

GENERAL DESCRIPTION

The SGM8922 is a dual, rail-to-rail output operational amplifier that is optimized and fully specified for 5V operation. High output current allows low load impedances to be driven.

The SGM8922 has a wide input common mode voltage range and output voltage swing, running at single-supply voltage from 3V to 5.5V.

The SGM8922 provides excellent overall performance. It exhibits low noise, distortion, low offset and high output current capability, making this device an excellent choice for high quality, low voltage or battery operated audio systems.

The SGM8922 is offered in Green SOIC-8, MSOP-8 and TSSOP-8 packages and ESD (HBM) reaches 8kV. It is specified over the extended -40°C to +125°C temperature range.

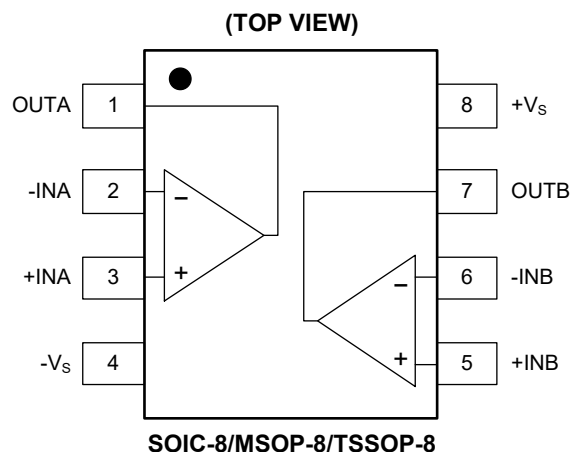
APPLICATIONS

Data Acquisition
Process Control
Active Filter
Test Equipment
Mobile Phone
Audio Processing
Video Processing
Headphone Amplifier
Portable Equipment
Broadband Communication
A-to-D Driver
D-to-A Driver

FEATURES

- Rail-to-Rail Output
- Low Noise: $6\text{nV}/\sqrt{\text{Hz}}$
- Low Distortion
- High Output Voltage Swing: 4.73V (with 100mA Output Current)
- Low Output Voltage Swing: 0.24V (with 100mA Output Current)
- Supply Voltage Range: 3V to 5.5V
- Low Input Offset Voltage: 0.9mV (MAX, SGM8922A)
- Gain-Bandwidth Product: 12.7MHz
- Slew Rate: 6.8V/ μs
- Low Supply Current: 3mA/Amplifier (TYP)
- Available in Green SOIC-8, MSOP-8 and TSSOP-8 Packages

PIN CONFIGURATIONS



PACKAGE/ORDERING INFORMATION

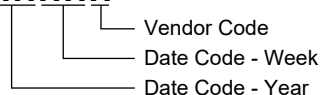
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8922	MSOP-8	-40°C to +85°C	SGM8922YMS8/TR	SGM8922 YMS8 XXXXX	Tape and Reel, 3000
	SOIC-8	-40°C to +85°C	SGM8922YS8/TR	SGM8922YS8 XXXXX	Tape and Reel, 2500
	TSSOP-8	-40°C to +85°C	SGM8922YTS8/TR	SGM8922 YTS8 XXXXX	Tape and Reel, 4000
	SOIC-8	-40°C to +125°C	SGM8922XS8/TR	SGM8922XS8 XXXXX	Tape and Reel, 2500
SGM8922A	MSOP-8	-40°C to +85°C	SGM8922AYMS8/TR	SGM8922 YMS8 XXXXX	Tape and Reel, 3000
	SOIC-8	-40°C to +85°C	SGM8922AYS8/TR	SGM8922YS8 XXXXX	Tape and Reel, 2500
	SOIC-8	-40°C to +125°C	SGM8922AXS8/TR	SGM8922XS8 XXXXX	Tape and Reel, 2500

MARKING INFORMATION

NOTE: XXXXXX = Date Code and Vendor Code.

SOIC-8/MSOP-8/TSSOP-8

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

Supply Voltage, +V_S to -V_S..... 6V
 Input Common Mode Voltage Range..... -0.1V to 3.8V
 Package Thermal Resistance @ T_A = +25°C
 SOIC-8, θ_{JA}..... 82°C/W
 MSOP-8, θ_{JA}..... 105°C/W
 TSSOP-8, θ_{JA}..... 108°C/W
 Junction Temperature +150°C
 Storage Temperature Range..... -65°C to +150°C
 Lead Temperature (Soldering, 10s) +260°C
 ESD Susceptibility
 HBM..... 8000V
 MM..... 400V

RECOMMENDED OPERATING CONDITIONS

Operating 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 by ESD if you don't pay attention to ESD protection. 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 very small parametric changes could cause the device not to meet its published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

ELECTRICAL CHARACTERISTICS

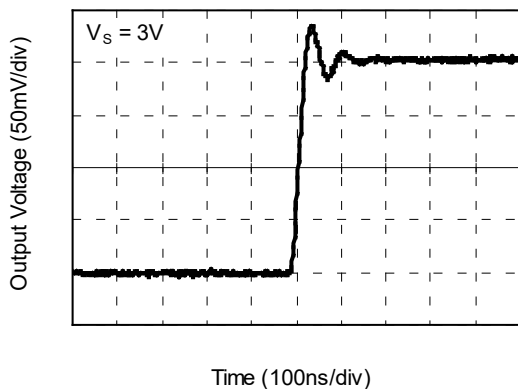
(At $T_A = +25^\circ\text{C}$, $V_S = 5\text{V}$, $R_L = 600\Omega$ connected to $V_S/2$, unless otherwise noted.)

PARAMETER	CONDITIONS	SGM8922						
		TYP	MIN/MAX OVER TEMPERATURE					
		+25°C	+25°C	-40°C to +85°C	-40°C to +125°C	UNITS	MIN /MAX	
Dynamic Performance								
Gain-Bandwidth Product (GBP)	R _L = 600Ω	12.7				MHz	TYP	
Slew Rate	2V _{PP} step, A _V = 1	6.8				V/μs	TYP	
Crosstalk	f = 1kHz	-120				dB	TYP	
Noise/Distortion Performance								
Total Harmonic Distortion + Noise (THD+N)	V _{OUT} = 2V _{PP} , f = 1kHz,							
	A _V = 1, R _L = 600Ω	0.003				%	TYP	
Input Voltage Noise Density (e _n)	f = 1kHz	6				nV/√Hz	TYP	
Phase Margin	R _L = 600Ω, C _L = 100pF	45				degree	TYP	
DC Performance								
Input Offset Voltage (V _{OS})	SGM8922		3	4.2	5	mV	MAX	
	SGM8922A		0.9	1.8	2.6	mV	MAX	
Input Offset Voltage Drift		1.6				μV/°C	TYP	
Open-Loop Gain (A _{OL})	R _L = 600Ω, V _{OUT} = 0.15V to 4.85V	109	86	80	75	dB	MIN	
	R _L = 10kΩ, V _{OUT} = 0.05V to 4.95V	104	84	75	70	dB	MIN	
Input Characteristics								
Input Common Mode Voltage Range (V _{CM})	V _S = 5V	-0.1 to 3.8				V	TYP	
Common Mode Rejection Ratio (CMRR)	V _S = 5.5V, V _{CM} = -0.1V to 3.8V	108	60	56	51	dB	MIN	
Output Characteristics								
Output Voltage Swing from Rails	V _{OH}	I _{OUT} = 100mA	4.73	4.20	4.10	4	V	MIIN
	V _{OL}	I _{OUT} = -100mA	0.24	0.45	0.56	0.68	V	MAX
Output Short-Circuit Current			300			mA	MAX	
Power Supply								
Operating Voltage Range			3	3	3	V	MIN	
			5.5	5.5	5.5	V	MAX	
Quiescent Current (per Amplifier)	I _{OUT} = 0mA	3	3.9			mA	MAX	
Power Supply Rejection Ratio (PSRR)	V _S = 2.5V to 5.5V,							
	V _{CM} = (-V _S) + 0.5V	80	60	56	51	dB	MIN	

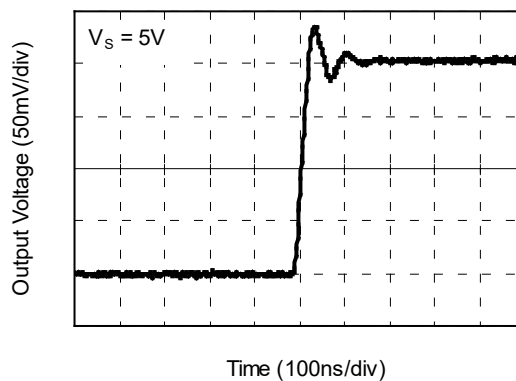
TYPICAL PERFORMANCE CHARACTERISTICS

At $T_A = +25^\circ\text{C}$, $A_V = +1$, $C_L = 100\text{pF}$ and $R_L = 600\Omega$, unless otherwise noted.

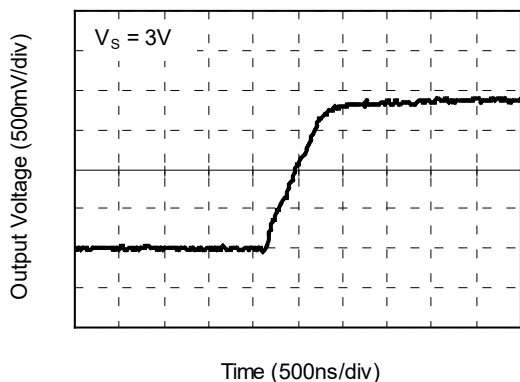
Small Signal Step Response



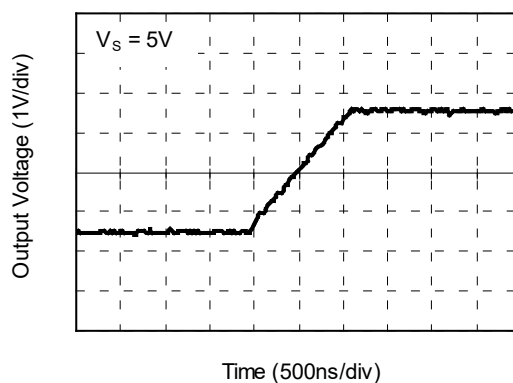
Small Signal Step Response



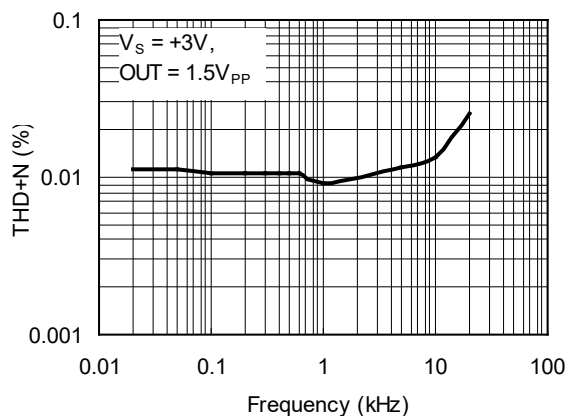
Large Signal Step Response



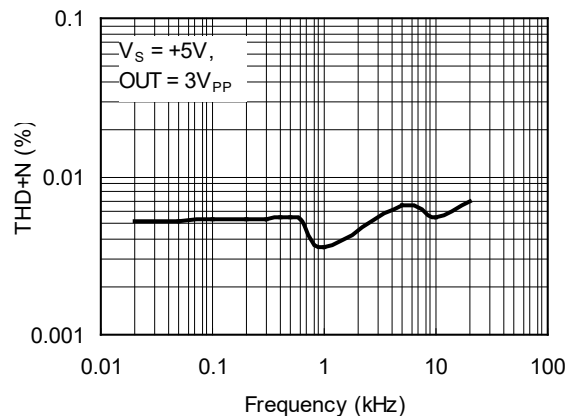
Large Signal Step Response



THD+N vs. Frequency

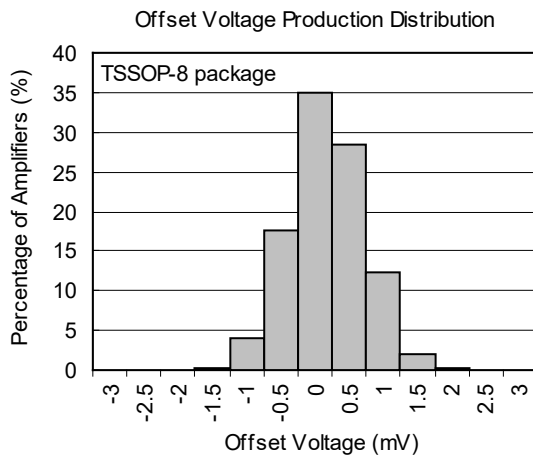
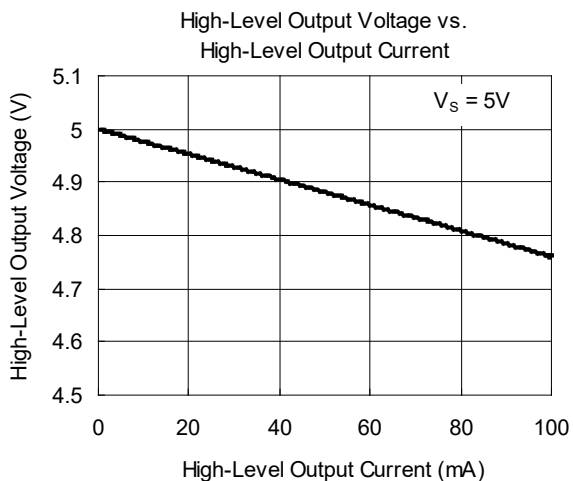
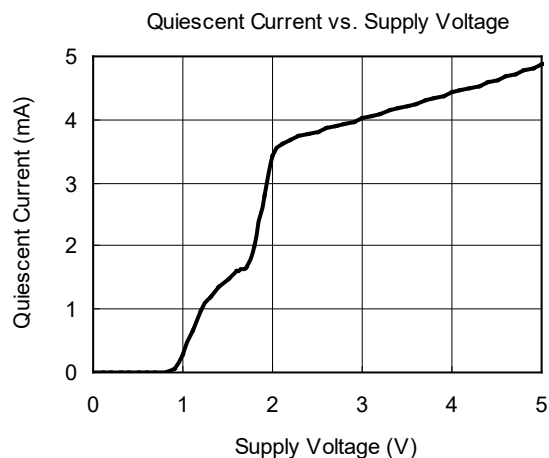
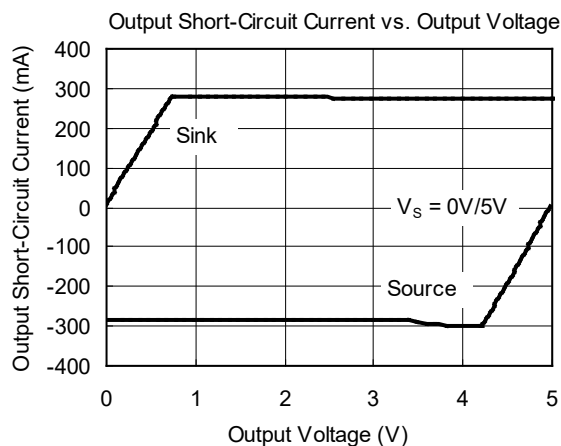


THD+N vs. Frequency



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_A = +25^\circ\text{C}$, $A_V = +1$, $C_L = 100\text{pF}$ and $R_L = 600\Omega$, unless otherwise noted.



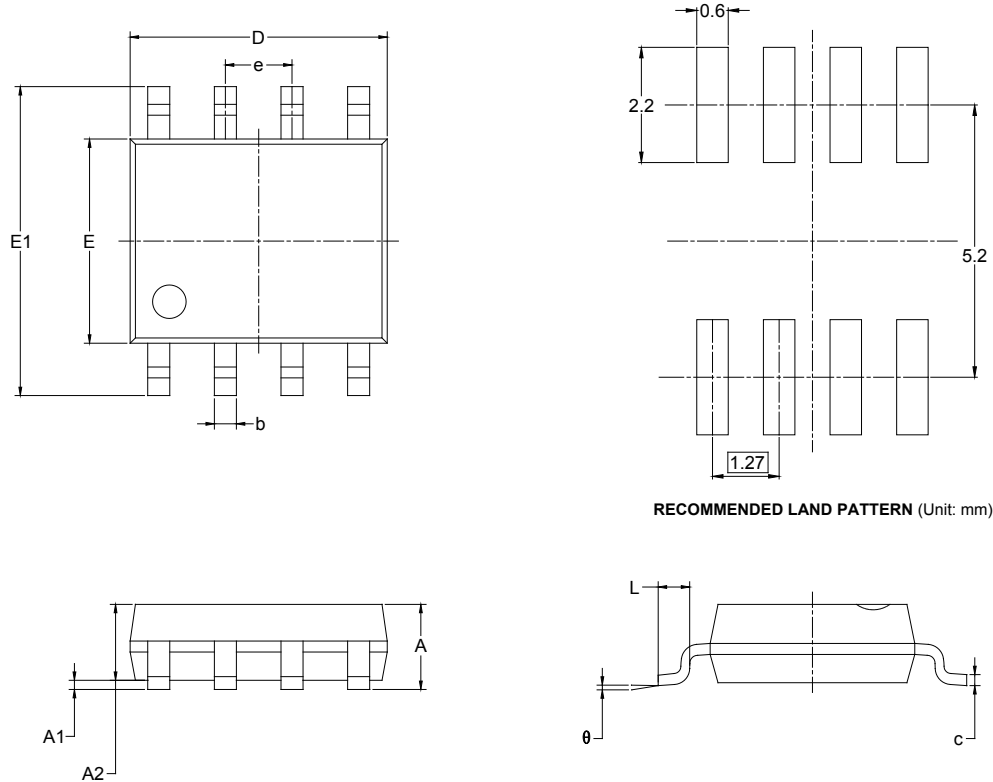
REVISION HISTORY

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

	Page
OCTOBER 2014 – REV.B.4 to REV.C	
Changed Package/Ordering Information section.....	2
APRIL 2013 – REV.B.3 to REV.B.4	Page
Changed Electrical Characteristics section	3
JANUARY 2013 – REV.B.2 to REV.B.3	Page
Added Tape and Reel Information section	9, 10
Changes from Original (APRIL 2018) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

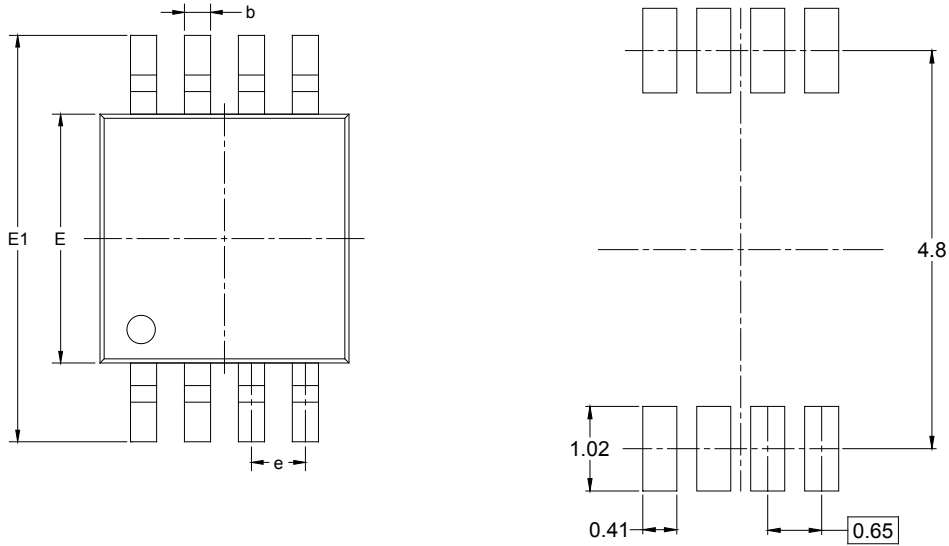
SOIC-8



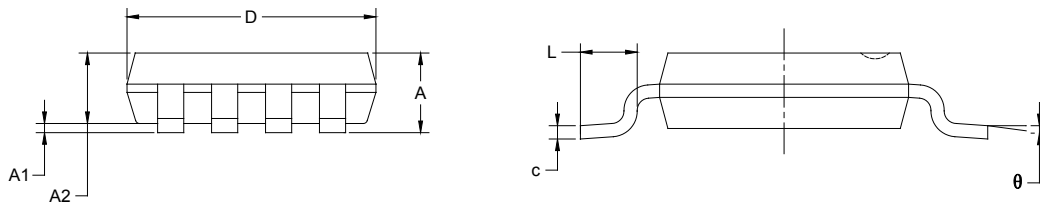
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050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

PACKAGE OUTLINE DIMENSIONS

MSOP-8



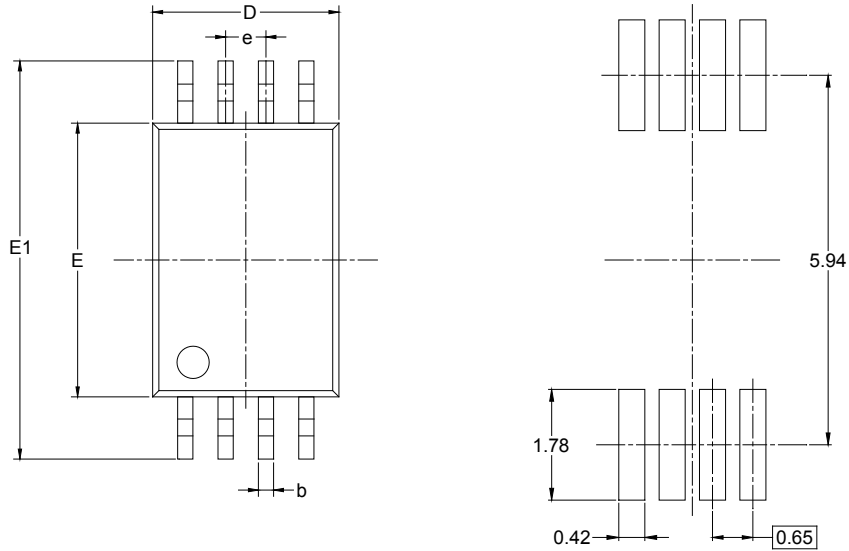
RECOMMENDED LAND PATTERN (Unit: mm)



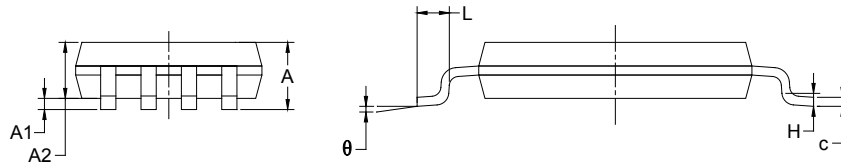
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

PACKAGE OUTLINE DIMENSIONS

TSSOP-8



RECOMMENDED LAND PATTERN (Unit: mm)

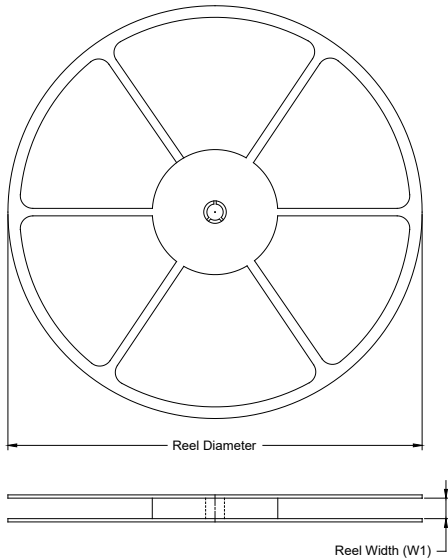


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.100		0.043
A1	0.050	0.150	0.002	0.006
A2	0.800	1.000	0.031	0.039
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	2.900	3.100	0.114	0.122
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 BSC		0.026 BSC	
L	0.500	0.700	0.02	0.028
H	0.25 TYP		0.01 TYP	
θ	1°	7°	1°	7°

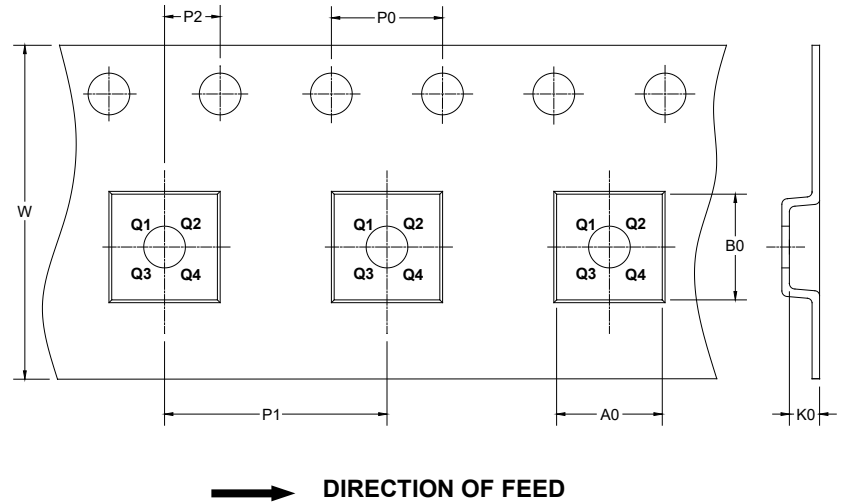
PACKAGE INFORMATION

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
TSSOP-8	13"	12.4	6.76	3.30	1.80	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