

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°C to $+85^{\circ}\text{C}$.

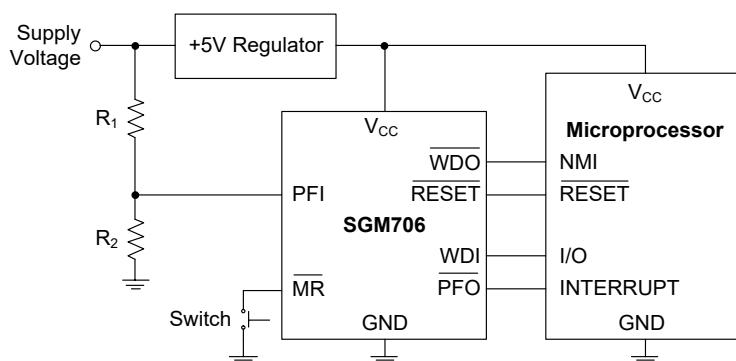
FEATURES

- 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°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 μP Power Monitoring

TYPICAL APPLICATION



SGM706

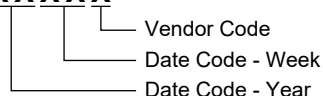
PACKAGE/ORDERING INFORMATION

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 $T_A = +25^\circ\text{C}$, unless otherwise noted.)

Terminal Voltage (with respect to GND)

V_{CC} -0.3V to 6V

All Other Inputs -0.3V to ($V_{CC} + 0.3V$)

Input Current, V_{CC} 20mA

GND 20mA

Output Current, (all outputs) 20mA

Junction Temperature $+150^\circ\text{C}$

Storage Temperature -65°C to $+150^\circ\text{C}$

Lead Temperature (Soldering, 10s) $+260^\circ\text{C}$

ESD Susceptibility

HBM 4000V

MM 300V

RECOMMENDED OPERATING CONDITIONS

Ambient Temperature Range -40°C to $+85^\circ\text{C}$

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.

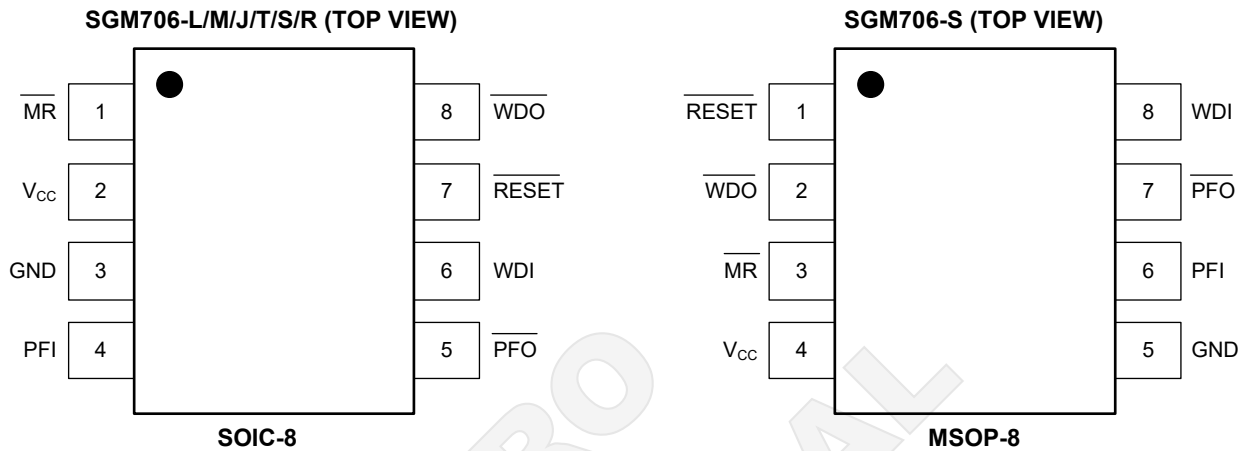
ESD SENSITIVITY CAUTION

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. 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. PFO will go low when PFI is lower than 1.25V. If not used, connect PFI to GND or V_{CC} .
5	7	PFO	Power-Fail Voltage Monitor Output Pin. PFO will go low when PFI is lower than 1.25V. 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	RESET	Active-Low Reset Output Pin. It delivers a 200ms (TYP) low pulse when activated. RESET remains low if V_{CC} is below the reset threshold or 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 MR input goes from low to high.
8	2	WDO	Watchdog Output Pin. If the WDI finishes the watchdog timeout period (1.6s, TYP) and remains low before the timer is cleared, the WDO goes low. WDO is different from RESET in that it does not have a minimum pulse width. Once V_{CC} is higher than the reset threshold, WDO will immediately go high.

SGM706

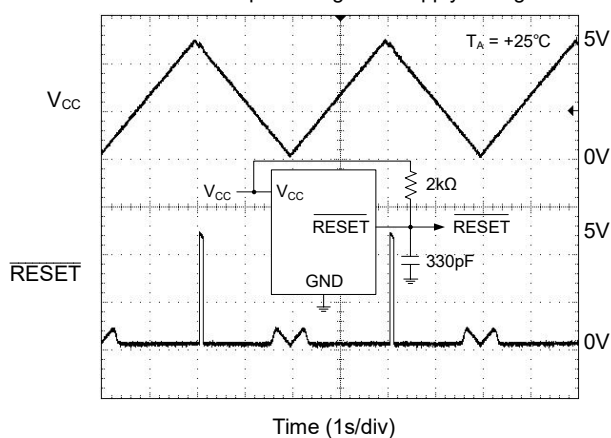
ELECTRICAL CHARACTERISTICS

($V_{CC} = 4.75V$ 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.)

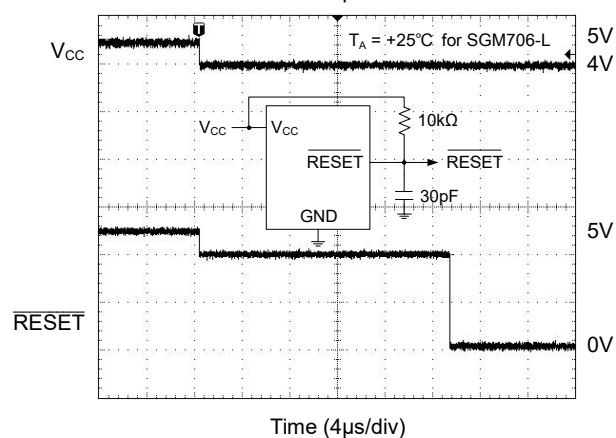
PARAMETER		CONDITIONS	MIN	TYP	MAX	UNITS
Operating Voltage Range (V_{CC})			1.0		5.5	V
Supply Current (I_{SUPPLY})				50	150	μA
Reset Threshold (V_{RT})		SGM706-L	4.5	4.65	4.75	V
		SGM706-M	4.25	4.4	4.5	
		SGM706-J	3.91	4.0	4.07	
		SGM706-T	3.02	3.08	3.14	
		SGM706-S (SOIC-8)	2.85	2.93	2.95	
		SGM706-S (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	μA
		$WDI = 0V$	-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	μA
$\overline{MR}$ 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

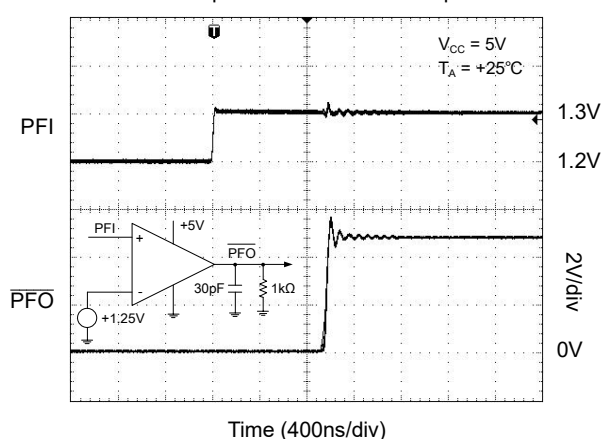
$\overline{\text{RESET}}$ Output Voltage vs. Supply Voltage



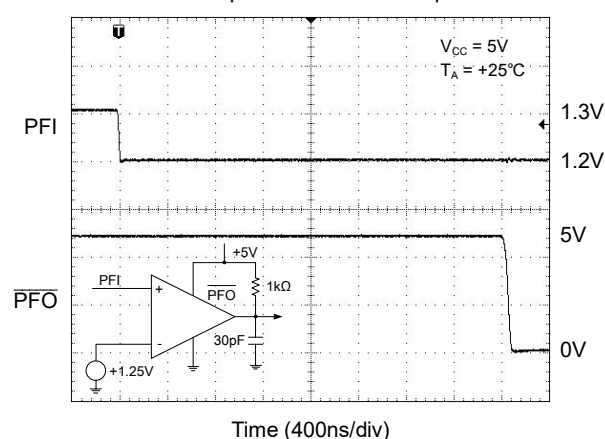
$\overline{\text{RESET}}$ Response Time



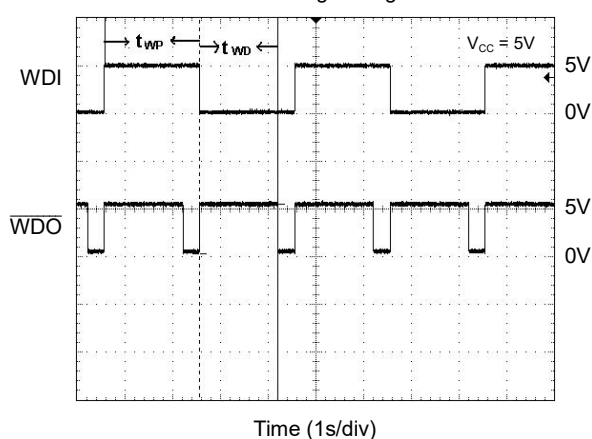
Power-Fail Comparator De-assertion Response Time



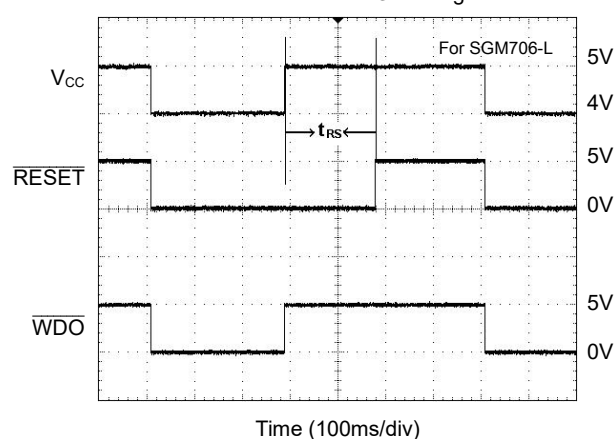
Power-Fail Comparator Assertion Response Time



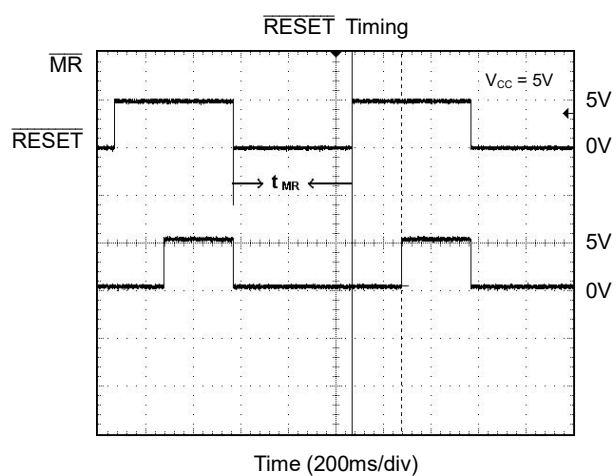
Watchdog Timing



$\overline{\text{RESET}}$ and $\overline{\text{WDO}}$ Timing



TYPICAL PERFORMANCE CHARACTERISTICS (continued)



SGM706

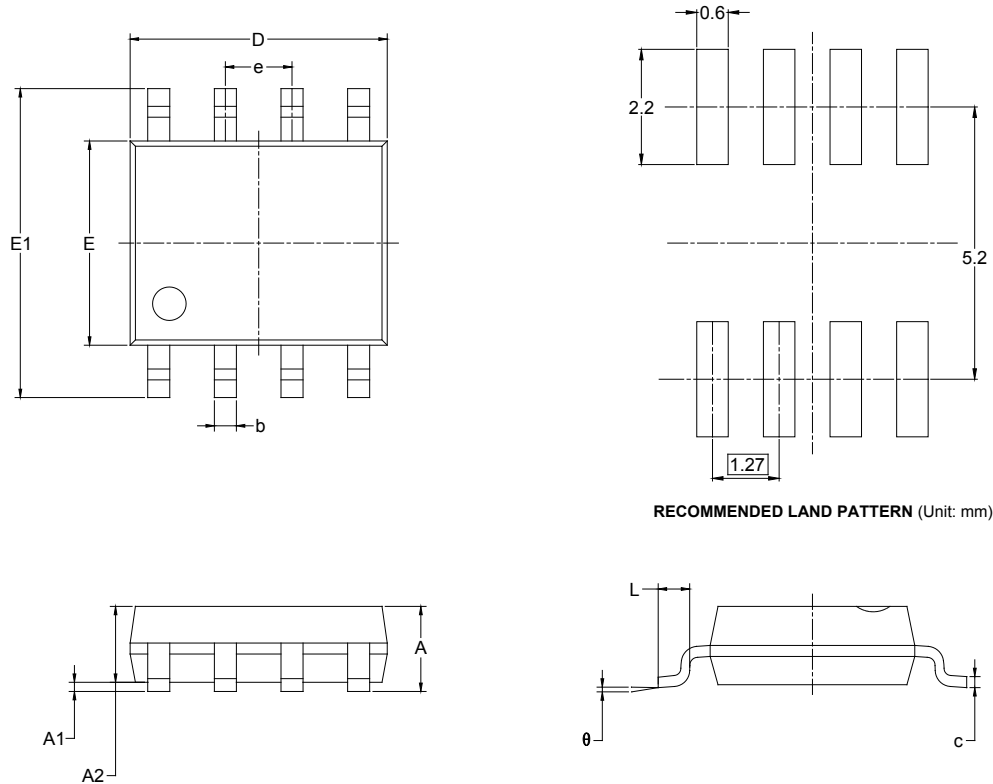
REVISION HISTORY

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

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

PACKAGE OUTLINE DIMENSIONS

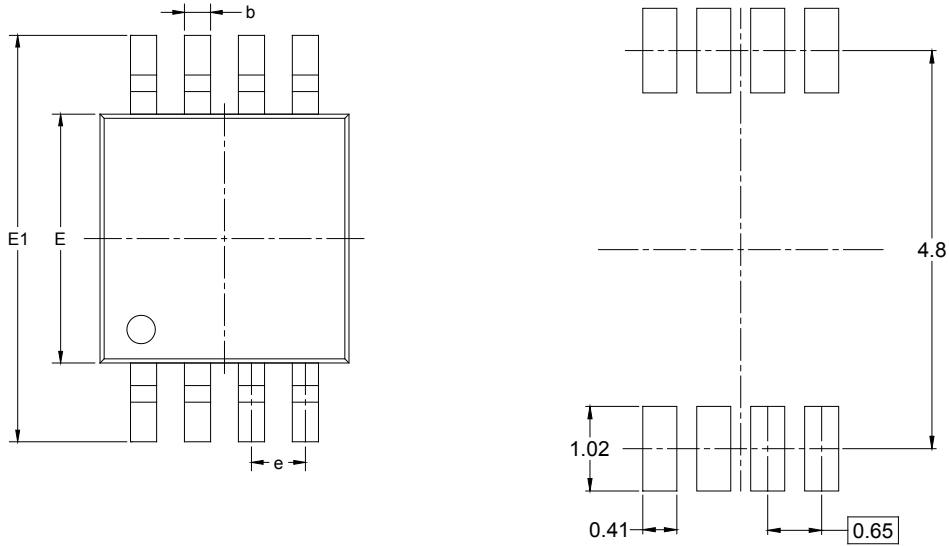
SOIC-8



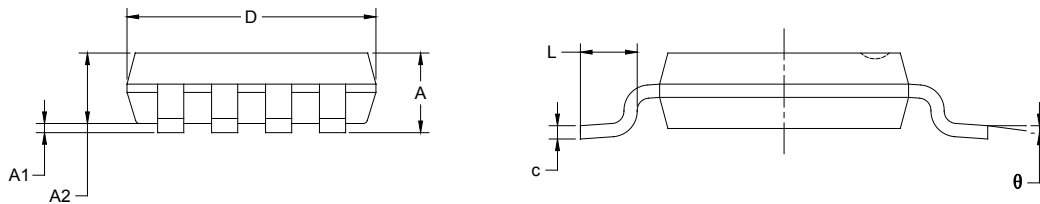
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050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

PACKAGE OUTLINE DIMENSIONS

MSOP-8



RECOMMENDED LAND PATTERN (Unit: mm)

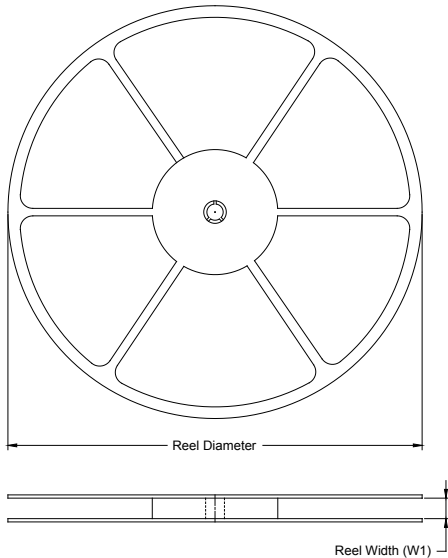


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

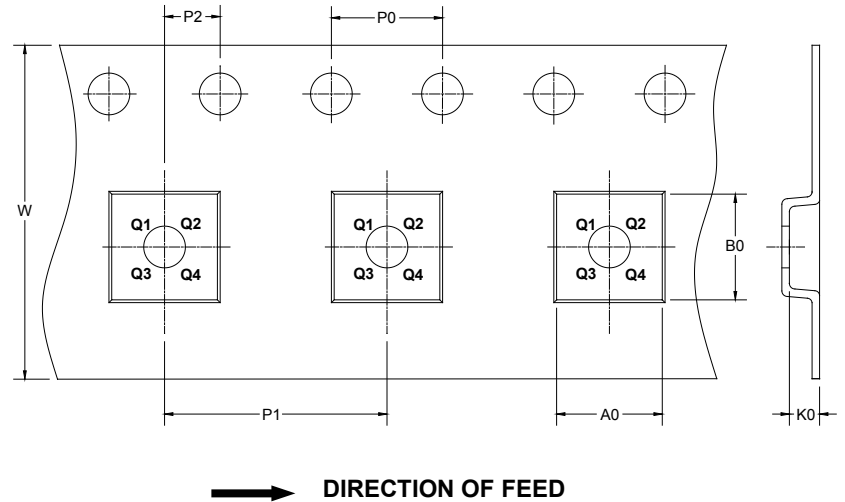
PACKAGE INFORMATION

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
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