

### GENERAL DESCRIPTION

The SGM706S is an integrated microprocessor supervisory device. Compared with the design using a single IC or discrete components, this integration design has the advantage of improving system stability and accuracy. The SGM706S can be reset under power-up, power-down or even voltage reduction brownout conditions. When  $V_{CC}$  is as low as 1V, the reset output can still operate. And it also has a low-level active manual reset nMR function.

The SGM706S provides an independent watchdog monitoring circuit, which is activated when its WDI input has not toggled for more than 2s.

When the power supply fails, the battery power is low, or the additional power supply needs to be monitored, it can be realized by the 1.25V threshold detector of the SGM706S.

The SGM706S is available in Green UTDFN-1.5×1.5-8L, SOIC-8 and MSOP-8 packages. It operates over an junction temperature range of -40°C to +125°C.

### TYPICAL APPLICATION

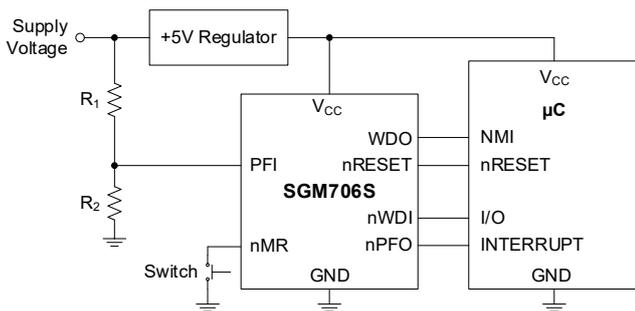


Figure 1. Typical Application Circuit

### FEATURES

- **Ultra-Low Supply Current:** < 1µA (TYP)
- **Precision Supply-Voltage Monitor**
  - 4.63V for SGM706S-L
  - 4.38V for SGM706S-M
  - 4.0V for SGM706S-J
  - 3.08V for SGM706S-T
  - 2.93V for SGM706S-S
  - 2.63V for SGM706S-R
  - 2.32V for SGM706S-Z
  - 1.63V for SGM706S-X
- **Guaranteed nRESET Valid at  $V_{CC} = 1V$**
- **260ms Reset Pulse Width**
- **Debounced TTL/CMOS-Compatible**
- **Manual Reset Input**
- **Watchdog Timer with 2s Timeout**
- **Voltage Monitor for Power-Fail or Low-Battery Warning**
- **Available in Green UTDFN-1.5×1.5-8L, SOIC-8 and MSOP-8 Packages**

### APPLICATIONS

- Computers
- Battery-Powered Applications
- Portable Equipment
- Automotive Equipment
- Safety Systems
- Intelligent Instruments
- Critical µC Power Monitoring
- Microprocessor Systems

## PACKAGE/ORDERING INFORMATION

MODEL	RESET THRESHOLD (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM706S-L	4.63	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-LXUDW8G/TR	0R1 XXX	Tape and Reel, 4000
	4.63	SOIC-8	-40°C to +125°C	SGM706S-LXS8G/TR	0OCXS8 XXXXX	Tape and Reel, 4000
	4.63	MSOP-8	-40°C to +125°C	SGM706S-LXMS8G/TR	SGM0R9 XMS8 XXXXX	Tape and Reel, 4000
SGM706S-M	4.38	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-MXUDW8G/TR	0R2 XXX	Tape and Reel, 4000
	4.38	SOIC-8	-40°C to +125°C	SGM706S-MXS8G/TR	0EEXS8 XXXXX	Tape and Reel, 4000
	4.38	MSOP-8	-40°C to +125°C	SGM706S-MXMS8G/TR	SGM0RA XMS8 XXXXX	Tape and Reel, 4000
SGM706S-J	4.0	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-JXUDW8G/TR	0R3 XXX	Tape and Reel, 4000
	4.0	SOIC-8	-40°C to +125°C	SGM706S-JXS8G/TR	0OBXS8 XXXXX	Tape and Reel, 4000
	4.0	MSOP-8	-40°C to +125°C	SGM706S-JXMS8G/TR	SGM0RB XMS8 XXXXX	Tape and Reel, 4000
SGM706S-T	3.08	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-TXUDW8G/TR	0R4 XXX	Tape and Reel, 4000
	3.08	SOIC-8	-40°C to +125°C	SGM706S-TXS8G/TR	0ODXS8 XXXXX	Tape and Reel, 4000
	3.08	MSOP-8	-40°C to +125°C	SGM706S-TXMS8G/TR	SGM0RC XMS8 XXXXX	Tape and Reel, 4000
SGM706S-S	2.93	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-SXUDW8G/TR	0R5 XXX	Tape and Reel, 4000
	2.93	SOIC-8	-40°C to +125°C	SGM706S-SXS8G/TR	033XS8 XXXXX	Tape and Reel, 4000
	2.93	MSOP-8	-40°C to +125°C	SGM706S-SXMS8G/TR	SGM0RD XMS8 XXXXX	Tape and Reel, 4000
SGM706S-R	2.63	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-RXUDW8G/TR	0R6 XXX	Tape and Reel, 4000
	2.63	SOIC-8	-40°C to +125°C	SGM706S-RXS8G/TR	032XS8 XXXXX	Tape and Reel, 4000
	2.63	MSOP-8	-40°C to +125°C	SGM706S-RXMS8G/TR	SGM0RE XMS8 XXXXX	Tape and Reel, 4000
SGM706S-Z	2.32	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-ZXUDW8G/TR	0R7 XXX	Tape and Reel, 4000
	2.32	SOIC-8	-40°C to +125°C	SGM706S-ZXS8G/TR	0OEXS8 XXXXX	Tape and Reel, 4000
	2.32	MSOP-8	-40°C to +125°C	SGM706S-ZXMS8G/TR	SGM0RF XMS8 XXXXX	Tape and Reel, 4000

# 8-Pin Microprocessor Supervisory Circuit with Watchdog Timer and Manual Reset

## SGM706S

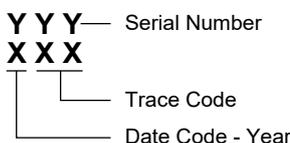
### PACKAGE/ORDERING INFORMATION (continued)

MODEL	RESET THRESHOLD (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM706S-X	1.63	UTDFN-1.5×1.5-8L	-40°C to +125°C	SGM706S-XXUDW8G/TR	0R8 XXX	Tape and Reel, 4000
	1.63	SOIC-8	-40°C to +125°C	SGM706S-XXS8G/TR	0EFXS8 XXXXX	Tape and Reel, 4000
	1.63	MSOP-8	-40°C to +125°C	SGM706S-XXMS8G/TR	SGM0RG XMS8 XXXXX	Tape and Reel, 4000

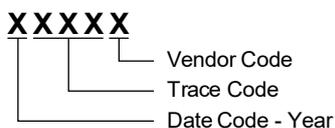
### MARKING INFORMATION

NOTE: XXX = Date Code and Trace Code. XXXXX = Date Code, Trace Code and Vendor Code.

#### UTDFN-1.5×1.5-8L



#### SOIC-8/MSOP-8



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

Terminal Voltage (With Respect to GND)

V<sub>CC</sub> ..... -0.3V to 6.0V

All Other Inputs ..... -0.3V to (V<sub>CC</sub> + 0.3V)

Input Current

V<sub>CC</sub> ..... 20mA

GND ..... 20mA

Output Current of All Outputs ..... 20mA

Package Thermal Resistance

UTDFN-1.5×1.5-8L, θ<sub>JA</sub> ..... 140.1°C/W

UTDFN-1.5×1.5-8L, θ<sub>JB</sub> ..... 94.1°C/W

UTDFN-1.5×1.5-8L, θ<sub>JC (TOP)</sub> ..... 103.8°C/W

UTDFN-1.5×1.5-8L, θ<sub>JC (BOT)</sub> ..... 73.1°C/W

SOIC-8, θ<sub>JA</sub> ..... 150.8°C/W

SOIC-8, θ<sub>JB</sub> ..... 104.5°C/W

SOIC-8, θ<sub>JC</sub> ..... 97.9°C/W

MSOP-8, θ<sub>JA</sub> ..... 162.1°C/W

MSOP-8, θ<sub>JB</sub> ..... 104.7°C/W

MSOP-8, θ<sub>JC</sub> ..... 70.4°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

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.

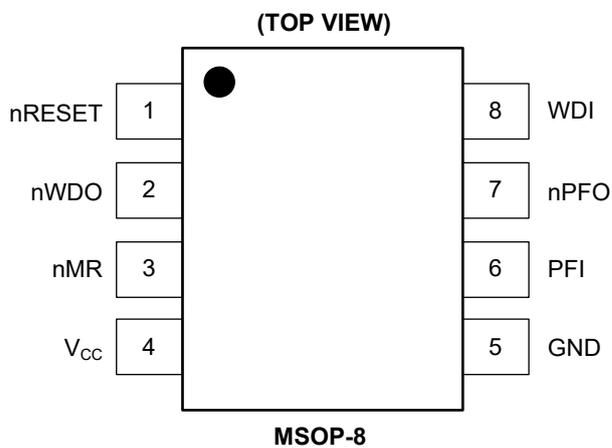
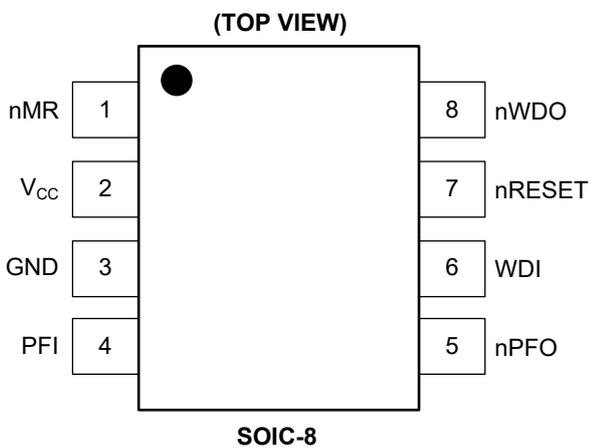
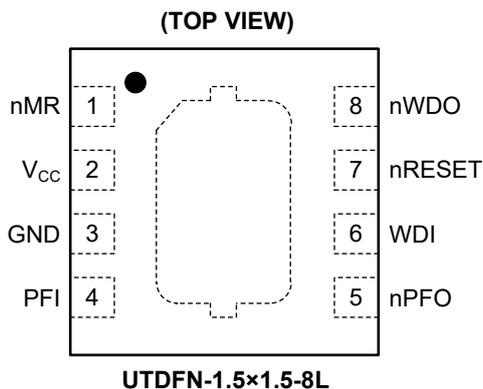
### ESD SENSITIVITY CAUTION

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 CONFIGURATIONS



## PIN DESCRIPTION

PIN			NAME	FUNCTION
UTDFN- 1.5×1.5-8L	SOIC-8	MSOP-8		
1	1	3	nMR	Manual Reset Input Pin. It is an active-low reset input with an internal 200 $\mu$ A ( $V_{CC} = +5V$ ) pull-up current. nMR can be driven by a CMOS/TTL logic or by a switch shorting to GND. If not used, leave it open or connect it to $V_{CC}$ .
2	2	4	$V_{CC}$	Supply Voltage Pin.
3	3	5	GND	Ground.
4	4	6	PFI	Power-Fail Voltage Monitor Input Pin. nPFO goes low when PFI is lower than 1.25V. If not used, connect PFI to GND or $V_{CC}$ .
5	5	7	nPFO	Power-Fail Voltage Monitor Output Pin. nPFO goes low when PFI is lower than 1.25V. nPFO remains high when PFI is more than 1.25V.
6	6	8	WDI	Watchdog Input Pin. If the WDI remains high or low for longer than the watchdog timeout period (2s, TYP), the internal watchdog timer will expire and nWDO will go low. The internal watchdog timer is kept clear while a reset is asserted or WDI is three-stated. The timer is also cleared if the WDI input is changed (on rising or falling edges). The watchdog feature is disabled if the WDI is left open or if it is connected to a three-stated buffer output. If it requires the SGM706S to switch WDI from normal state to disable state, ensure that the WDI enters the high-Z state within the period of 1.75s after the last WDI falling edge.
7	7	1	nRESET	Active-Low Reset Output Pin. It delivers a 260ms (TYP) low pulse when activated. nRESET will remain low if $V_{CC}$ is below the reset threshold or nMR is logic low. It goes (or remains) low for 260ms after any of the following events: $V_{CC}$ rises above the reset threshold or the nMR input goes from low to high.
8	8	2	nWDO	Watchdog Output Pin. If WDI can not reach a rising edge or a falling edge in 2s, the watchdog timer will timeout. Meanwhile, nWDO is pulled low and remains low until the watchdog timer is cleared. nWDO goes low when $V_{CC}$ is below the reset threshold. nWDO is different from nRESET in that it does not have a minimum pulse width. As long as $V_{CC}$ is higher than the reset threshold, nWDO will immediately go high.
Exposed Pad	—	—	—	The exposed pad can be left floating.

## ELECTRICAL CHARACTERISTICS

( $V_{CC} = 4.765V$  to  $5.5V$  for L Model;  $V_{CC} = 4.505V$  to  $5.5V$  for M Model;  $V_{CC} = 4.115V$  to  $5.5V$  for J Model;  $V_{CC} = 3.175V$  to  $5.5V$  for T Model;  $V_{CC} = 3.015V$  to  $5.5V$  for S Model;  $V_{CC} = 2.708V$  to  $5.5V$  for R Model;  $V_{CC} = 2.390V$  for Z Model;  $V_{CC} = 1.680V$  for X Model,  $T_J = -40^\circ C$  to  $+125^\circ C$ , typical values are at measured  $T_J = +25^\circ C$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS			
<b>Supply</b>									
Operating Voltage Range	$V_{CC}$		1.0		5.5	V			
Supply Current	$I_{SUPPLY}$	$V_{CC} = 3.6V$		0.9	2.02	$\mu A$			
		$V_{CC} = 5.5V$		1.03	2.33	$\mu A$			
<b>nRESET</b>									
nRESET Threshold	$V_{nRST}$	SGM706S-L	$T_J = +25^\circ C$	4.515	4.63	4.745	V		
			$T_J = -40^\circ C$ to $+125^\circ C$	4.485		4.765			
		SGM706S-M	$T_J = +25^\circ C$	4.275	4.38	4.485			
			$T_J = -40^\circ C$ to $+125^\circ C$	4.245		4.505			
		SGM706S-J	$T_J = +25^\circ C$	3.905	4.0	4.095			
			$T_J = -40^\circ C$ to $+125^\circ C$	3.875		4.115			
		SGM706S-T	$T_J = +25^\circ C$	3.005	3.08	3.155			
			$T_J = -40^\circ C$ to $+125^\circ C$	2.985		3.175			
		SGM706S-S	$T_J = +25^\circ C$	2.858	2.93	3.002			
			$T_J = -40^\circ C$ to $+125^\circ C$	2.833		3.015			
		SGM706S-R	$T_J = +25^\circ C$	2.566	2.63	2.694			
			$T_J = -40^\circ C$ to $+125^\circ C$	2.545		2.708			
		SGM706S-Z	$T_J = +25^\circ C$	2.260	2.32	2.380			
			$T_J = -40^\circ C$ to $+125^\circ C$	2.245		2.390			
		SGM706S-X	$T_J = +25^\circ C$	1.590	1.63	1.670			
			$T_J = -40^\circ C$ to $+125^\circ C$	1.580		1.680			
		nRESET Threshold Hysteresis	$V_{HYS}$	SGM706S-L		20			mV
				SGM706S-M		19			
SGM706S-J				18					
SGM706S-T				14					
SGM706S-S				13					
SGM706S-R				12					
SGM706S-Z				11					
SGM706S-X				8					
nRESET Pulse Width	$t_{RS}$		140	260	400	ms			
nRESET Output Voltage		$I_{SOURCE} = 800\mu A$	$0.7 \times V_{CC}$			V			
		$I_{SINK} = 3.2mA$			0.4				
		$V_{CC} = 1V, I_{SINK} = 50\mu A$			0.3				
VCC to nRESET Delay	$t_{RD}$	$V_{nRST} - V_{CC} = 100mV$		14		$\mu s$			

**ELECTRICAL CHARACTERISTICS (continued)**

( $V_{CC} = 4.765V$  to  $5.5V$  for L Model;  $V_{CC} = 4.505V$  to  $5.5V$  for M Model;  $V_{CC} = 4.115V$  to  $5.5V$  for J Model;  $V_{CC} = 3.175V$  to  $5.5V$  for T Model;  $V_{CC} = 3.015V$  to  $5.5V$  for S Model;  $V_{CC} = 2.708V$  to  $5.5V$  for R Model;  $V_{CC} = 2.390V$  for Z Model;  $V_{CC} = 1.680V$  for X Model,  $T_J = -40^{\circ}C$  to  $+125^{\circ}C$ , typical values are at measured  $T_J = +25^{\circ}C$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
<b>Watchdog</b>						
Watchdog Timeout Period	$t_{WD}$		1.1	2	3.34	s
WDI Pulse Width	$t_{WP}$	$V_{IL} = 0V, V_{IH} = V_{CC}$	90			ns
WDI Low-Level Input Voltage	$V_{IL\_WDI}$	$V_{nRST\_MAX} < V_{CC} < 5V$			0.5	V
WDI High-Level Input Voltage	$V_{IH\_WDI}$	$V_{nRST\_MAX} < V_{CC} < 5V$	$0.7 \times V_{CC}$			V
WDI Input Current		WDI = $V_{CC}$		0.01	1	$\mu A$
		WDI = $0V$	-1	-0.01		
nWDO Output Voltage		$I_{SOURCE} = 800\mu A$	$0.7 \times V_{CC}$			V
		$I_{SINK} = 1.2mA$			0.2	
<b>Manual Reset</b>						
nMR Pull-up Current		nMR = $0V, V_{CC} = 5V$	120	200	270	$\mu A$
nMR Pulse Width	$t_{MR}$		320			ns
nMR Low-Level Input Voltage	$V_{IL\_nMR}$				0.5	V
nMR High-Level Input Voltage	$V_{IH\_nMR}$		2			V
nMR to nRESET Output Delay	$t_{MD}$				420	ns
<b>PFI/nPFO</b>						
PFI Input Threshold		$V_{CC} = 5V$	1.17	1.25	1.31	V
PFI Input Current				0.1	50	nA
nPFO Output Voltage		$I_{SOURCE} = 800\mu A$	$0.7 \times V_{CC}$			V
		$I_{SINK} = 3.2mA$			0.3	

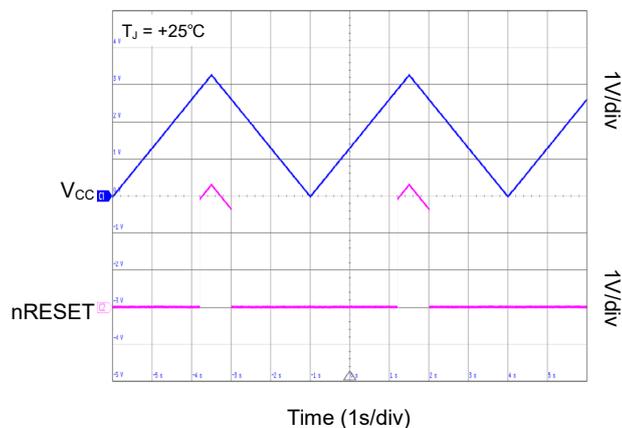
# 8-Pin Microprocessor Supervisory Circuit with Watchdog Timer and Manual Reset

## SGM706S

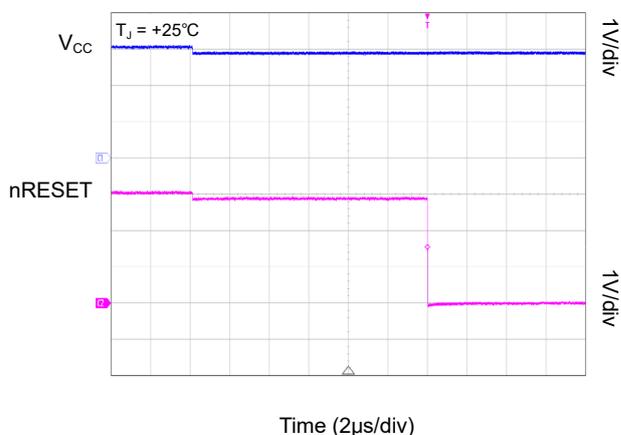
### TYPICAL PERFORMANCE CHARACTERISTICS

$V_{CC} = 3.3V$ , unless otherwise noted.

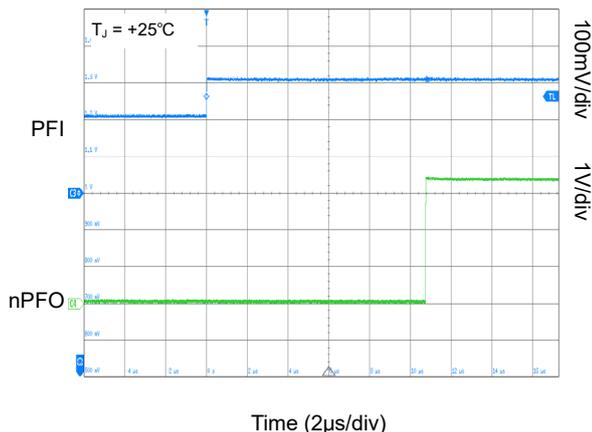
nRESET Output Voltage vs. Supply Voltage



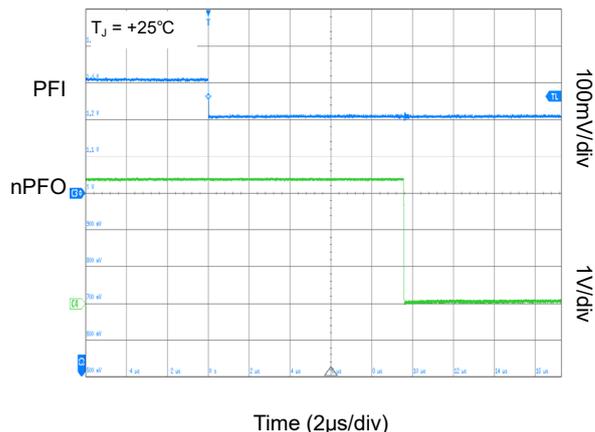
nRESET Response Time



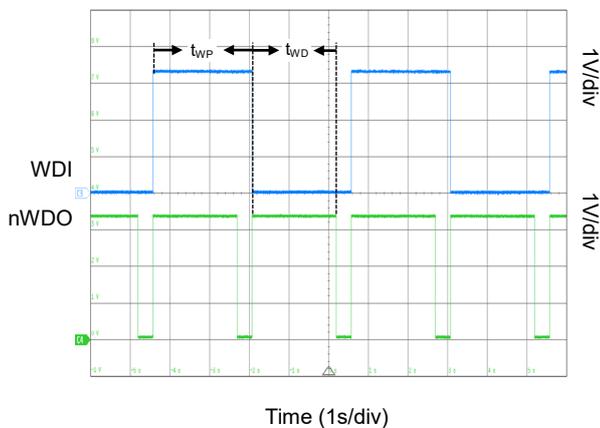
Power-Fail Comparator De-Assertion Response Time



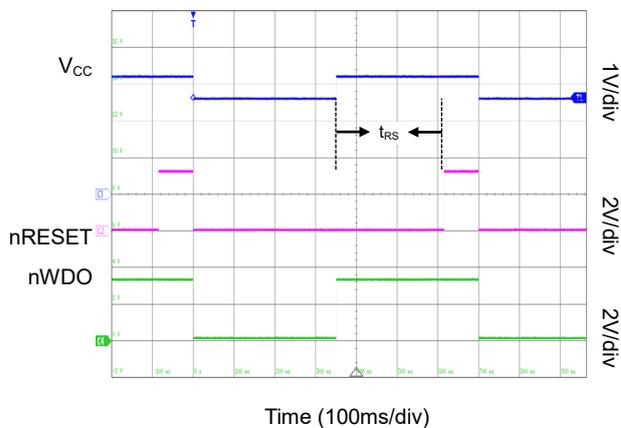
Power-Fail Comparator Assertion Response Time



Watchdog Timing

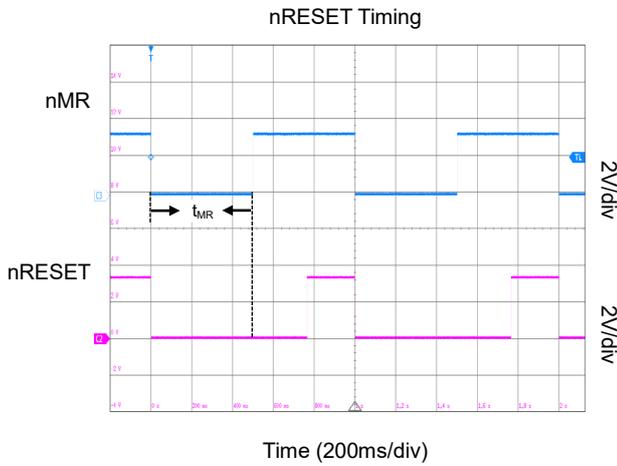


nRESET and nWDO Timing



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

V<sub>CC</sub> = 3.3V, unless otherwise noted.



FUNCTIONAL BLOCK DIAGRAM

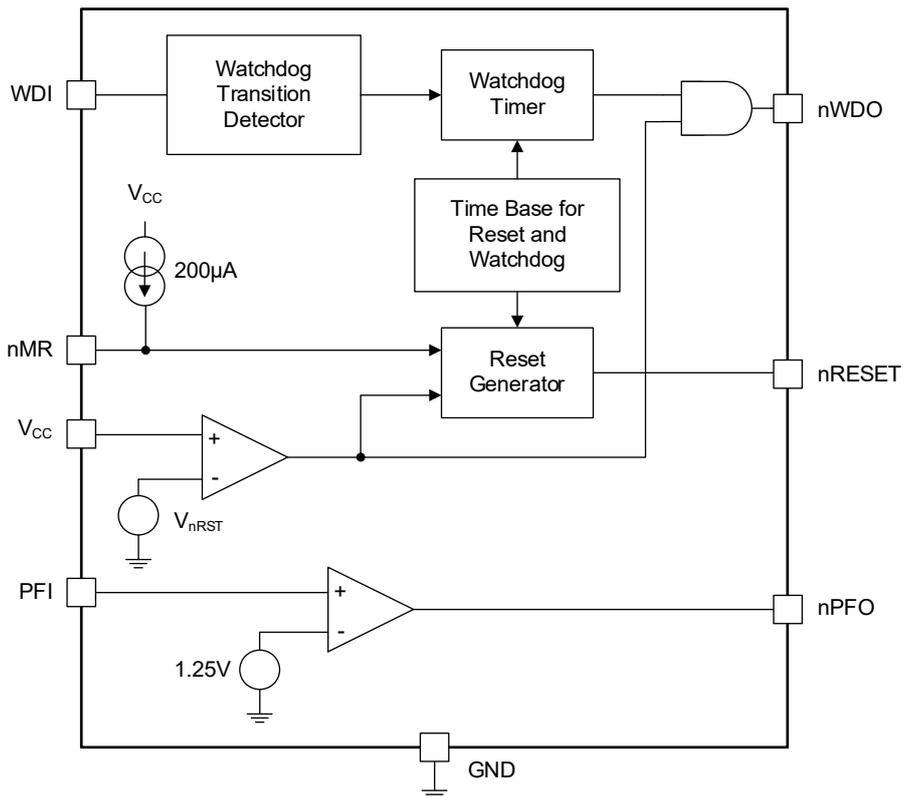


Figure 2. SGM706S Block Diagram

### DETAILED DESCRIPTION

#### Precise Reset Threshold

When the supply voltage drops significantly for the power supply fault, the SGM706S can even operate normally, which greatly reduces the possibility of system failure. In addition, the internal reference voltage accuracy of the SGM706S is very high, which guarantees high reliability of the devices.

To ensure sufficient time for the power supply and microprocessor to stabilize after power-up, a 260ms (TYP) reset output will hold by the internal timer after  $V_{CC}$  exceeds the reset threshold voltage. Similarly, a 260ms (TYP) reset output will also exist after the power supply recover from brownout or interruption that allows the power supply and microprocessor to have enough time to reach a steady state.

The SGM706S has an active-low nRESET output. When  $V_{CC}$  is as low as 1V during power-down, the nRESET will keep output a low level. This not only keeps the microprocessor shutdown when the supply voltage falls, but also prevents the microprocessor from occurring false actions when it powers up.

#### Watchdog

A watchdog timer is integrated in SGM706S. It must be periodically triggered by a rising edge or a falling edge of WDI. If the WDI cannot be triggered during the timeout period (2s, TYP) and WDI is not three-stated, the internal watchdog timer expires and nWDO goes low.

The internal watchdog timer is cleared while a reset is asserted or WDI is three-stated or WDI is fed on time within the timeout period.

To disable the watchdog function, leave the WDI pin open. If WDI is driven by a 3-state buffer, set it to the Hi-Z state. In this case the buffer leakage current should not exceed 10 $\mu$ A. The maximum capacitance seen on the WDI pin should be less than 200pF to assure that watchdog remains disabled.

#### Manual Reset (nMR)

The SGM706S provides a manual reset (nMR) function that allows users to reset the system manually. It is an active-low reset input with an internal pull-up resistor of 25k $\Omega$ . When the nMR is low, and for  $t_{RS}$  (260ms, TYP), after nMR returns high, the reset remains active. The nMR can be driven by a CMOS logic or by a reset switch shorting to GND. If not used, leave it open or connect it to the  $V_{CC}$ . When the device is far away from the reset switch or used in a noisy environment, a 0.1 $\mu$ F capacitor is recommended to connect between nMR and GND.

#### PFI, nPFO

For SGM706S, PFI (Power-Fail Input) and nPFO (Power-Fail Push-Pull Output) pins can be used for power-fail warning or monitoring a power supply of the other device, and do not affect nRESET pin.

The internal voltage reference (1.25V) is used for compare with PFI pin. Once the PFI voltage is lower than the negative-going input threshold voltage, the nPFO goes low. Once PFI voltage exceeds positive-going input threshold voltage, the output goes high. Connecting a resistor divider externally can monitor any voltages above 1.25V.

To ensure that the PFI leakage current can be ignored in comparison with the current through the resistor divider and to minimize the resistor power consumption, the sum of two resistors should be about 1M $\Omega$ . To ensure the accuracy of the detection voltage, the tolerance of the external resistor should be less than 1%. It is recommended to leave nPFO floating and connect PFI to  $V_{CC}$  pin if the PFI comparator is not used.

### APPLICATION INFORMATION

#### nRESET Valid to $V_{CC} = 0V$

The nRESET of SGM706S stops sinking current and becomes open circuit if  $V_{CC}$  is below 1.0V. And if a high-impedance input is connected to nRESET, the input voltage will drift and be undetermined. To solve the problem, it is recommended to use a 100kΩ resistor between nRESET and GND.

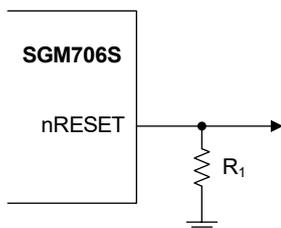


Figure 3. nRESET Valid to Ground Circuit

#### Monitoring Other Voltage Lines

Connect a voltage divider network to PFI and adjust the ratio appropriately. nPFO can be used to monitor another voltage line, which does not affect nRESET pin.

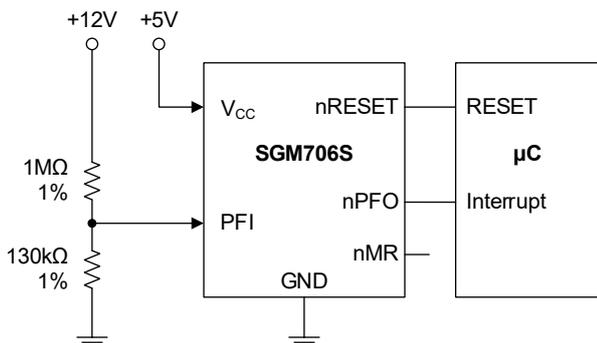


Figure 4. Power-Fail Voltage Monitoring

Connect a voltage divider network to PFI and connect nPFO to nMR can attain dual voltage lines monitoring simultaneously. It asserts nRESET in the conditions of 5V supply,  $V_{CC}$  falls below the reset threshold or the 12V supply falls approximately below 11V. Figure 5 shows the dual voltage lines monitoring of SGM706S configuration.

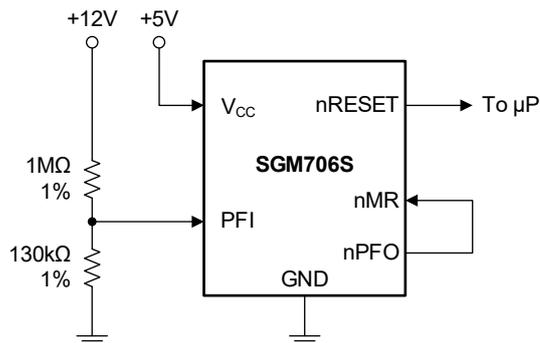


Figure 5. Dual Voltage Lines Monitoring

PFI can also be used to monitor a negative supply rail. The configuration is shown below. When the negative rail is lower than some negative voltage which makes  $V_{PFI}$  between 0V and 1.25V, a low nPFO will not drive the transistor to pull nMR low and nRESET will not be triggered. When the negative rail is degraded, which makes  $V_{PFI}$  be higher than 1.25V, a high nPFO drives the transistor to pull nMR low and trigger nRESET. And the accuracy of this circuit is not high, depending on the PFI threshold tolerance,  $V_{CC}$  line and the resistors.

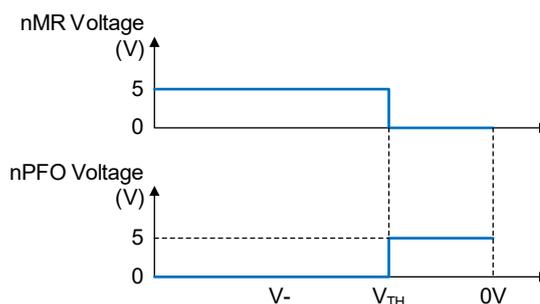
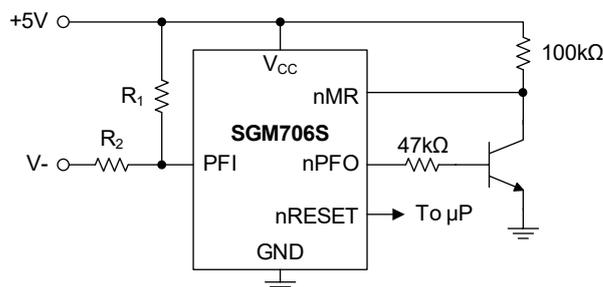


Figure 6. Negative Voltage Monitoring

**APPLICATION INFORMATION (continued)**

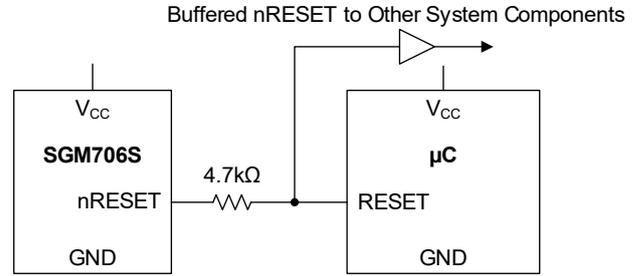
The negative rail voltage can be calculated by Equation 1, and  $V_{TH}$  is always negative.

$$\frac{5 - 1.25}{R_1} = \frac{1.25 - V_{TH}}{R_2} \quad (1)$$

The reset pin of some  $\mu C$  devices is bidirectional, such as the Motorola 68HC11 series. Connecting the SGM706S nRESET output to  $\mu C$  RESET output directly may cause race and hazard. For example, if nRESET is logic high and the RESET is logic low, connecting them directly may result in indeterminate logic levels, even damage the RESET pin of  $\mu C$ .

Therefore, a 4.7k $\Omega$  resistor is recommended to be connected between nRESET and the  $\mu C$  reset I/O as

show in Figure 7. Besides, buffer the nRESET output to reset other system components.



**Figure 7. Interfacing to  $\mu C$ s with Bidirectional Reset I/O**

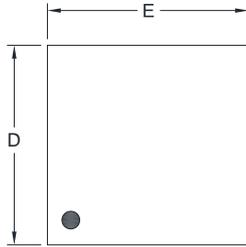
**REVISION HISTORY**

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

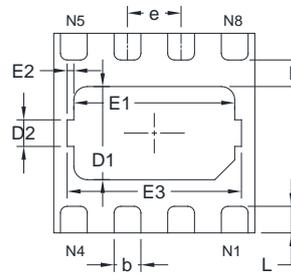
<b>MARCH 2026 – REV.A.2 to REV.A.3</b>	<b>Page</b>
Updated Pin Description section .....	5
Updated Application Information section .....	10
<b>SEPTEMBER 2025 – REV.A.1 to REV.A.2</b>	<b>Page</b>
Added UTDFN-1.5×1.5-8L and MSOP-8 packages .....	2 ~ 5, 13, 15, 16
Updated Electrical Characteristics section .....	6, 7
<b>FEBRUARY 2025 – REV.A to REV.A.1</b>	<b>Page</b>
Updated Electrical Characteristics section .....	4, 5
Updated Typical Performance Characteristics section .....	6, 7
<b>Changes from Original to REV.A (NOVEMBER 2023)</b>	<b>Page</b>
Changed from product preview to production data .....	All

PACKAGE OUTLINE DIMENSIONS

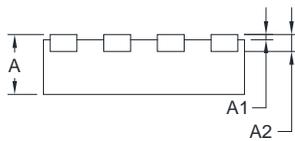
UTDFN-1.5x1.5-8L



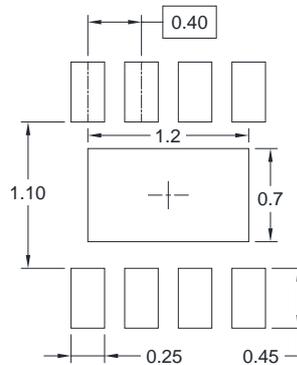
TOP VIEW



BOTTOM VIEW



SIDE VIEW



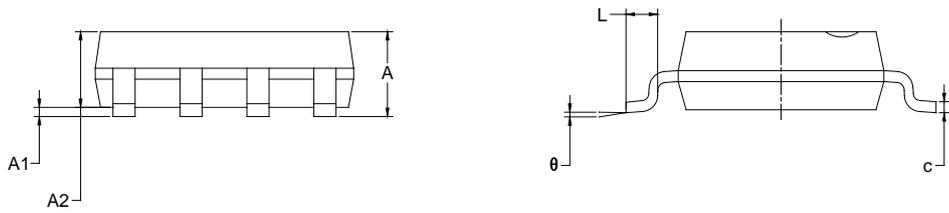
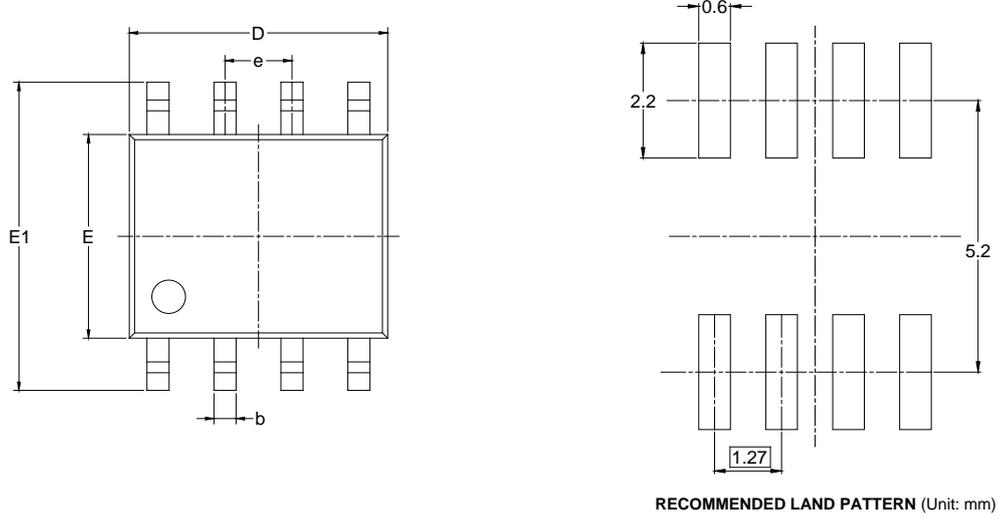
RECOMMENDED LAND PATTERN

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.400	0.500	0.016	0.020
A1	0.000	0.050	0.000	0.002
A2	0.127 REF		0.005 REF	
D	1.450	1.550	0.057	0.061
D1	0.600	0.800	0.024	0.031
D2	0.200 REF		0.008 REF	
E	1.450	1.550	0.057	0.061
E1	1.100	1.300	0.043	0.051
E2	0.050 REF		0.002 REF	
E3	1.200	1.400	0.047	0.055
k	0.200 REF		0.008 REF	
b	0.150	0.250	0.006	0.010
e	0.400 BSC		0.016 BSC	
L	0.150	0.250	0.006	0.010

NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

SOIC-8

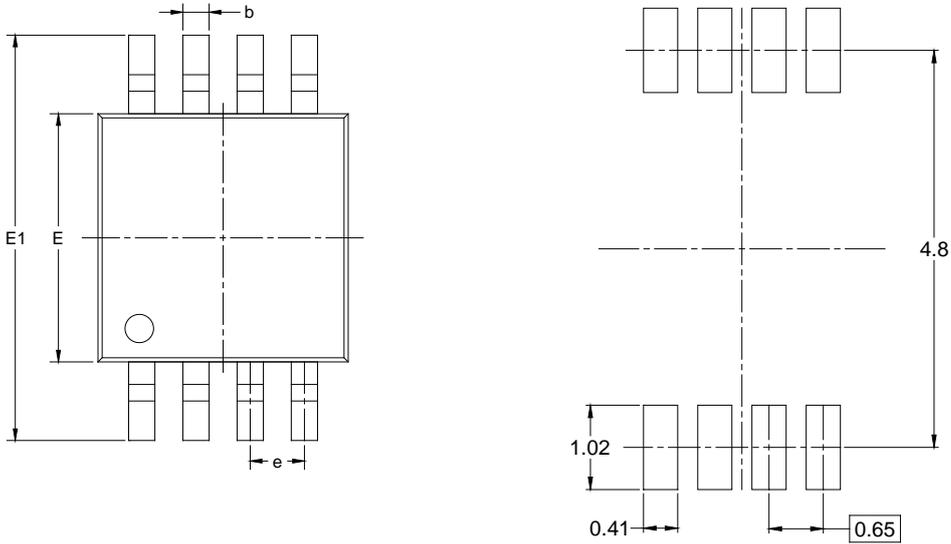


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

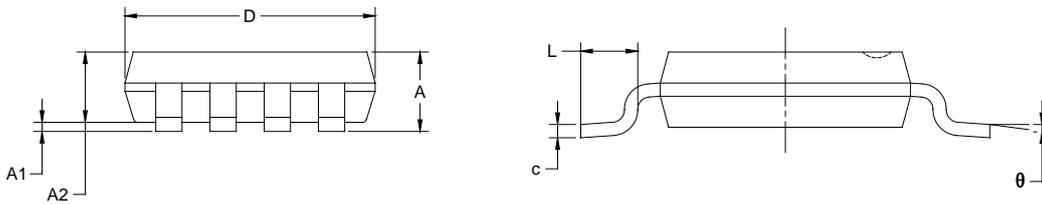
NOTES:  
 1. Body dimensions do not include mode flash or protrusion.  
 2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

MSOP-8



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026 BSC	
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

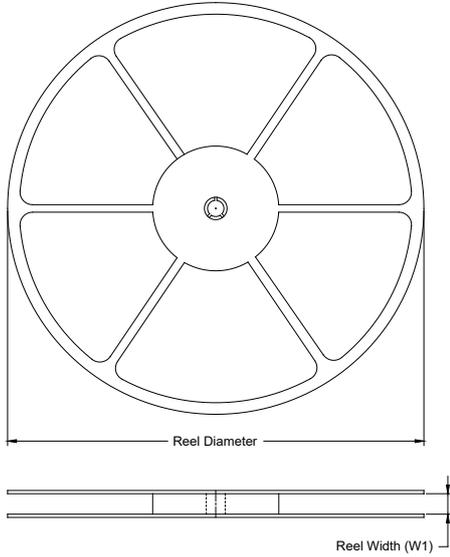
NOTES:

1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

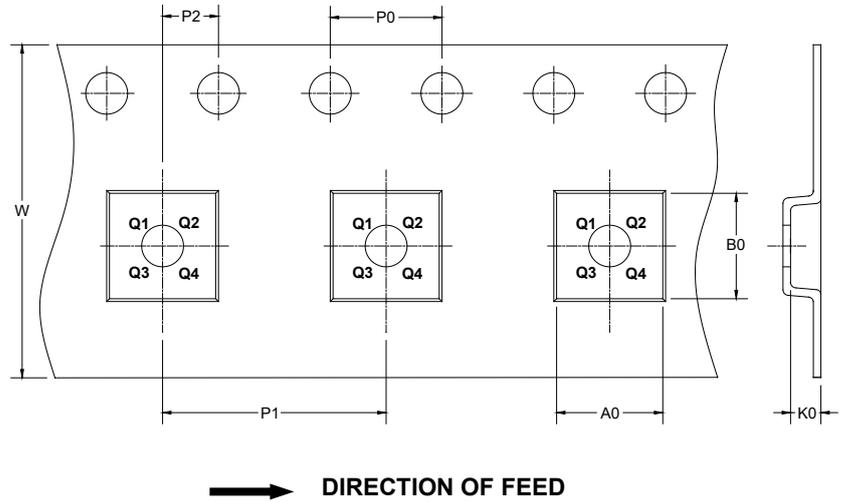
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



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

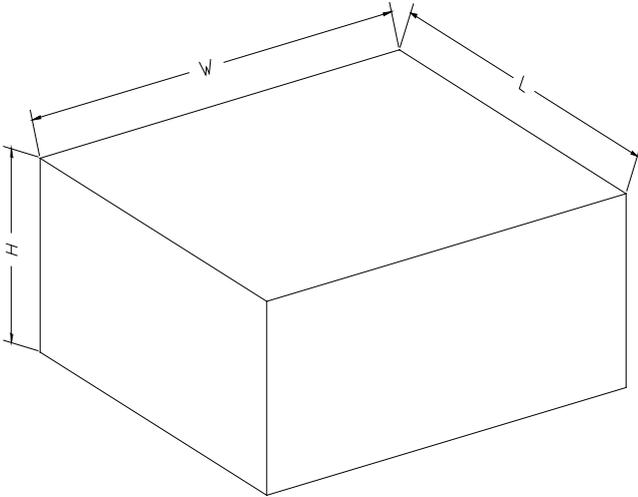
### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
UTDFN-1.5×1.5-8L	7"	9.0	1.70	1.70	0.75	4.0	4.0	2.0	8.0	Q1
SOIC-8	13"	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1
MSOP-8	13"	12.4	5.20	3.30	1.50	4.0	8.0	2.0	12.0	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
13"	386	280	370	5

DD0002