

GENERAL DESCRIPTION

The SGM6614 is a 15A switch current, fully integrated synchronous Boost converter. The integrated switch FET and rectifier switch with an 8.8mΩ low-side on-resistance and a 12.2mΩ high-side on-resistance respectively provide high conversion efficiency for portable applications. The wide input voltage range of 2.17V to 18V offers flexibility to various input supplies such as single-cell to multi-cell Lithium batteries. The device can support up to 18V output.

The SGM6614 adopts the fixed frequency peak current mode control topology for main switch FET PWM duty cycle control. The device operates in pulse width modulation (PWM) mode at medium and heavy loads, where two power FETs are alternately turned on in one switching cycle. It automatically switches to pulse frequency modulation (PFM) mode at light loads. PWM mode adopts 500kHz switching frequency.

The SGM6614 offers various protection features to improve device robustness, such as over-voltage protection, over-current protection and thermal shutdown.

The SGM6614 is available in a Green TQFN-3×2.5-11L package.

FEATURES

- 2.17V to 18V Input Voltage Range
- 4.5V to 18V Output Voltage Range
- 2.4V Minimum Input Voltage for Startup
- 15A (TYP) Peak Switch Current Limit
- 8.8mΩ Low-side and 12.2mΩ High-side MOSFETs
- Fixed 500kHz Switching Frequency
- High Efficiency
 - ◆ Up to 94.42% Efficiency at $V_{IN} = 3.6V$, $V_{OUT} = 13V$, and $I_{OUT} = 2A$
 - ◆ Up to 97.07% Efficiency at $V_{IN} = 7.2V$, $V_{OUT} = 16V$, and $I_{OUT} = 2.5A$
- 85μA (TYP) Quiescent Current into VOUT Pin
- Less than 1.5μA Shutdown Current
- Auto PFM at Light Loads
- 19V Output Over-Voltage Protection
- Cycle-by-Cycle Over-Current Protection
- Thermal Shutdown
- Available in a Green TQFN-3×2.5-11L Package

APPLICATIONS

- Smart Speaker
- Portable POS
- Power Bank

TYPICAL APPLICATION

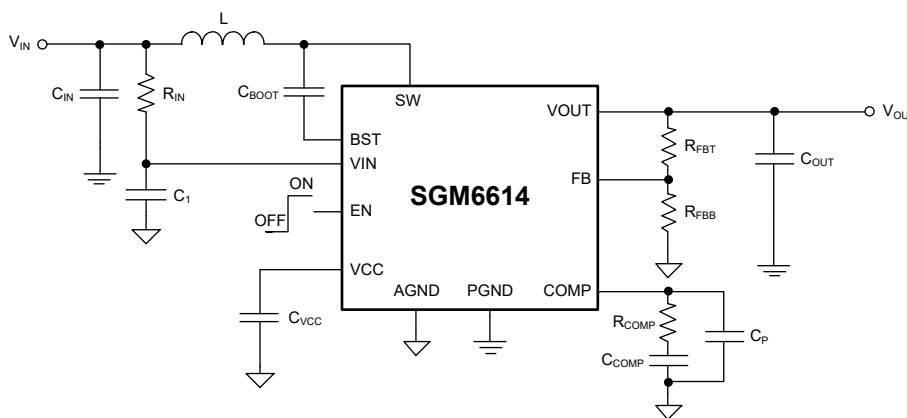


Figure 1. Typical Application

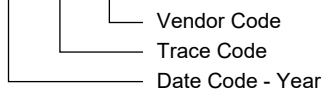
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM6614	TQFN-3x2.5-11L	-40°C to +125°C	SGM6614XTSL11G/TR	SGMMEV XXXXX	Tape and Reel, 5000

MARKING INFORMATION

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

XXXXX



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

- BST Voltage..... -0.3V to $V_{SW} + 5.5V$
- VIN, EN, VOUT, SW Voltages -0.3V to 20V
- Other Pin Voltages..... -0.3V to 6V
- Package Thermal Resistance
- TQFN-3x2.5-11L, θ_{JA} 63°C/W
- Junction Temperature..... +150°C
- Storage Temperature Range -65°C to +150°C
- Lead Temperature (Soldering, 10s)..... +260°C
- ESD Susceptibility
- HBM..... 4000V
- CDM 1000V

RECOMMENDED OPERATING CONDITIONS

- Input Voltage Range, V_{IN} 2.17V to 18V
- Output Voltage Range, V_{OUT} 4.5V to 18V
- Effective Inductance Range, L..... 0.8µH to 5.6µH
- Effective Input Capacitance Range, C_{IN} 10µF (TYP)
- Effective Output Capacitance Range, C_{OUT} .. 10µF to 1000µF
- Operating Junction Temperature Range..... -40°C to +125°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.

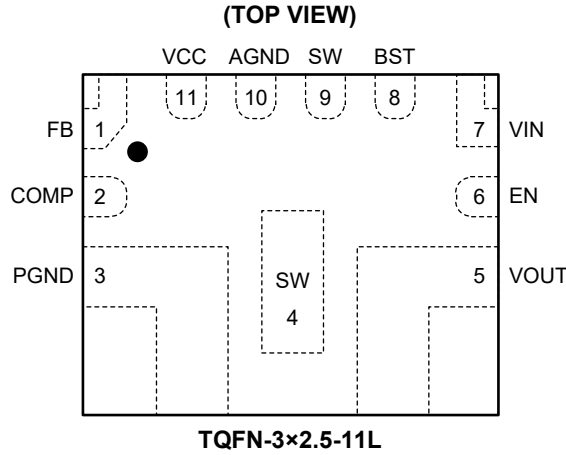
ESD SENSITIVITY CAUTION

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



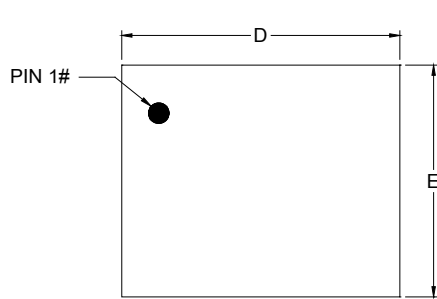
PIN DESCRIPTION

PIN	NAME	I/O	FUNCTION
1	FB	I	Inverting Input of the Error Amplifier. Connect it to the midpoint of a resistor divider to set the Boost output voltage.
2	COMP	O	Internal Error Amplifier Output. Connect the loop compensation components between the COMP and AGND pins.
3	PGND	P	Power Ground Pin. Source connection of the internal N-channel low-side MOSFET.
4, 9	SW	P	Switching Node. Drain connection of the internal N-channel low-side MOSFET.
5	VOUT	P	The Boost Output Pin.
6	EN	I	Enable Pin. Logic high turns the converter on. Logic low turns the converter off.
7	VIN	I	Input Power Supply Pin.
8	BST	O	N-Channel Rectify Switch Power Supply Pin. Connect a 0.1μF ceramic capacitor between the BST and SW pins.
10	AGND	-	Signal Ground Pin.
11	VCC	O	Internal Regulator Output Pin. Connect a ceramic capacitor greater than 1.0μF between the VCC and the ground.

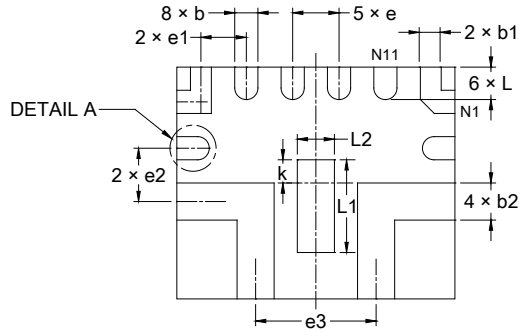
NOTE: I = input, O = output, P = power supply.

PACKAGE OUTLINE DIMENSIONS

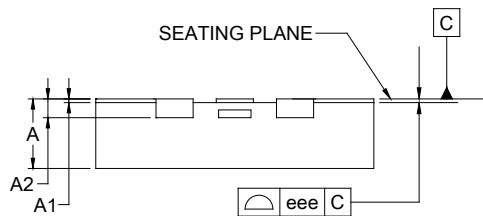
TQFN-3x2.5-11L



TOP VIEW



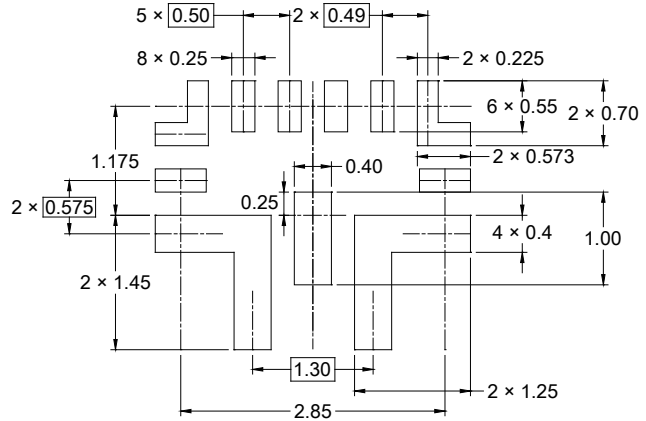
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL
CONSTRUCTION



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.700	-	0.800
A1	0.000	-	0.050
A2	0.203 REF		
b	0.200	-	0.300
b1	0.175	-	0.275
b2	0.350	-	0.450
D	2.900	-	3.100
E	2.400	-	2.600
e	0.500 BSC		
e1	0.490 BSC		
e2	0.575 BSC		
e3	1.300 BSC		
k	0.250 REF		
L	0.250	-	0.450
L1	0.900	-	1.100
L2	0.300	-	0.500
eee	0.080		

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
TQFN-3×2.5-11L	13"	12.4	2.80	3.30	1.10	4.0	8.0	2.0	12.0	Q2

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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
13"	386	280	370	5

DD0002