



SGM8926

110kHz, Rail-to-Rail Output CMOS Operational Amplifier

GENERAL DESCRIPTION

The SGM8926 is a low power, low offset voltage and rail-to-rail output voltage feedback amplifier. It has a wide output voltage swing, and takes the minimum operating supply voltage down to 1.6V. The maximum recommended supply voltage is 5.5V.

The SGM8926 provides 110kHz bandwidth at a low current consumption of 6.4 μ A per amplifier. Very low input bias currents of 1pA enable this amplifier to be used for integrators, photodiode amplifiers and piezoelectric sensors. Rail-to-rail output is useful to designers for buffering ASIC in single-supply systems.

Applications for this amplifier also include safety monitoring, portable equipment, battery and power supply control, signal conditioning and interfacing for transducers in very low power systems.

The SGM8926 dual is available in Green MSOP-8 and SOIC-8 packages. It is specified over the extended -40°C to +85°C temperature range.

FEATURES

- **Low Offset Voltage:** 0.9mV (MAX)
- **Rail-to-Rail Output**
- **Unity Gain Stable**
- **Gain-Bandwidth Product:** 110kHz
- **Supply Voltage Range:** 1.6V to 5.5V
- **Low Supply Current:** 6.4 μ A/Amplifier (TYP)
- **-40°C to +85°C Operating Temperature Range**
- **Available in Green SOIC-8 and MSOP-8 Packages**

APPLICATIONS

ASIC Input or Output Amplifier
Sensor Interface
Piezoelectric Transducer Amplifier
Medical Instrumentation
Mobile Communication
Audio Output
Portable System
Smoke Detector
Mobile Telephone
Notebook PC
PCMCIA Card
Battery-Powered Equipment

PACKAGE/ORDERING INFORMATION

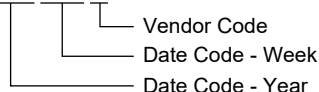
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8926	SOIC-8	-40°C to +85°C	SGM8926YS8G/TR	SGM 8926YS8 XXXXX	Tape and Reel, 2500
	MSOP-8	-40°C to +85°C	SGM8926YMS8G/TR	SGM8926 YMS8 XXXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code and Vendor Code.

SOIC-8/MSOP-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	$(-V_S) - 0.1V$ to $(+V_S) - 1.3V$
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 +85°C
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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

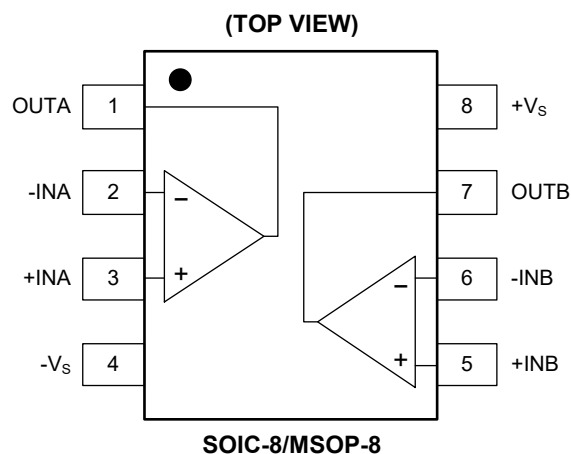
This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures

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.

PIN CONFIGURATIONS



ELECTRICAL CHARACTERISTICS(At $T_A = +25^\circ\text{C}$, $V_S = 5\text{V}$, $V_{OUT} = V_S/2$, Full = -40°C to $+85^\circ\text{C}$, unless otherwise noted.)

PARAMETER	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
DC Performance						
Input Offset Voltage (V _{OS})	V _{CM} = V _S /2	+25°C		0.15	0.9	mV
Input Offset Voltage Drift (ΔV _{OS} /ΔT)		Full		2.5		μV/°C
Open-Loop Voltage Gain (A _{OL})	R _L = 100kΩ to V _S /2, V _{OUT} = 0.05V to 4.95V	+25°C		93		dB
	R _L = 10kΩ to V _S /2, V _{OUT} = 0.15V to 4.85V	+25°C	80	88		
		Full	77			
Input Characteristics						
Common Mode Rejection Ratio (CMRR)	V _{CM} = -0.1V to 3.7V	+25°C	69	85		dB
		Full	67			
Output Characteristics						
Output Voltage Swing from Rail	R _L = 10kΩ to V _S /2	+25°C		21	39	mV
		Full			42	
	R _L = 2kΩ to V _S /2	+25°C		80	105	
		Full			115	
Output Short-Circuit Current (I _{SC})	R _L = 10Ω to V _S /2	+25°C	24	36		mA
		Full	18			
Power Supply						
Quiescent Current/Amplifier (I _Q)	I _{OUT} = 0mA	+25°C		6.4	11.5	μA
		Full			14	
Power Supply Rejection Ratio (PSRR)	V _S = 1.6V to 5.5V, V _{CM} = 0.3V	+25°C	64	77		dB
		Full	62			
Dynamic Performance						
Gain-Bandwidth Product (GBP)	R _L = 100kΩ, C _L = 100pF, V _{CM} = 2.5V	+25°C		110		kHz
Slew Rate (SR)	V _{CM} = 2.5V	+25°C		0.04		V/μs
Crosstalk	f = 1kHz	+25°C		90		dB
Noise Performance						
Input Voltage Noise Density (e _n)	f = 1kHz	+25°C		105		nV/√Hz

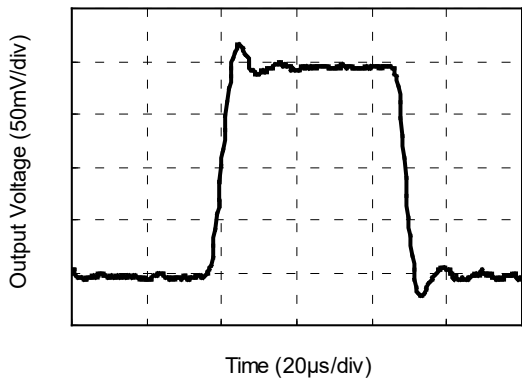
ELECTRICAL CHARACTERISTICS (continued)(At $T_A = +25^\circ\text{C}$, $V_S = 1.6\text{V}$, $V_{CM} = 0.3\text{V}$, $V_{OUT} = V_S/2$, Full = -40°C to $+85^\circ\text{C}$, unless otherwise noted.)

PARAMETER	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
DC Performance						
Input Offset Voltage (V _{OS})		+25°C		0.25	0.9	mV
Input Offset Voltage Drift (ΔV _{OS} /ΔT)		Full		1.8		μV/°C
Open-Loop Voltage Gain (A _{OL})	R _L = 100kΩ to V _S /2, V _{OUT} = 0.05V to 1.55V	+25°C		99		dB
	R _L = 10kΩ to V _S /2, V _{OUT} = 0.15V to 1.45V	+25°C	79	91		
		Full	78			
Input Characteristics						
Common Mode Rejection Ratio (CMRR)	V _{CM} = -0.1V to 0.3V	+25°C	64	78		dB
		Full	62			
Output Characteristics						
Output Voltage Swing from Rail	R _L = 10kΩ to V _S /2	+25°C		13	25	mV
		Full			28	
	R _L = 2kΩ to V _S /2	+25°C		63	87	
		Full			90	
Output Short-Circuit Current (I _{SC})	R _L = 10Ω to V _S /2	+25°C	0.4	2.6		mA
		Full	0.25			
Power Supply						
Quiescent Current/Amplifier (I _Q)	I _{OUT} = 0mA	+25°C		5.8	10	μA
		Full			13.5	
Dynamic Performance						
Gain-Bandwidth Product (GBP)	R _L = 100kΩ, C _L = 100pF	+25°C		110		kHz
Slew Rate (SR)		+25°C		0.04		V/μs
Crosstalk	f = 1kHz	+25°C		90		dB
Noise Performance						
Input Voltage Noise Density (e _n)	f = 1kHz	+25°C		105		nV/√Hz

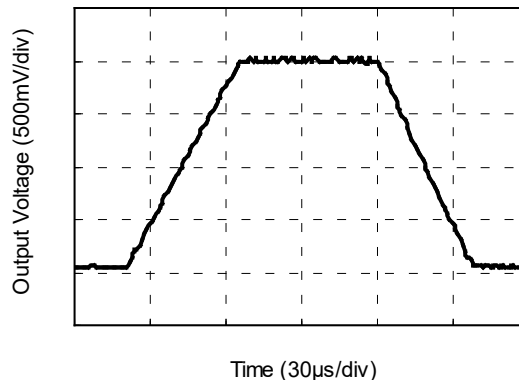
TYPICAL PERFORMANCE CHARACTERISTICS

At $T_A = +25^\circ\text{C}$, $V_S = 5\text{V}$, unless otherwise noted.

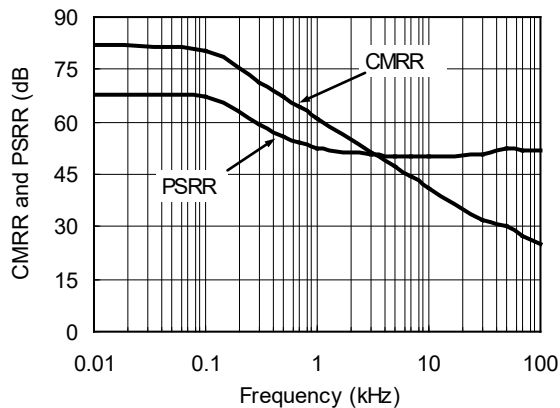
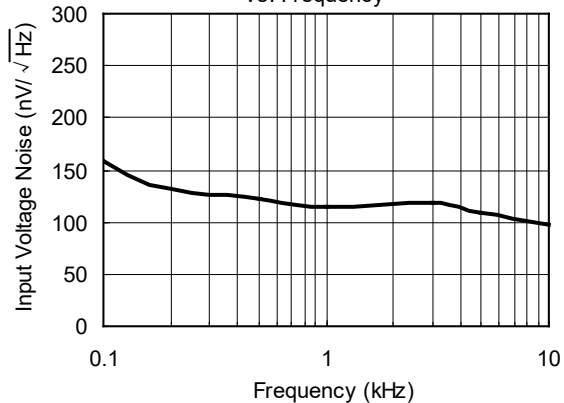
Small Signal Step Response



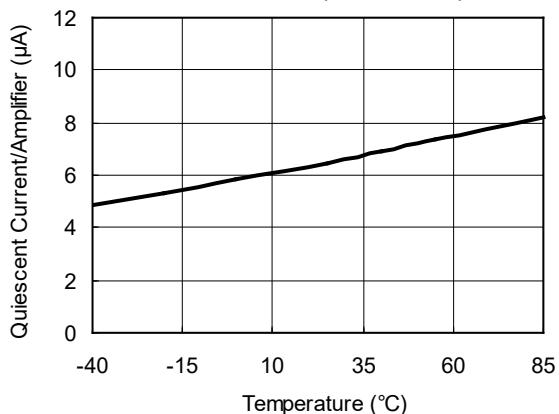
Large Signal Step Response



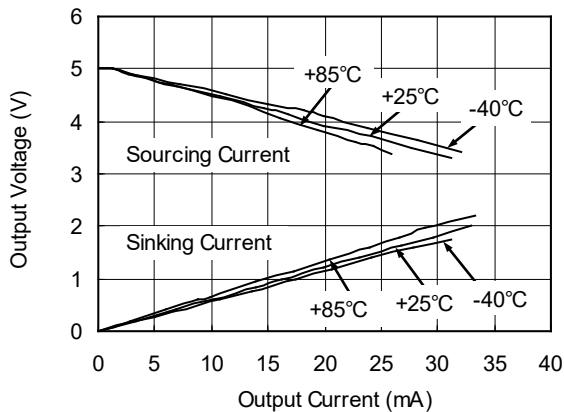
CMRR and PSRR vs. Frequency

Input Voltage Noise Spectral Density
vs. Frequency

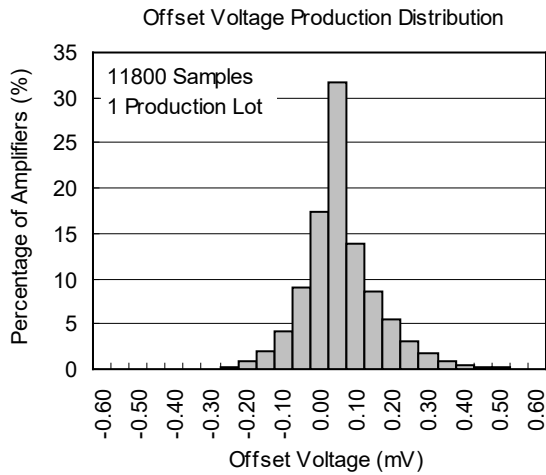
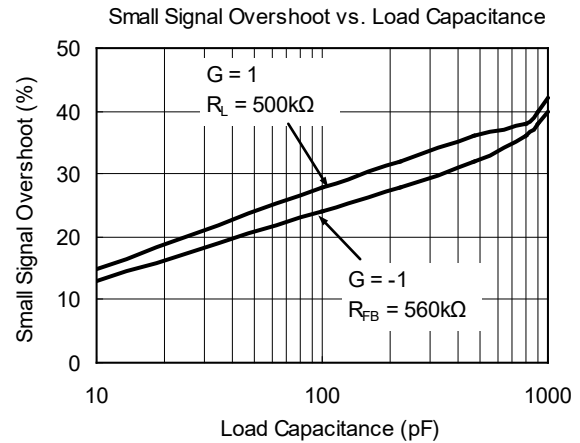
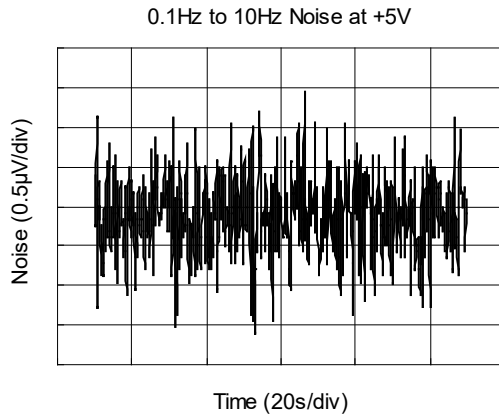
Quiescent Current/Amplifier vs. Temperature



Output Voltage vs. Output Current



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_A = +25^\circ\text{C}$, $V_S = 5\text{V}$, unless otherwise noted.

REVISION HISTORY

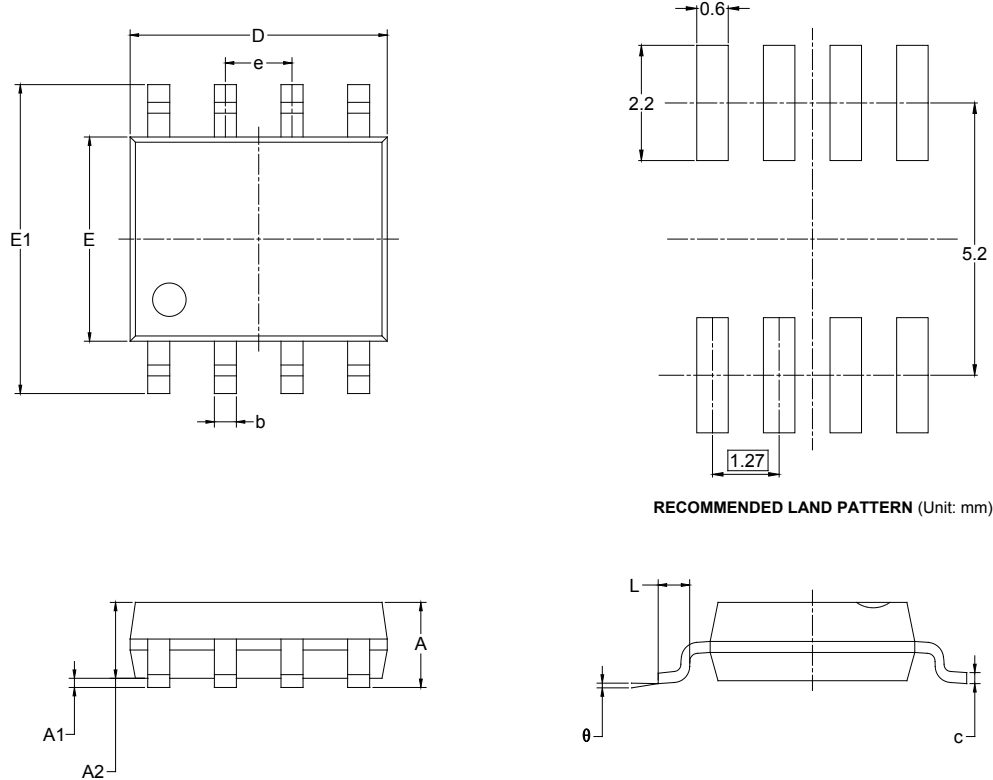
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original (DECEMBER 2013) to REV.A**Page**

Changed from product preview to production data.....	All
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PACKAGE OUTLINE DIMENSIONS

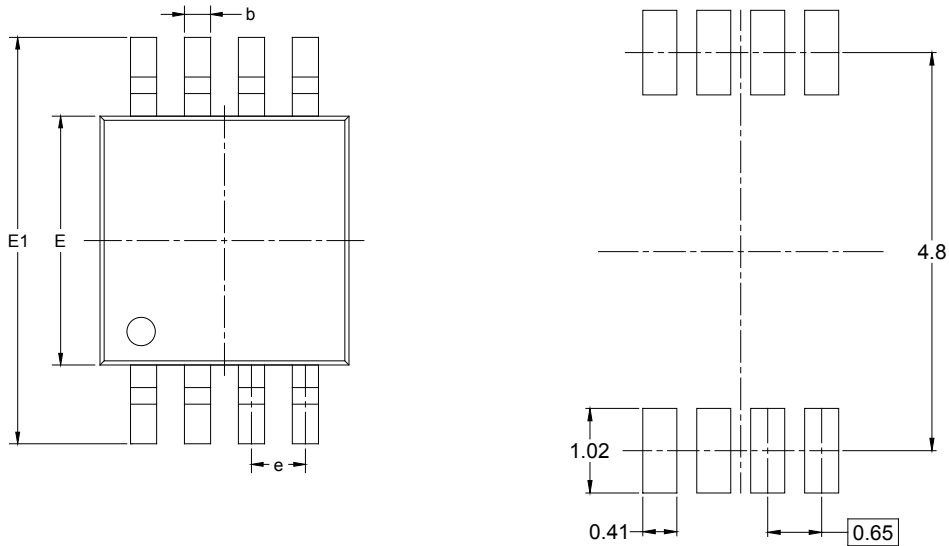
SOIC-8



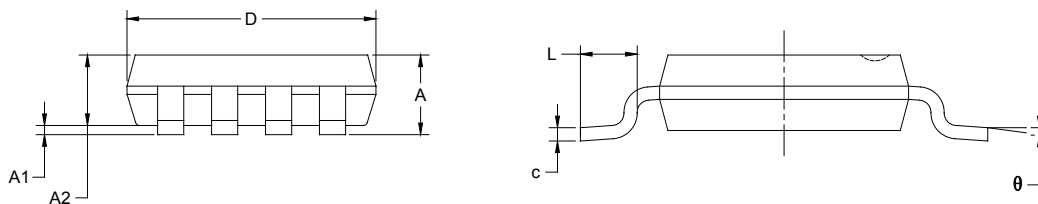
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050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

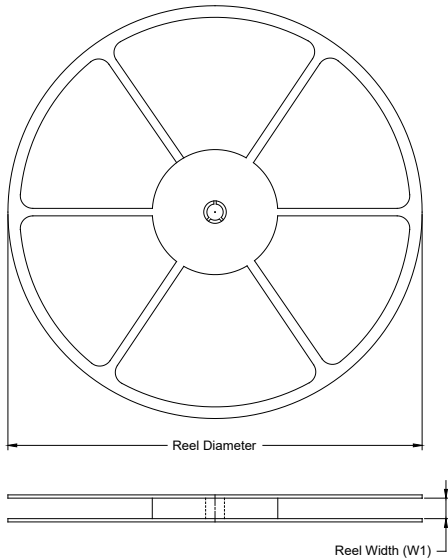


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

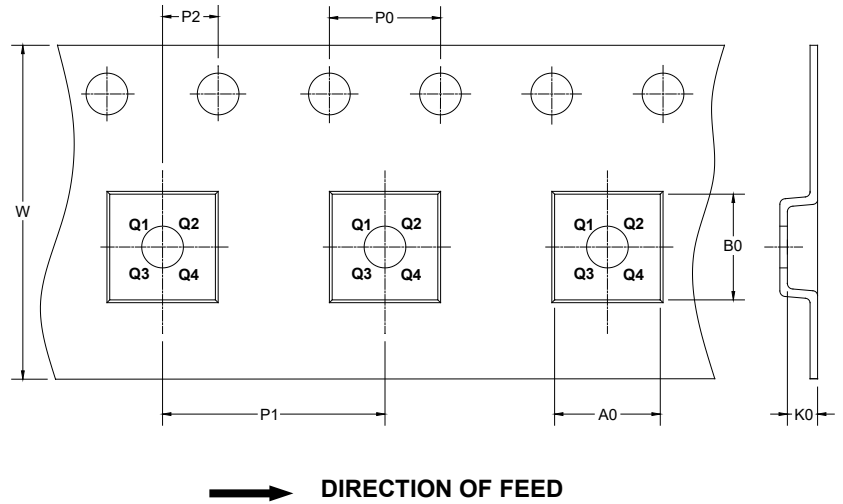
PACKAGE INFORMATION

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