

GENERAL DESCRIPTION

The SGM40659/60/61 are over-voltage protection devices designed to protect low voltage systems from damage with a high voltage supply up to +28V_{DC}.

The integrated 27mΩ (TYP) R_{ON} FET allows it to pass through 4A continuous current. The FET is turned off when the input voltage exceeds the over-voltage threshold which can be adjusted between 4V and 20V with optional external resistors.

If the OVLO input is connected to GND, the SGM40659/60/61 automatically choose the internal OVLO thresholds that are preset to 15.61V/6.80V/5.94V (SGM40659/60/61) typically.

The SGM40659/60/61 are available in a Green WLCSP-1.30×0.94-6B package, and operate over an ambient temperature range of -40°C to +85°C.

FEATURES

- **Wide Power Supply Voltage Range: 2.5V to 28V**
- **Integrated Switch On-Resistance: 27mΩ (TYP)**
- **Current Capability up to 4A**
- **Internal Over-Voltage Protection Thresholds:**
 - ◆ **Fixed 15.61V (SGM40659)**
 - ◆ **Fixed 6.80V (SGM40660)**
 - ◆ **Fixed 5.94V (SGM40661)**
- **Wide Adjustable OVLO Threshold Range: 4V to 20V**
- **Surge Immunity up to +40V**
- **Debounce Time: 15ms**
- **Switch Turn-Off Time: 80ns**
- **Under-Voltage Lockout Protection**
- **Short-Circuit Protection**
- **Thermal Shutdown Protection**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green WLCSP-1.30×0.94-6B Package**

APPLICATIONS

Portable Internet Devices and Accessory
 Mobile Phones
 Tablet Computers

TYPICAL APPLICATION

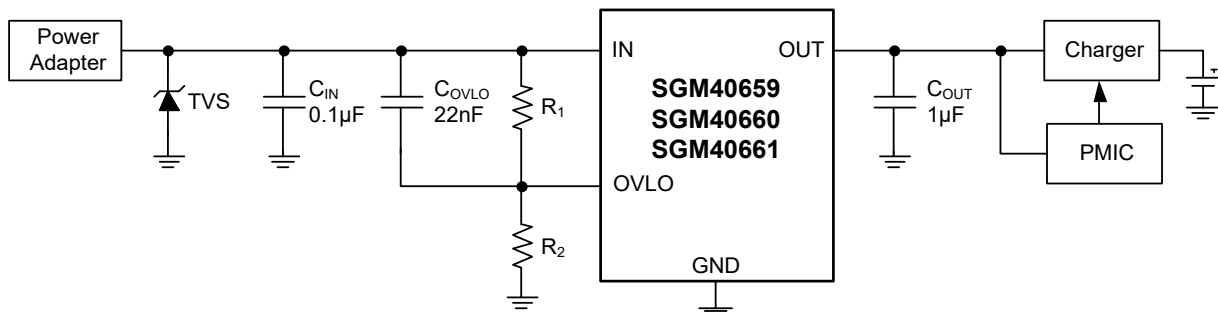
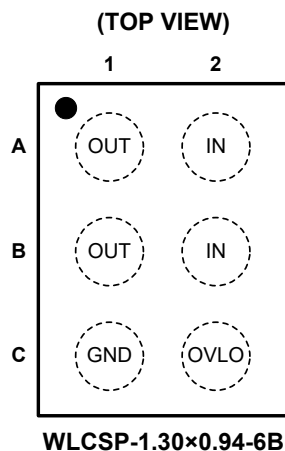


Figure 1. Typical Application Circuit

PIN CONFIGURATION



PIN DESCRIPTION

PIN	NAME	FUNCTION
A1, B1	OUT	Output Voltage Pin.
A2, B2	IN	Input Voltage Pin.
C1	GND	Ground.
C2	OVLO	External OVLO Adjustment Pin.

SGM40659 SGM40660/SGM40661 Adjustable Over-Voltage Protection Switches

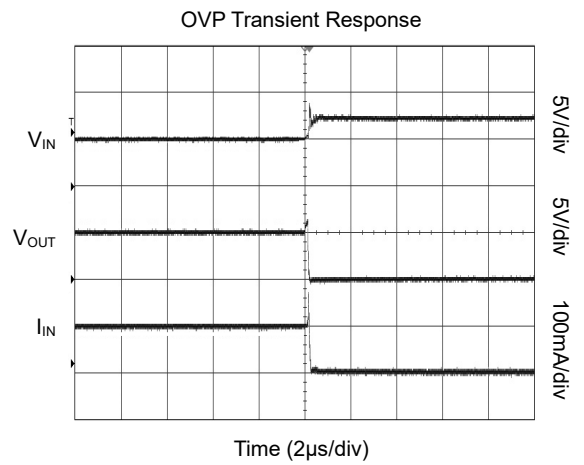
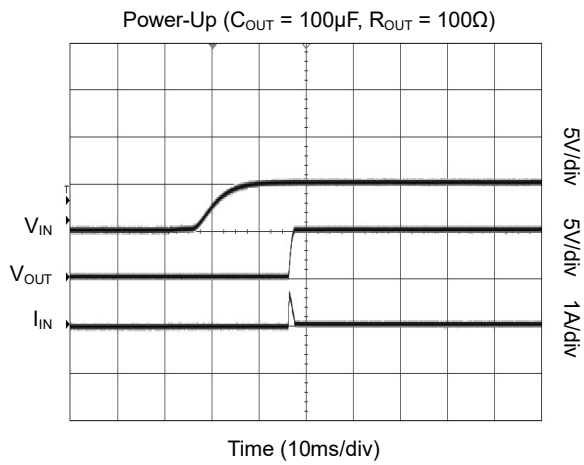
ELECTRICAL CHARACTERISTICS

($V_{IN} = 2.5V$ to $28V$, $C_{IN} = 0.1\mu F$, Full = $-40^{\circ}C$ to $+85^{\circ}C$, typical values are at $V_{IN} = 5V$, $I_{IN} \leq 3A$, $T_A = +25^{\circ}C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	
Input Operation							
Input Voltage Range	V_{IN}		2.5		28	V	
Input Supply Current	I_{IN}	$V_{IN} = 5V$			140	μA	
Under-Voltage Lockout Threshold	V_{IN_UVLO}	V_{IN} rising		2.4		V	
Under-Voltage Lockout Hysteresis	V_{UVLO_HYS}			0.2		V	
Over-Voltage Protection							
Internal Over-Voltage Protection Threshold	V_{IN_OVLO}	V_{IN} rising	SGM40659	15.07	15.61	16.14	V
			SGM40660	6.60	6.80	7.00	
			SGM40661	5.75	5.94	6.12	
		V_{IN} falling	SGM40659	14.22	14.76		
			SGM40660	6.24	6.47		
			SGM40661	5.45	5.66		
OVLO Preset Threshold Range	V_{OVLO_TH}		1.183	1.213	1.242	V	
Adjustable OVLO Threshold Range			4		20	V	
External OVLO Select threshold	V_{OVLO_SELECT}		0.24	0.27	0.31	V	
Switch On-Resistance	R_{ON}	$V_{IN} = 5V$, $I_{OUT} = 0.5A$, $T_A = +25^{\circ}C$		27	45	$m\Omega$	
OVLO Input Leakage Current	I_{OVLO}	$V_{OVLO} = 1.3V$	-100		100	nA	
Timing Characteristics							
Debounce Time	t_{DEB}	Time from $V_{IN} > 2.5V$ to the time V_{OUT} starts rising		15		ms	
Switch Turn-On Time	t_{ON}	$V_{IN} = 5V$, $R_L = 100\Omega$, $C_{LOAD} = 100\mu F$, V_{OUT} from 10%, V_{IN} to 90% V_{IN}		2		ms	
Switch Turn-Off Time	t_{OFF}	$V_{IN} > V_{OVLO}$ to $V_{OUT} = 80\%$ of V_{IN} , $R_L = 100\Omega$, V_{IN} rising at $2V/\mu s$		80		ns	
Thermal Shutdown							
Thermal Shutdown				150		$^{\circ}C$	
Thermal Shutdown Hysteresis				60		$^{\circ}C$	

TYPICAL PERFORMANCE CHARACTERISTICS

$T_A = +25^\circ\text{C}$, $V_{IN} = 5\text{V}$, OVLO pin = GND, $C_{IN} = 0.1\mu\text{F}$ and $C_{OUT} = 1\mu\text{F}$, unless otherwise specified.



FUNCTIONAL BLOCK DIAGRAM

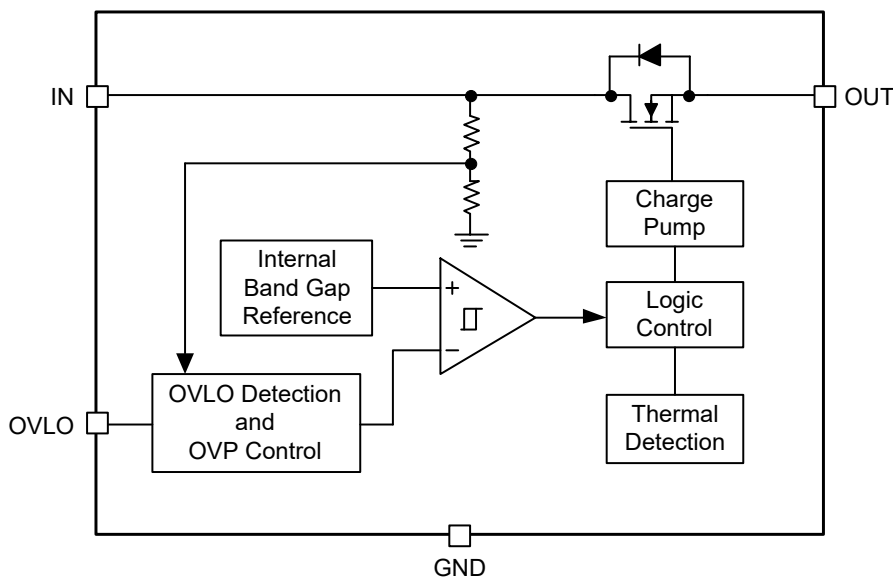


Figure 2. Block Diagram

REVISION HISTORY

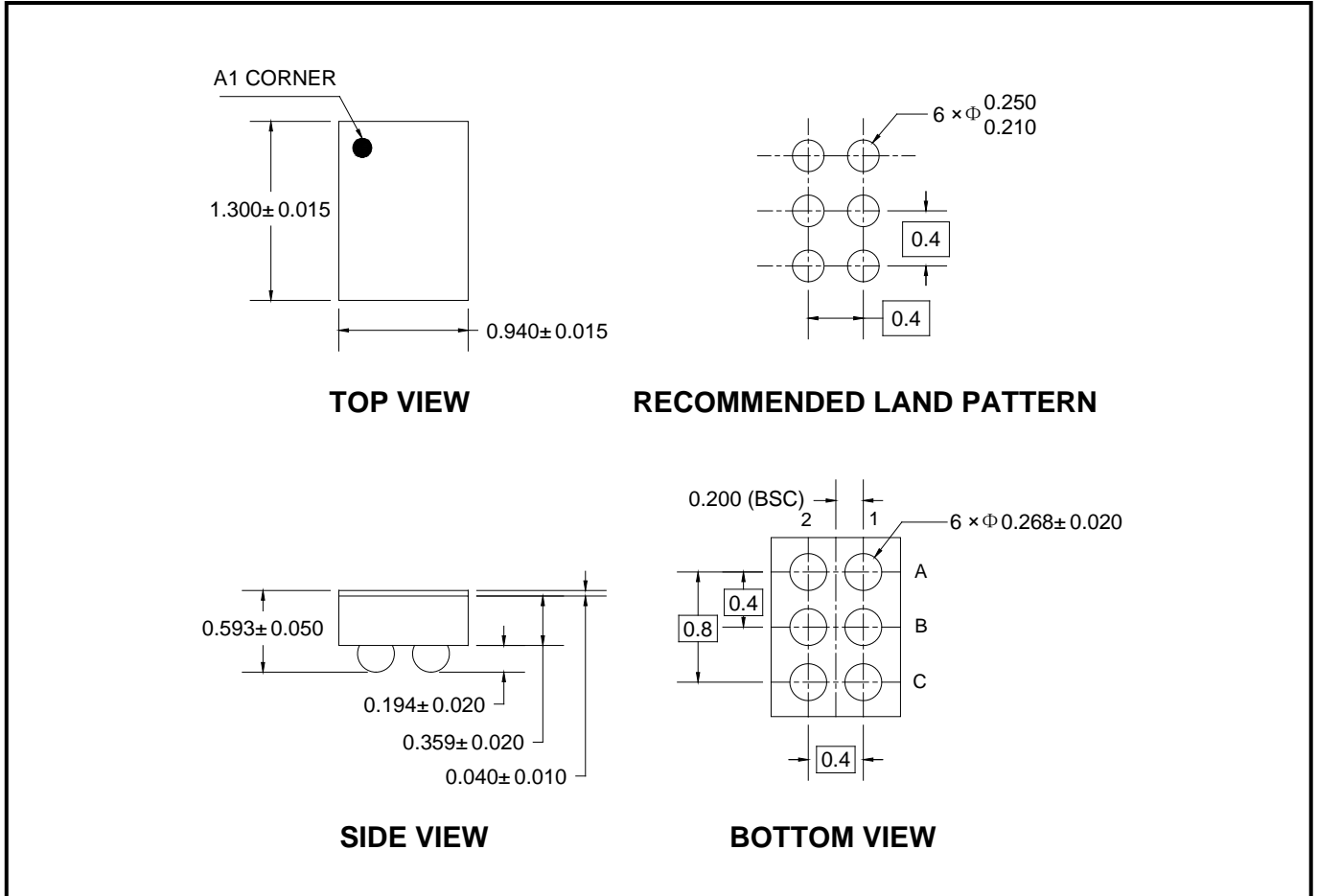
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original (SEPTEMBER 2018) to REV.A

Changed from product preview to production data.....All

PACKAGE OUTLINE DIMENSIONS

WLCSP-1.30x0.94-6B

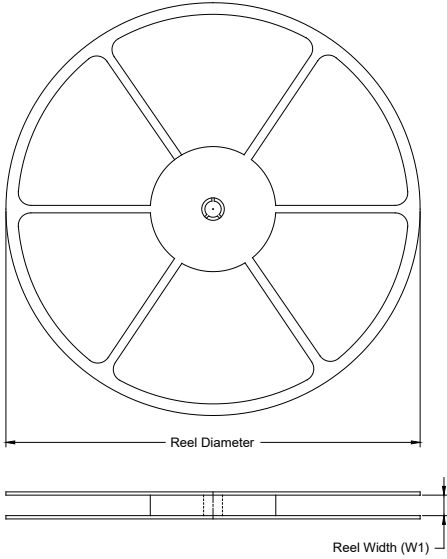


NOTE: All linear dimensions are in millimeters.

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-1.30×0.94-6B	7"	9.0	1.07	1.52	0.72	4.0	4.0	2.0	8.0	Q1

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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

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