SGM3802
Positive/Negative Dual-Output 300mA Power Supply for TFT LCD Bias

GENERAL DESCRIPTION

The SGM3802 is designed for powering devices which require both positive and negative bias voltages, such as LCDs, AFEs, etc. The device integrates a Boost converter VO1 for VPO and an inverting Buck-Boost converter VO2 for VNO. Output voltages of both converters can be programmed in digital steps through the I^2C interface control pins.

The SGM3802 is available in a Green WLCSP-1.25×1.75-12B package. It operates over an ambient temperature range of -40℃ to +85℃.

APPLICATIONS

LCD Bias
Wearable Device Display/Audio
AFE with Positive & Negative Rails

FEATURES

- **Outputs Programmable with I^2C Interface**
- **4.6V to 6.4V Programmable Range with 100mV Step for Positive Output**
- **-4.6V to -6.4V Programmable Range with 100mV Step for Negative Output**
- **300mA Output Current for V_{PO} and V_{NO}**
- **Excellent Performance**
  - **Outstanding Transient Response**
- **1.45MHz Switching Frequency for Positive Rail**
- **1.25MHz Switching Frequency for Negative Rail**
- **Power Save Mode**
- **Configurable Active Discharge**
- **Internal Soft-Start to limit Inrush Current**
- **Over-Temperature Protection (OTP)**
- **Over-Current Protection (OCP)**
- **Short-Circuit Protection (SCP)**

TYPICAL APPLICATION

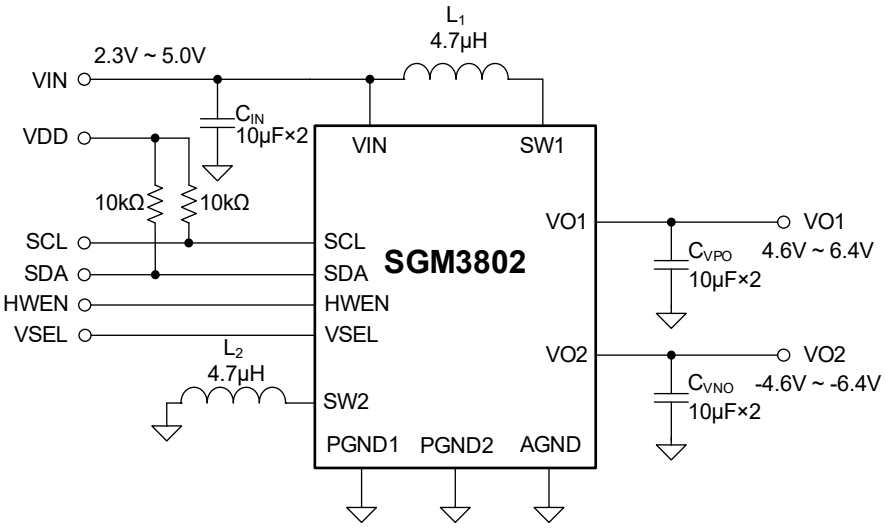


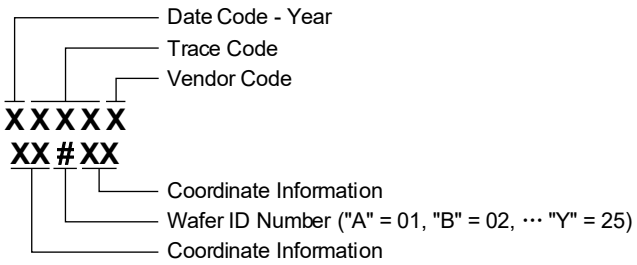
Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM3802	WLCSP-1.25×1.75-12B	-40℃ to +85℃	SGM3802YG/TR	3802 XXXXX XX#XX	Tape and Reel, 5000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code. XX#XX = Coordinate Information and Wafer ID Number.



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

VIN Voltage ..... -0.3V to 6V
VO1 Voltage ..... -0.3V to 7.5V
SW1 Voltage ..... -0.3V to 7.5V
SW1 Voltage (Transient: 10ns) ..... -1V to 9V
VO2 Voltage ..... -7.5V to 0.3V
SW2 Voltage ..... -7.5V to 6V
SW2 Voltage (Transient: 10ns) ..... -9V to 8V
SDA, SCL, HWEN, VSEL ..... -0.3V to 6V
PGND1, PGND2 to AGND ..... -0.3V to 0.3V
Package Thermal Resistance
WLCSP-1.25×1.75-12B, θ_{JA} ..... 101.5℃/W
WLCSP-1.25×1.75-12B, θ_{JB} ..... 35.7℃/W
WLCSP-1.25×1.75-12B, θ_{JC} ..... 29℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility (1) (2)
HBM ..... ±2000V
CDM ..... ±1000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.

2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range ..... 2.3V to 5V
Operating Ambient Temperature Range ..... -40℃ to +85℃
Operating Junction Temperature Range ..... -40℃ to +125℃

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

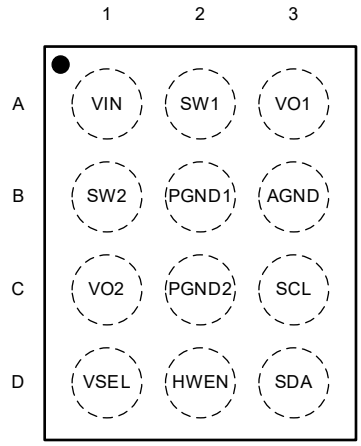
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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

(TOP VIEW)



WLCSP-1.25×1.75-12B

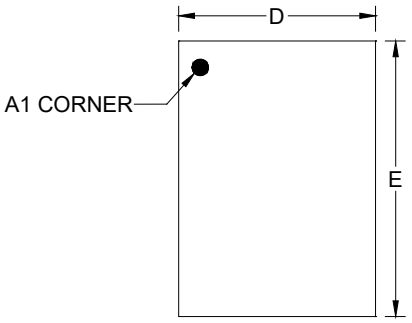
PIN DESCRIPTION

PIN	NAME	I/O	FUNCTION
A1	VIN	I	Supply Input.
A2	SW1	O	VO1 Boost Converter Switching Node.
A3	VO1	O	VO1 Boost Converter Output Pin.
B1	SW2	O	VO2 Inverting Buck-Boost Converter Switching Node.
B2	PGND1	G	VO1 Boost Converter Power Ground.
B3	AGND	G	Analog Ground.
C1	VO2	O	VO2 Inverting Buck-Boost Converter Output Pin.
C2	PGND2	G	VO2 Inverting Buck-Boost Converter Power Ground.
C3	SCL	I	I^2C Interface Clock Signal.
D1	VSEL	I	Default Output Voltage Select Pin. High = ±6.0V; Low = ±5.4V; Floating = ±5.0V
D2	HWEN	I	Device Enable Pin.
D3	SDA	I/O	I^2C Interface Data Bus.

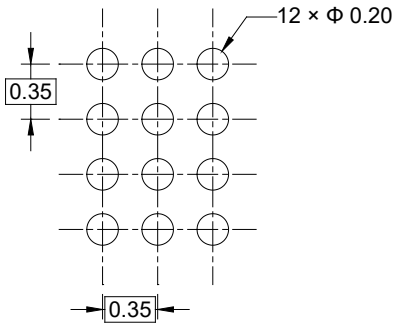
NOTE: I = input, O = output, I/O = input or output, G = ground.

PACKAGE OUTLINE DIMENSIONS

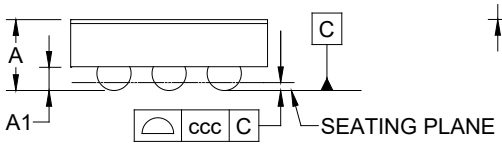
WLCSP-1.25×1.75-12B



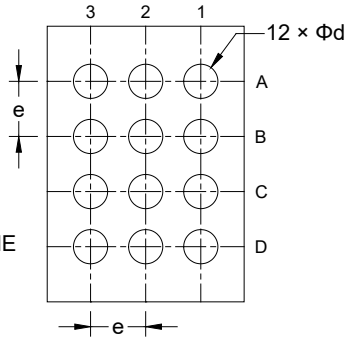
TOP VIEW



RECOMMENDED LAND PATTERN (Unit: mm)



SIDE VIEW



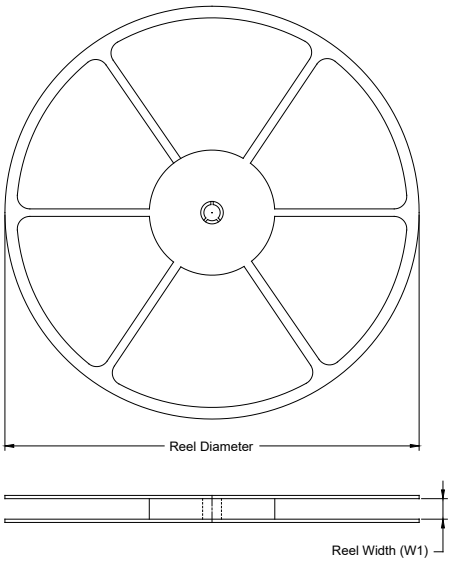
BOTTOM VIEW

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	0.495
A1	0.131	-	0.171
D	1.220	-	1.280
E	1.720	-	1.780
d	0.187	-	0.247
e	0.350 BSC		
ccc	0.050		

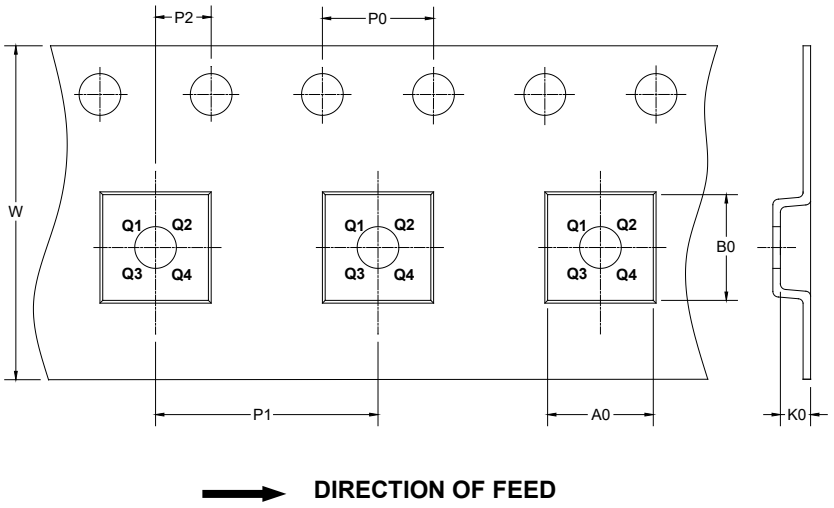
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



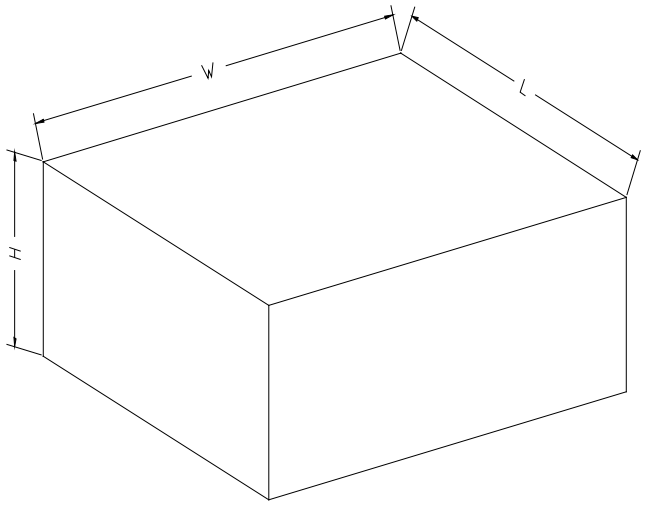
NOTE: The picture is only for reference. Please make the object as the standard.

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
WLCSP-1.25×1.75-12B	7"	9.5	1.37	1.94	0.69	4.0	4.0	2.0	8.0	Q1

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