

GENERAL DESCRIPTION

The SGM66075A is a high power density synchronous Boost converter with integrated low $R_{DS(ON)}$ bypass switch from the input to output. The device operates with 2MHz (TYP) switching frequency in Boost mode. At light load, the device operates in I^2C programmable PFM mode to maximize efficiency.

The SGM66075A has a wide input range from 2.3V to 5.5V. After startup, the device is capable to operate down to 2.1V input before shutdown. Boost output voltage is programmable from 2.85V to 5.0V via I^2C interface with 50mV step.

During operation, when the input voltage is higher than the programmed output voltage, the SGM66075A operates in bypass mode via the integrated low $R_{DS(ON)}$ bypass switch to maximize the system efficiency. The current limit of bypass switch can be programmed to 11.2A (TYP) with 1 μ s (TYP) deglitch or 7.7A (TYP) with 1ms (TYP) deglitch.

When EN pin is pulled to logic high, the SGM66075A can be programmed in auto bypass mode, forced bypass mode or low power bypass mode. In auto bypass mode, when the input voltage falls below or rises above the programmed output voltage, the device automatically switches to either Boost or bypass mode to maintain the output voltage regulation. In low power bypass mode, the device will turn off more circuits to achieve lower quiescent current than forced bypass mode.

The maximum I^2C programmable Boost valley current limit of SGM66075A is 9A (TYP). For high pulsating load applications, the device is capable to support 5A peak current at 3.4V output when the input source voltage drops to 2.7V.

The SGM66075A is available in a Green WLCSP-1.73x1.73-16B package.

FEATURES

- Up to 96.7% Efficiency at $V_{IN} = 3.3V$, $V_{OUT} = 3.4V$, $I_{LOAD} = 1A$
- Wide V_{IN} Range from 2.3V to 5.5V
 - ◊ 2.1V after Startup
- Programmable Output Voltage from 2.85V to 5.0V
 - ◊ SGM66075A: 3.4V Default V_{OUT}
 - ◊ SGM66075A-3.6: 3.6V Default V_{OUT}
- $I_{OUT} \geq 5A$ (Peak) at $V_{OUT} = 3.4V$, $V_{IN} \geq 2.7V$
- Integrated Bypass Mode with 9m Ω Bypass Switch
- Low Power Bypass Mode
- Programmable Valley Inductor Current Limit and Output Voltage
- True Load Disconnect
- Low-Ripple Light-Load PFM Mode
- I^2C Controlled Interface
- Protection Features:
 - ◊ Short-Circuit Protection
 - ◊ Over-Current Protection
 - ◊ Over-Temperature Protection
- Available in a Green WLCSP-1.73x1.73-16B Package

APPLICATIONS

Single-Cell Ni-Rich, Si-Anode, Li-Ion, LiFePO4
 Smart-Phones or Tablet PCs
 2.5G, 3G, 4G Mini-Module Data Cards

TYPICAL APPLICATION

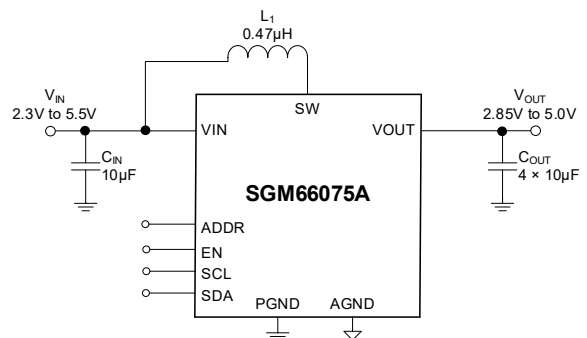


Figure 1. Typical Application Circuit

Low- I_Q , High Efficiency 9A Valley Current Synchronous Boost Converter with Bypass Switch

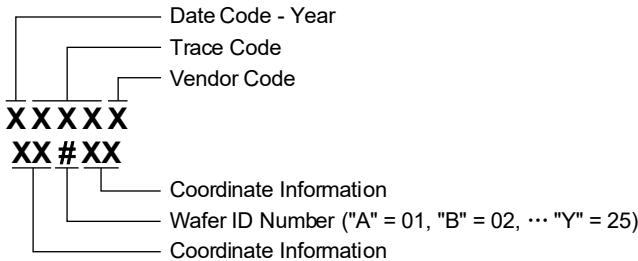
SGM66075A

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM66075A	WLCSP-1.73×1.73-16B	-40°C to +125°C	SGM66075AXG/TR	1IV XXXXX XX#XX	Tape and Reel, 3000
SGM66075A-3.6	WLCSP-1.73×1.73-16B	-40°C to +125°C	SGM66075A-3.6XG/TR	1M8 XXXXX XX#XX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor 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

VIN, EN, VOUT, ADDR Voltages.....	-0.3V to 6V
SCL, SDA Voltages	-0.3V to 6V
SW Voltage.....	-0.3V to 6V
SW Voltage (10ns Transient).....	-1V to 8V
Valley Current into SW	9A
Package Thermal Resistance	
WLCSP-1.73×1.73-16B, θ_{JA}	46.9°C/W
WLCSP-1.73×1.73-16B, θ_{JB}	11°C/W
WLCSP-1.73×1.73-16B, θ_{JC}	29.1°C/W
Junction Temperature.....	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility ^{(1) (2)}	
HBM.....	±2000V
CDM	±500V

NOTES:

- For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
- For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Input Voltage Range.....	2.3V to 5.5V
Inductance, L	200nH to 470nH
Output Effective Capacitance, C _{OUT}	
.....	9µF to 100µF, 14µF (TYP)
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.

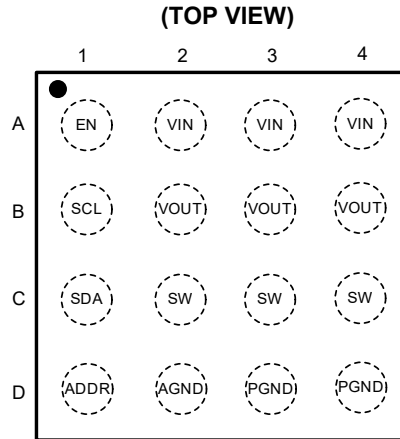
ESD SENSITIVITY CAUTION

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



WLCSP-1.73x1.73-16B

PIN DESCRIPTION

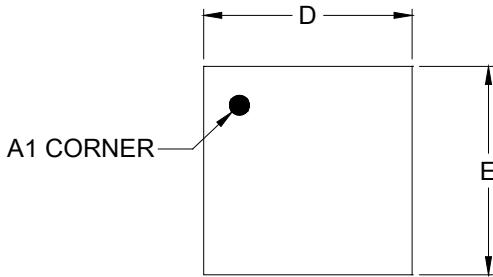
PIN	NAME	TYPE	DESCRIPTION
A1	EN	AI	Enable. When this pin is high, the device is enabled. When this pin is low, a pull-down resistor R_{PD} is connected to this pin.
B1	SCL	DI	Serial Interface Clock. SDA can be released when receiving 9 clock pulses on the SCL line if SDA is stuck low by the device.
C1	SDA	DIO	Serial Interface Data Line.
D1	ADDR	AI	I^2C Slave Address Pin. This pin can be pulled high, pulled low or floating. During POR, the pull-down resistor and pull-up resistor connected to this pin are both 100k Ω .
A2, A3, A4	VIN	P	Input Power Supply. Connect one 10 μ F or larger capacitors between this pin and PGND.
B2, B3, B4	VOUT	P	Output Voltage. Connect four 10 μ F or larger capacitors between this pin and PGND.
C2, C3, C4	SW	P	Switching Node. Connect to the inductor.
D2	AGND	P	Analog Ground.
D3, D4	PGND	P	Power Ground.

NOTE: AI = analog input, DI = digital input, DIO = digital input/output, P = power.

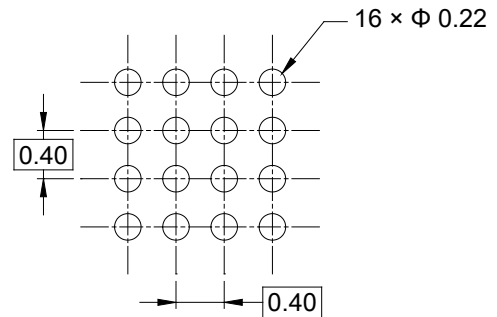
PACKAGE INFORMATION

PACKAGE OUTLINE DIMENSIONS

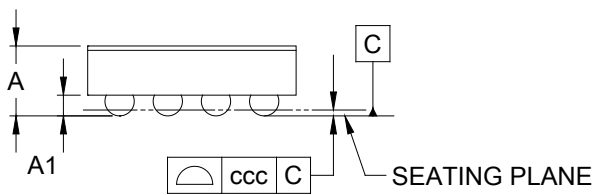
WLCSP-1.73×1.73-16B



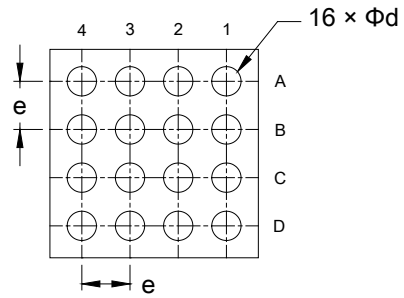
TOP VIEW



RECOMMENDED LAND PATTERN (Unit: mm)



SIDE VIEW



BOTTOM VIEW

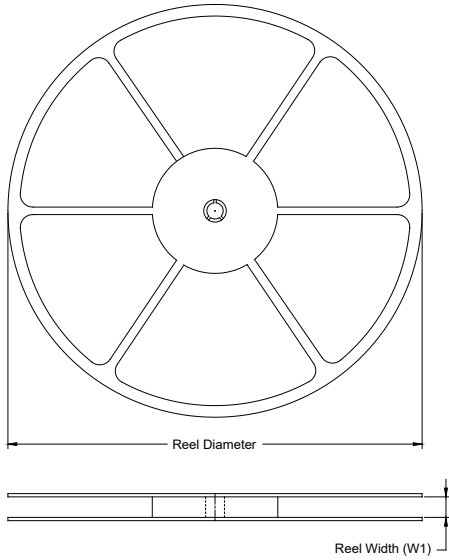
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	0.625
A1	0.152	-	0.192
D	1.700	-	1.760
E	1.700	-	1.760
d	0.213	-	0.273
e	0.400 BSC		
ccc	0.050		

NOTE: This drawing is subject to change without notice.

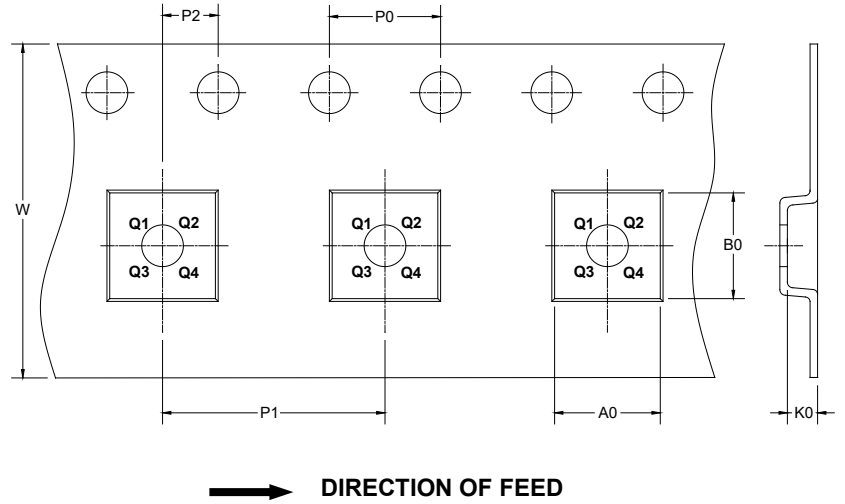
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

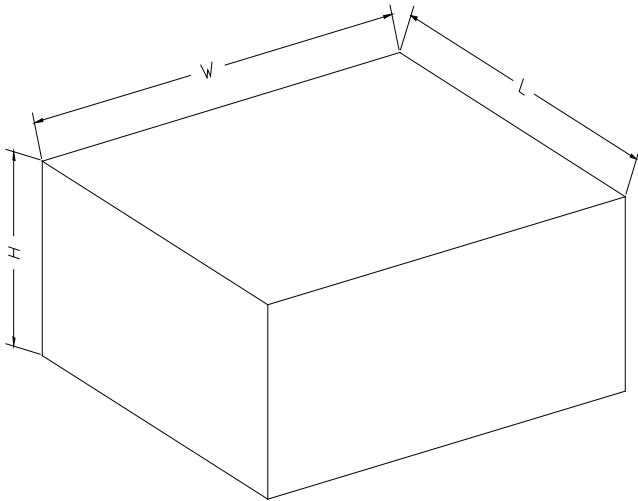
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
WLCSP-1.73×1.73-16B	7"	9.5	1.86	1.86	0.71	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

D00002