



# SGM3206 Unregulated 60mA Charge Pump Voltage Inverter

## GENERAL DESCRIPTION

The SGM3206 is a charge pump voltage inverter that is designed for operating over an input voltage range of 1.4V to 5.5V. The SGM3206 can provide up to 60mA output current. The typical conversion efficiency exceeds 85% over a wide range of output current. The fixed switching frequency is 47kHz. The wide supply voltage is well suited for various applications powered by a 1-cell Li-Ion battery, as well as 2-cell or 3-cell NiCd, NiMH or Alkaline batteries.

This device requires one flying capacitor and two small bypass capacitors for a complete charge pump inverter, making it ideal for numerous battery-powered and board level applications.

The SGM3206 is available in a Green SOT-23-5 package. It operates over an ambient temperature range of -40°C to +85°C.

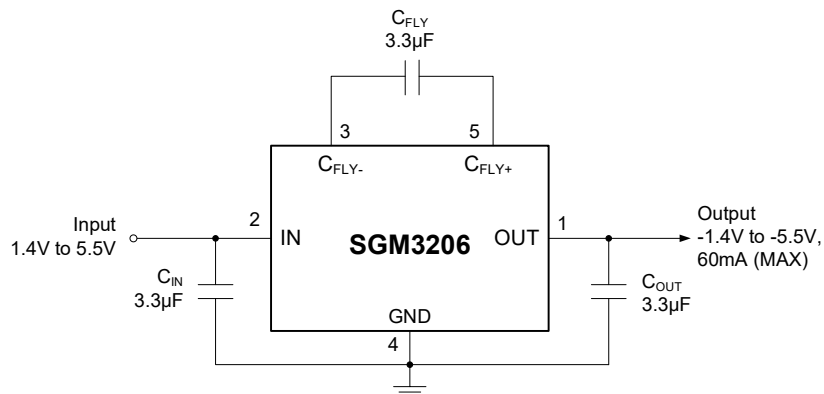
## FEATURES

- **Input Voltage Range: 1.4V to 5.5V**
- **Inverts Input Supply Voltage**
- **Output Current: 60mA**
- **Quiescent Current: 115µA (TYP)**
- **Integrated Active Schottky Diode for Startup into Load**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green SOT-23-5 Package**

## APPLICATIONS

LCD Bias  
Bipolar Amplifier Supply  
GaAs Bias for RF Power Amplifier

## TYPICAL APPLICATION

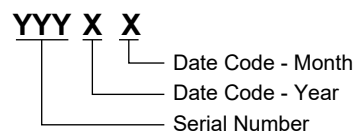


**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM3206	SOT-23-5	-40°C to +85°C	SGM3206YN5G/TR	SL7XX	Tape and Reel, 3000

**MARKING INFORMATION**

NOTE: XX = Date 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**

Voltage Range

IN to GND.....	-0.3V to 6V
OUT to GND.....	-6V to 0.3V
C <sub>FLY-</sub> to GND.....	0.3V to V <sub>OUT</sub> - 0.3V
C <sub>FLY+</sub> to GND.....	-0.3V to V <sub>IN</sub> + 0.3V
Continuous Output Current.....	100mA
Operating Temperature Range.....	-40°C to +85°C
Junction Temperature.....	+150°C
Storage Temperature Range.....	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C

ESD Susceptibility

HBM.....	8000V
MM.....	400V

**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.

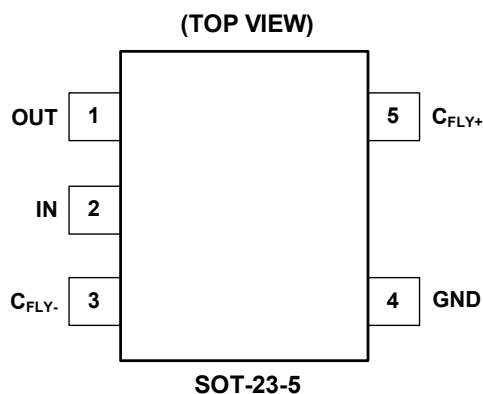
**ESD SENSITIVITY CAUTION**

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	FUNCTION
1	OUT	Power Output Pin. It is recommended that the filter capacitor C <sub>OUT</sub> bypass OUT to GND.
2	IN	Power Input Pin. A ceramic bypass capacitor that has the same value as the flying capacitor to GND is recommended.
3	C <sub>FLY-</sub>	Flying Capacitor Negative Terminal.
4	GND	Ground.
5	C <sub>FLY+</sub>	Flying Capacitor Positive Terminal.

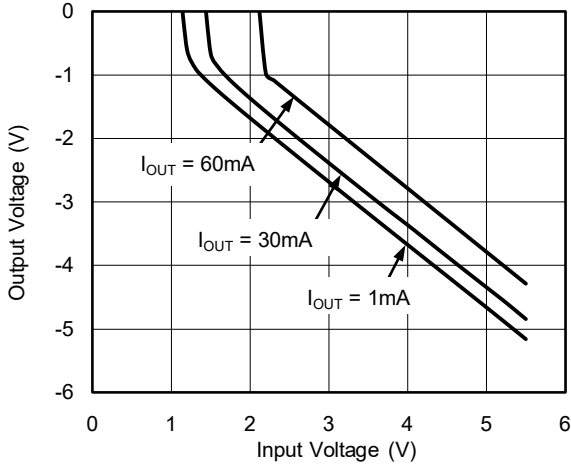
**ELECTRICAL CHARACTERISTICS**(C<sub>IN</sub> = C<sub>FLY</sub> = C<sub>OUT</sub> = 3.3μF, V<sub>IN</sub> = 5V, Full = -40°C to +85°C. Typical values are at T<sub>A</sub> = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Input Voltage Range	V <sub>IN</sub>	R <sub>L</sub> = 5kΩ	Full	1.4		5.5	V
Maximum Output Current Range at OUT	I <sub>OUT</sub>		Full	60			mA
Output Voltage	V <sub>OUT</sub>		+25°C		-V <sub>IN</sub>		V
Output Voltage Ripple	V <sub>PP</sub>	I <sub>OUT</sub> = 5mA	+25°C		30		mV <sub>P-P</sub>
Quiescent Current (No Load Input Current)	I <sub>Q</sub>		+25°C		115	135	μA
			Full			166	
Internal Switching Frequency	f <sub>OSC</sub>		+25°C	38	47	57	kHz
			Full	35		60	
Impedance		I <sub>OUT</sub> = 30mA	+25°C		10	13	Ω
			Full			15	

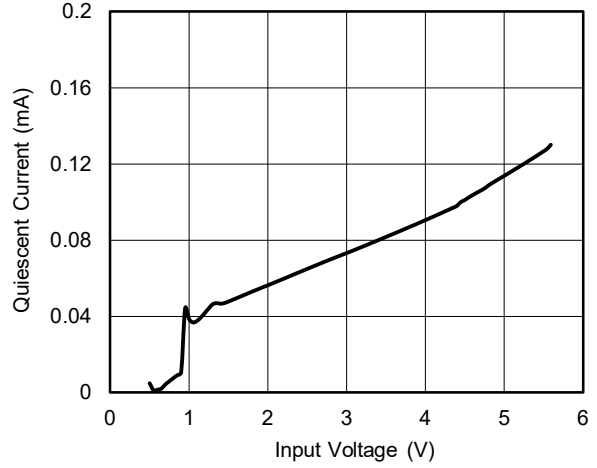
**TYPICAL PERFORMANCE CHARACTERISTICS**

$C_{IN} = C_{FLY} = C_{OUT} = 3.3\mu F$ ,  $T_A = +25^\circ C$ , unless otherwise noted.

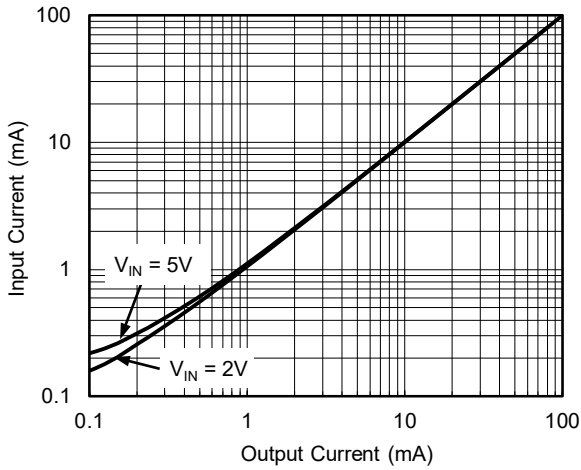
Output Voltage vs. Input Voltage



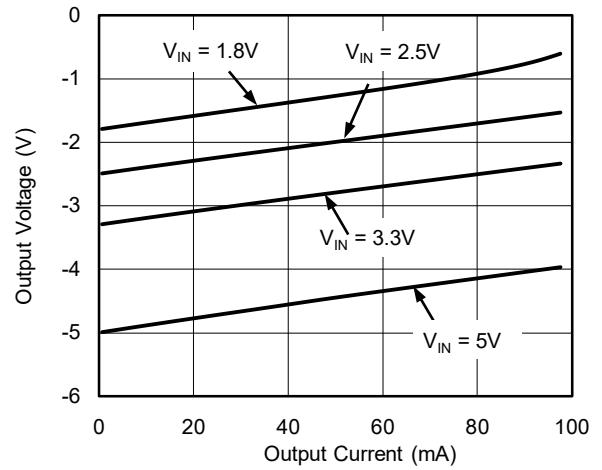
Quiescent Current vs. Input Voltage



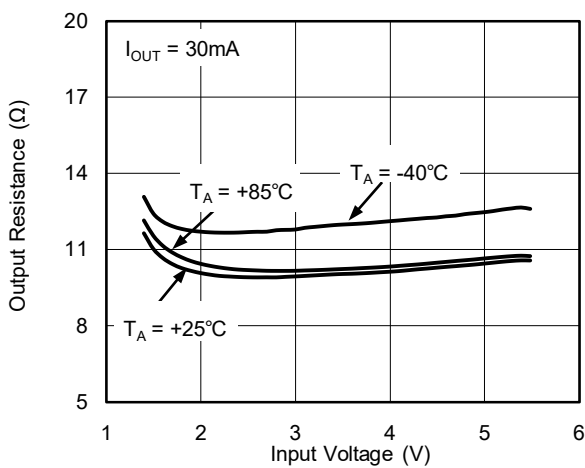
Input Current vs. Output Current



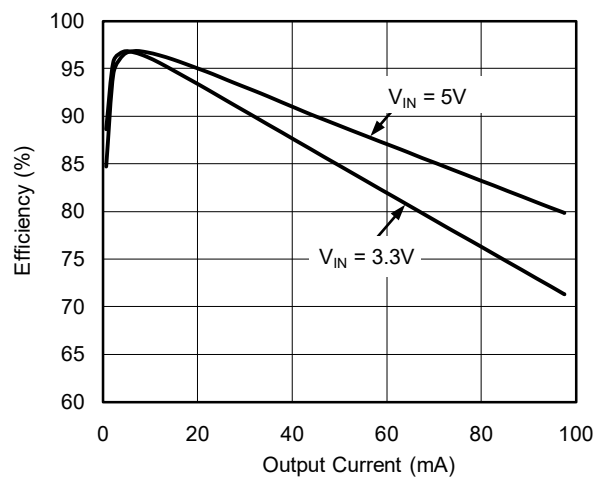
Output Voltage vs. Output Current



Output Resistance vs. Input Voltage

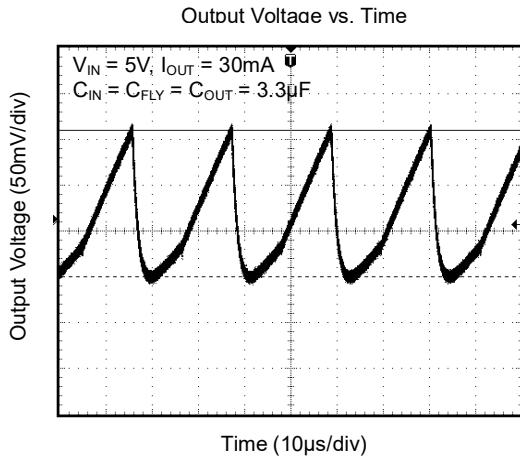


Efficiency vs. Output Current



**TYPICAL PERFORMANCE CHARACTERISTICS (continued)**

T<sub>A</sub> = +25°C, unless otherwise noted.



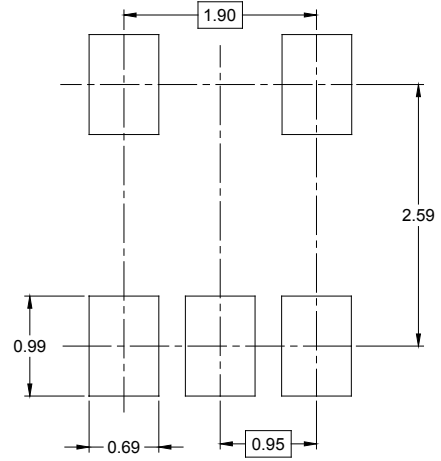
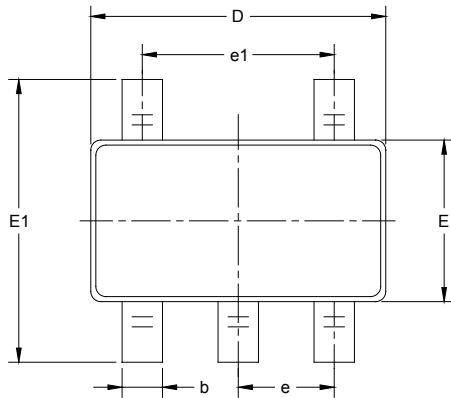
**REVISION HISTORY**

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

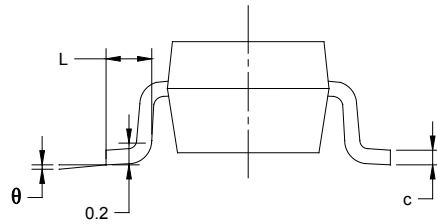
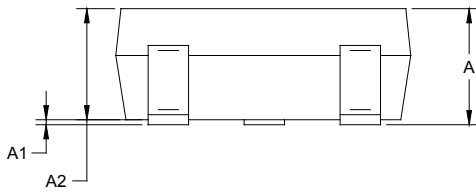
Changes from Original (JANUARY 2014) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)

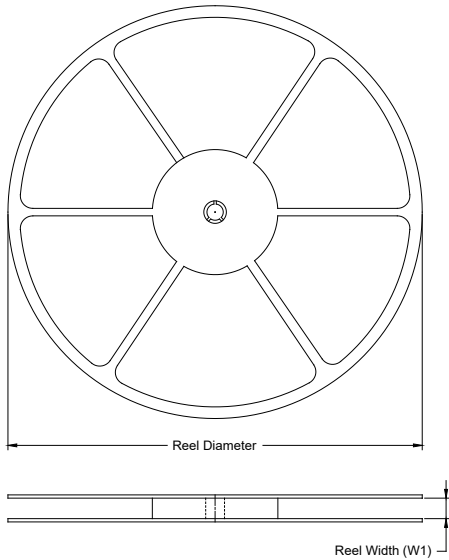


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037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

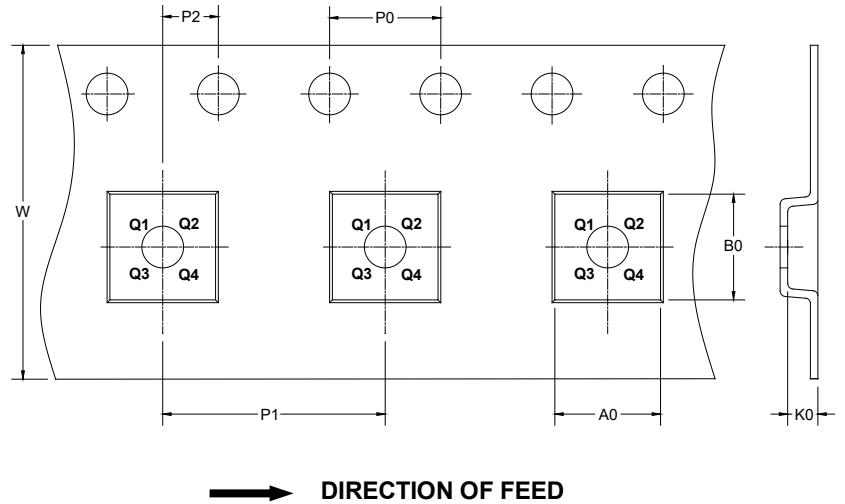
# PACKAGE INFORMATION

## 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

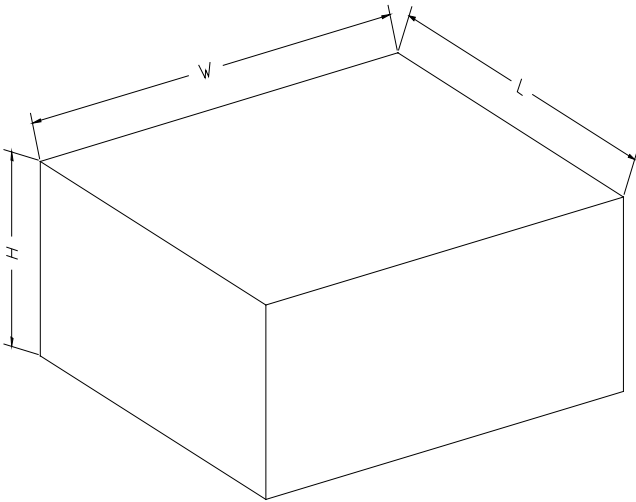
Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT-23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3

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