

GENERAL DESCRIPTION

The SGM2021 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 SGM2021 series also offer low dropout voltage to prolong battery life in portable electronics.

The SGM2021 features include output current limit and thermal shutdown protection.

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

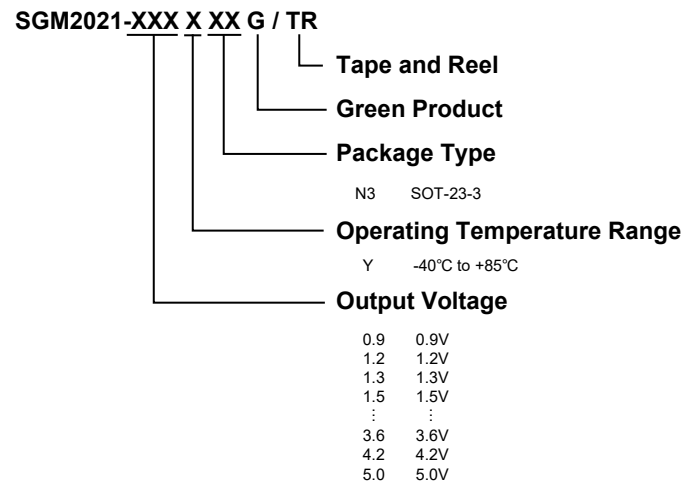
APPLICATIONS

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

FEATURES

- **Low Output Noise**
- **Low Dropout Voltage**
- **Maximum Output Current: 300mA**
- **Thermal-Overload Protection**
- **Output Current Limit**
- **Available 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**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green SOT-23-3 Package**

PRODUCT NAME STRUCTURE



TYPICAL APPLICATION

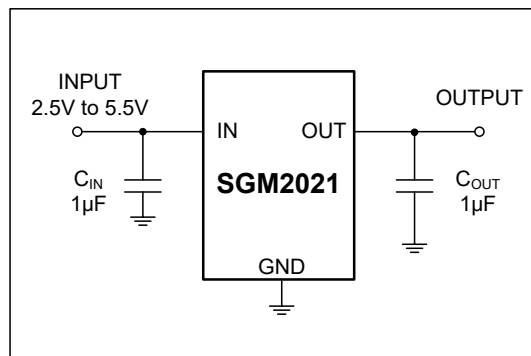


Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	V _{OUT} (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING 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 _{IN} + 0.3V)
Power Dissipation, P _D @ T _A = 25°C	
SOT-23-3	0.4W
Package Thermal Resistance	
SOT-23-3, θ _{JA}	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
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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.

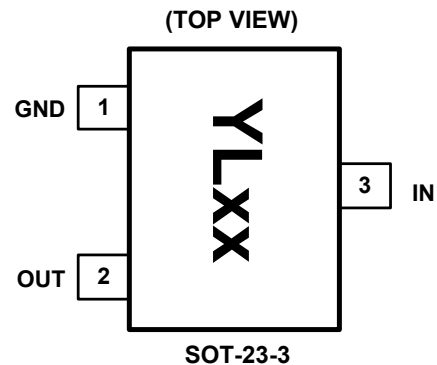
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged 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, 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.
3	IN	Regulator Input. Supply voltage can range from 2.5V to 5.5V. Bypass with a 1µF capacitor to GND.

ELECTRICAL CHARACTERISTICS(V_{IN} = V_{OUT (NOMINAL)} + 0.5V or 2.5V, whichever is greater, T_A = +25°C, unless otherwise noted.)

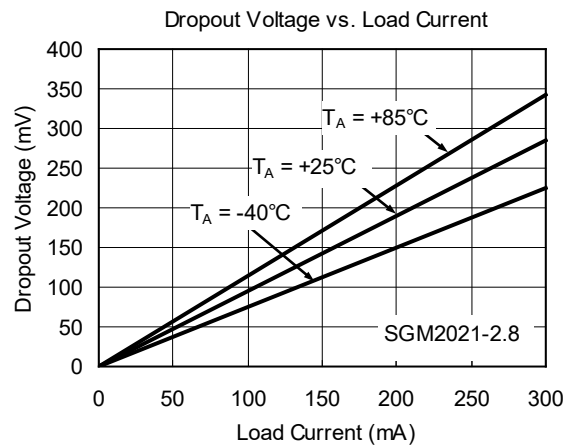
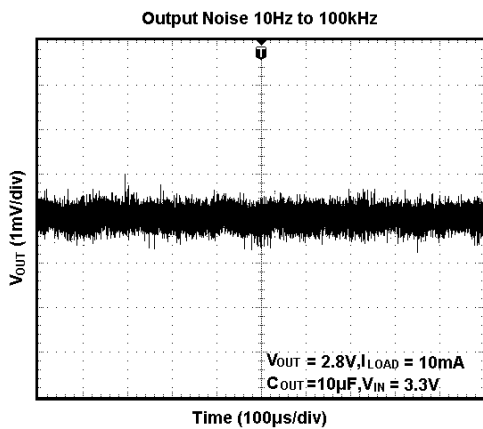
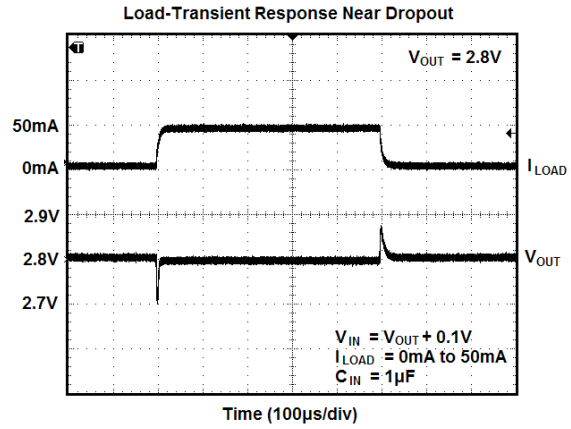
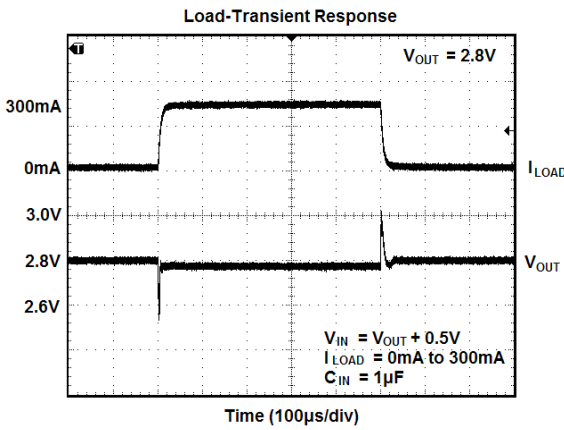
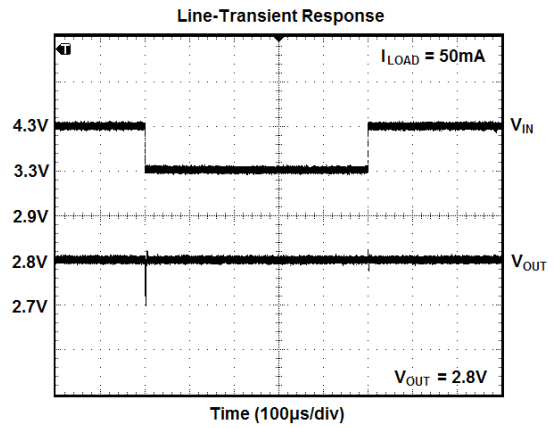
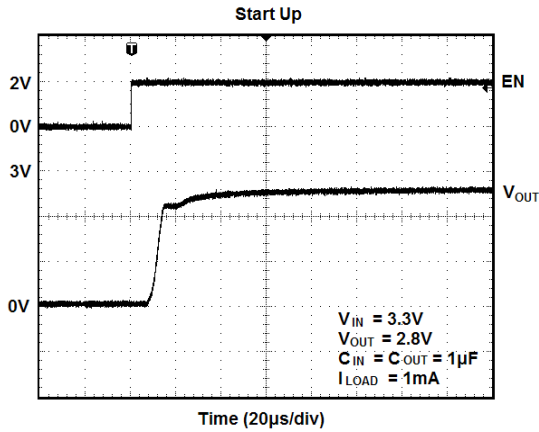
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	
Input Voltage	V _{IN}		2.5		5.5	V	
Output Voltage Accuracy		I _{OUT} = 0.1mA, T _A = +25°C	-2.5		2.5	%	
Maximum Output Current			300			mA	
Current Limit	I _{LIM}		310	500		mA	
Ground Pin Current	I _Q	No load		120	220	μA	
Dropout Voltage ⁽¹⁾		I _{OUT} = 1mA		0.9		mV	
		I _{OUT} = 300mA		270	400		
Line Regulation	ΔV _{LNR}	V _{IN} = 2.5V or (V _{OUT} + 0.5V) to 5.5V, I _{OUT} = 1mA		0.02	0.05	%/V	
Load Regulation	ΔV _{LDR}	I _{OUT} = 0.1mA to 300mA, C _{OUT} = 1μF, V _{OUT} > 2V		0.002	0.005	%/mA	
		I _{OUT} = 0.1mA to 300mA, C _{OUT} = 1μF, V _{OUT} ≤ 2V		0.004	0.008		
Output Voltage Noise	e _n	f = 10Hz to 100kHz, C _{OUT} = 10μF		140		μV _{RMS}	
Power Supply Rejection Rate	PSRR	I _{OUT} = 50mA, C _{OUT} = 1μF, V _{IN} = V _{OUT} + 1V	f = 217Hz		62		dB
			f = 100Hz		69		dB
Thermal Protection							
Thermal Shutdown Temperature	T _{SHDN}			150		°C	
Thermal Shutdown Hysteresis	ΔT _{SHDN}			15		°C	

NOTE:

- The dropout voltage is defined as V_{IN} - V_{OUT}, when V_{OUT} is 100mV below the value of V_{OUT} for V_{IN} = V_{OUT} + 0.5V (only applicable for V_{OUT} = +2.5V to +5.0V).

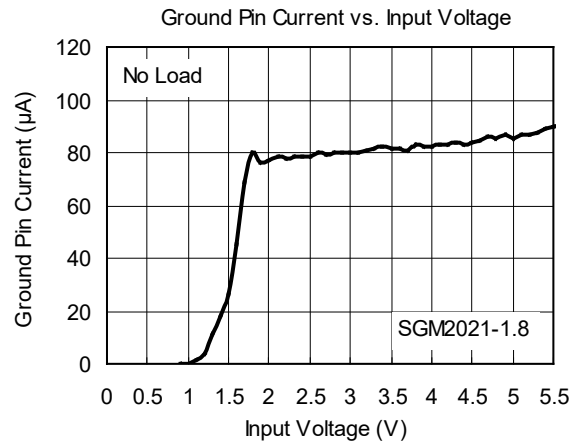
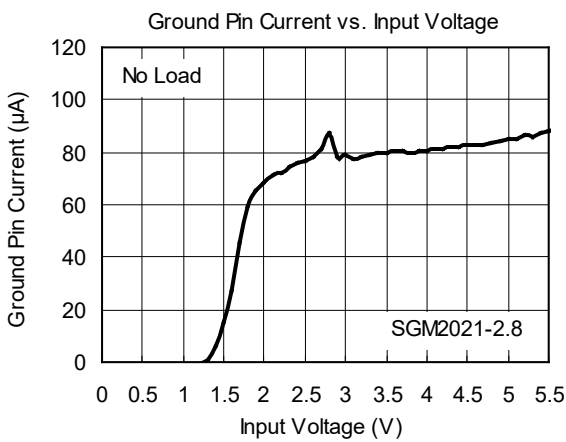
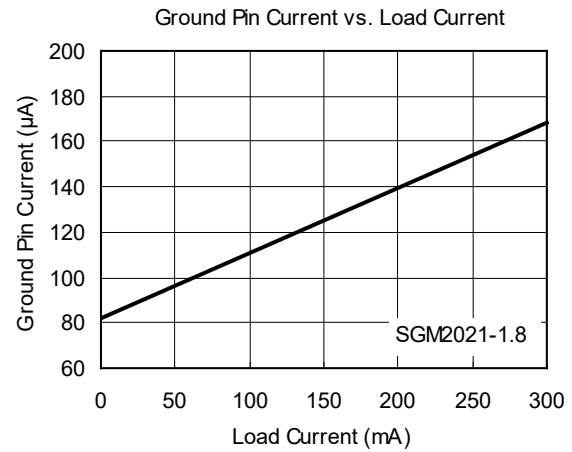
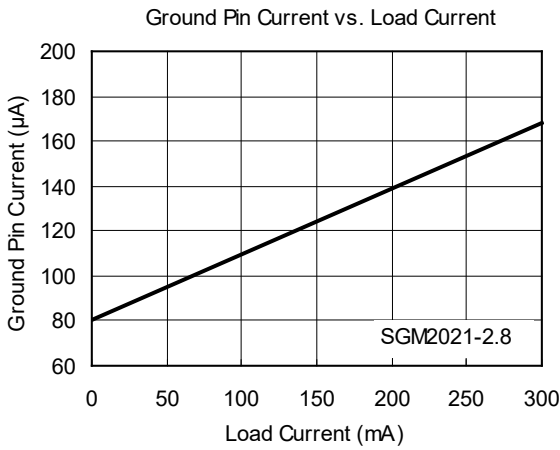
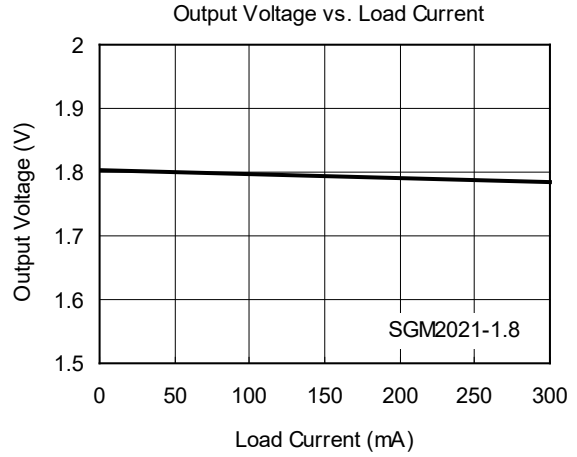
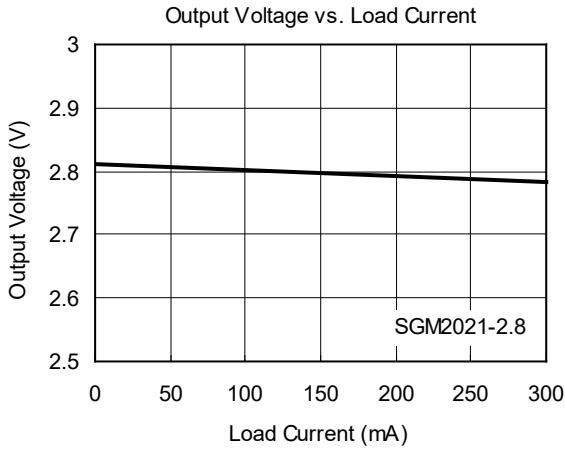
TYPICAL PERFORMANCE CHARACTERISTICS

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



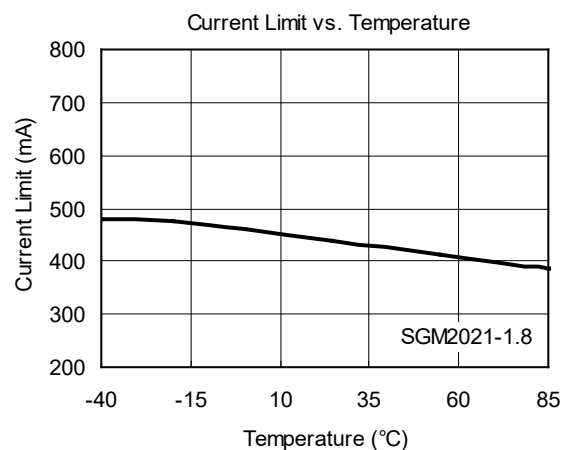
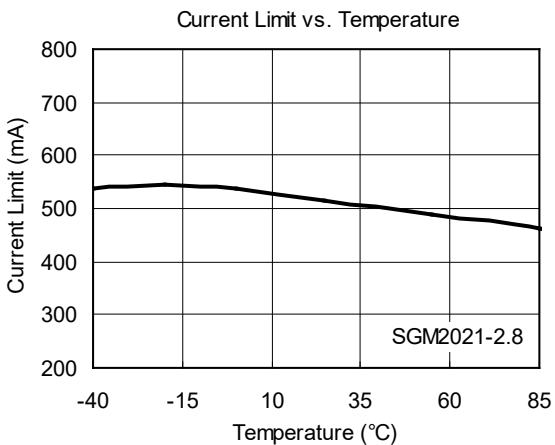
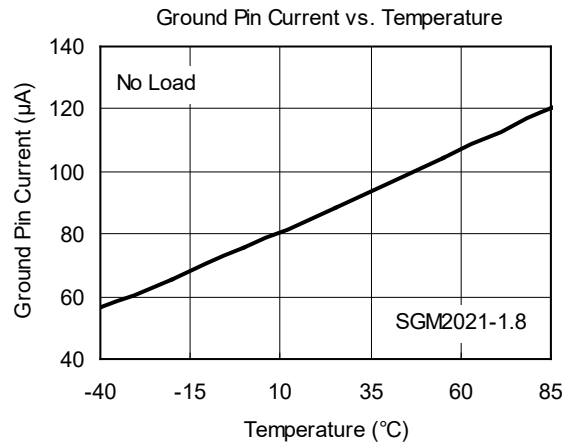
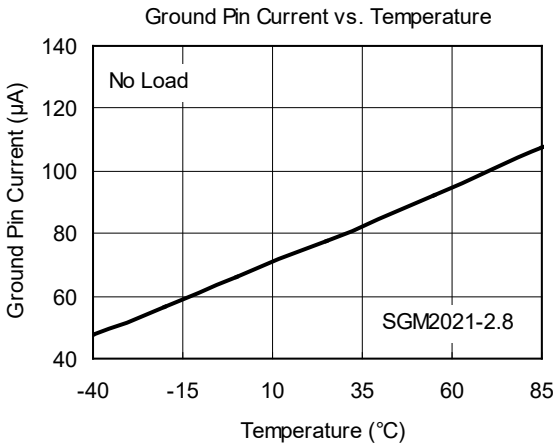
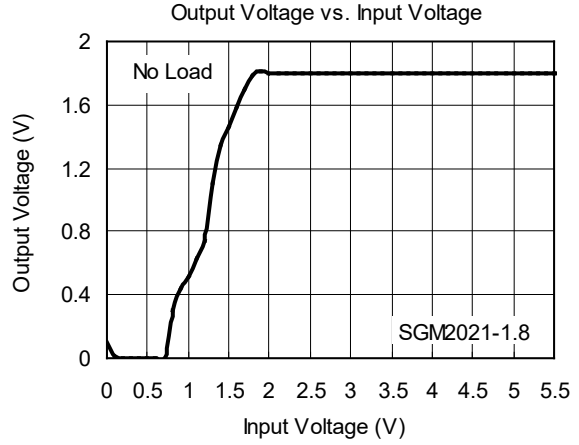
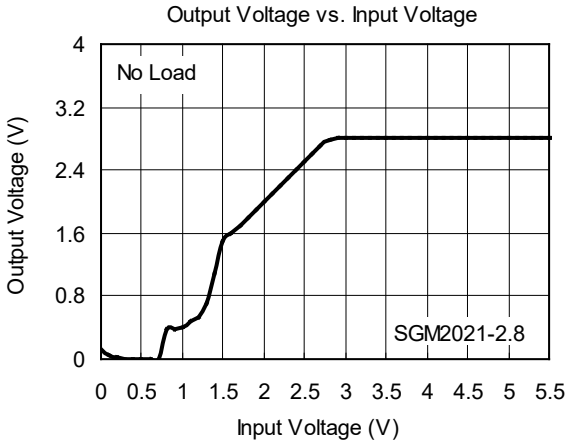
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

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



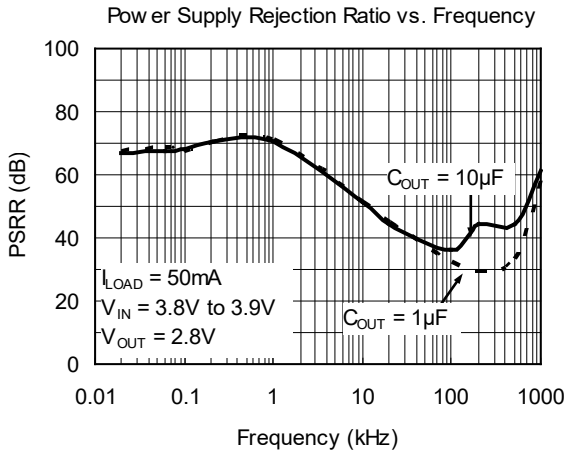
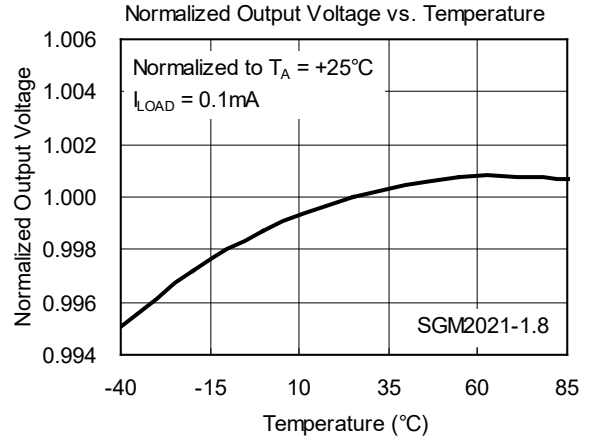
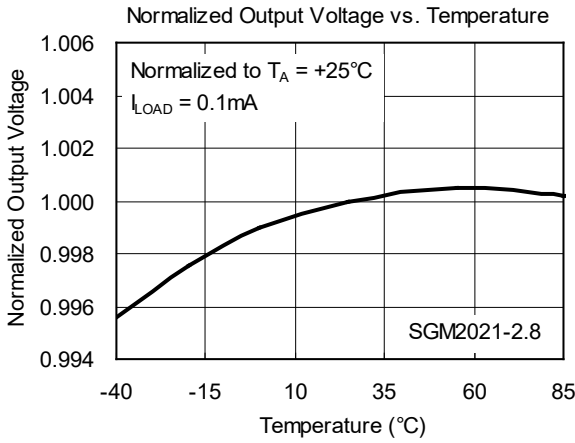
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

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



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

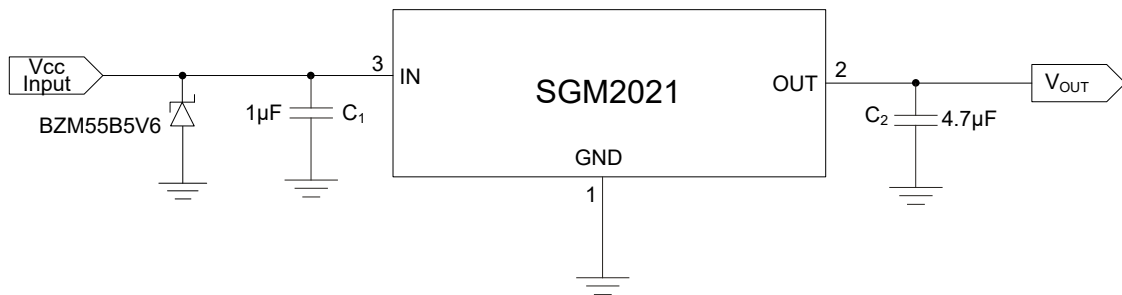
$V_{IN} = V_{OUT (NOMINAL)} + 0.5V$ or $2.5V$ (whichever is greater), $C_{IN} = 1\mu F$, $C_{OUT} = 1\mu F$, $T_A = +25^\circ C$, unless otherwise noted.



SGM2021

APPLICATION NOTE

When LDO is used in handheld products, attention must be paid to voltage spikes which could damage SGM2021. In such applications, voltage spikes will be generated at charger interface and V_{BUS} pin of USB interface when charger adapters and USB equipments are hot-plugged. Besides this, handheld products will be tested on the production line without battery. Test engineer will apply power from the connector pin which connects with positive pole of the battery. When external power supply is turned on suddenly, the voltage spikes will be generated at the battery connector. The voltage spikes will be very high, and it always exceeds the absolute maximum input voltage (6.0V) of LDO. In order to get robust design, design engineer needs to clear up this voltage spike. Zener diode is a cheap and effective solution to eliminate such voltage spike. For example, BZM55B5V6 is a 5.6V small package Zener diode which can be used to remove voltage spikes in cell phone designs. The schematic is shown below.



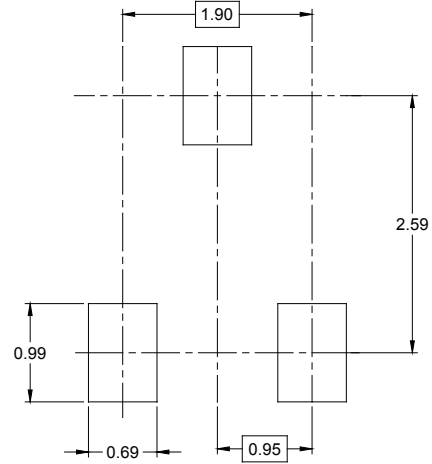
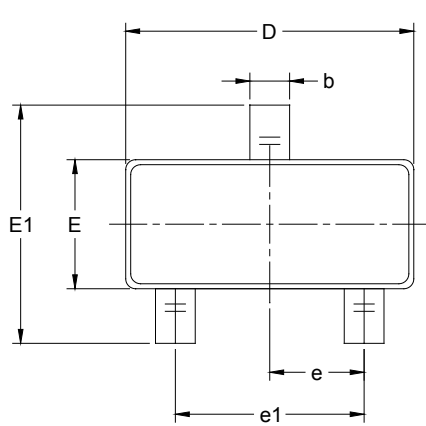
REVISION HISTORY

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

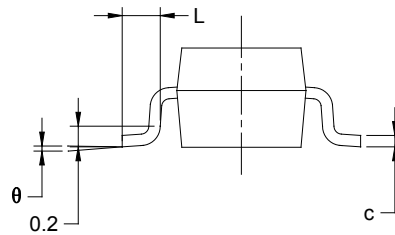
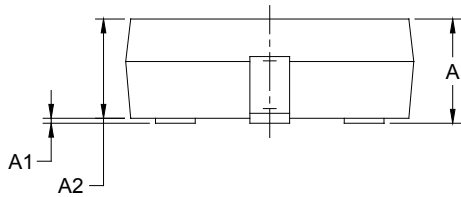
APRIL 2016 – REV.B to REV.B.1	Page
Changed Normalized Output Voltage vs. Temperature (SGM2021-2.8 and SGM2021-1.8)	9

PACKAGE OUTLINE DIMENSIONS

SOT-23-3



RECOMMENDED LAND PATTERN (Unit: mm)

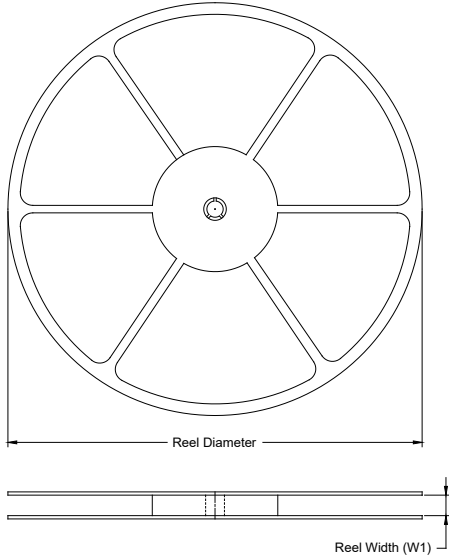


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

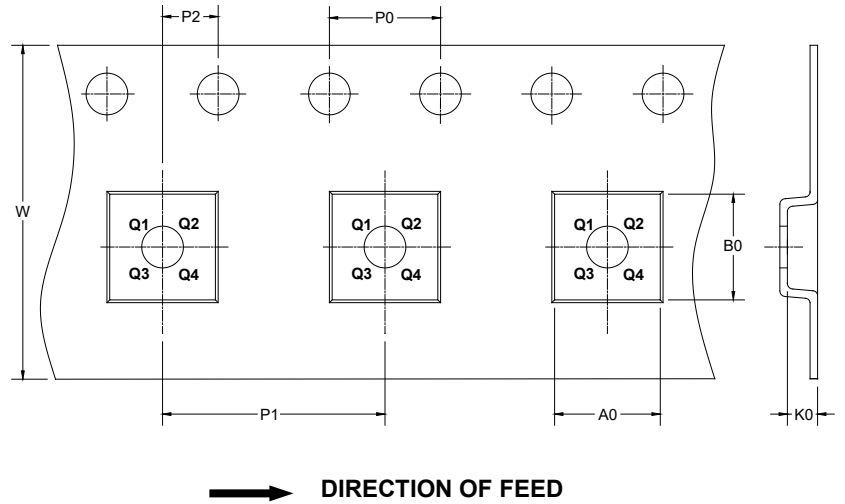
PACKAGE INFORMATION

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

DD0001

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

DD0002