



SGM3110 MicroPower Regulated Charge Pump

GENERAL DESCRIPTION

The SGM3110 is a MicroPower switched capacitor voltage converter that delivers a regulated output. No external inductor is required for operation.

The SGM3110 can deliver up to 100mA to the voltage regulated output. It features very low quiescent current and high efficiency over a large portion of its load range, making this device ideal for battery-powered applications. Furthermore, the combination of few external components and small package size keeps the total converter board area to a minimum in space-restricted applications.

The SGM3110 uses a pulse skipping technique to provide a regulated output from a varying input supply. The SGM3110 contains a thermal management circuit to protect the device under continuous output short-circuit conditions.

The SGM3110 has lead (Pb) free SOT23-6 package and is rated over the -40°C to +85°C temperature range.

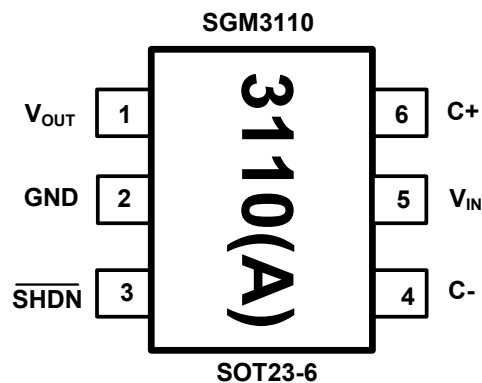
APPLICATIONS

Cellular Phones
 Digital Cameras
 Handheld Electronics
 LED/Display Backlight Driver
 LEDs for Camera Flash
 Portable Communication Devices
 MP3 Players
 GPS Receivers
 PDAs

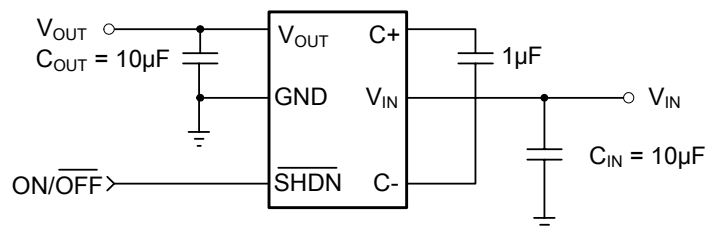
FEATURES

- Step-Up Voltage Converter
- Input Voltage Range:
 SGM3110-5.0: 2.7 to 5.0V
 SGM3110-4.5: 2.7 to 4.5V
- MicroPower Consumption: 60µA
- Fixed 5V, 4.5V ± 4% Output
- Peak Current 250mA for 100ms
- High Frequency 750kHz Operation
- Logic-Controlled Shutdown
- Short-Circuit/Over-Temperature Protection
- Lead (Pb) Free SOT23-6 Package

PIN CONFIGURATION (TOP VIEW)



TYPICAL APPLICATION



PACKAGE/ORDERING INFORMATION

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	MARKING INFORMATION
SGM3110-5.0YN6/TR	SOT23-6	Tape and Reel, 3000	3110
SGM3110-4.5YN6/TR	SOT23-6	Tape and Reel, 3000	3110A

ABSOLUTE MAXIMUM RATINGS

V_{IN} to GND	-0.3V to 6V	Package Thermal Resistance	
V_{OUT} to GND	-0.3V to 6V	SOT23-6, θ_{JA}	250°C/W
SHDN to GND.....	-0.3V to 6V	Lead Temperature Range (Soldering 10 sec)	
Storage Temperature Range.....	-65°C to +150°C	260°C
Junction Temperature.....	160°C	ESD Susceptibility	
Operating Temperature Range	-40°C to +85°C	HBM.....	2000V
Power Dissipation, P_D @ $T_A = 25^\circ\text{C}$		MM.....	400V
SOT23-6	0.34W		

NOTES:

1. Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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.

PIN DESCRIPTION

NAME	FUNCTION
V_{OUT}	Regulated output pin.
GND	Ground
$\overline{\text{SHDN}}$	Shutdown input. Logic low signal disables the converter.
C-	Flying capacitor negative terminal.
V_{IN}	Input supply pin.
C+	Flying capacitor positive terminal.

ELECTRICAL CHARACTERISTICS(T_A = -40°C to +85°C, unless otherwise noted. Typical values are at T_A = 25°C, C_{FLY} = 1μF, C_{IN} = 10μF, C_{OUT} = 10μF).

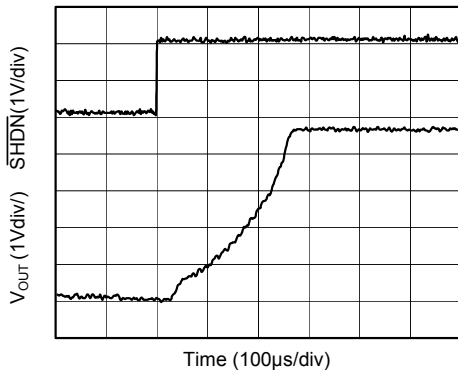
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
SGM3110-5.0						
Input Voltage Range	V _{IN}	V _{OUT} = 5.0V	2.7		V _{OUT}	V
Output Voltage	V _{OUT}	2.7V < V _{IN} < 5V, I _{OUT} ≤ 50mA	4.8	5.0	5.2	V
		3.0V < V _{IN} < 5V, I _{OUT} ≤ 100mA	4.8	5.0	5.2	
Quiescent Power Supply Current	I _Q	2.7V < V _{IN} < 5V, I _{OUT} = 0mA, $\overline{\text{SHDN}} = V_{\text{IN}}$		60	68	μA
Shutdown Supply Current	I _{SHDN}	2.7V < V _{IN} < 3.6V, I _{OUT} = 0mA, V _{SHDN} = 0		0.2	1	μA
		3.6V < V _{IN} < 5V, I _{OUT} = 0mA, V _{SHDN} = 0			1	
Ripple Voltage	V _{RIPPLE}	V _{IN} = 2.7V, I _{OUT} = 50mA		15		mV _{P-P}
		V _{IN} = 3V, I _{OUT} = 100mA		88		
Efficiency	η	V _{IN} = 2.7V, I _{OUT} = 50mA		91		%
Frequency	f _{OSC}	Oscillator Free Running		750		kHz
$\overline{\text{SHDN}}$ Input Threshold High	V _{IH}		1.4			V
$\overline{\text{SHDN}}$ Input Threshold Low	V _{IL}				0.4	
$\overline{\text{SHDN}}$ Input High Current	I _{IH}	$\overline{\text{SHDN}} = V_{\text{IN}}$	-1		+1	μA
$\overline{\text{SHDN}}$ Input Low Current	I _{IL}	$\overline{\text{SHDN}} = \text{GND}$	-1		+1	μA
Turn-On Time	T _{ON}	V _{IN} = 3V, I _{OUT} = 0mA		0.3		ms
SGM3110-4.5						
Input Voltage Range	V _{IN}	V _{OUT} = 4.5V	2.7		V _{OUT}	V
Output Voltage	V _{OUT}	2.7V < V _{IN} < 4.5V, I _{OUT} ≤ 50mA	4.32	4.5	4.68	V
		3.0V < V _{IN} < 4.5V, I _{OUT} ≤ 100mA	4.32	4.5	4.68	
Quiescent Power Supply Current	I _Q	2.7V < V _{IN} < 4.5V, I _{OUT} = 0mA, $\overline{\text{SHDN}} = V_{\text{IN}}$		60	68	μA
Shutdown Supply Current	I _{SHDN}	2.7V < V _{IN} < 3.6V, I _{OUT} = 0mA, V _{SHDN} = 0		0.2	1	μA
		3.6V < V _{IN} < 4.5V, I _{OUT} = 0mA, V _{SHDN} = 0			1	
Ripple Voltage	V _{RIPPLE}	V _{IN} = 2.7V, I _{OUT} = 50mA		15		mV _{P-P}
		V _{IN} = 3V, I _{OUT} = 100mA		88		
Efficiency	η	V _{IN} = 2.7V, I _{OUT} = 50mA		83		%
Frequency	f _{OSC}	Oscillator Free Running		750		kHz
$\overline{\text{SHDN}}$ Input Threshold High	V _{IH}		1.4			V
$\overline{\text{SHDN}}$ Input Threshold Low	V _{IL}				0.4	
$\overline{\text{SHDN}}$ Input High Current	I _{IH}	$\overline{\text{SHDN}} = V_{\text{IN}}$	-1		+1	μA
$\overline{\text{SHDN}}$ Input Low Current	I _{IL}	$\overline{\text{SHDN}} = \text{GND}$	-1		+1	μA
Turn-On Time	T _{ON}	V _{IN} = 3V, I _{OUT} = 0mA		0.3		ms

Specifications subject to changes without notice.

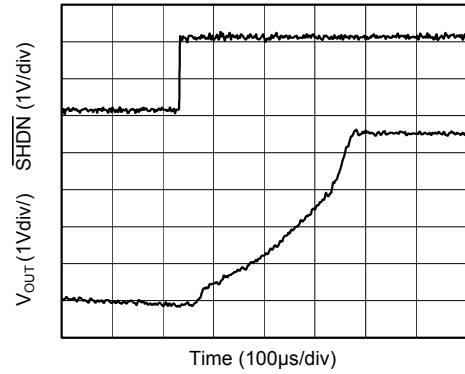
TYPICAL PERFORMANCE CHARACTERISTICS

At $V_S = +5.0V$, $T_A = +25^\circ C$, $V_{IN} = 3V$, $C_{IN} = C_{OUT} = 10\mu F$, $C_{FLY} = 1\mu F$, unless otherwise noted.

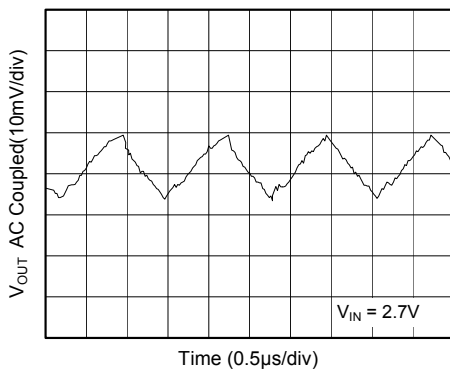
Startup Time with 50mA Load



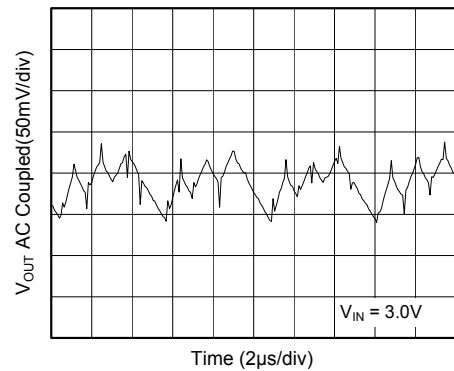
Startup Time with 100mA Load



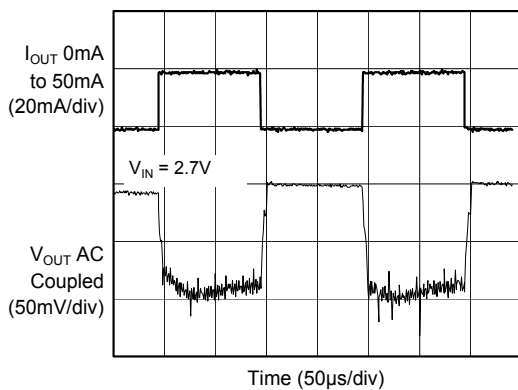
Output Ripple with I_{OUT} = 50mA



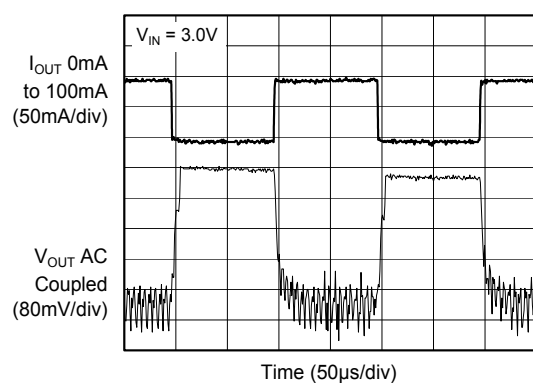
Output Ripple with I_{OUT} = 100mA



Load Transient Response for 50mA

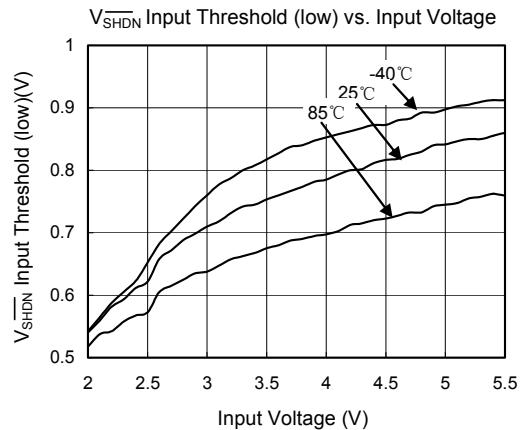
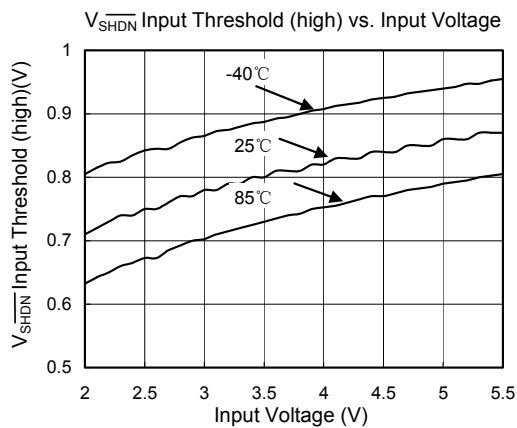
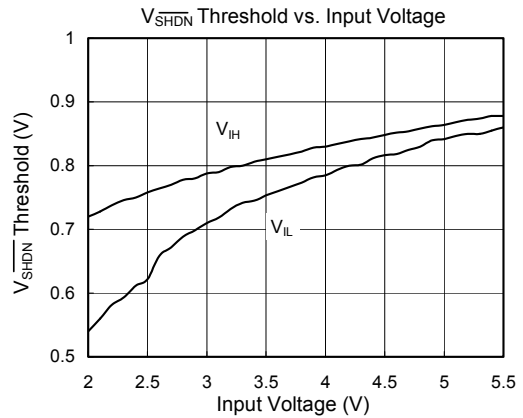
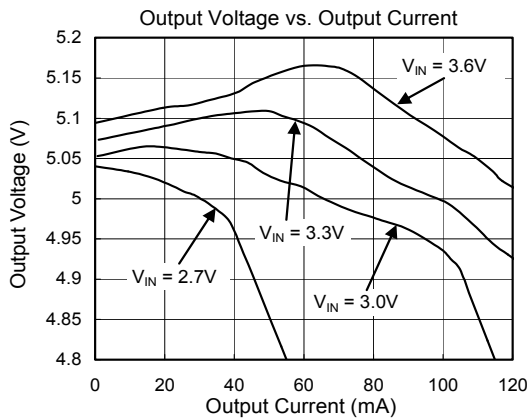
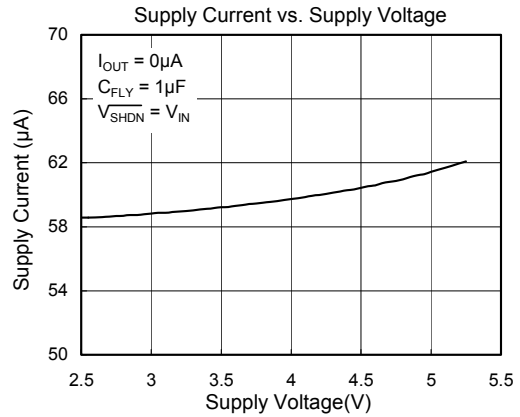
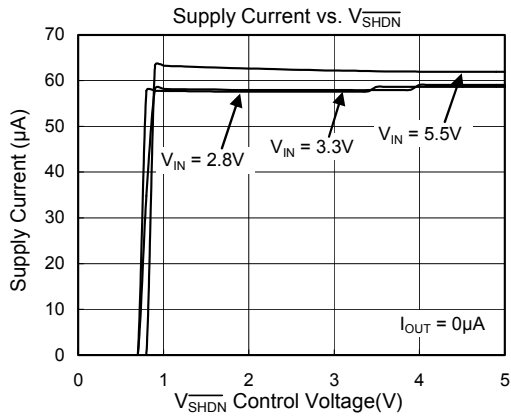


Load Transient Response for 100mA



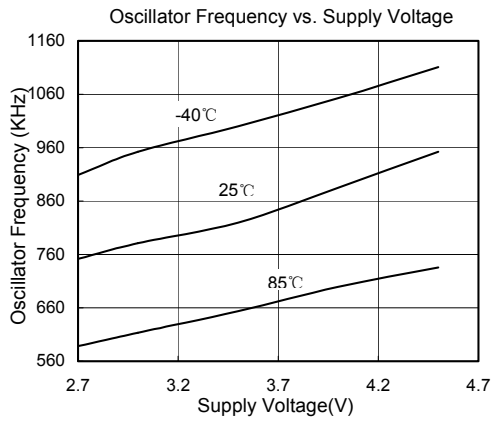
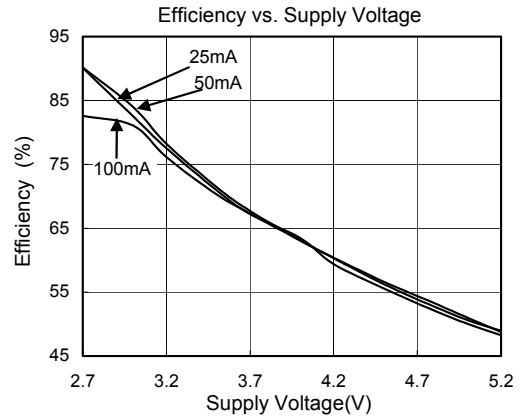
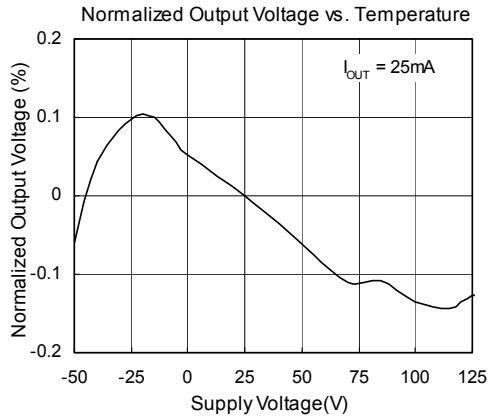
TYPICAL PERFORMANCE CHARACTERISTICS

At $V_S = +5.0V$, $T_A = +25^\circ C$, $V_{IN} = 3V$, $C_{IN} = C_{OUT} = 10\mu F$, $C_{FLY} = 1\mu F$, unless otherwise noted.



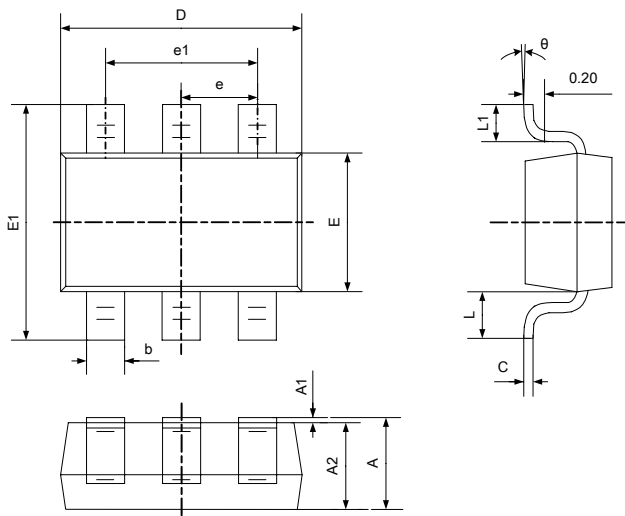
TYPICAL PERFORMANCE CHARACTERISTICS

At $V_S = +5.0V$, $T_A = +25^\circ C$, $V_{IN} = 3V$, $C_{IN} = C_{OUT} = 10\mu F$, $C_{FLY} = 1\mu F$, unless otherwise noted.



PACKAGE OUTLINE DIMENSIONS

SOT23-6



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	0.400	0.012	0.016
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	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

04/2008 REV. A

SGMICRO is dedicated to provide high quality and high performance analog IC products to customers. All SGMICRO products meet the highest industry standards with strict and comprehensive test and quality control systems to achieve world-class consistency and reliability.

For information regarding SGMICRO Corporation and its products, see www.sg-micro.com