

GENERAL DESCRIPTION

The SGM6601 is a high-frequency boost converter. The input voltage accepts a range of 1.8V to 5.5V. It is specified for small to medium LCD bias supply and white LED backlight supplies. The switching frequency can reach up to 1MHz, which supports both ceramic output capacitors and tantalum output capacitors.

The internal 400mA switch current limit provides a low output voltage ripple. For low-power applications, this device allows the use of a small form factor inductor. A typical low quiescent current of 20 μ A together with an optimized control scheme allows the device to achieve very high efficiency over the whole load current.

The adjustable output voltage can reach a maximum of 38V ideally with a dual cell NiMH/NiCd battery or a single cell Li-ion battery. And a standard 3.3V/5V to 12V power conversion can also be achieved.

The SGM6601 is available in TDFN-2 \times 2-6L and TSOT-23-5 packages. It operates over an ambient temperature range of -40 $^{\circ}$ C to +85 $^{\circ}$ C.

FEATURES

- **Input Voltage Range: 1.8V to 5.5V**
- **Maximum 38V Adjustable Output Voltage**
- **400mA Internal Switch Current**
- **Maximum 1MHz Switching Frequency**
- **20 μ A (TYP) Low Quiescent Current**
- **0.1 μ A (TYP) Shutdown Current**
- **Internal Soft-Start Function**
- **-40 $^{\circ}$ C to +85 $^{\circ}$ C Operating Temperature Range**
- **Available in Green TSOT-23-5 and TDFN-2 \times 2-6L Packages**

APPLICATIONS

LCD Bias Supply

White-LED Supply for LCD Backlights

Mobile Phones

Audio Player

Digital Camera

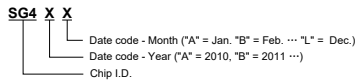
PDA's and Handheld PCs

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM6601	TDFN-2x2-6L	-40°C to +85°C	SGM6601YTDI6G/TR	6601 XXXX	Tape and Reel, 3000
	TSOT-23-5	-40°C to +85°C	SGM6601YTIN5G/TR	SG4XX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: **XXXX** = Date Code. **XX** = Date Code



For example: SG4CA (2012, January)

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 Supply Voltage.....	-0.3V to 6V
EN and FB Pin Voltages.....	-0.3V to V_{IN}
SW Switch Voltage.....	40V
Operating Temperature Range.....	-40°C to +85°C
Junction Temperature.....	150°C
Storage Temperature Range.....	-65°C to +150°C
Package Thermal Resistance	
TDFN-2x2-6L, θ_{JA}	124°C/W
TSOT-23-5, θ_{JA}	250°C/W
Lead Temperature (Soldering, 10s).....	260°C
ESD Susceptibility	
HBM.....	4000V
MM.....	200V

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.

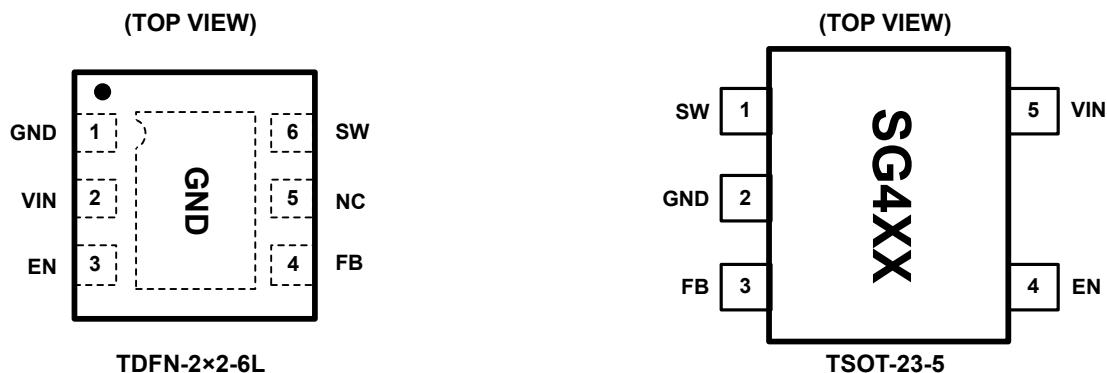
ESD SENSITIVITY CAUTION

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

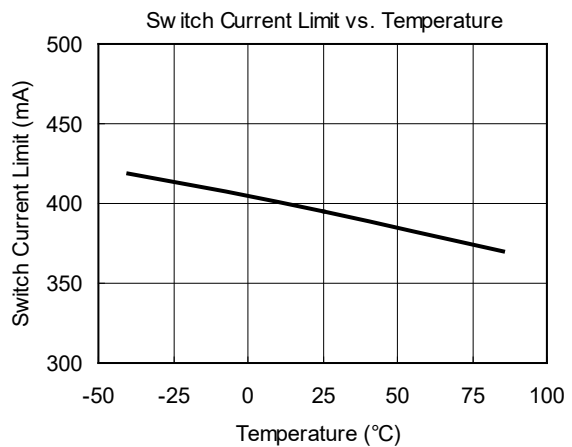
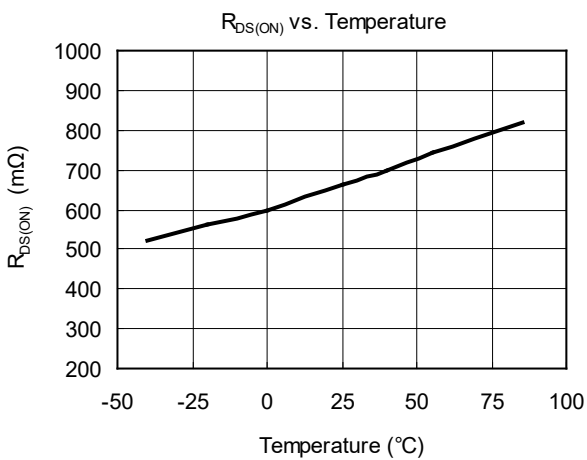
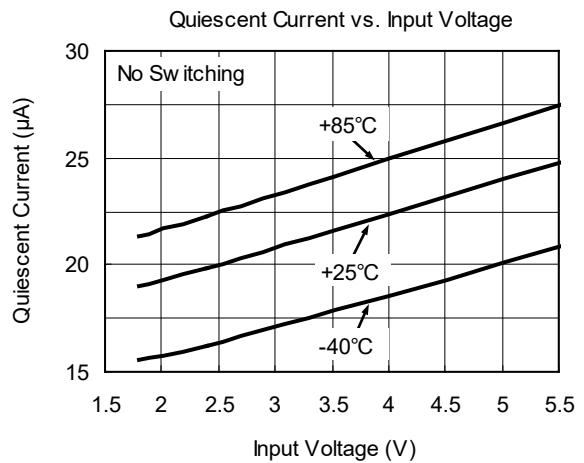
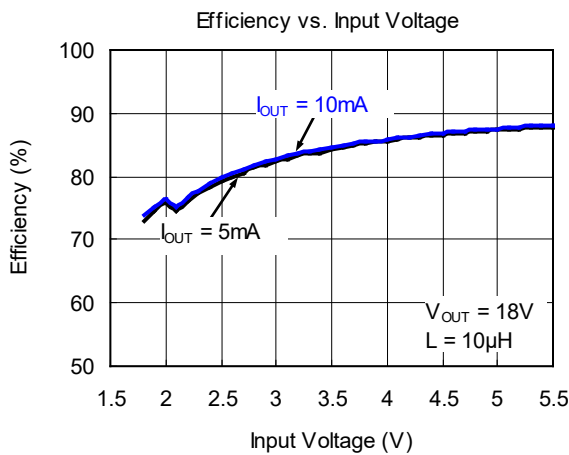
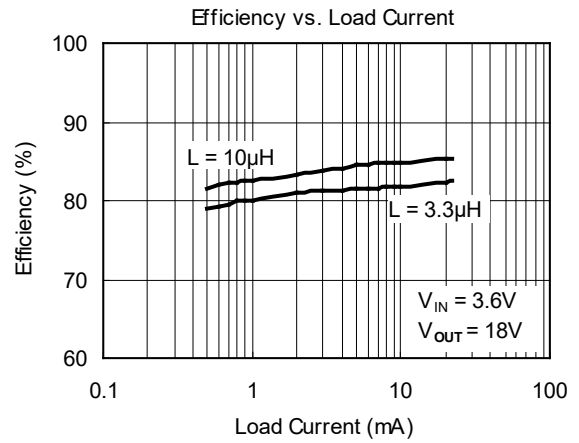
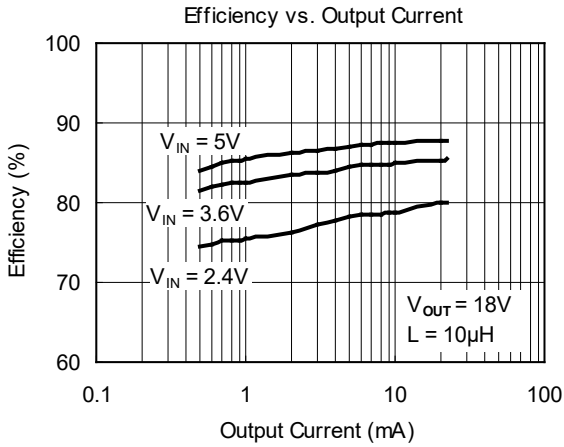
NAME	PIN		FUNCTION
	TDFN-2x2-6L	TSOT-23-5	
SW	6	1	Switch Pin. It is connected to the drain of the internal power MOSFET. Connect this pin to the inductor and Schottky diode.
GND	1	2	Ground.
FB	4	3	Feedback Pin. Connect this pin to the external voltage divider to program the desired output voltage.
EN	3	4	Enable Pin. Connect this pin to ground to make the device enter shutdown mode. Do not leave it floating.
VIN	2	5	Power Supply. Place it closely decoupled to GND with a capacitor.
NC	5	—	No Connection.
Exposed Pad	GND	—	Power Ground Exposed Pad. Must be connected to GND.

ELECTRICAL CHARACTERISTICS

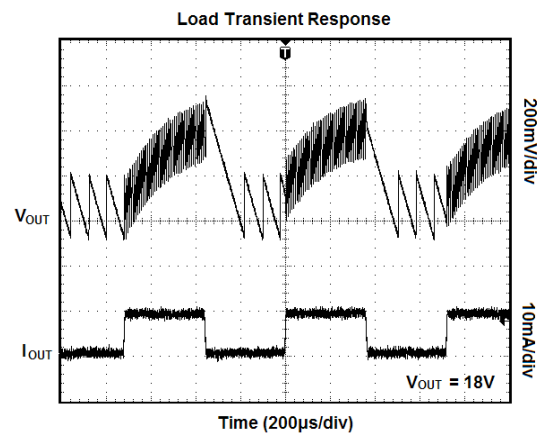
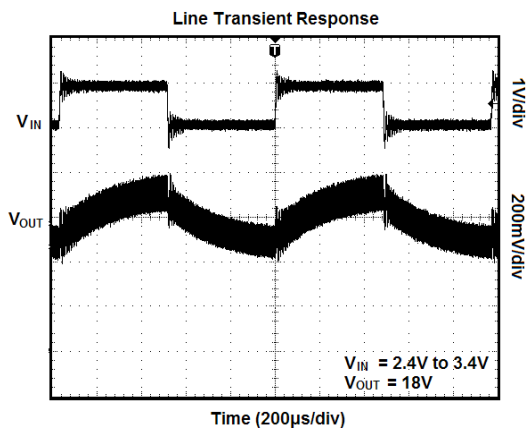
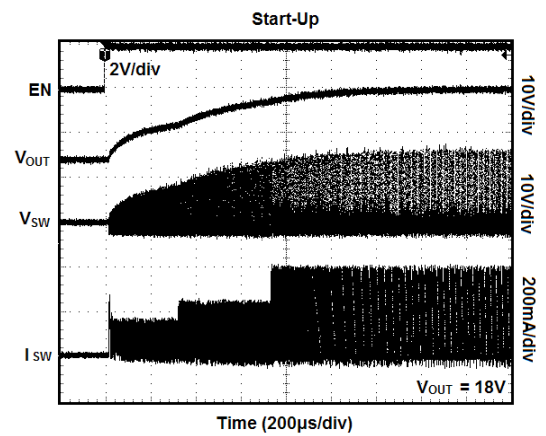
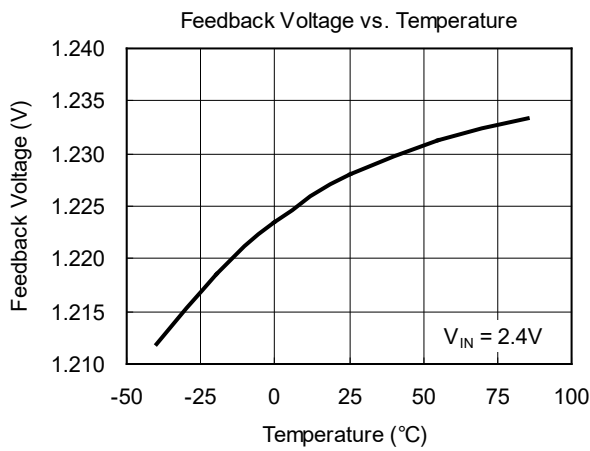
($V_{IN} = 2.4V$, $EN = V_{IN}$, $C_{IN} = 4.7\mu F$, $C_{OUT} = 1\mu F$, $L = 10\mu H$, $T_A = -40^\circ C$ to $+85^\circ C$. Typical values are at $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
SUPPLY CURRENT						
Input Voltage Range	V_{IN}		1.8		5.5	V
Shutdown Current	I_{SD}	$EN = GND$		0.1	1	μA
Operating Quiescent Current	I_Q	$I_{OUT} = 0mA$, not switching, $V_{FB} = 1.3V$		20	35	μA
Under-Voltage Lockout Threshold	V_{UVLO}			1.5	1.65	V
ENABLE						
EN Input High Voltage	V_{IH}		1.3			V
EN Input Low Voltage	V_{IL}				0.4	V
EN Input Leakage Current		$EN = GND$ or V_{IN}		0.1	1	μA
POWER SWITCH AND CURRENT LIMIT						
Maximum Switch Voltage	V_{SW}				39	V
Minimum Off Time	t_{OFF}		270	430	570	ns
Maximum On Time	t_{ON}		4	6	8.5	μs
MOSFET On-Resistance	$R_{DS(ON)}$	$V_{IN} = 2.4V$, $I_{SW} = 200mA$		660	1100	$m\Omega$
MOSFET Leakage Current		$V_{SW} = 38V$			1	μA
Switch Current Limit	I_{LIM}		210	400	500	mA
OUTPUT						
Adjustable Output Voltage Range	V_{OUT}		V_{IN}		38	V
Feedback Reference Voltage	V_{FB}	$T_A = 25^\circ C$	1.202	1.229	1.253	V
Feedback Leakage Current	I_{FB}	$V_{FB} = 1.3V$			1	μA
Output Voltage Line Regulation	ΔV_{OUT}	$V_{IN} = 1.8V$ to $5.5V$, $V_{OUT} = 18V$, $I_{LOAD} = 10mA$, $C_{FF} =$ not connected		0.04		%/V
Output Voltage Load Regulation		$V_{IN} = 2.4V$, $V_{OUT} = 18V$, $I_{OUT} = 0mA$ to $30mA$		0.15		%/mA

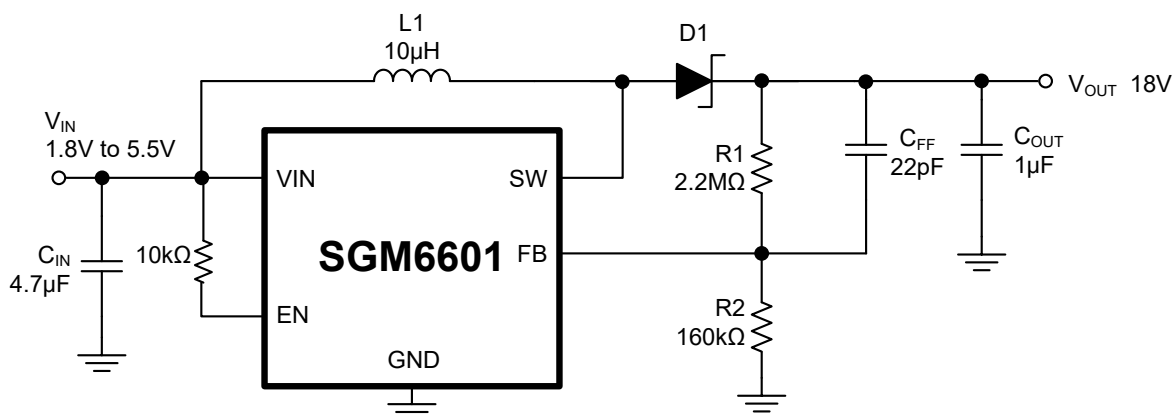
TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL APPLICATIONS



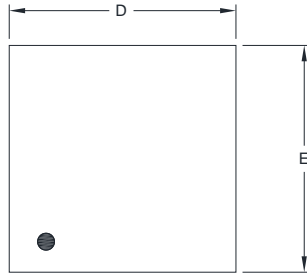
REVISION HISTORY

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

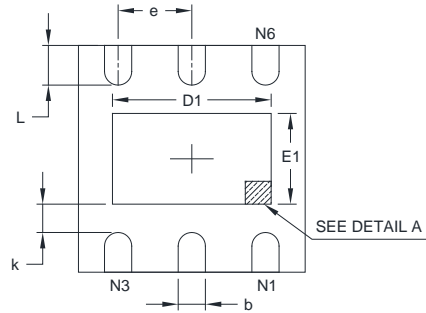
FEBRUARY 2014 – REV.A to REV.1		Page
Updated Electrical Characteristics data	All	All
Changes from Original (SEPTEMBER 2012) to REV.A		Page
Changed from product preview to production data.....	All	All

PACKAGE OUTLINE DIMENSIONS

TDFN-2x2-6L



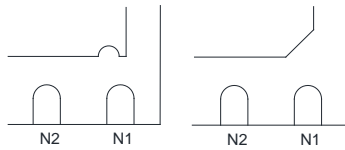
TOP VIEW



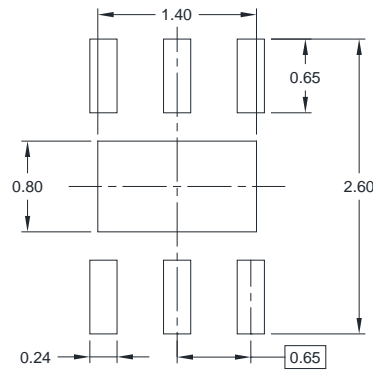
BOTTOM VIEW



SIDE VIEW



DETAIL A



RECOMMENDED LAND PATTERN (Unit: mm)

Pin #1 ID and Tie Bar Mark Options

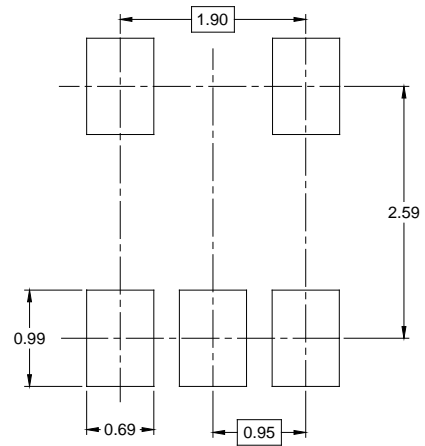
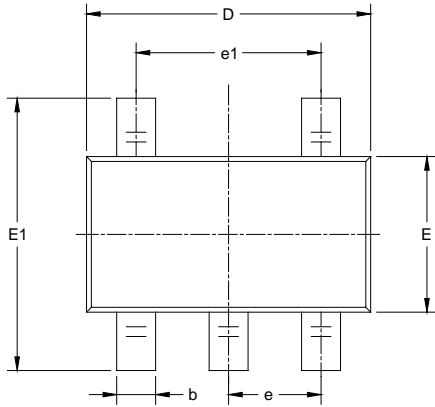
NOTE: The configuration of the Pin #1 identifier is optional, but must be located within the zone indicated.

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.100	1.450	0.043	0.057
E	1.900	2.100	0.075	0.083
E1	0.600	0.850	0.024	0.034
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.650 TYP		0.026 TYP	
L	0.250	0.450	0.010	0.018

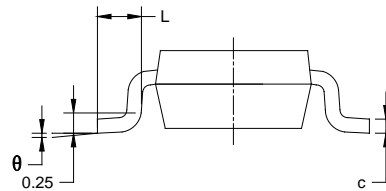
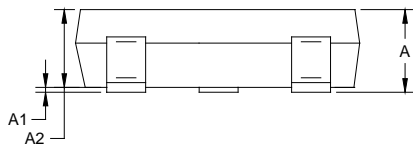
NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

TSOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b	0.350	0.500	0.014	0.020
c	0.080	0.200	0.003	0.008
D	2.820	3.020	0.111	0.119
E	1.600	1.700	0.063	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
θ	0°	8°	0°	8°

NOTES:

1. Body dimensions do not include mode flash or protrusion.
2. 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
TDFN-2×2-6L	7"	9.50	2.30	2.30	1.10	4.00	4.00	2.00	8.00	Q1
TSOT-23-5	7"	9.5	3.17	3.1	1.10	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