



# SGMICRO True Reverse Current Blocking, 28V/5.5A Rated

## SGM40677

### Current Limit Switch with Over-Voltage Protection and

#### GENERAL DESCRIPTION

The SGM40677 is current limit switch that can offer 28V/5.5A rated capability. It provides rich system protections including over-current protection (OCP), true reverse current blocking (TRCB), over-voltage protection (OVP), under-voltage protection (UVP), over-temperature protection (OTP) and short-circuit protection (SCP). The SGM40677 features 18mΩ low on-resistance with WLCSP package. The input operating voltage is 4V to 22V.

The SGM40677 provides accurate current limit protection. Besides, the device offers adjustable over-voltage protection, configurable ON polarity and configurable over-current threshold action, which help meet various system applications.

The SGM40677 is available in a Green WLCSP -1.66×2.54-24B package.

#### APPLICATIONS

Mobile Devices, Host Computing  
Wearable Accessories

#### FEATURES

- 28V/5.5A Ratings
- Wide Input Operating Voltage: 4V to 22V
- Low On-Resistance: 18mΩ at 5V and +25°C
- Programmable Current Limit through R<sub>SET</sub>: 500mA ~ 5.5A
- Configurable OVLO through OV1/OV2 Input
  - ◆ 5.965V (TYP)
  - ◆ 10.1V (TYP)
  - ◆ 16.89V (TYP)
  - ◆ 23.1V (TYP)
- Configurable ON Polarity
- Configurable Over-Current Action
  - ◆ Auto-Retry Mode
  - ◆ Limited Constant Current Mode
- True Reverse Current Blocking
- Over-Temperature Shutdown
- Open-Drain Fault Indicator: nFLAG
- Robust ESD Capability
  - ◆ ±4kV HBM & ±1kV CDM
  - ◆ 15kV Air Discharge & 8kV Contact Discharge under IEC 61000-4-2
- Available in a Green WLCSP-1.66×2.54-24B Package

#### SIMPLIFIED SCHEMATIC

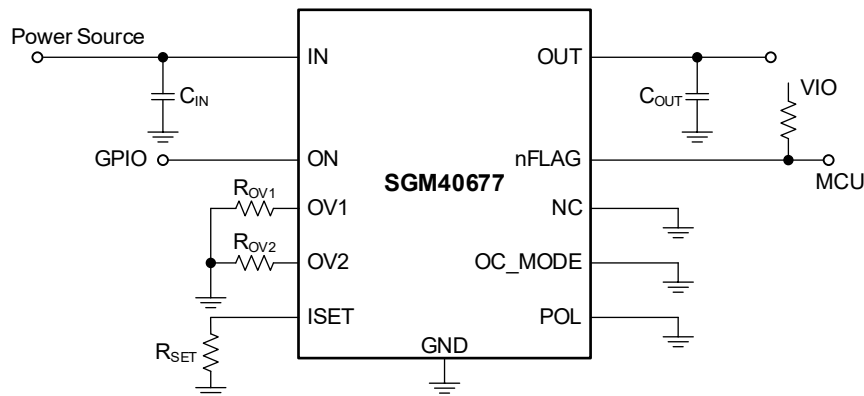


Figure 1. Simplified Schematic

# Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

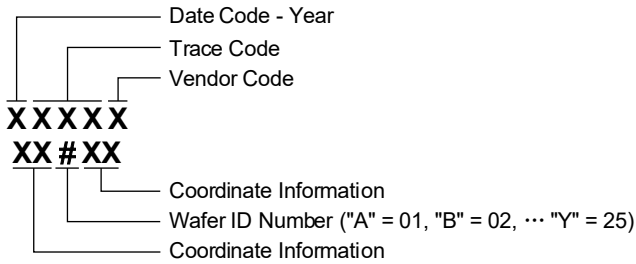
## SGM40677

### PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM40677	WLCSP-1.66×2.54-24B	-40°C to +85°C	SGM40677YG/TR	40677 XXXXX XX#XX	Tape and Reel, 3000

### MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code. XX#XX = Coordinate Information and Wafer ID Number.



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

IN, OUT to GND.....	-0.3V to 28V
ON, POL, ISET, OC_MODE, nFLAG and OVx to GND .....	-0.3V to 6V
Continuous Switch Current, I <sub>SW</sub> .....	5.8A
Package Thermal Resistance	
WLCSP-1.66×2.54-24B, θ <sub>JA</sub> .....	43.3°C/W
WLCSP-1.66×2.54-24B, θ <sub>JB</sub> .....	9.3°C/W
WLCSP-1.66×2.54-24B, θ <sub>JC</sub> .....	16°C/W
Junction Temperature.....	+150°C
Storage Temperature Range .....	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility <sup>(1)(2)</sup>	
HBM.....	±4000V
CDM .....	±1000V

#### 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

Supply Voltage Range .....	4V to 22V
Input and Output Capacitance, C <sub>IN</sub> , C <sub>OUT</sub> .....	> 1µF
Operating Ambient Operating Temperature ...	-40°C to +85°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.

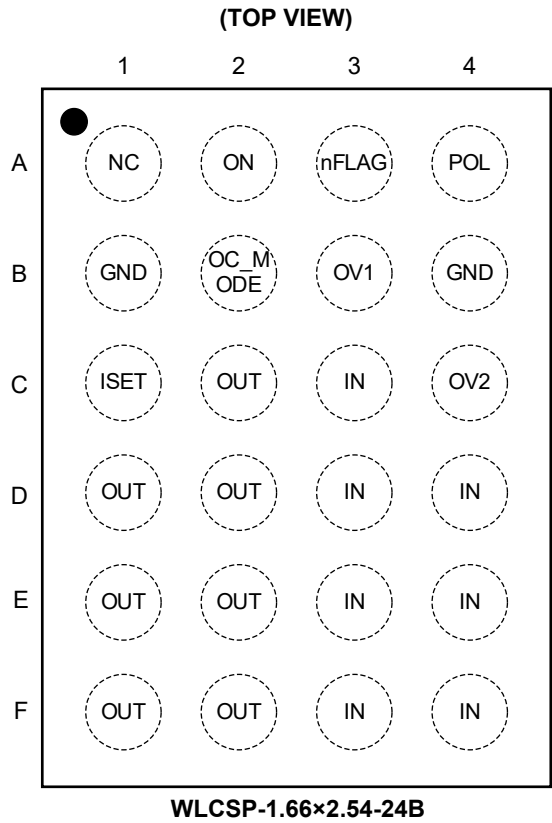
### ESD SENSITIVITY CAUTION

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



PIN DESCRIPTION

PIN	NAME	FUNCTION
A1	NC	It is recommended to tie to GND.
A2	ON	This pin integrates a 2MΩ pull-down resistor. The active polarity of ON depends on POL.
A3	nFLAG	State Indicator Pin with Open-Drain Structure. This pin is active-low during over-current, over-temperature or over/under-voltage conditions.
A4	POL	ON Polarity Selection Pin. This pin integrates a 2MΩ pull-up resistor. High/Floating: Active-Low Low: Active-High <sup>(1)</sup>
B1, B4	GND	Device Ground.
B2	OC_MODE	Over-Current Protection Programming Pin. This pin integrates a 2MΩ pull-up resistor. High/Floating: Auto-retry mode during over-current (OC) condition. Low: Limited constant current mode during over-current (OC) condition. <sup>(1)</sup>
B3	OV1	Over-Voltage Selection Input 1. This pin integrates a 2MΩ pull-up resistor. It is recommended to use OV1 with an external 1kΩ resistor.
C1	ISET	Place a resistor from ISET pin to GND to adjust the current limit threshold.
C2, D1, D2, E1, E2, F1, F2	OUT	Device Output Terminal.
C3, D3, D4, E3, E4, F3, F4	IN	Device Input and Supply Voltage.
C4	OV2	Over-Voltage Selection Input 2. This pin integrates a 2MΩ pull-up resistor. It is recommended to use OV2 with an external 1kΩ resistor.

NOTE: 1. Connect to a certain level when noise interference.

# SGM40677

## Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

### ELECTRICAL CHARACTERISTICS

( $V_{IN} = 4V$  to  $22V$ ,  $T_A = -40^\circ C$  to  $+85^\circ C$ , typical values are measured at  $V_{IN} = 5V$ ,  $T_A = +25^\circ C$ ,  $C_{IN} = C_{OUT} = 1\mu F$ ,  $POL = OV1 = OV2 = OC\_MODE = GND$  and  $ON = high$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
<b>Basic Operation</b>						
Input Voltage Range	$V_{IN}$		4		22	V
Quiescent Current	$I_Q$	$I_{OUT} = 0mA$ , $V_{ON} = on$	$V_{IN} = 5V$	130	180	$\mu A$
			$V_{IN} = 12V$	140	190	
			$V_{IN} = 20V$	145	200	
$V_{IN}$ Shutdown Current	$I_{SD\_IN}$	$V_{IN} = 5.5V$ , $V_{ON} = off$ , $V_{OUT}$ shorted to GND		60	100	$\mu A$
On-Resistance	$R_{ON}$	$I_{OUT} = 1A$	$V_{IN} = 5V$	18	32	m $\Omega$
			$V_{IN} = 12V$	18	32	
			$V_{IN} = 20V$	18	32	
ON Leakage Current	$I_{ON}$	$V_{ON} = V_{IN}$			5	$\mu A$
Logic Pin Input Voltage (ON/POL/OC_MODE/OV1/OV2)	$V_{IH}$	$V_{IN} = 4V$ to $22V$	1.2			V
	$V_{IL}$	$V_{IN} = 4V$ to $22V$			0.4	V
Output Logic Low Voltage (nFLAG)	$V_{P\_LOW}$	$V_{IN} = 5V$ , $I_{SINK} = 5mA$		0.1	0.25	V
Output High, Leakage Current (nFLAG)	$I_{LKG}$	$V_{IN} = 5V$ , switch on			0.5	$\mu A$
Current Limit	$I_{LIM}$	$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 13k\Omega$	0.39	0.45	0.51	A
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 1.48k\Omega$	2.85	3.00	3.15	
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 1.24k\Omega$	3.42	3.60	3.78	
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 1.1k\Omega$	3.75	4.03	4.31	
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 0.8k\Omega$	5.08	5.47	5.85	
Typical Current Limit	$I_{LIM\_TYP}$	$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 13k\Omega$ , $T_A = +25^\circ C$	0.42	0.45	0.49	A
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 1.48k\Omega$ , $T_A = +25^\circ C$	2.91	3.00	3.10	
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 1.24k\Omega$ , $T_A = +25^\circ C$	3.48	3.60	3.72	
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 1.1k\Omega$ , $T_A = +25^\circ C$	3.83	4.03	4.23	
		$V_{IN} = 5V$ , $V_{OUT} = 4V$ , $R_{SET} = 0.8k\Omega$ , $T_A = +25^\circ C$	5.17	5.47	5.76	
Circuit Breaker Threshold	$I_{CB}$	ISET pin open		0.35		A
		ISET pin shorted to GND		0.55		
Fast-Trip Threshold <sup>(1)</sup>	$I_{FT}$		6			A
$I_{LIM}$ Foldback Trip Voltage	$V_{FOLD}$	$V_{OUT}$ under $I_{LIM}$ mode		2.015		V
$I_{LIM}$ Foldback Current	$I_{FOLD}$	$V_{IN} = 5V$ , $OC\_MODE = high$ , $V_{OUT} < V_{FOLD}$		500		mA
		$V_{IN} = 5V$ , $OC\_MODE = low$ , $V_{OUT} < V_{FOLD}$		250		mA
Under-Voltage Lockout Threshold	$V_{UVLO\_R}$	$V_{IN}$ rising		2.7	2.9	V
	$V_{UVLO\_F}$	$V_{IN}$ falling		2.5		V
Under-Voltage Lockout Hysteresis	$V_{HYS}$			200		mV

NOTE: 1. Guaranteed by design.

# Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

## SGM40677

### ELECTRICAL CHARACTERISTICS (continued)

( $V_{IN} = 4V$  to  $22V$ ,  $T_A = -40^\circ C$  to  $+85^\circ C$ , typical values are measured at  $V_{IN} = 5V$ ,  $T_A = +25^\circ C$ ,  $C_{IN} = C_{OUT} = 1\mu F$ ,  $POL = OV1 = OV2 = OC\_MODE = GND$  and  $ON = high$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	
Over-Voltage Lockout Threshold	$V_{OVLO}$	OV1 = logic low, OV2 = logic low	$V_{IN}$ rising	22.66	23.1	23.37	V
			$V_{IN}$ falling	22.265			
		OV1 = logic low, OV2 = logic high	$V_{IN}$ rising	9.94	10.1	10.24	
			$V_{IN}$ falling	9.77			
		OV1 = logic high, OV2 = logic low	$V_{IN}$ rising	16.6	16.89	17.12	
			$V_{IN}$ falling	16.32			
		OV1 = logic high, OV2 = logic high	$V_{IN}$ rising	5.88	5.965	6.05	
			$V_{IN}$ falling	5.78			
OVP Response Time	$t_{OVP}$	$R_L = 100\Omega$ , $C_L = 0\mu F$ , $V_{IN} > V_{OVLO}$ to $V_{OUT} = 90\%V_{IN}$			0.5	$\mu s$	
TRCB Protection, Trip Point	$V_{T\_RCB}$	$(V_{OUT} - V_{IN})$ threshold for reverse protection comparater trigger		18	35	mV	
TRCB Protection, Release Point	$V_{R\_RCB}$	$(V_{IN} - V_{OUT})$ threshold for reverse protection comparater release		18	35	mV	
TRCB Response Time <sup>(1)</sup>	$t_{RCB}$	$V_{IN} = 5V$ , 10mV overdrive to shutdown		5		$\mu s$	
TRCB Release Time <sup>(1)</sup>	$t_{RCB\_RELEASE}$	$V_{IN} = 5V$ , 10mV overdrive to enable		1		$\mu s$	
Over-Current Response Time <sup>(1)</sup>	$t_{LIM}$	$I_{LIM} = 2A$ , $I_{OUT} = 0.2 \times I_{LIM}$ to $1.4 \times I_{LIM}$ , slew rate = $1A/\mu s$ , from $I_{OUT} = 1.4 \times I_{LIM}$ until the output voltage begins to drop		50		$\mu s$	
Scalable Fast-Trip Response Time <sup>(1)</sup>	$t_{FT}$	$I_{OUT} > I_{FT}$		800		ns	
$V_{OUT}$ Shutdown Current	$I_{SD\_OUT}$	$V_{OUT} = 5V$ , $V_{ON} = off$ , $V_{IN}$ shorted to GND			2	$\mu A$	
Thermal Shutdown Temperature <sup>(1)</sup>	$T_{SD}$	Shutdown threshold		150		$^\circ C$	
	$T_{HYS}$	Hysteresis		20			
$V_{OUT}$ Rise Time	$t_R$	$R_L = 100\Omega$ , $C_L = 1\mu F$		2.0		ms	
Delay On Time	$t_{DON}$	$R_L = 100\Omega$ , $C_L = 1\mu F$		1.1		ms	
$V_{OUT}$ Fall Time	$t_F$	$R_L = 100\Omega$ , $C_L = 1\mu F$		200		$\mu s$	
Delay Off Time	$t_{DOFF}$	$R_L = 100\Omega$ , $C_L = 1\mu F$		6.8		$\mu s$	
Over-Current Blanking Time <sup>(1)</sup>	$t_{BLANK}$	$OC\_MODE = logic high$		6		ms	
Auto-Retry Time <sup>(1)</sup>	$t_{RSTRT}$	$OC\_MODE = logic high$		220		ms	
Hiccup Time <sup>(1)</sup>	$t_{HICCUP}$	$OC\_MODE = logic low$		50		ms	
Over-Current Qualification Time <sup>(1)</sup>	$t_{QUAL}$	$OC\_MODE = logic low$		6		ms	
nFLAG De-bounce Time <sup>(1)</sup>	$t_{nFLAG\_OC}$	Release after OC		3.5		ms	
	$t_{nFLAG\_OT}$	Release after thermal shutdown		17			
	$t_{nFLAG\_UV}$	Release after UVLO		1.1			
	$t_{nFLAG\_OV}$	Release after OVLO		1.1			

NOTE: 1. Guaranteed by design.

### TIMING DIAGRAM

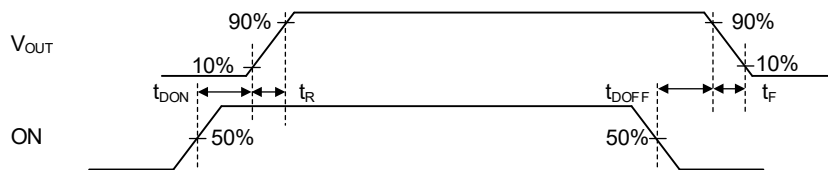
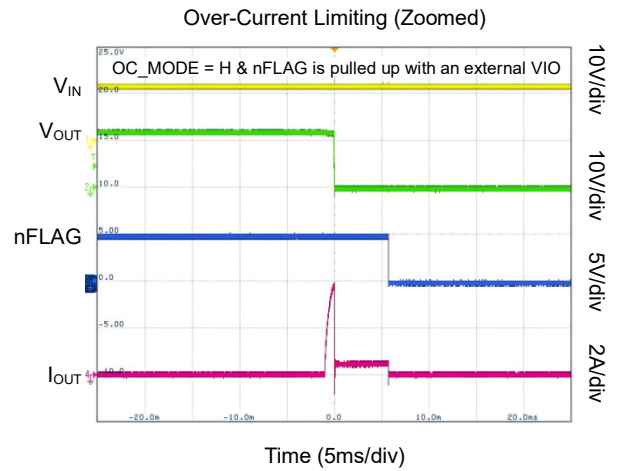
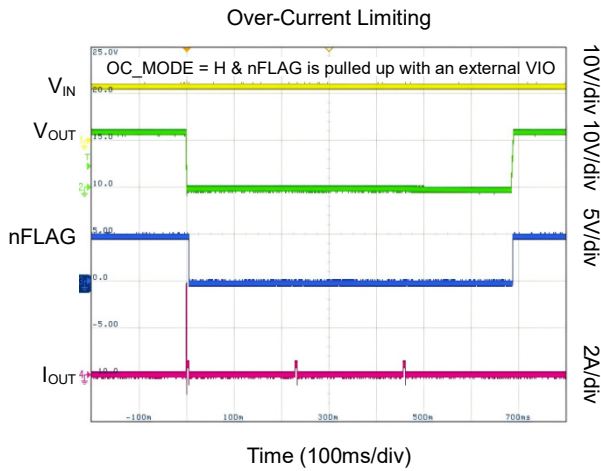
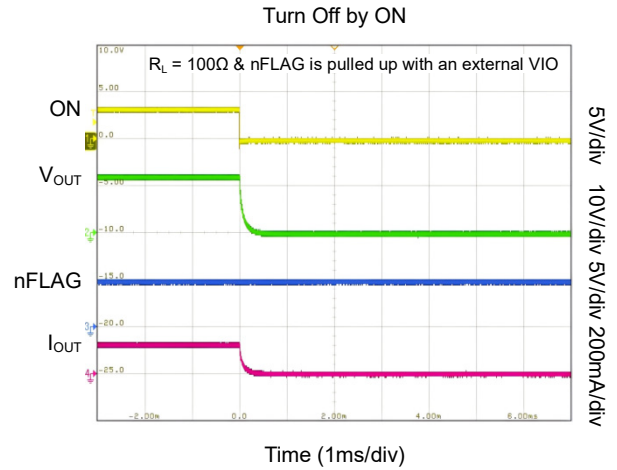
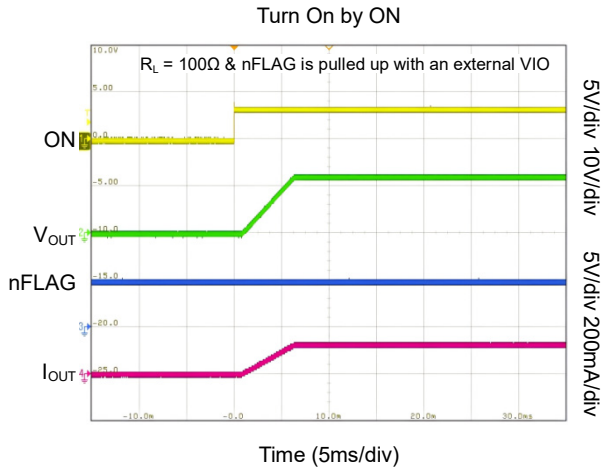
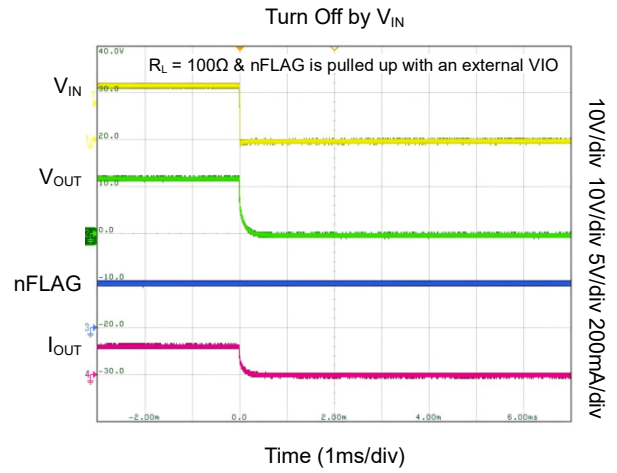
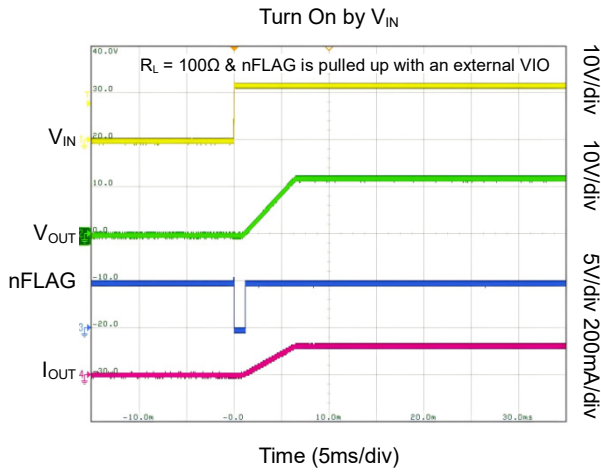


Figure 2. Turn On/Off by ON (POL = GND)

# SGM40677 Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

## TYPICAL PERFORMANCE CHARACTERISTICS

$T_A = +25^\circ\text{C}$ ,  $V_{IN} = 12\text{V}$ ,  $C_{IN} = C_{OUT} = 1\mu\text{F}$ ,  $\text{POL} = \text{OV1} = \text{OV2} = \text{OC\_MODE} = \text{GND}$ ,  $\text{ON} = \text{high}$ ,  $R_{SET} = 1.24\text{k}\Omega$ , unless otherwise noted.

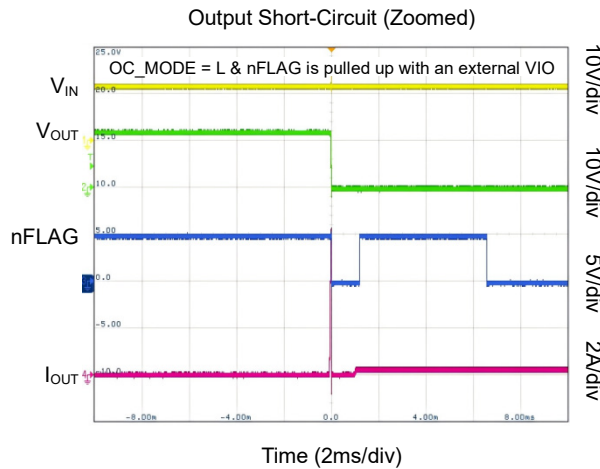
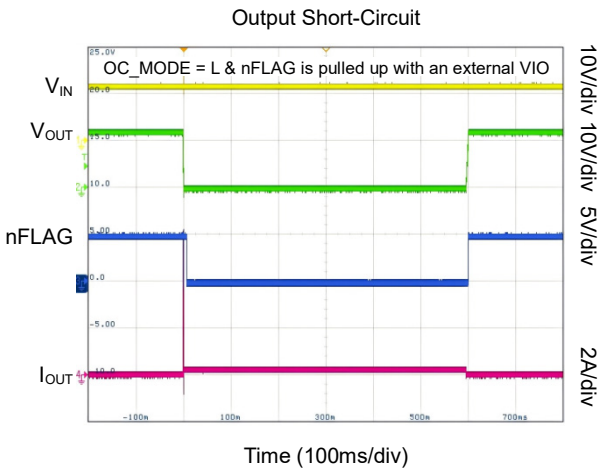
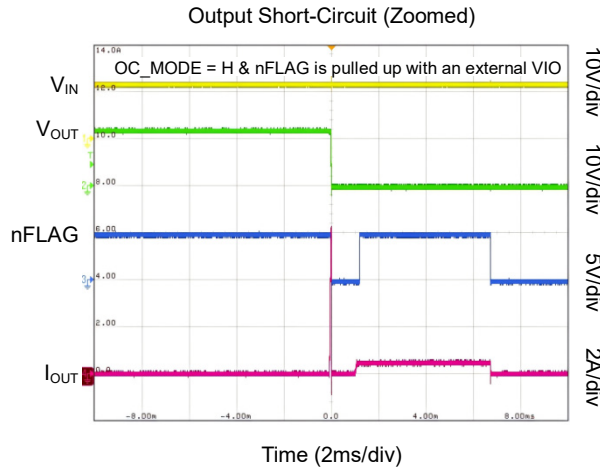
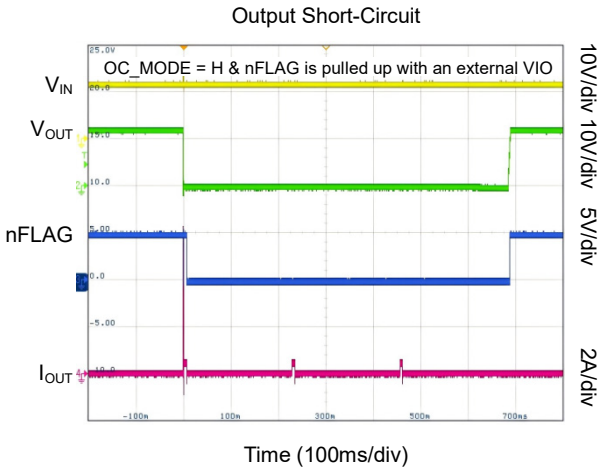
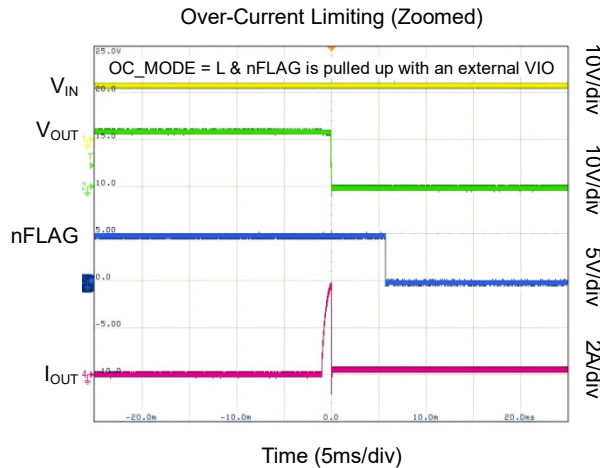
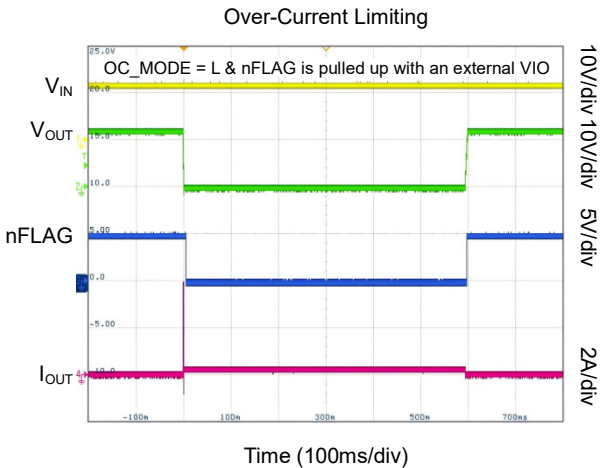


# Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

## SGM40677

### TYPICAL PERFORMANCE CHARACTERISTICS (continued)

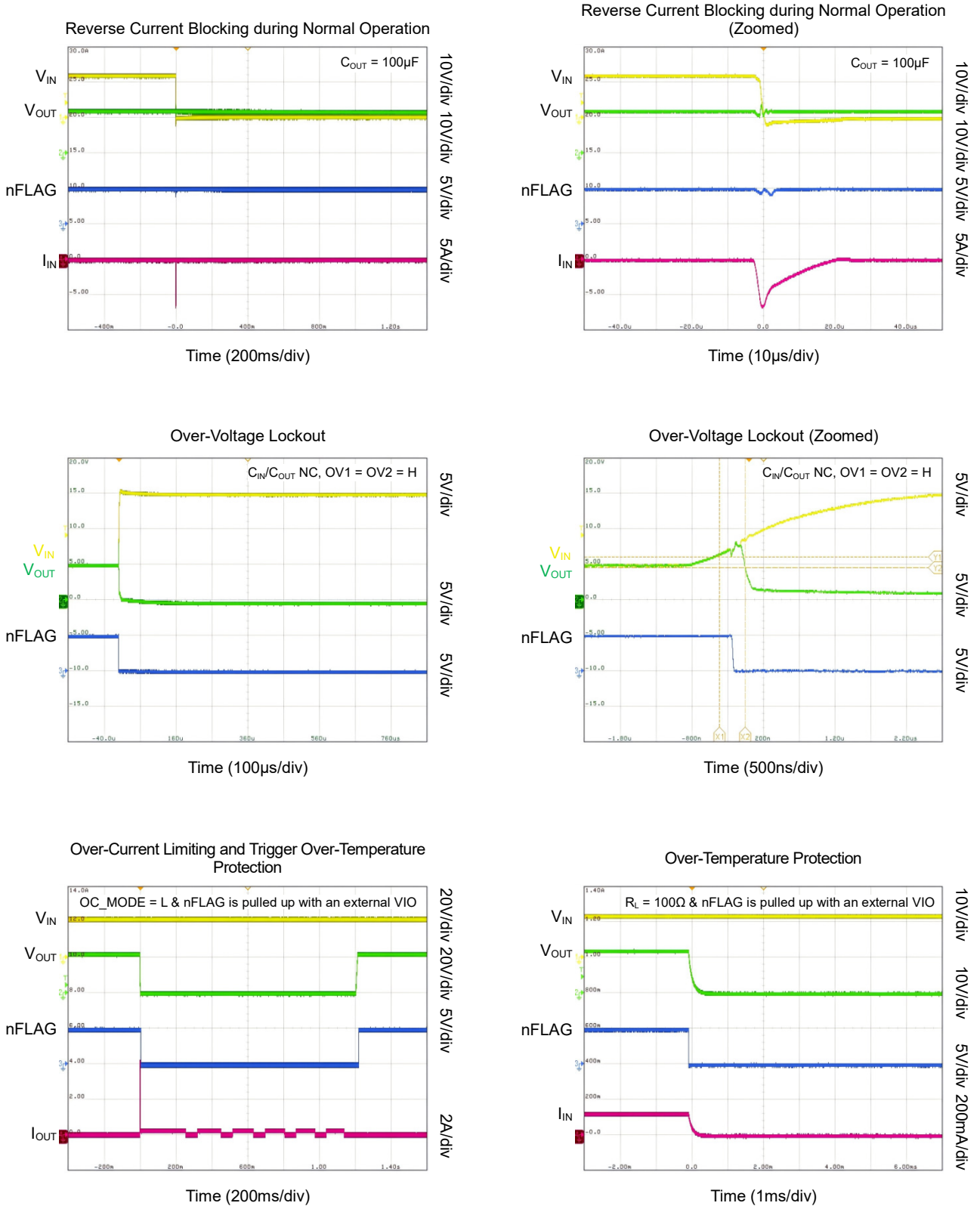
$T_A = +25^\circ\text{C}$ ,  $V_{IN} = 12\text{V}$ ,  $C_{IN} = C_{OUT} = 1\mu\text{F}$ ,  $\text{POL} = \text{OV1} = \text{OV2} = \text{OC\_MODE} = \text{GND}$ ,  $\text{ON} = \text{high}$ ,  $R_{SET} = 1.24\text{k}\Omega$ , unless otherwise noted.



# SGM40677 Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$T_A = +25^\circ\text{C}$ ,  $V_{IN} = 12\text{V}$ ,  $C_{IN} = C_{OUT} = 1\mu\text{F}$ ,  $\text{POL} = \text{OV1} = \text{OV2} = \text{OC\_MODE} = \text{GND}$ ,  $\text{ON} = \text{high}$ ,  $R_{SET} = 1.24\text{k}\Omega$ , unless otherwise noted.



# SGM40677 Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

## FUNCTIONAL BLOCK DIAGRAM

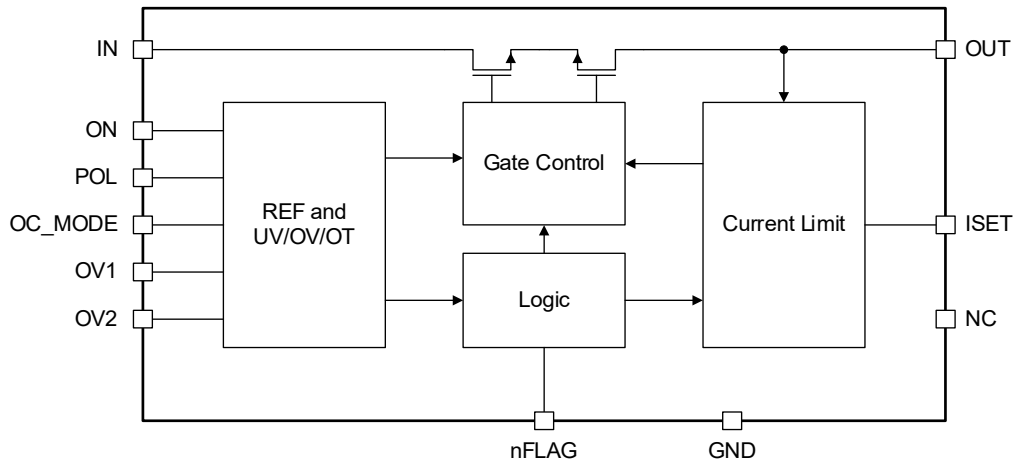


Figure 3. Block Diagram

# SGM40677 Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

## DETAILED DESCRIPTION

### Under-Voltage Lockout

The SGM40677 implements under-voltage protection at IN pin to prevent  $V_{IN}$  voltage from being too low for normal operation of system and equipment. A fixed locking threshold voltage ( $V_{UVLO}$ ) is provided inside the device for under-voltage protection. After the  $V_{IN}$  voltage exceeds the  $V_{UVLO}$  for more than 1.1ms, the  $V_{OUT}$  begins to rise.

### nFLAG Indication

The SGM40677 provides an active-low open-drain output (nFLAG) as the indication pin for downstream circuit. nFLAG pin needs to be pulled up to a power supply. The nFLAG output is defined when the  $V_{IN}$  is higher than 1V ( $V_{POR\_TYP}$ ). Under-voltage, over-voltage, over-current, fast-trip and over-temperature will pull low the nFLAG pin.

### Over-Voltage Lockout

The SGM40677 implements over-voltage lockout at IN pin to prevent  $V_{IN}$  voltage from being too high for normal operation of system and equipment. If the voltage of IN pin exceeds the  $V_{OVLO\_R}$ , the device will shut down the power path. When the input voltage drops below  $V_{OVLO\_F}$  and remains so for 1.1ms, the power path will be re-enabled. During  $V_{IN}$  terminal surge condition, input over-voltage lockout effectively reduces the rise of input voltage, thus protecting upstream devices from high voltage. The  $V_{OVLO\_R}$  and  $V_{OVLO\_F}$  can be adjusted through two external pins, OV1 and OV2. The specific logical representation is shown in Figure 4.

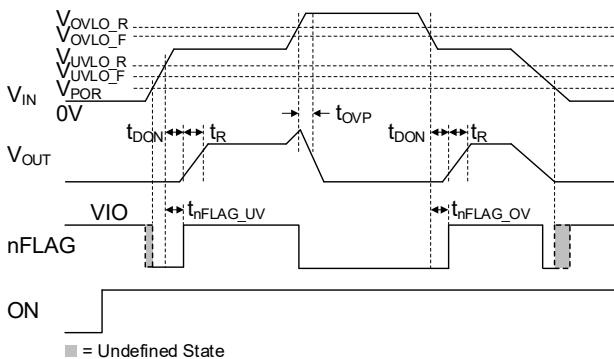


Figure 4. Turn On/Off by  $V_{IN}$  ( $POL = GND$  & nFLAG is pulled up with an external VIO)

### Over-Current Protection

When overload occurs, the internal current limit amplifier of the device regulates the load current to the current limit threshold  $I_{LIM}$ . The output voltage will drop under regulation, which leads to increased power dissipation of the device. Once the junction temperature  $T_J$  reaches the over-temperature protection threshold  $T_{SD}$ , the internal FETs will be turned off. For a given over-current threshold, the value of  $R_{SET}$  can be calculated by equation 1:

$$I_{LIM} (A) = \frac{4.5}{R_{SET} (k\Omega)} \quad (1)$$

NOTE: The equation is only used for the current limit range of 1A to 5.5A.

The current limiting performance of SGM40677 has two modes: limited constant current mode and auto-retry mode. The logic for setting the current limiting performance can be configured through the external pin OC\_MODE. The logic of the current limiting performance is shown in Figure 5, Figure 6 and Figure 7.

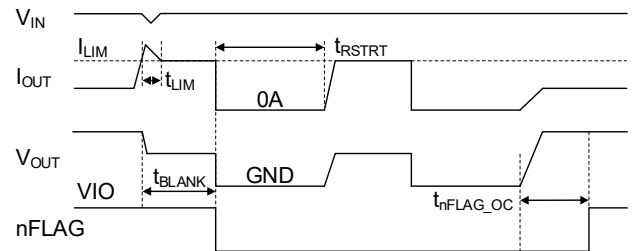


Figure 5. Over-Current Limiting ( $OC\_MODE = H$  & nFLAG is pulled up with an external VIO)

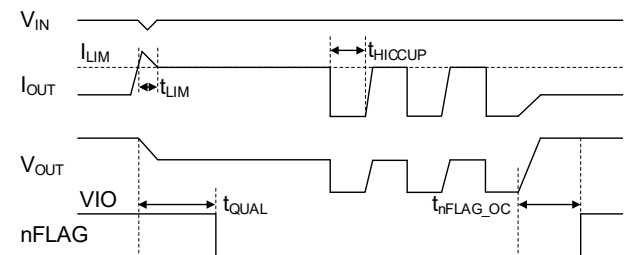
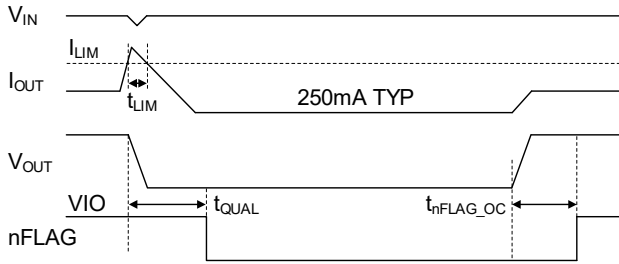


Figure 6. Over-Current Limiting ( $OC\_MODE = L$  & nFLAG is pulled up with an external VIO & Trigger Over-Temperature Protection)

# Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated

## SGM40677

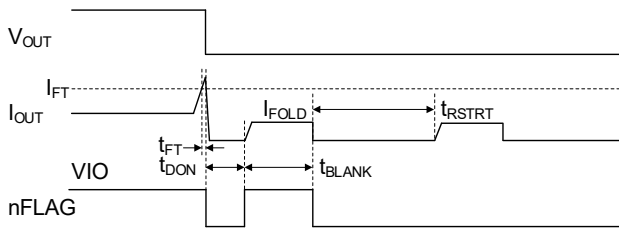
### DETAILED DESCRIPTION (continued)



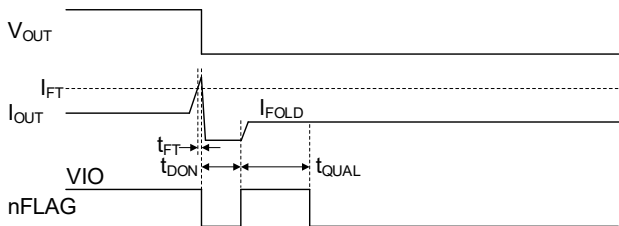
**Figure 7. Over-Current Limiting (OC\_MODE = L & nFLAG is pulled up with an external VIO & COUT = 1µF)**

#### Short-Circuit Protection

When a serious over-current event similar to a short-circuit event occurs, the SGM40677 triggers a fast response to prevent the system from being damaged by excessive current flowing through the device. Then the device will turn FET on again in a current limit mode. In this way, the rapid recovery of FET can be realized after a transient severe over-current event, and the drop of VOUT voltage can be minimized. If the fault persists, the device continues to operate in the current limit mode, causing the internal temperature of the device to rise until the thermal shutdown. The logical presentation is shown in Figure 8 and Figure 9.



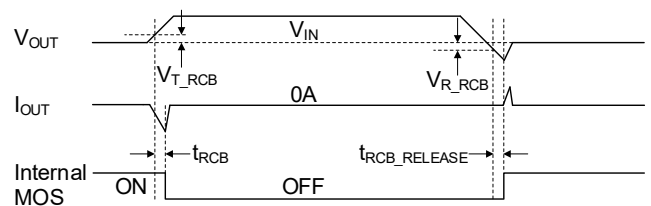
**Figure 8. Output Short-Circuit (OC\_MODE = H & nFLAG is pulled up with an external VIO)**



**Figure 9. Output Short-Circuit (OC\_MODE = L & nFLAG is pulled up with an external VIO)**

#### True Reverse Current Blocking

The SGM40677 is internally integrated with back-to-back MOSFETs connected in a common source configuration. The device monitors the voltage of the IN and OUT pin during normal operation. If  $V_{OUT} - V_{IN}$  exceeds  $V_{T\_RCB}$ , the device provides fast response ( $t_{RCB}$ ) to block transient reverse currents. The device keeps reverse current blocking state until  $V_{IN} - V_{OUT}$  exceeds  $V_{R\_RCB}$ , the device recovers to reach full forward conduction state in  $t_{RCB\_RELEASE}$ . This very fast response time reduces supply drop. The reverse logic representation is shown in Figure 10.



**Figure 10. Reverse Current Blocking during Normal Operation**

#### Over-Temperature Protection

The SGM40677 always monitors the temperature ( $T_J$ ) of the internal die. Once the internal temperature exceeds the  $T_{SD}$ , the device shuts down immediately. The SGM40677 will not turn on until the internal temperature is lower than a safe threshold ( $T_{SD} - T_{HYS}$ ). After that, it will retry to turn on automatically after a  $t_{HICCUP}$  delay time if the device is still enabled.

# SGM40677 **Current Limit Switch with Over-Voltage Protection and True Reverse Current Blocking, 28V/5.5A Rated**

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## REVISION HISTORY

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

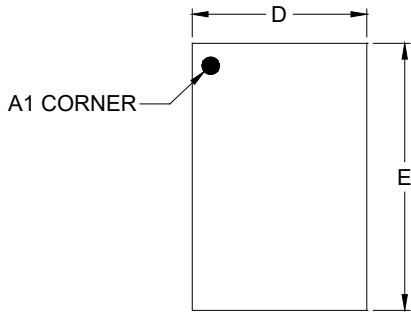
<b>Changes from Original to REV.A (DECEMBER 2025)</b>	<b>Page</b>
Changed from product preview to production data.....	All

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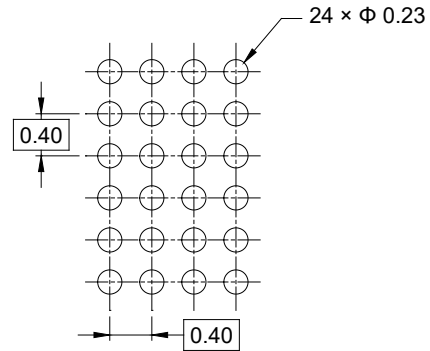
# PACKAGE INFORMATION

## PACKAGE OUTLINE DIMENSIONS

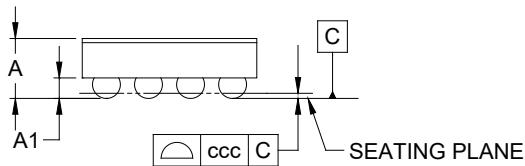
### WLCSP-1.66×2.54-24B



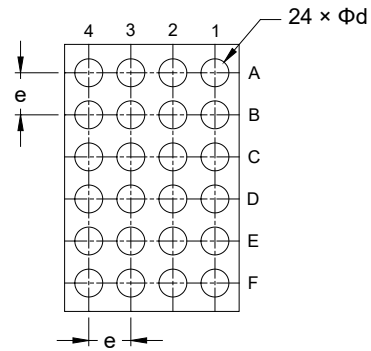
TOP VIEW



RECOMMENDED LAND PATTERN (Unit: mm)



SIDE VIEW



BOTTOM VIEW

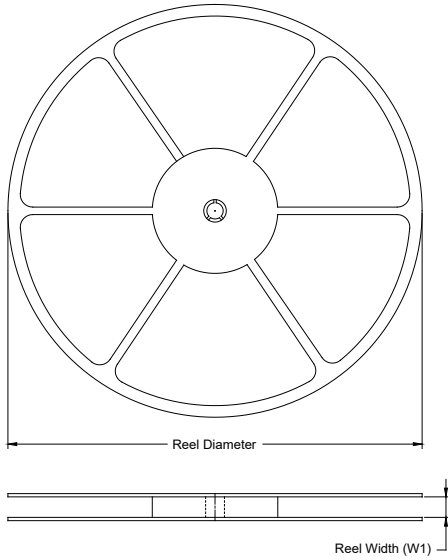
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	0.610
A1	0.175	-	0.215
D	1.630	-	1.690
E	2.510	-	2.570
d	0.235	-	0.295
e	0.400 BSC		
ccc	0.050		

NOTE: This drawing is subject to change without notice.

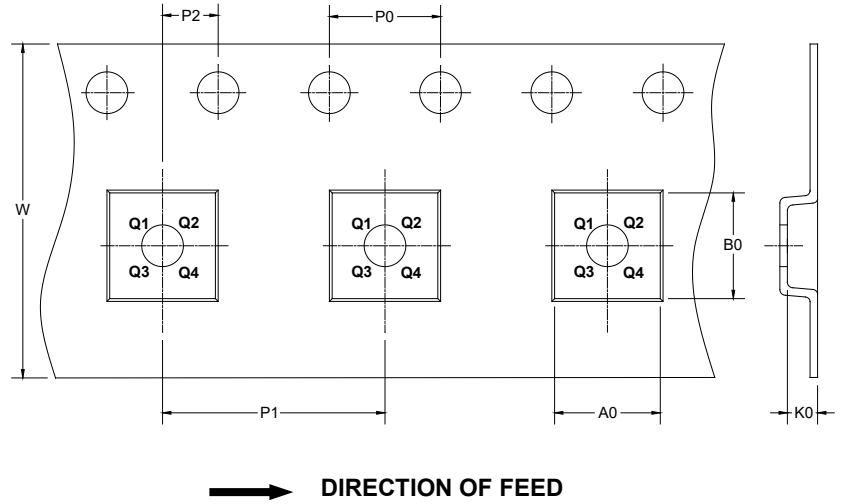
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



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

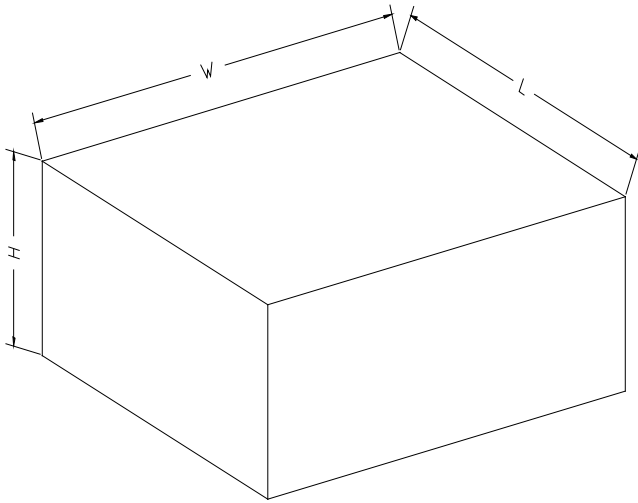
### KEY PARAMETER LIST OF TAPE AND REEL

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-1.66×2.54-24B	7"	9.5	1.90	2.71	0.81	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