Shutdown Temperature   | T <sub>SHDN</sub>  |   |           | 150   |       | °C                |    |
| Thermal Shutdown Hysteresis    | ΔT <sub>SHDN</sub> |   |           | 15    |       | °C                |    |

## NOTE:

- 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).

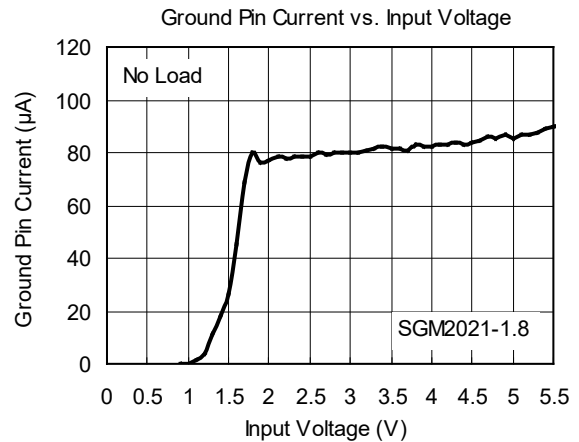
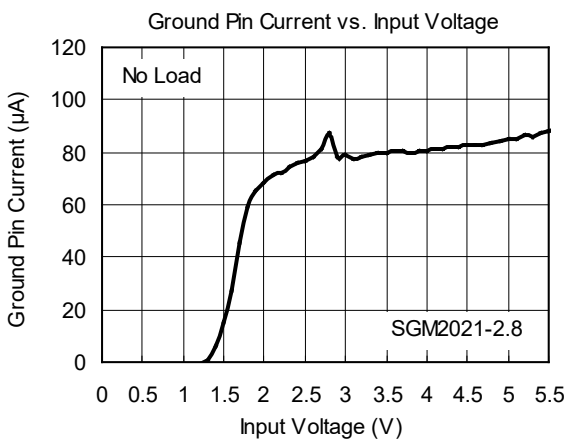
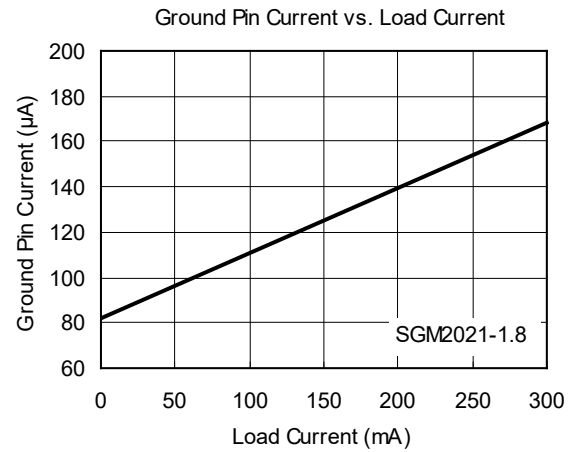
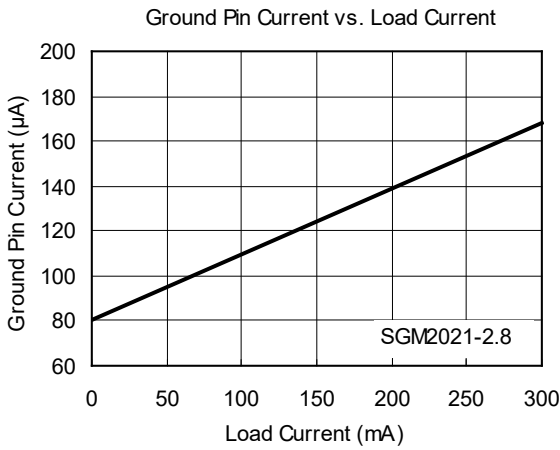
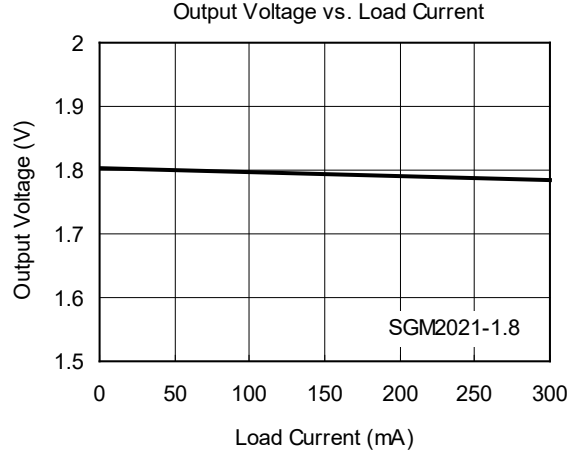
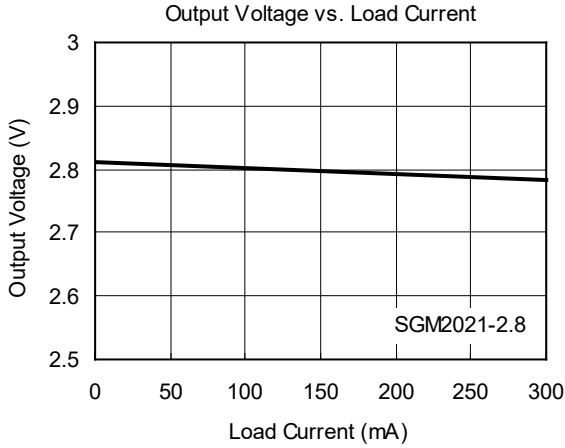
TYPICAL PERFORMANCE CHARACTERISTICS

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



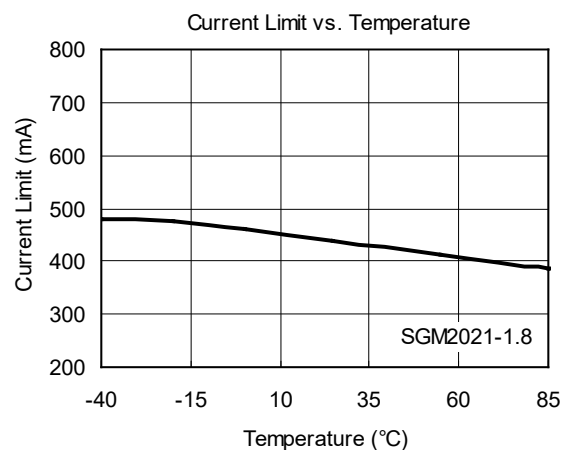
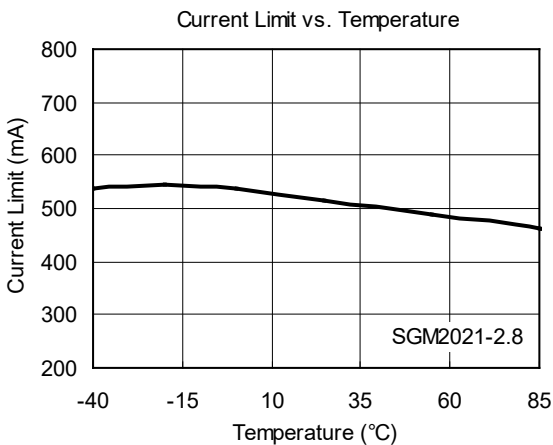
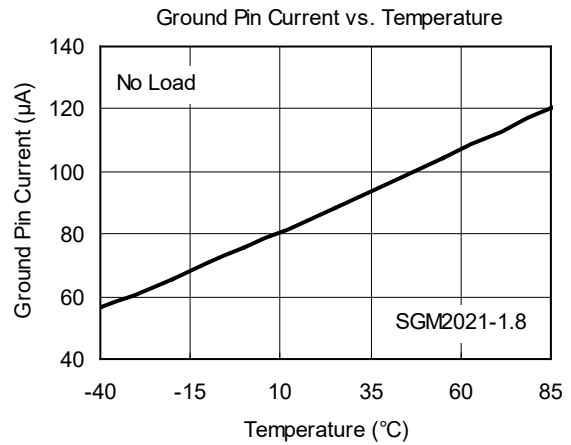
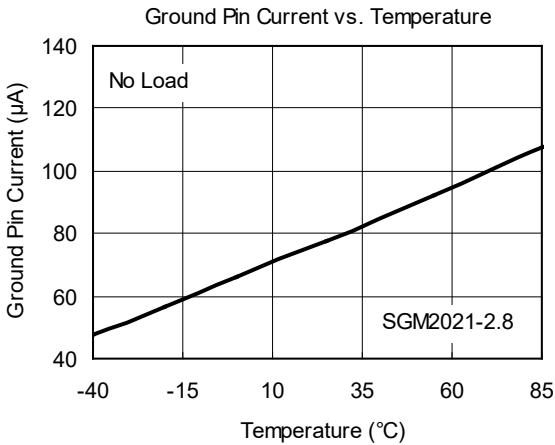
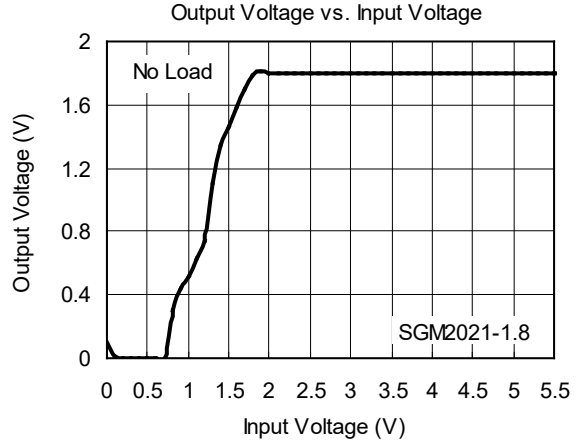
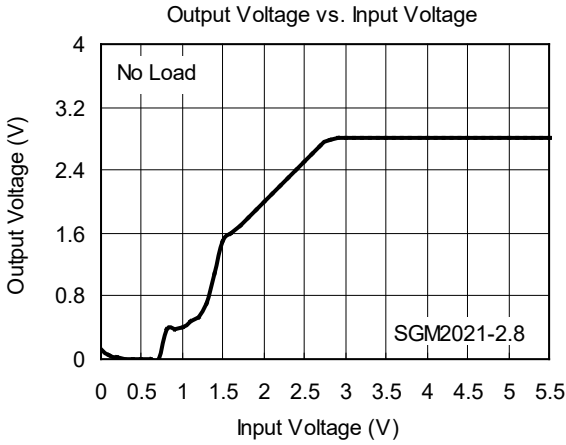
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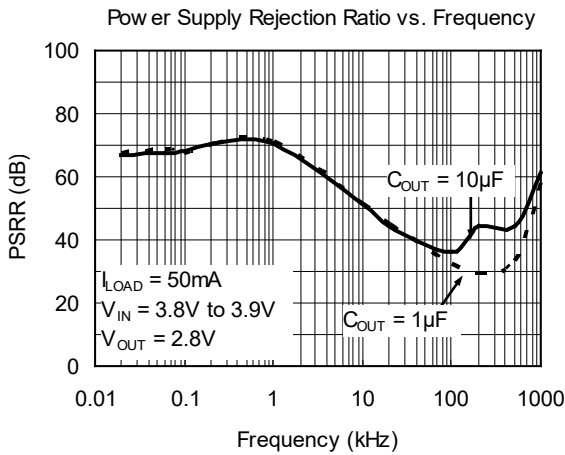
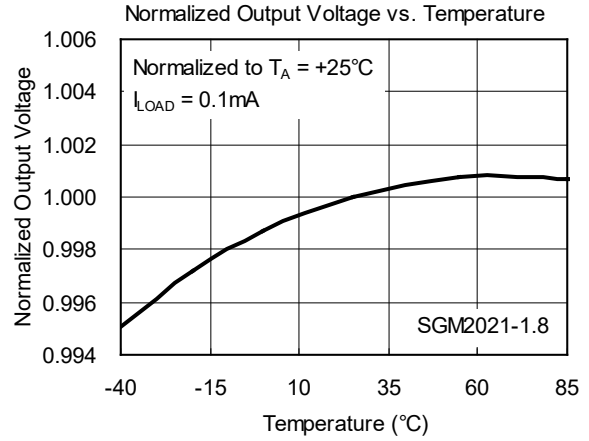
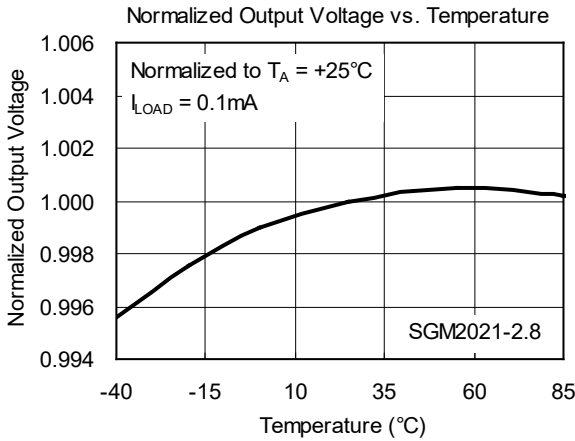
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**TYPICAL PERFORMANCE CHARACTERISTICS (continued)**

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



**REVISION HISTORY**

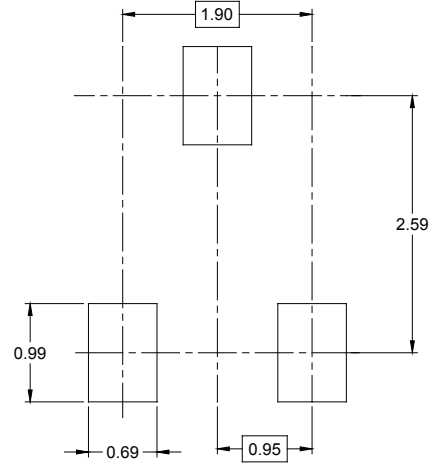
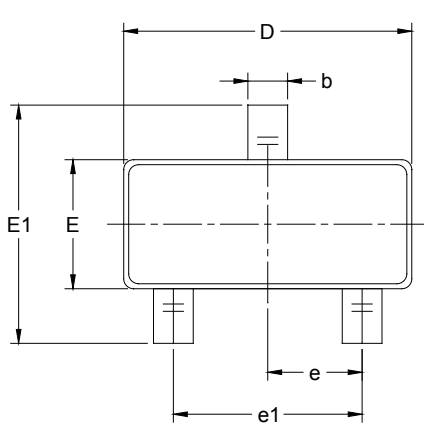
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| APRIL 2016 – REV.B to REV.B.1   | Page |
|---|------|
| Changed Normalized Output Voltage vs. Temperature (SGM2021-2.8 and SGM2021-1.8) ..... | 9    |

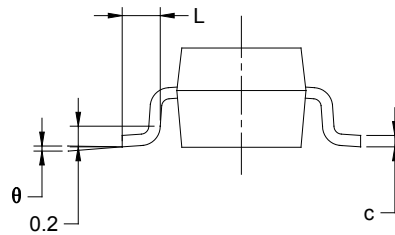
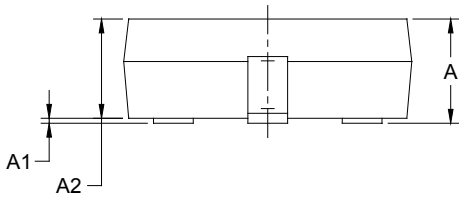


PACKAGE OUTLINE DIMENSIONS

SOT-23-3



RECOMMENDED LAND PATTERN (Unit: mm)



| Symbol   | Dimensions<br>In Millimeters |       | Dimensions<br>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 |
| $\theta$ | 0°                           | 8°    | 0°                      | 8°    |

# 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 |
|--------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| SOT-23-3     | 7"            | 9.0                | 3.20    | 3.30    | 1.30    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |

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# 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 |
|-------------|-------------|------------|-------------|--------------|
| 7" (Option) | 368         | 227        | 224         | 8            |
| 7"          | 442         | 410        | 224         | 18           |

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