

### GENERAL DESCRIPTION

The SGM706 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 SGM706 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 ( $\overline{MR}$ ) function.

The SGM706 provides an independent watchdog monitoring circuit, which can activate this function when its power input has not toggled for more than 1.6s.

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 SGM706.

The SGM706 is available in a Green SOIC-8 package. The SGM706-S is available in Green SOIC-8 and MSOP-8 packages. They operate over an ambient temperature range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

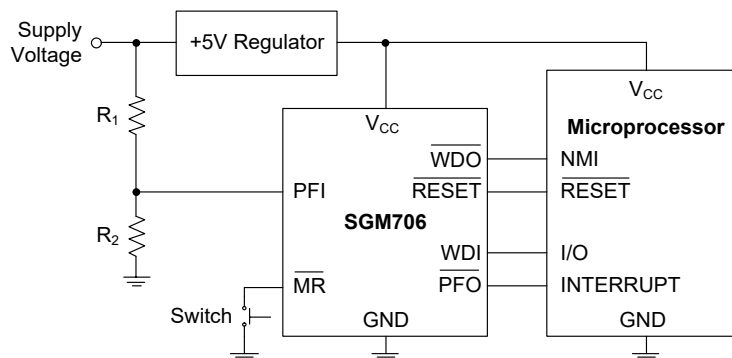
### FEATURES

- Precision Supply-Voltage Monitor
  - 4.65V for SGM706-L
  - 4.40V for SGM706-M
  - 4.0V for SGM706-J
  - 3.08V for SGM706-T
  - 2.93V for SGM706-S
  - 2.63V for SGM706-R
- Guaranteed  $\overline{\text{RESET}}$  Valid at  $V_{CC} = 1\text{V}$
- Reset Pulse Width: 200ms (TYP)
- Debounced TTL/CMOS-Compatible
- Manual-Reset Input
- Watchdog Timer with 1.6s (TYP) Timeout
- 1.25V Threshold Detector for Power-Fail or Low-Battery Warning
- $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  Operating Temperature Range
- SGM706 is Available in a Green SOIC-8 Package
- SGM706-S is Available in Green SOIC-8 and MSOP-8 Packages

### APPLICATIONS

Microprocessor Systems  
Computers  
Automotive Equipment  
Controllers  
Intelligent Instruments  
Critical  $\mu\text{P}$  Power Monitoring

### TYPICAL APPLICATION



**SGM706**

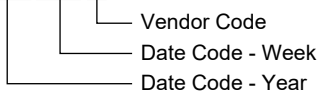
**PACKAGE/ORDERING INFORMATION**

MODEL	RESET THRESHOLD (V)	PACKAGE DESCRIPTION	ORDERING NUMBER	PACKAGE MARKING	PACKAGE OPTION
SGM706	4.65	SOIC-8	SGM706-LYS8G/TR	SGM706-LYS8 XXXXX	Tape and Reel, 4000
	4.40	SOIC-8	SGM706-MYS8G/TR	SGM706-MYS8 XXXXX	Tape and Reel, 4000
	4.0	SOIC-8	SGM706-JYS8G/TR	SGM706-JYS8 XXXXX	Tape and Reel, 4000
	3.08	SOIC-8	SGM706-TYS8G/TR	SGM706-TYS8 XXXXX	Tape and Reel, 4000
	2.93	SOIC-8	SGM706-SYS8G/TR	SGM706-SYS8 XXXXX	Tape and Reel, 4000
	2.93	MSOP-8	SGM706-SYMS8G/TR	SGM706S YMS8 XXXXX	Tape and Reel, 4000
	2.63	SOIC-8	SGM706-RYS8G/TR	SGM706-RYS8 XXXXX	Tape and Reel, 4000

**MARKING INFORMATION**

NOTE: XXXXX = Date Code and Vendor Code.

**XXXXX**



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**

(Typical values are at T<sub>A</sub> = +25°C, unless otherwise noted.)

Terminal Voltage (with respect to GND)

- V<sub>CC</sub> ..... -0.3V to 6V
- All Other Inputs ..... -0.3V to (V<sub>CC</sub> + 0.3V)
- Input Current, V<sub>CC</sub> ..... 20mA
- GND ..... 20mA
- Output Current, (all outputs) ..... 20mA
- Junction Temperature ..... +150°C
- Storage Temperature ..... -65°C to +150°C
- Lead Temperature (Soldering, 10s) ..... +260°C
- ESD Susceptibility
- HBM ..... 4000V
- MM ..... 300V

**RECOMMENDED OPERATING CONDITIONS**

Ambient Temperature Range ..... -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.

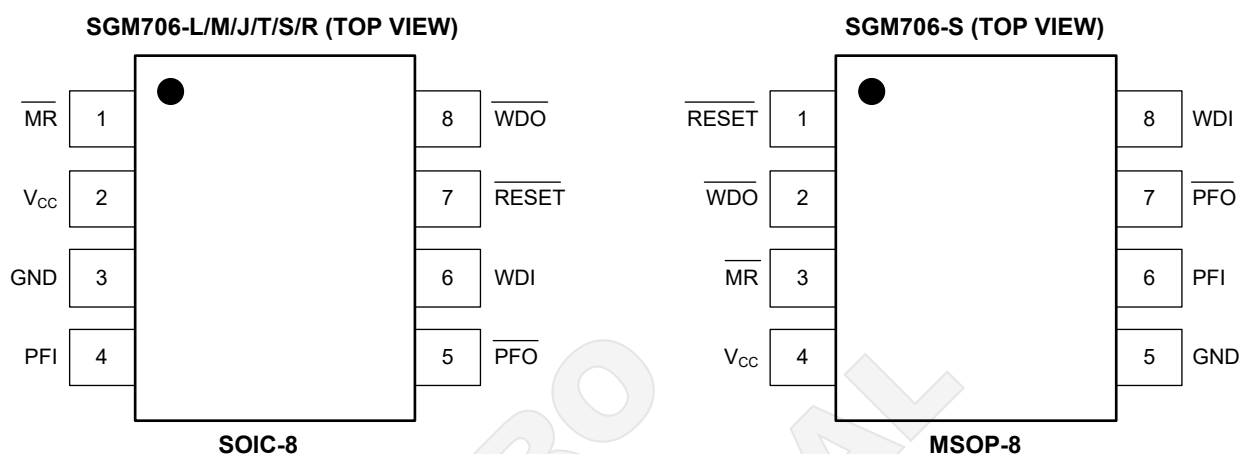
**ESD SENSITIVITY CAUTION**

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 CONFIGURATIONS



### PIN DESCRIPTION

PIN		NAME	FUNCTION
SOIC-8	MSOP-8		
1	3	MR	Manual Reset Input Pin. It is an active-low reset input with an internal 250µA ( $V_{CC} = +5V$ ) pull-up current. $\overline{MR}$ 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	4	$V_{CC}$	Supply Voltage Pin.
3	5	GND	Ground Pin.
4	6	PFI	Power-Fail Voltage Monitor Input Pin. $\overline{PFO}$ will go low when PFI is lower than 1.25V. If not used, connect PFI to GND or $V_{CC}$ .
5	7	$\overline{PFO}$	Power-Fail Voltage Monitor Output Pin. $\overline{PFO}$ will go low when PFI is lower than 1.25V. $\overline{PFO}$ will remain high when PFI is more than 1.25V.
6	8	WDI	Watchdog Input Pin. If the WDI remains high or low for longer than the watchdog timeout period (1.6s, TYP), the internal watchdog timer expires and WDO goes 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.
7	1	$\overline{RESETE}$	Active-Low Reset Output Pin. It delivers a 200ms (TYP) low pulse when activated. $\overline{RESETE}$ remains low if $V_{CC}$ is below the reset threshold or $\overline{MR}$ is logic low. It goes (or remains) low for 200ms after any of the following events: $V_{CC}$ rises above the reset threshold, a watchdog expiry triggers a reset, or the $\overline{MR}$ input goes from low to high.
8	2	$\overline{WDO}$	Watchdog Output Pin. If the WDI finishes the watchdog timeout period (1.6s, TYP) and remains low before the timer is cleared, the $\overline{WDO}$ goes low. WDO is different from RESETE in that it does not have a minimum pulse width. Once $V_{CC}$ is higher than the reset threshold, $\overline{WDO}$ will immediately go high.

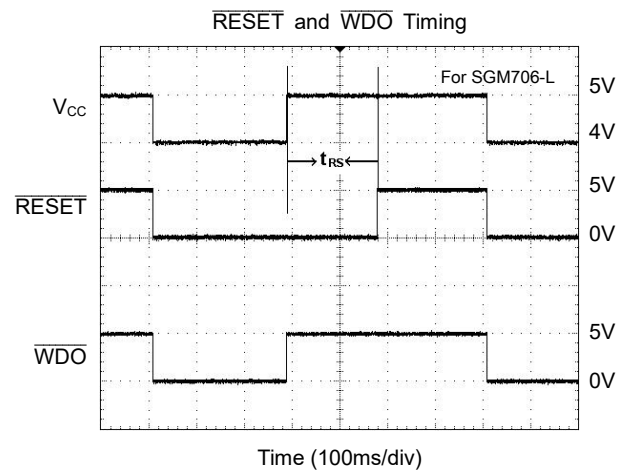
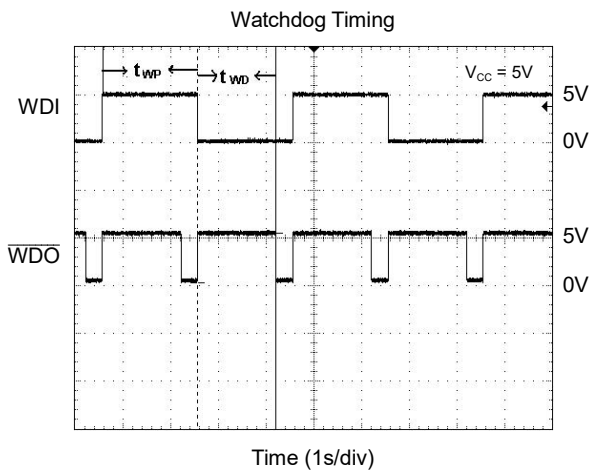
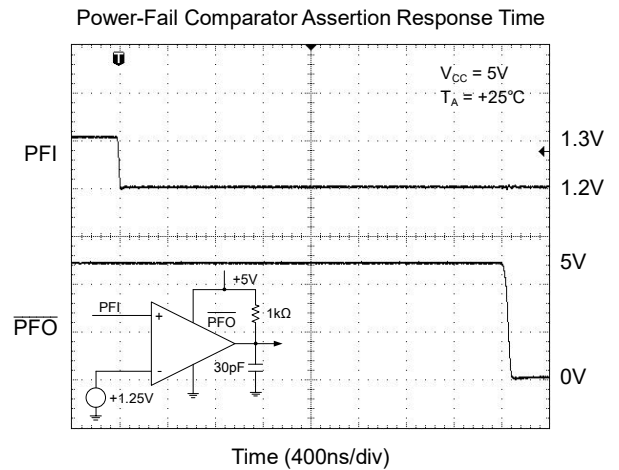
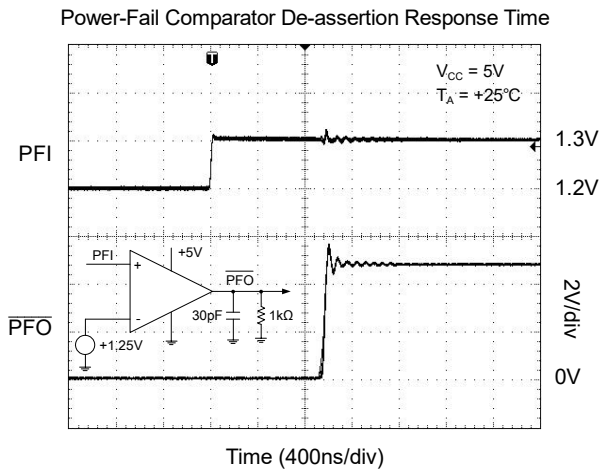
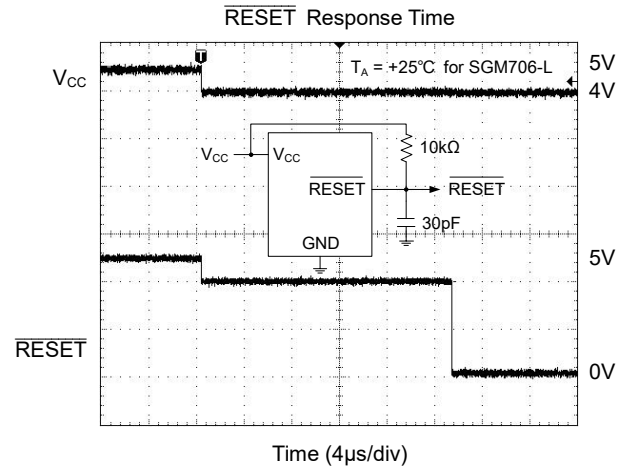
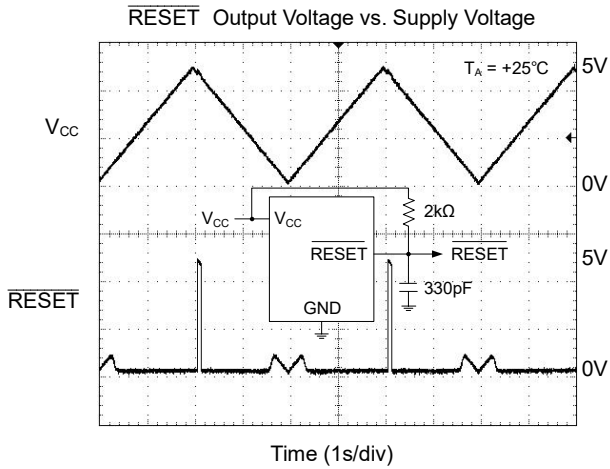
# SGM706

## ELECTRICAL CHARACTERISTICS

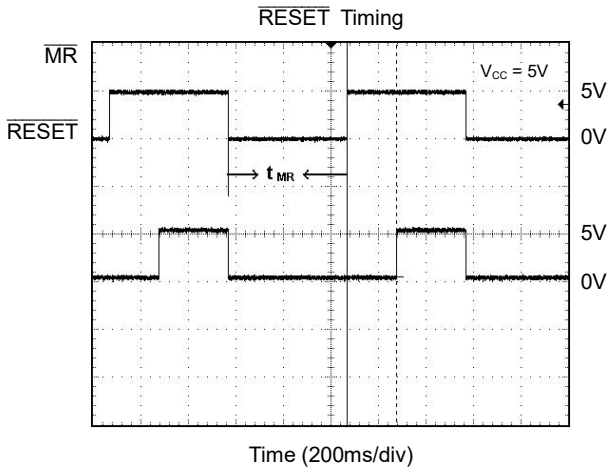
( $V_{CC} = 4.75V$  to  $5.5V$  for SGM706-L;  $V_{CC} = 4.5V$  to  $5.5V$  for SGM706-M;  $V_{CC} = 4.07V$  to  $5.5V$  for SGM706-J;  $V_{CC} = 3.14V$  to  $5.5V$  for SGM706-T;  $V_{CC} = 2.95V$  to  $5.5V$  for SGM706-S;  $V_{CC} = 2.68V$  to  $5.5V$  for SGM706-R;  $T_A = -40^{\circ}C$  to  $+85^{\circ}C$ , unless otherwise noted.)

PARAMETER		CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage Range ( $V_{CC}$ )			1.0		5.5	V
Supply Current ( $I_{SUPPLY}$ )				50	150	$\mu A$
Reset Threshold ( $V_{RT}$ )	SGM706-L		4.5	4.65	4.75	V
	SGM706-M		4.25	4.4	4.5	
	SGM706-J		3.91	4.0	4.07	
	SGM706-T		3.02	3.08	3.14	
	SGM706-S (SOIC-8)		2.85	2.93	2.95	
	SGM706-S (MSOP-8)		2.82	2.93	2.95	
	SGM706-R		2.56	2.63	2.68	
Reset Threshold Hysteresis	SGM706-L, SGM706-M			40		mV
	SGM706-J			34		
	SGM706-T, SGM706-S			25		
	SGM706-R			22		
Reset Pulse Width ( $t_{RS}$ )			120	200	280	ms
$\overline{RESET}$ 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	
Watchdog Timeout Period ( $t_{WD}$ )			1.0	1.6	2.25	sec
WDI Pulse Width ( $t_{WP}$ )		$V_{IL} = 0.4V, V_{IH} = V_{CC}$	70			ns
WDI Input Threshold	Low	$V_{CC} = 5V$			0.8	V
	High	$V_{CC} = 5V$	3.5			
	Low	$V_{RST(MAX)} < V_{CC} < 3.6V$			0.8	
	High	$V_{RST(MAX)} < V_{CC} < 3.6V$	$0.7 \times V_{CC}$			
WDI Input Current		$WDI = V_{CC}$		50	150	$\mu A$
		$WDI = 0V$	-150	-50		
$\overline{WDO}$ Output Voltage		$I_{SOURCE} = 800\mu A$	$0.7 \times V_{CC}$			V
		$I_{SINK} = 1.2mA$			0.4	
$\overline{MR}$ Pull-Up Current		$\overline{MR} = 0V$	100		600	$\mu A$
$\overline{MR}$ Pulse Width ( $t_{MR}$ )			250			ns
$\overline{MR}$ Input Threshold	Low	$T_A = +25^{\circ}C$			0.8	V
	High		2			
$\overline{MR}$ to Reset Out Delay ( $t_{MD}$ )					350	ns
PFI Input Threshold		$V_{CC} = 5V$	1.18	1.25	1.3	V
PFI Input Current				0.2		nA
PFO Output Voltage		$I_{SOURCE} = 800\mu A$	$0.7 \times V_{CC}$			V
		$I_{SINK} = 3.2mA$			0.4	

### TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (continued)



## SGM706

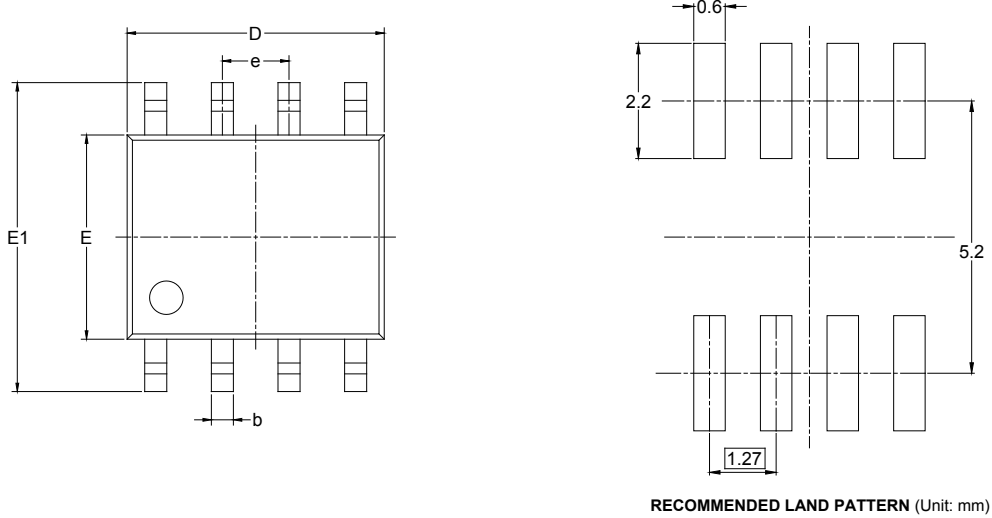
### REVISION HISTORY

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

<b>DECEMBER 2017 – REV.A.4 to REV.B</b>	<b>Page</b>
Changed Electrical Characteristics section .....	4
<hr/>	
<b>AUGUST 2017 – REV.A.3 to REV.A.4</b>	<b>Page</b>
SGM706-S Added MSOP-8 Package .....	All
<hr/>	
<b>MARCH 2017 – REV.A.2 to REV.A.3</b>	<b>Page</b>
Changed Packing Option .....	2
<hr/>	
<b>JANUARY 2013 – REV.A.1 to REV.A.2</b>	<b>Page</b>
Added Recommended Land Pattern Information .....	10
Added Tape and Reel Information .....	11, 12
<hr/>	
<b>MAY 2011 – REV.A to REV.A.1</b>	<b>Page</b>
Updated Package Description .....	All
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<b>Changes from Original (APRIL 2010) to REV.A</b>	<b>Page</b>
Changed from product preview to production data .....	All

PACKAGE OUTLINE DIMENSIONS

SOIC-8

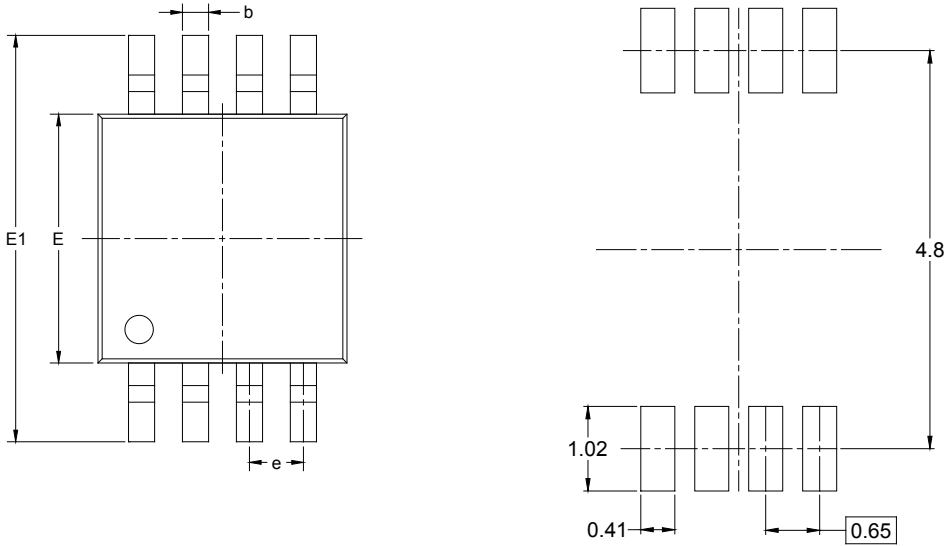


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050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

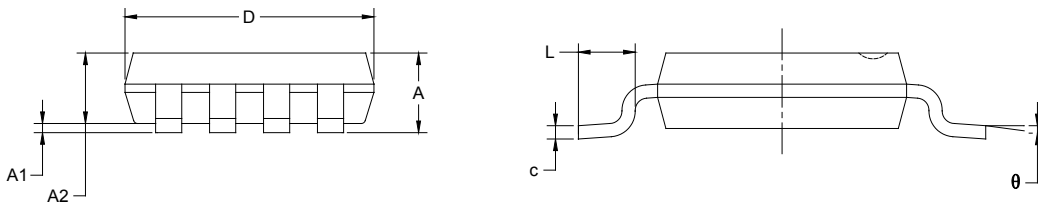


PACKAGE OUTLINE DIMENSIONS

MSOP-8



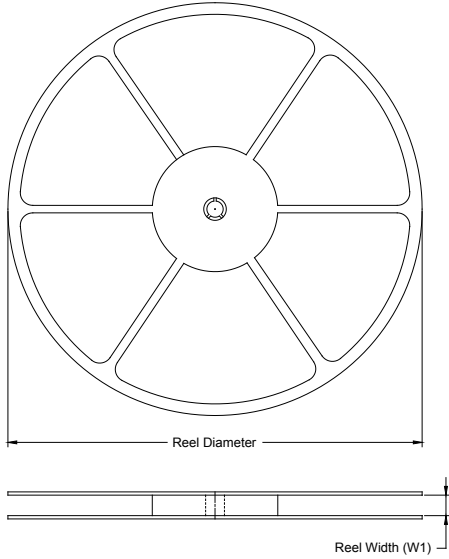
RECOMMENDED LAND PATTERN (Unit: mm)



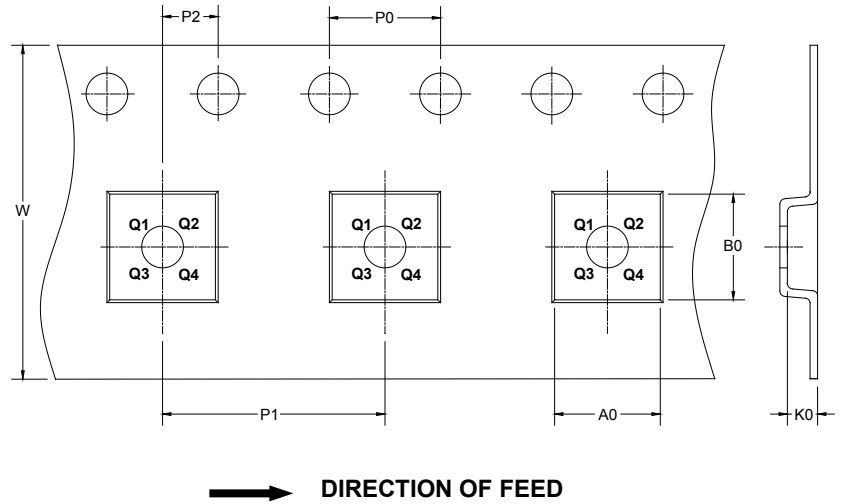
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

**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
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
13"	386	280	370	5

DD0002