SGM62118
High-Efficiency Buck-Boost Converter

GENERAL DESCRIPTION

The SGM62118 is a synchronous 4-switch Buck-Boost converter which is suitable for battery operated applications. The device's programmable light load PFM mode and low quiescent current (18μA, TYP) offer above 90% efficiency in the 10mA to 2A output current range. The output voltage is programmable via external feedback resistor divider.

The SGM62118 can operate in Buck, Boost or a novel 4-cycle Buck-Boost mode when the input voltage is close to or equal to the output voltage. The device implements pre-defined mode transition thresholds to avoid undesired toggling within modes to reduce output voltage ripple.

The SGM62118 offers various protection features to improve device robustness such as over-temperature, input over-voltage and output over-current protections. These features can protect the device against unexpected system failure.

The SGM62118 is available in a small Green WLCSP-2.21×1.40-15B package. High integration provides a compact solution with only six external components.

TYPICAL APPLICATION

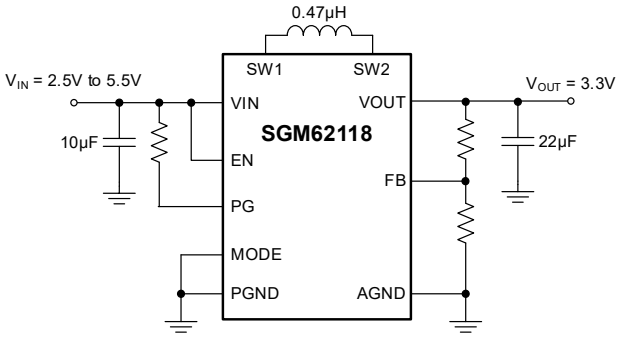


Figure 1. Typical Application Circuit

FEATURES

- **2.2V to 5.5V Input Voltage Range**
- **1.8V to 5.2V Output Voltage Range (Adjustable)**
- **2A Output Current for V_{IN} ≥ 2.5V and V_{OUT} = 3.3V**
- **Above 90% Efficiency for I_{OUT} from 10mA to 2A**
- **High Efficiency over the Entire Load Range**
- **18μA (TYP) Quiescent Current**
- **Programmable Forced PWM Mode and Pulse Frequency Modulation Mode**
- **Real Buck, Boost and Buck-Boost Modes**
- **Power Good**
- **Internal Soft-Start**
- **Start-up into Pre-Biased Outputs**
- **Forward and Reverse Current Operation and Current Limit**
- **OTP, Input OVP and Output OCP Protections**
- **True Shutdown Function with Load Disconnect**
- **Available in a Green WLCSP-2.21×1.40-15B Package**

APPLICATIONS

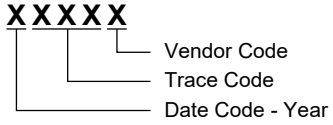
System Pre-Regulator
Point-of-Load Regulation
Thermoelectric Devices
Battery Backup
Voltage Stabilizer and Converter

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM62118	WLCSP-2.21×1.40-15B	-40℃ to +125℃	SGM62118XG/TR	62118 XXXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor 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.

ABSOLUTE MAXIMUM RATINGS

Input Voltages
VIN, SW1, SW2, EN, MODE, VOUT, FB, PG ..... -0.3V to 6V
SW1, SW2 (AC, less than 10ns) Voltages ..... -0.3V to 8V
Package Thermal Resistance
WLCSP-2.21×1.40-15B, θ_{JA} ..... 102℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM 3000V
CDM 1000V

RECOMMENDED OPERATING CONDITIONS

Input Voltage, V_{IN} ..... 2.2V (1) to 5.5V
Output Voltage, V_{OUT} ..... 1.8V to 5.2V (2)
Effective Capacitance Connected to V_{IN}, C_{IN} .....
..... 4μF (MIN), 5μF (TYP)
Effective Inductance, L ..... 0.37μH to 0.57μH, 0.47μH (TYP)
Effective Capacitance Connected to V_{OUT}, C_{OUT}
1.8V ≤ V_{OUT} ≤ 2.3V ..... 10μF (MIN)
V_{OUT} > 2.3V ..... 7μF (MIN), 8.2μF (TYP)
Operating Junction Temperature, T_J ..... -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

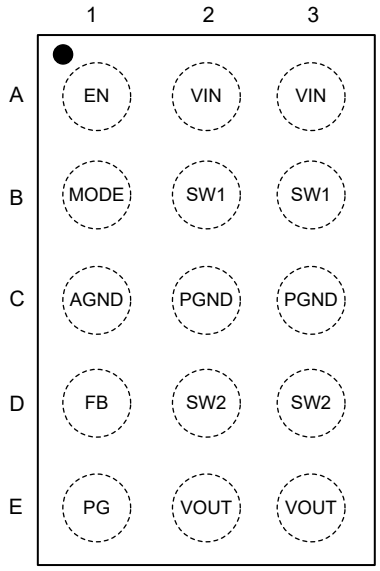
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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-2.21×1.40-15B

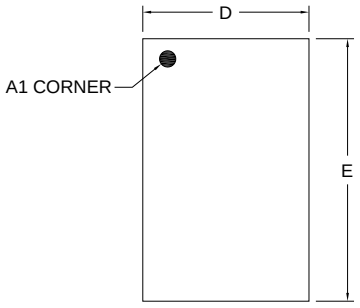
PIN DESCRIPTION

PIN	NAME	I/O	DESCRIPTION
A1	EN	I	Active High Logic. Device Enable Input. Do not leave it floating.
A2, A3	VIN	I	Supply Voltage for Power Stage and Control Stage.
B1	MODE	I	Logic 0 for PFM Mode and Logic 1 for Forced PWM Mode. Do not leave it floating.
B2, B3	SW1	P	Buck Leg Connection for Inductor.
C1	AGND	G	Analog Ground. Connect it to the PGND pin under the chip.
C2, C3	PGND	G	Power Ground.
D1	FB	I	Voltage Feedback Pin. Connect a resistor divider at FB pin to program the output voltage.
D2, D3	SW2	P	Boost Leg Connection for Inductor.
E1	PG	O	Power Good Indicator. Open-Drain Output. Leave it floating if not used.
E2, E3	VOUT	O	Converter Output.

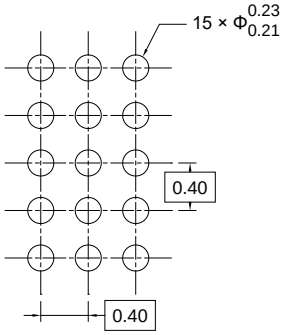
NOTE: I: input, O: output, G: ground, P: power.

PACKAGE OUTLINE DIMENSIONS

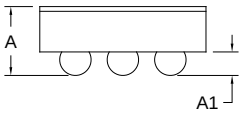
WLCSP-2.21×1.40-15B



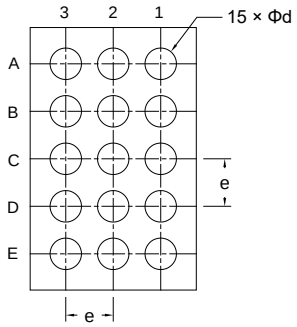
TOP VIEW



RECOMMENDED LAND PATTERN (Unit: mm)



SIDE VIEW



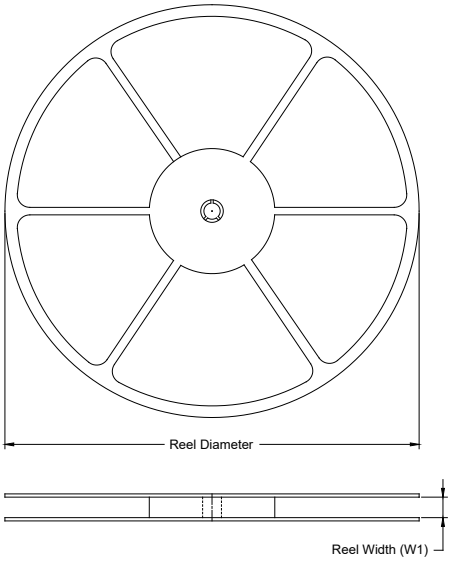
BOTTOM VIEW

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.542	0.580	0.618
A1	0.178	0.198	0.218
D	1.380	1.405	1.430
E	2.190	2.215	2.240
d	0.245	0.265	0.285
e	0.400 BSC		

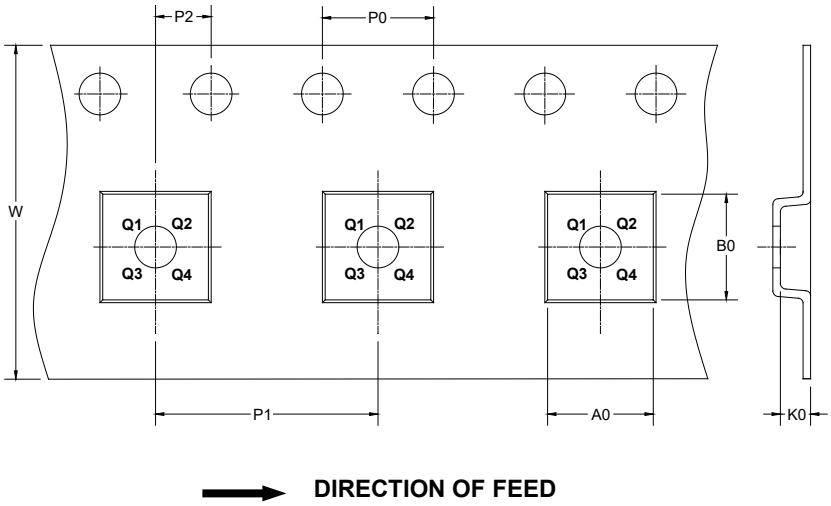
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



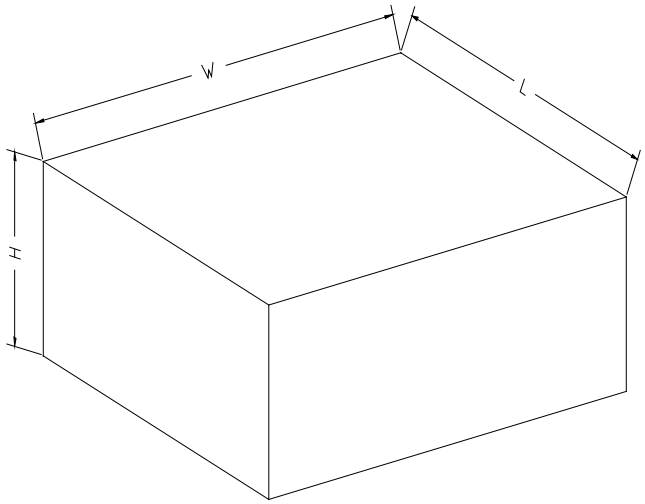
NOTE: The picture is only for reference. Please make the object as the standard.

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-2.21×1.40-15B	7″	9.5	1.53	2.38	0.73	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