



# SGM66055

## 2.2MHz, Fixed Output Synchronous Tiny Boost Converter with a 4A Switch

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### GENERAL DESCRIPTION

The SGM66055 is an internally compensated, 2.2MHz switching frequency, current mode, synchronous boost switching regulator. Even below the minimum system battery voltage, the device maintains the output voltage regulation for a minimum output load current of 0.9A. This device turns into power-saving mode to maintain high efficiency by lowering switching frequency. With its anti-ringing circuitry damping the charge in parasitic capacitor, it reduces EMI interference significantly. Its output is disconnected by the rectifier circuit during shutdown with no input to output leakage.

The SGM66055-4.5/5.4 are available in the Green WLCSP-1.21×1.21-9B package; the SGM66055-5.0 is available in the Green WLCSP-1.21×1.21-9B and TDFN-2×3-8BL packages. They operate over an ambient temperature range of -40°C to +85°C.

### FEATURES

- **2.5V to 4.5V Operating Input Voltage Range**
- **4.5V, 5.0V and 5.4V Fixed Output Voltages**
- **5.7V Output Voltage Clamping**
- **93% Efficient Synchronous Boost Converter**
- **23μA (TYP) Device Quiescent Current**
- **Less than 1μA Shutdown Current**
- **Improved Light Load Efficiency with Power-Save Mode (PSM)**
- **Load Disconnect During Shutdown**
- **Low Reverse Leakage Current when  $V_{OUT} > V_{IN}$**
- **Over-Temperature Protection**
- **Available in Green WLCSP-1.21×1.21-9B and TDFN-2×3-8BL Packages**
- **-40°C to +85°C Operating Temperature Range**

### APPLICATIONS

Class-D Audio Amplifier  
Smart Phones and Tablets  
Portable and Wearable Devices  
USB OTG Supply

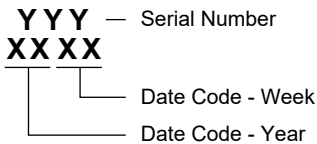
**PACKAGE/ORDERING INFORMATION**

MODEL	V <sub>OUT</sub> (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM66055	4.5	WLCSP-1.21×1.21-9B	-40°C to +85°C	SGM66055-4.5YG/TR	M9E XXXX	Tape and Reel, 3000
	5.0	WLCSP-1.21×1.21-9B	-40°C to +85°C	SGM66055-5.0YG/TR	GW6 XXXX	Tape and Reel, 3000
	5.4	WLCSP-1.21×1.21-9B	-40°C to +85°C	SGM66055-5.4YG/TR	GW7 XXXX	Tape and Reel, 3000
	5.0	TDFN-2×3-8BL	-40°C to +85°C	SGM66055-5.0YTDC8G/TR	MC3 XXXX	Tape and Reel, 3000

**MARKING INFORMATION**

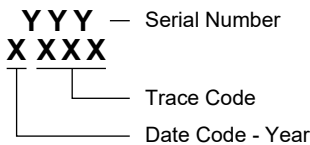
**WLCSP-1.21×1.21-9B**

(1) XXXX = Date Code.



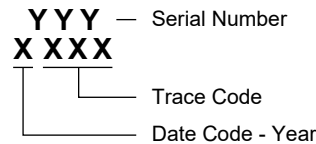
**TDFN-2×3-8BL**

(3) XXXX = Date Code and Trace Code.



**SGM66055-5.0: WLCSP-1.21×1.21-9B**

(2) XXXX = Date Code and Trace 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 on VIN Pin .....	-0.3V to 5.5V
Voltage on VOUT Pin .....	6V
SW Node (DC).....	-0.3V to 6V
SW Node (Transient: 10ns, 3MHz) .....	-1V to 8V
Voltage on Other Pins.....	-0.3V to 6V <sup>(1)</sup>
Package Thermal Resistance	
WLCSP-1.21×1.21-9B, θ <sub>JA</sub> .....	90°C/W
TDFN-2×3-8BL, θ <sub>JA</sub> .....	85°C/W
Junction Temperature.....	+150°C
Storage Temperature Range .....	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility	
HBM.....	4000V
MM.....	400V
CDM .....	1000V

NOTE: 1. Lesser of 6V or V<sub>IN</sub> + 0.3V.

**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.

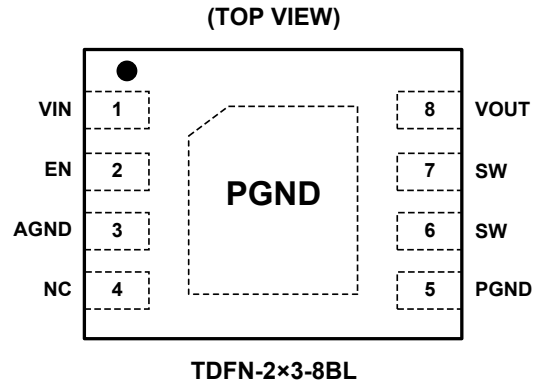
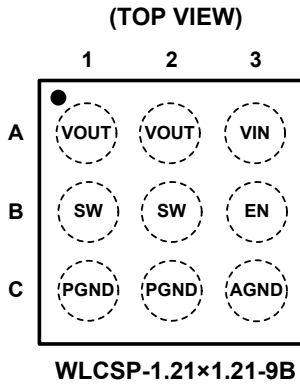
**ESD SENSITIVITY CAUTION**

This integrated circuit can be damaged 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.

**DISCLAIMER**

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATIONS



PIN DESCRIPTION

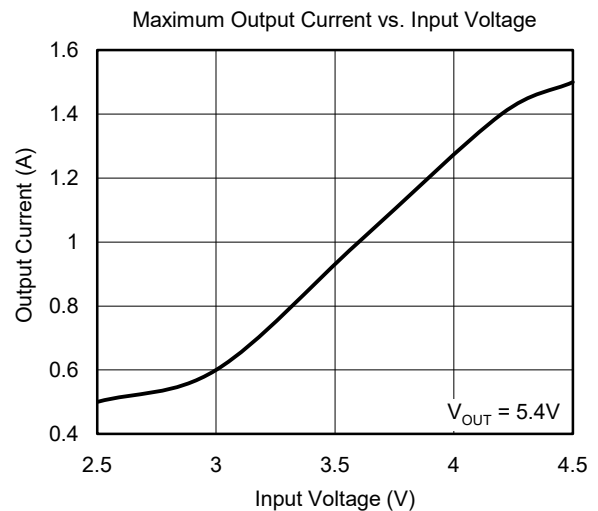
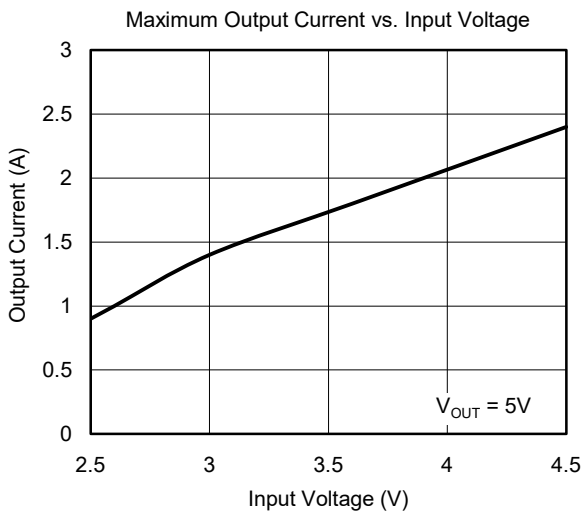
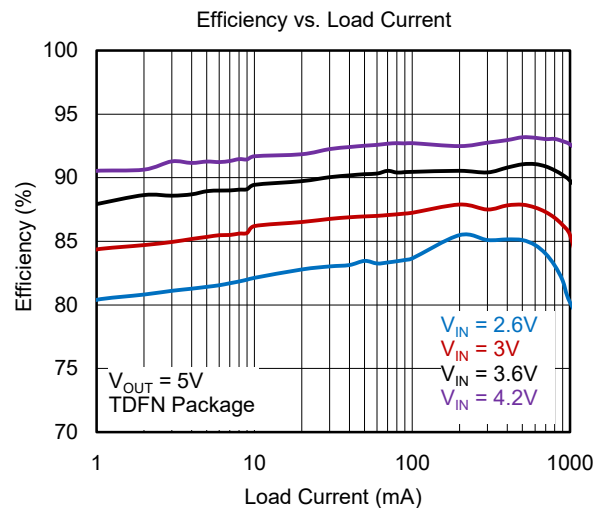
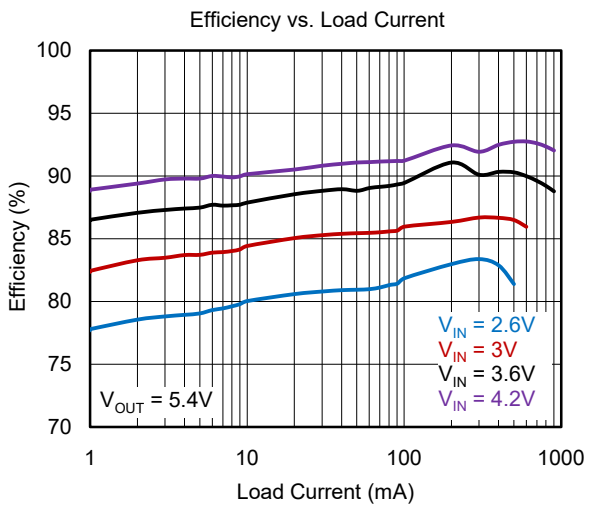
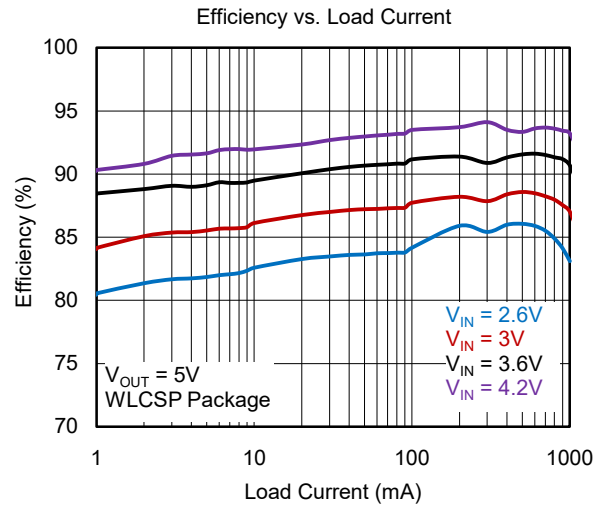
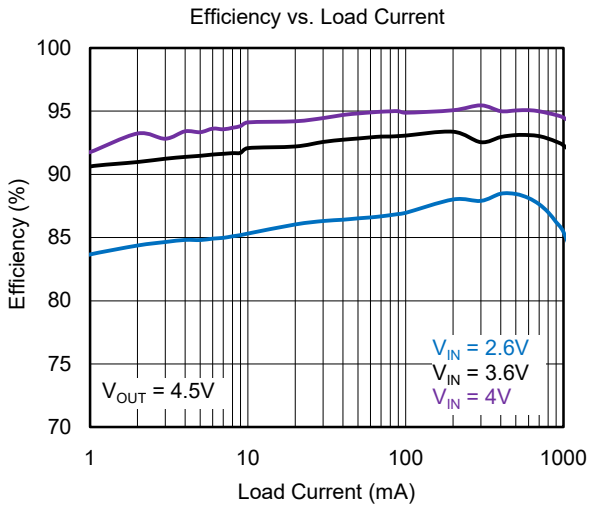
WLCSP-1.21×1.21-9B	TDFN-2×3-8BL	NAME	FUNCTION
A1, A2	8	VOUT	Output Voltage. $V_{OUT}$ directly connects to $C_{OUT}$ .
A3	1	VIN	Input Voltage. Connect to Li-Ion battery and the bias supply.
B1, B2	6, 7	SW	Switching Node. SW connects to an inductor.
B3	2	EN	Enable. Input logic high to enable this circuit.
C1, C2	5	PGND	Power Ground. $C_{OUT}$ capacitor should be connected to the pins as close as possible.
C3	3	AGND	Analog Ground. All voltage levels are referenced to this pin and it connects to PGND at a single point.
—	4	NC	No Connection.
—	Exposed Pad	PGND	Exposed Pad. Internally connects to PGND.

**ELECTRICAL CHARACTERISTICS**(V<sub>IN</sub> = 3.6V, 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
<b>DC/DC Stage</b>							
Input Voltage Range	V <sub>IN</sub>		+25°C	2.5		4.5	V
Switching Frequency	f		Full	1.80	2.20	2.55	MHz
Switch Current Limit	I <sub>L</sub>	SGM66055-4.5/5.0	+25°C	3.3	4.2	4.8	A
		SGM66055-5.4	+25°C	2.1	3.0	3.6	
Start-Up Current Limit			+25°C		700		mA
Boost Switch On-Resistance	V <sub>OUT</sub> = 5.0V	WLCSP	+25°C		50	65	mΩ
		TDFN	+25°C		85	105	
Rectifying Switch On-Resistance	V <sub>OUT</sub> = 5.0V	WLCSP	+25°C		60	80	mΩ
		TDFN	+25°C		95	115	
Output Voltage		SGM66055-4.5	Full	4.40	4.50	4.64	V
		SGM66055-5.0	Full	4.89	5.00	5.15	
		SGM66055-5.4	Full	5.30	5.40	5.56	
Line Regulation		V <sub>IN</sub> = 2.5V to V <sub>OUT</sub> - 0.5V	+25°C		0.1		%
Load Regulation			+25°C		0.2		%
Quiescent Current	I <sub>Q</sub>	V <sub>EN</sub> = V <sub>IN</sub> = 3.6V, not switching	+25°C		23	33	μA
Shutdown Current		V <sub>EN</sub> = 0V, V <sub>IN</sub> = 3.6V	+25°C			1	μA
<b>Control Stage</b>							
EN Input Low Voltage	V <sub>IL</sub>		Full			0.4	V
EN Input High Voltage	V <sub>IH</sub>		Full	1.3			V
EN Input Current		Clamped on GND or VIN	Full	-1		1	μA
Over-Temperature Protection					150		°C
Over-Temperature Hysteresis					20		°C

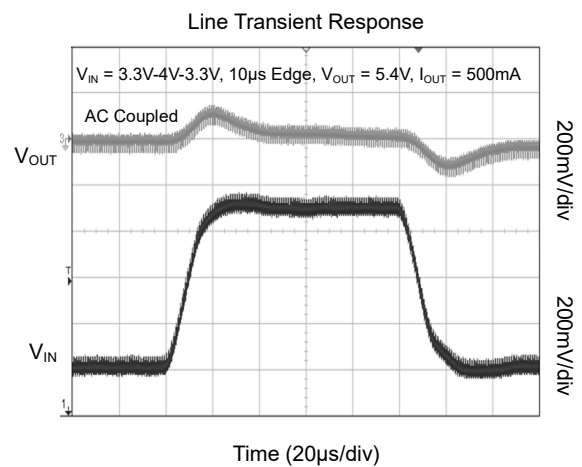
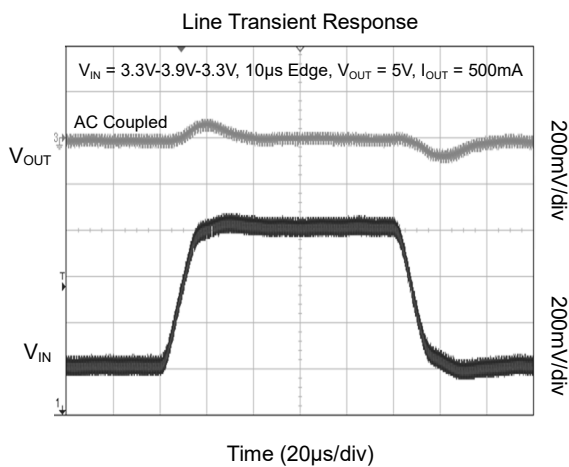
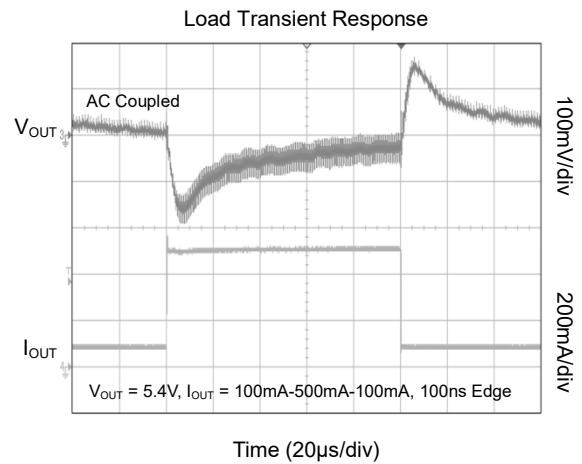
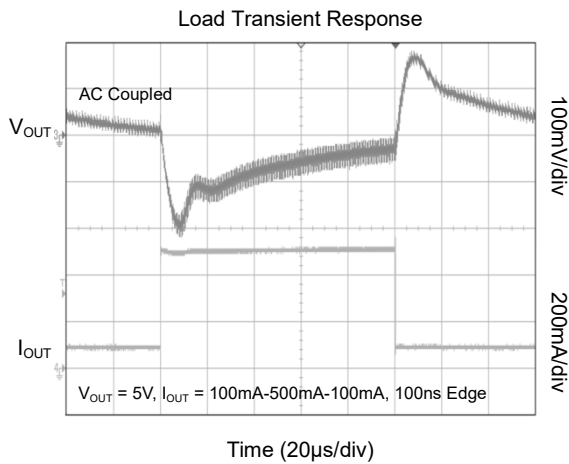
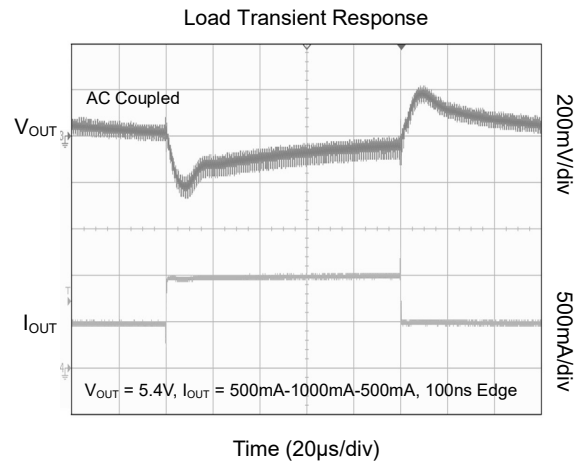
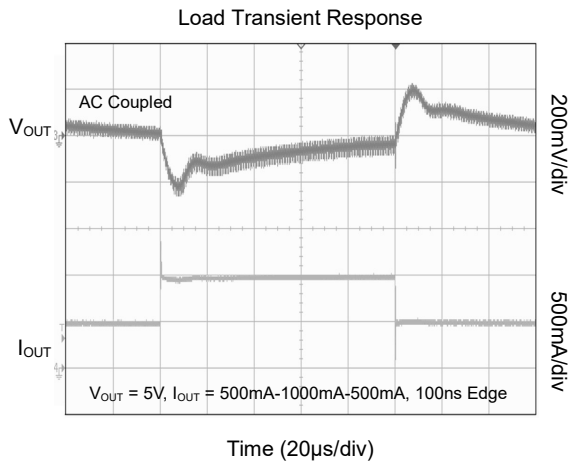
TYPICAL PERFORMANCE CHARACTERISTICS

At  $T_A = +25^\circ\text{C}$ ,  $V_{IN} = 3.6\text{V}$ ,  $C_{IN} = 10\mu\text{F}$ ,  $C_{OUT} = 20\mu\text{F}$ , unless otherwise noted.



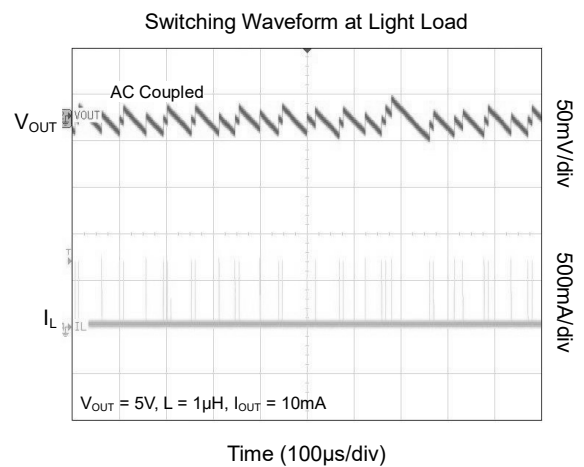
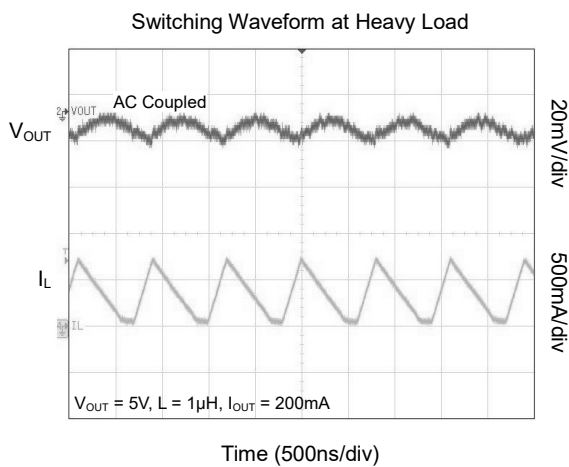
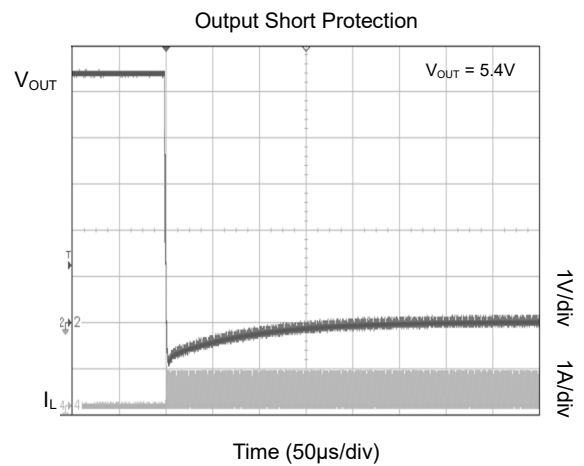
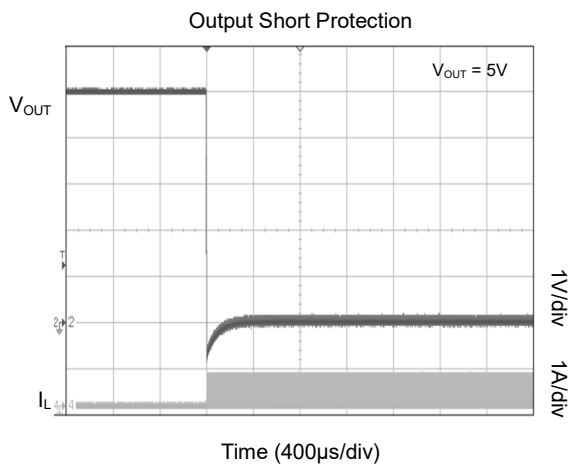
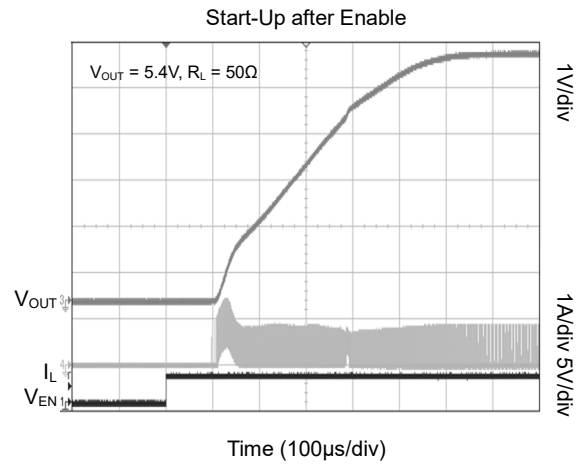
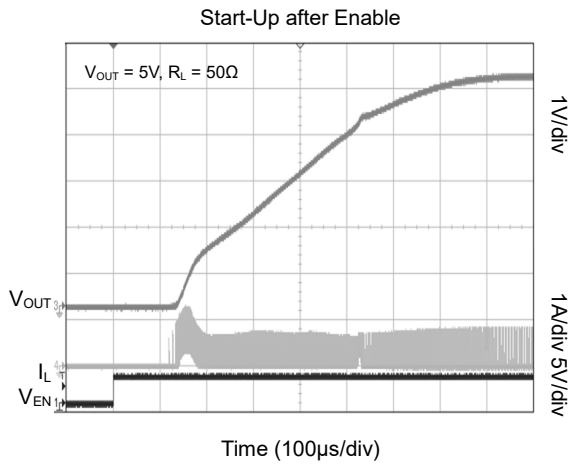
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At  $T_A = +25^\circ\text{C}$ ,  $V_{IN} = 3.6\text{V}$ ,  $C_{IN} = 10\mu\text{F}$ ,  $C_{OUT} = 20\mu\text{F}$ , unless otherwise noted.



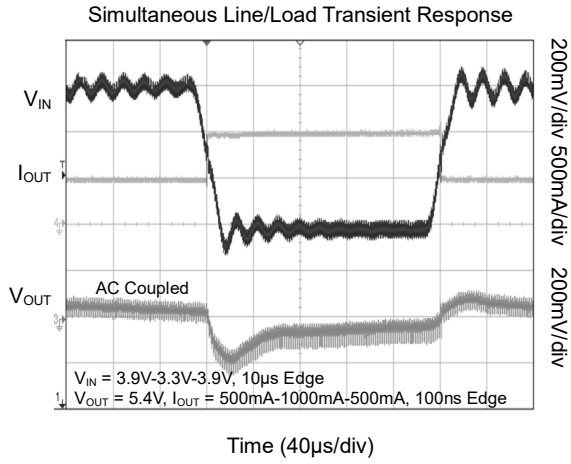
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At  $T_A = +25^\circ\text{C}$ ,  $V_{IN} = 3.6\text{V}$ ,  $C_{IN} = 10\mu\text{F}$ ,  $C_{OUT} = 20\mu\text{F}$ , unless otherwise noted.



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At  $T_A = +25^\circ\text{C}$ ,  $V_{IN} = 3.6\text{V}$ ,  $C_{IN} = 10\mu\text{F}$ ,  $C_{OUT} = 20\mu\text{F}$ , unless otherwise noted.





FUNCTIONAL BLOCK DIAGRAM

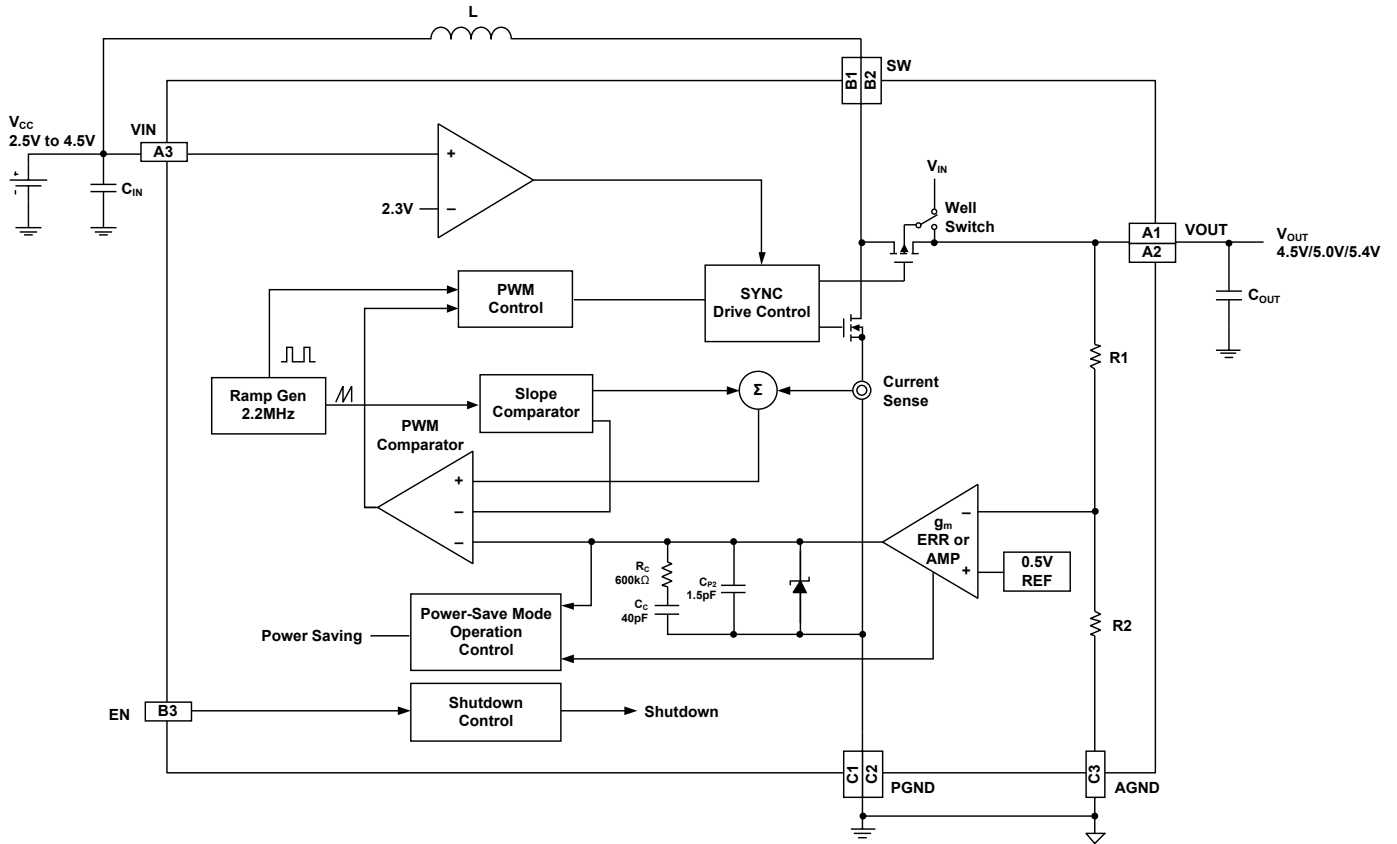


Figure 1. SGM66055 Block Diagram

**REVISION HISTORY**

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

<b>NOVEMBER 2021 – REV.A.1 to REV.A.2</b>	<b>Page</b>
Updated Start-up section .....	10

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<b>FEBRUARY 2021 – REV.A to REV.A.1</b>	<b>Page</b>
Updated Marking Information section.....	2

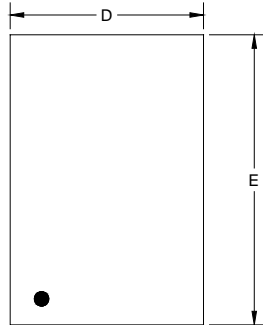
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<b>Changes from Original (AUGUST 2018) to REV.A</b>	<b>Page</b>
Changed from product preview to production data.....	All

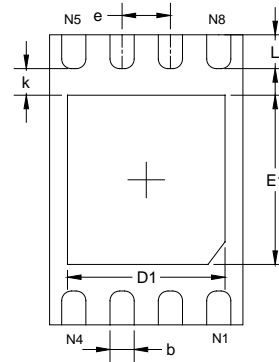
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PACKAGE OUTLINE DIMENSIONS

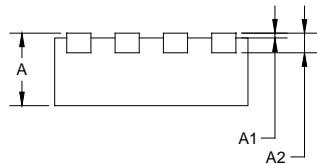
TDFN-2x3-8BL



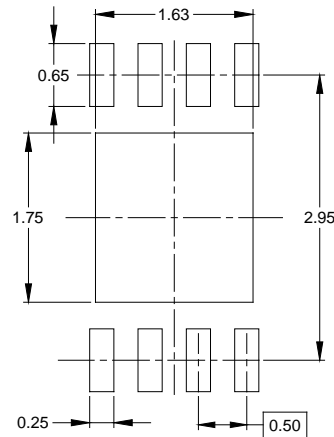
TOP VIEW



BOTTOM VIEW



SIDE VIEW



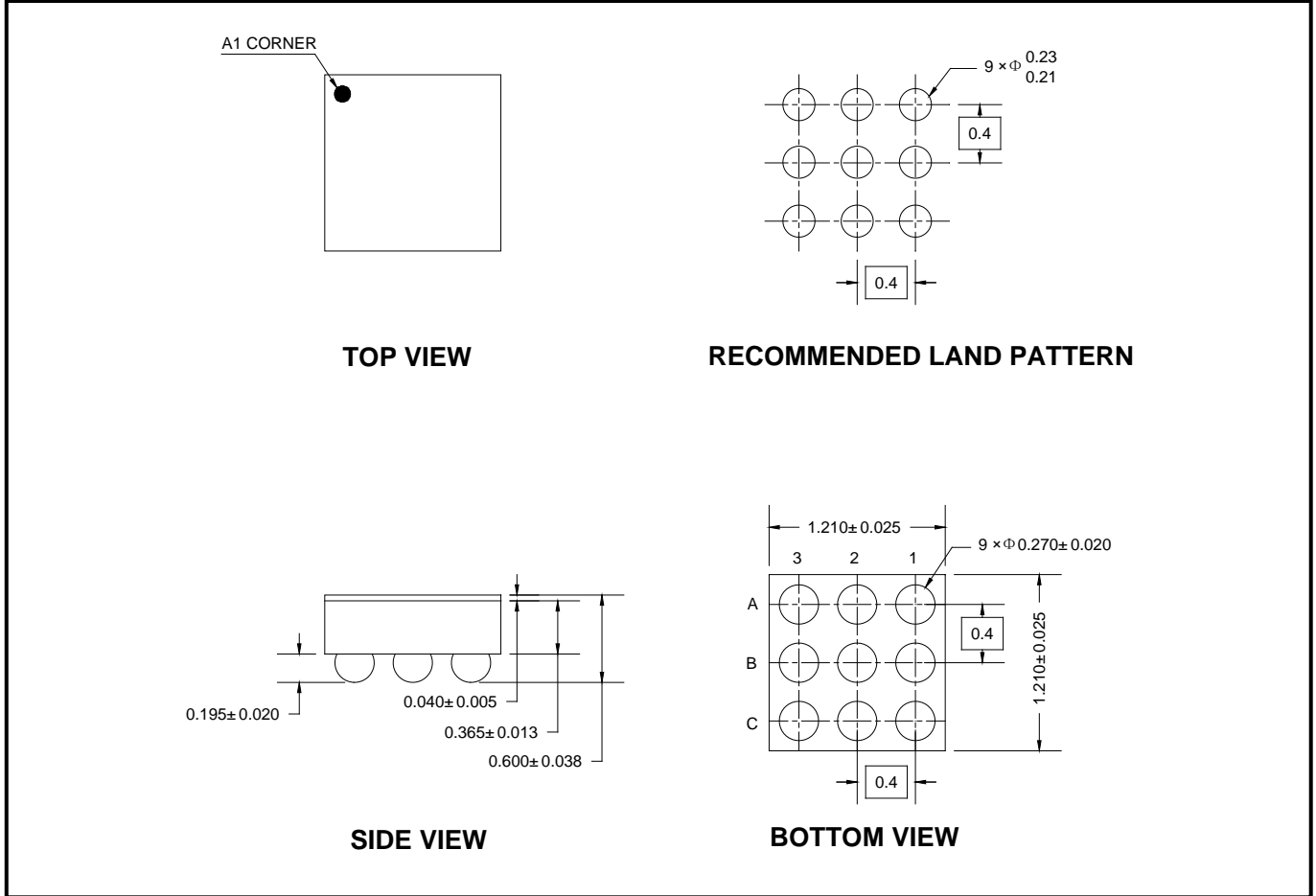
RECOMMENDED LAND PATTERN (Unit: mm)

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	1.950	2.050	0.077	0.081
D1	1.530	1.730	0.060	0.068
E	2.950	3.050	0.116	0.120
E1	1.650	1.850	0.065	0.073
b	0.200	0.300	0.008	0.012
e	0.500 BSC		0.020 BSC	
k	0.250 REF		0.010 REF	
L	0.300	0.450	0.012	0.018

NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

WLCSP-1.21x1.21-9B



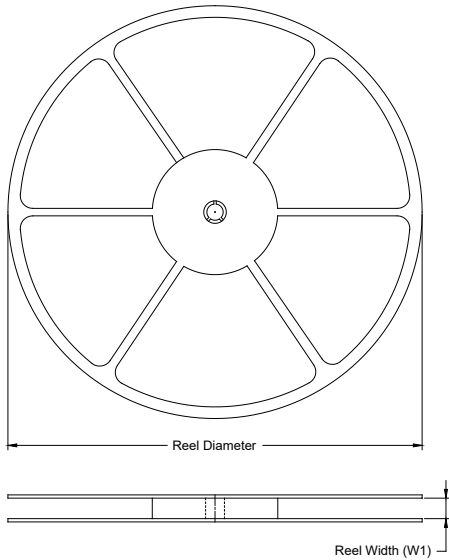
NOTES:

1. All linear dimensions are in millimeters.
2. This drawing is subject to change without notice.

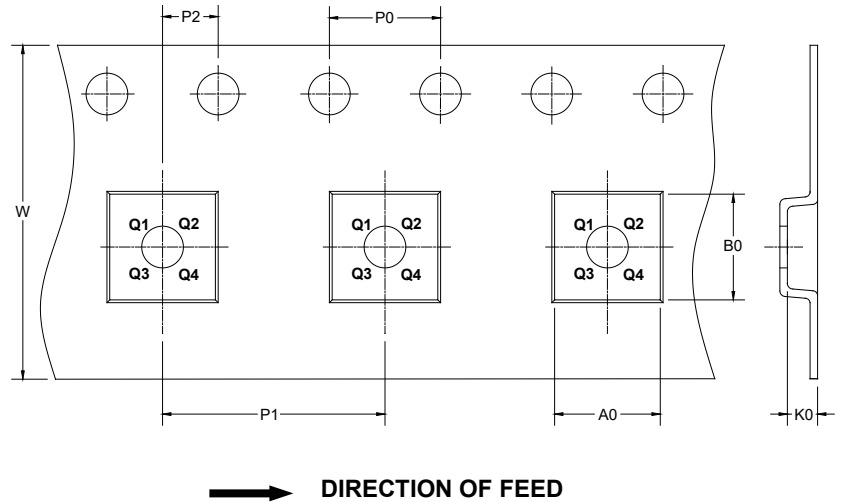
# PACKAGE INFORMATION

## 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
TDFN-2×3-8BL	7"	9.5	2.30	3.30	1.10	4.0	4.0	2.0	8.0	Q2
WLCSP-1.21×1.21-9B	7"	9.2	1.33	1.33	0.74	4.0	4.0	2.0	8.0	Q1

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

单击下面可查看定价，库存，交付和生命周期等信息

[>>SGMICRO\(圣邦微电子\)](#)