



SGM8271/SGM8272/SGM8274

High Voltage Rail-to-Rail Output Operational Amplifiers

GENERAL DESCRIPTION

The SGM8271 (single), SGM8272 (dual) and SGM8274 (quad) are high precision operational amplifiers, which are optimized for high voltage operation from 4.5V to 36V single supply or $\pm 2.25\text{V}$ to $\pm 18\text{V}$ dual power supplies. They provide a wide input common mode voltage range and rail-to-rail output voltage swing.

Furthermore, the SGM8271/2/4 provide high slew rate, low bias current, low offset current, low offset voltage and low offset voltage drift.

The SGM8271 is available in Green SOT-23-5, MSOP-8 and SOIC-8 packages. The SGM8272 is available in Green SOIC-8 and MSOP-8 packages. The SGM8274 is available in Green SOIC-14 and TSSOP-14 packages. They are specified over the extended -40°C to $+125^{\circ}\text{C}$ temperature range.

FEATURES

- **Low Offset Voltage:** 3mV (MAX)
- **Low Input Bias Current**
- **Low Input Offset Current**
- **Wide Input Common Mode Voltage Range**
- **High Input Impedance**
- **Output Short-Circuit Protection**
- **Rail-to-Rail Output**
- **High Slew Rate:** 7V/ μs
- **Low Quiescent Current:** 150 μA /Amplifier
- **Small Packaging:**
 - SGM8271 Available in Green SOT-23-5, MSOP-8 and SOIC-8 Packages**
 - SGM8272 Available in Green MSOP-8 and SOIC-8 Packages**
 - SGM8274 Available in Green SOIC-14 and TSSOP-14 Packages**

APPLICATIONS

High Impedance Sensor
Photodiode Amplifier
Professional Audio Instrument
DAC Output Amplifier
Medical Equipment
Test Equipment
Active Filter
Precision Instrument

**SGM8271/SGM8272
SGM8274**

High Voltage Rail-to-Rail Output Operational Amplifiers

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8271	SOT-23-5	-40°C to +85°C	SGM8271AYN5G/TR	SBDXX	Tape and Reel, 3000
	SOT-23-5	-40°C to +85°C	SGM8271BYN5G/TR	SG5XX	Tape and Reel, 3000
	MSOP-8	-40°C to +85°C	SGM8271YMS8G/TR	SGM8271 YMS8 XXXXX	Tape and Reel, 3000
	SOIC-8	-40°C to +85°C	SGM8271YS8G/TR	SGM 8271YS8 XXXXX	Tape and Reel, 2500
	SOIC-8	-40°C to +125°C	SGM8271XS8G/TR	SGM 8271XS8 XXXXX	Tape and Reel, 2500
SGM8272	MSOP-8	-40°C to +85°C	SGM8272YMS8G/TR	SGM8272 YMS8 XXXXX	Tape and Reel, 3000
	SOIC-8	-40°C to +85°C	SGM8272YS8G/TR	SGM 8272YS8 XXXXX	Tape and Reel, 2500
	SOIC-8	-40°C to +125°C	SGM8272XS8G/TR	SGM 8272XS8 XXXXX	Tape and Reel, 2500
SGM8274	SOIC-14	-40°C to +85°C	SGM8274YS14G/TR	SGM8274YS14 XXXXX	Tape and Reel, 2500
	SOIC-14	-40°C to +125°C	SGM8274XS14G/TR	SGM8274XS14 XXXXX	Tape and Reel, 2500
	TSSOP-14	-40°C to +85°C	SGM8274YTS14G/TR	SGM8274 YTS14 XXXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XX = Date Code. XXXXX = Date Code and Vendor Code.

SOT-23-5

YYY X X

— Date Code - Month
— Date Code - Year
— Serial Number

SOIC-8/MSOP-8/SOIC-14/TSSOP-14

XXXXX

The diagram shows a 5-digit code 'XXXXX' with lines connecting it to three labels: 'Vendor Code' (connected to the last digit), 'Date Code - Week' (connected to the second and third digits), and 'Date Code - Year' (connected to the first two digits).

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 $-V_S$	40V
Input Common Mode Voltage Range	$(-V_S) - 0.1V$ to $(+V_S) - 1.5V$
Input/Output Voltage Range	$(-V_S) - 0.3V$ to $(+V_S) + 0.3V$
Differential Input Voltage.....	1.5V
Junction Temperature.....	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility	
HBM.....	4000V
MM (SGM8271/2)	150V
MM (SGM8274)	300V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range	-40°C to +125°C
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NOTE:

1. It is recommended that CMOS device adopts the proper power supply sequence. Always sort the V_S first, followed by the inputs and outputs.

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

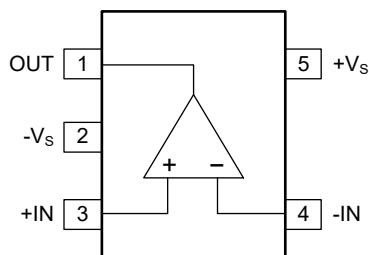
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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.

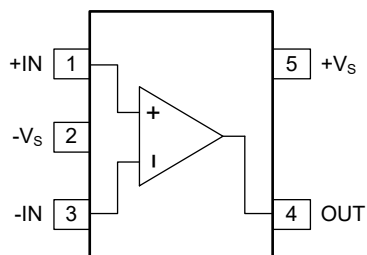
PIN CONFIGURATIONS

SGM8271AYN5G (TOP VIEW)



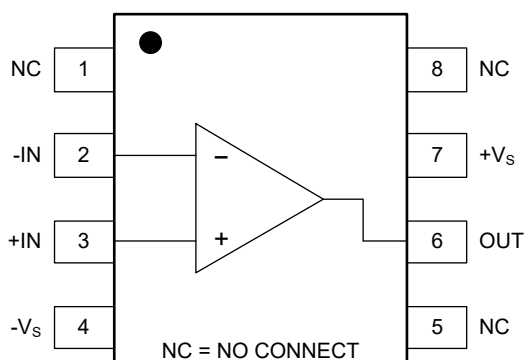
SOT-23-5

SGM8271BYN5G (TOP VIEW)



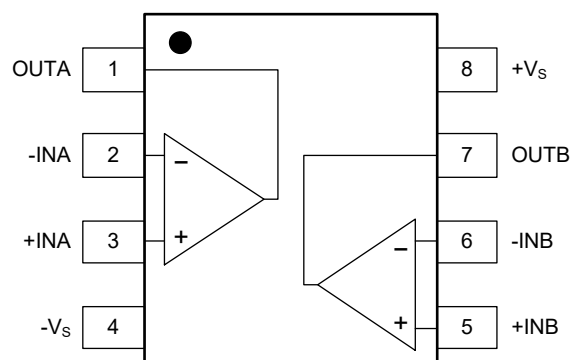
SOT-23-5

SGM8271 (TOP VIEW)



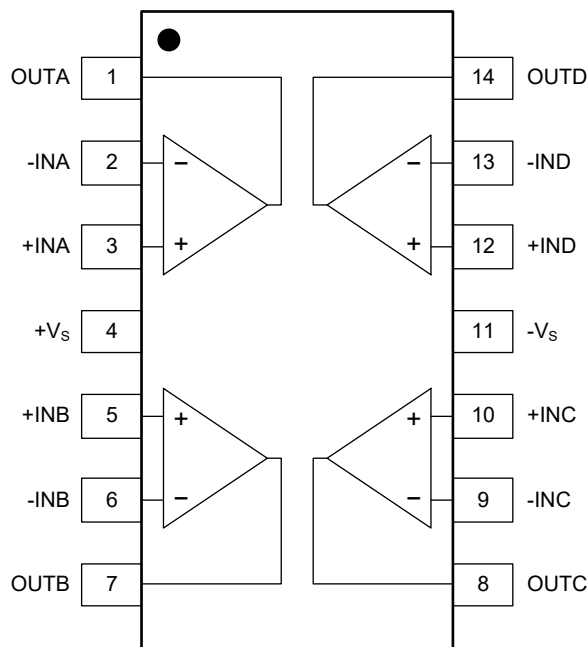
SOIC-8/MSOP-8

SGM8272 (TOP VIEW)



SOIC-8/MSOP-8

SGM8274 (TOP VIEW)



SOIC-14/TSSOP-14

ELECTRICAL CHARACTERISTICS

($V_S = +5V$, $R_L = 2k\Omega$ connected to 2.5V, unless otherwise noted.)

PARAMETER	CONDITIONS	TYP	MIN/MAX OVER TEMPERATURE				UNITS	MIN/ MAX
		+25°C	+25°C	-40°C to +85°C	-40°C to +125°C			
Input Offset Voltage (V_{OS})	$V_{CM} = 2.5V$	0.6	3.0	3.8	3.9		mV	MAX
Input Offset Voltage Drift ($\Delta V_{OS}/\Delta T$)		3					$\mu V/^\circ C$	TYP
Input Bias Current (I_B)		20					pA	TYP
Input Offset Current (I_{OS})		20					pA	TYP
Open-Loop Voltage Gain (A_{OL})	$V_{OUT} = 0.5V$ to $4.5V$, $R_L = 5k\Omega$	86	75	72	70		dB	MIN
Output Voltage Swing from Rail	V_{OH} $R_L = 10k\Omega$	16	39	43	46		mV	MAX
	V_{OL} $R_L = 10k\Omega$	14	30	34	38			MAX
Output Short-Circuit Current (I_{SC})	Sink $R_L = 10\Omega$	46.2	34.1	21.5	11.0		mA	MIN
	Source $R_L = 10\Omega$	44.4	30.5	20.7	12.3			
Input Common Mode Voltage Range (V_{CM})		-0.1 to 3.5					V	TYP
Common Mode Rejection Ratio (CMRR)	$V_{CM} = -0.1V$ to $3.5V$	84	67	62	60		dB	MIN
Power Supply Rejection Ratio (PSRR)	$V_S = 4.5V$ to $36V$	103	82	80	78		dB	MIN
Quiescent Current/Amplifier	$I_{OUT} = 0A$	144	275	309	329		μA	MAX
Gain-Bandwidth Product (GBP)	$C_L = 100pF$, $V_{CM} = 2.5V$	1.4					MHz	TYP
Gain Margin	$C_L = 100pF$, $V_{CM} = 2.5V$	-10					dB	TYP
Phase Margin	$C_L = 100pF$, $V_{CM} = 2.5V$	50					$^\circ$	TYP
Channel-to-Channel Crosstalk	$f = 1MHz$	-80					dB	TYP
Slew Rate (SR)	Up	$V_{OUT} = 2V_{P-P}$ step, $C_L = 100pF$, $G = 1$	5				V/ μs	TYP
	Down	$V_{OUT} = 2V_{P-P}$ step, $C_L = 100pF$, $G = 1$	5					TYP
Overload Recovery Time (ORT)	Up	$V_{IN} \times G = V_S$	2.0				μs	TYP
	Down	$V_{IN} \times G = V_S$	4.0					
Settling Time (t_s)	$C_L = 100pF$, $G = 1$, 200mV output step	2					μs	TYP
Input Voltage Noise Density (e_n)	$f = 20kHz$, $V_{CM} = 2.5V$	30					$nV/\sqrt{Hz}$	TYP
	$f = 1kHz$, $V_{CM} = 2.5V$	45						
Total Harmonic Distortion + Noise (THD+N)	$V_{OUT} = 2V_{P-P}$, $f = 1kHz$, $G = 1$, $R_L = 600\Omega$	0.018					%	TYP
	$V_{OUT} = 2V_{P-P}$, $f = 1kHz$, $G = 1$, $R_L = 2k\Omega$	0.009						

ELECTRICAL CHARACTERISTICS (continued)

($V_S = \pm 5V$, $R_L = 2k\Omega$ connected to 0V, unless otherwise noted.)

PARAMETER	CONDITIONS	TYP	MIN/MAX OVER TEMPERATURE				UNITS	MIN/ MAX
		+25°C	+25°C	-40°C to +85°C	-40°C to +125°C			
Input Offset Voltage (V_{OS})	$V_{CM} = 0V$	0.6	3.0	3.8	3.9		mV	MAX
Input Offset Voltage Drift ($\Delta V_{OS}/\Delta T$)		3					$\mu V/^\circ C$	TYP
Input Bias Current (I_B)		20					pA	TYP
Input Offset Current (I_{OS})		20					pA	TYP
Open-Loop Voltage Gain (A_{OL})	$V_{OUT} = -4.5V$ to $4.5V$, $R_L = 5k\Omega$	93	81	78	76		dB	MIN
Output Voltage Swing from Rail	V_{OH} $R_L = 10k\Omega$	28	67	73	79		mV	MAX
	V_{OL} $R_L = 10k\Omega$	23	39	47	62			MAX
Output Current (I_{OUT})		60					mA	TYP
Input Common Mode Voltage Range (V_{CM})		-5.1 to 3.5					V	TYP
Common Mode Rejection Ratio (CMRR)	$V_{CM} = -5.1V$ to $3.5V$	92	75	68	66		dB	MIN
Quiescent Current/Amplifier	$I_{OUT} = 0A$	145	276	311	332		μA	MAX
Gain-Bandwidth Product (GBP)	$C_L = 100pF$, $V_{CM} = 0V$	1.4					MHz	TYP
Gain Margin	$C_L = 100pF$, $V_{CM} = 0V$	-10					dB	TYP
Phase Margin	$C_L = 100pF$, $V_{CM} = 0V$	50					°	TYP
Channel-to-Channel Crosstalk	$f = 1MHz$	-80					dB	TYP
Slew Rate (SR)	Up	$V_{OUT} = 2V_{P-P}$ step, $C_L = 100pF$, $G = 1$	6				V/ μs	TYP
	Down	$V_{OUT} = 2V_{P-P}$ step, $C_L = 100pF$, $G = 1$	4					TYP
Overload Recovery Time (ORT)	Up	$V_{IN} \times G = V_S$	1.5				μs	TYP
	Down	$V_{IN} \times G = V_S$	2.5					
Settling Time (t_s)	$C_L = 100pF$, $G = 1$, 200mV output step	2					μs	TYP
Input Voltage Noise Density (e_n)	$f = 20kHz$, $V_{CM} = 0V$	30					$nV/\sqrt{Hz}$	TYP
	$f = 1kHz$, $V_{CM} = 0V$	45						
Total Harmonic Distortion + Noise (THD+N)	$V_{OUT} = 2V_{P-P}$, $f = 1kHz$, $G = 1$, $R_L = 600\Omega$	0.018					%	TYP
	$V_{OUT} = 2V_{P-P}$, $f = 1kHz$, $G = 1$, $R_L = 2k\Omega$	0.009						

ELECTRICAL CHARACTERISTICS (continued)

($V_S = \pm 15V$, $R_L = 2k\Omega$ connected to 0V, unless otherwise noted.)

PARAMETER	CONDITIONS	TYP	MIN/MAX OVER TEMPERATURE				UNITS	MIN/ MAX
		+25°C	+25°C	-40°C to +85°C	-40°C to +125°C			
Input Offset Voltage (V_{OS})	$V_{CM} = 0V$	0.6	3.0	3.8	3.9		mV	MAX
Input Offset Voltage Drift ($\Delta V_{OS}/\Delta T$)		3					$\mu V/^\circ C$	TYP
Input Bias Current (I_B)		20					pA	TYP
Input Offset Current (I_{OS})		20					pA	TYP
Open-Loop Voltage Gain (A_{OL})	$V_{OUT} = -14.5V$ to $14.5V$, $R_L = 5k\Omega$	100	85	82	80		dB	MIN
Output Voltage Swing from Rail	V_{OH} $R_L = 10k\Omega$	67	174	193	210		mV	MAX
	V_{OL} $R_L = 10k\Omega$	63	102	124	148			MAX
Output Current (I_{OUT})		60					mA	TYP
Input Common Mode Voltage Range (V_{CM})		-15.1 to 13.5					V	TYP
Common Mode Rejection Ratio (CMRR)	$V_{CM} = -15.1V$ to $13.5V$	95	79	71	66		dB	MIN
Quiescent Current/Amplifier	$I_{OUT} = 0A$	150	286	320	337		μA	MAX
Gain-Bandwidth Product (GBP)	$C_L = 100pF$, $V_{CM} = 0V$	1.4					MHz	TYP
Gain Margin	$C_L = 100pF$, $V_{CM} = 0V$	-10					dB	TYP
Phase Margin	$C_L = 100pF$, $V_{CM} = 0V$	50					°	TYP
Channel-to-Channel Crosstalk	$f = 1MHz$	-80					dB	TYP
Slew Rate (SR)	Up	$V_{OUT} = 2V_{P-P}$ step, $C_L = 100pF$, $G = 1$	7				V/ μs	TYP
	Down	$V_{OUT} = 2V_{P-P}$ step, $C_L = 100pF$, $G = 1$	4					TYP
Overload Recovery Time (ORT)	Up	$V_{IN} \times G = V_S$	0.5				μs	TYP
	Down	$V_{IN} \times G = V_S$	1.0					
Settling Time (t_s)	$C_L = 100pF$, $G = 1$, 200mV output step	2					μs	TYP
Input Voltage Noise Density (e_n)	$f = 20kHz$, $V_{CM} = 0V$	29					$nV/\sqrt{Hz}$	TYP
	$f = 1kHz$, $V_{CM} = 0V$	43						
Total Harmonic Distortion + Noise (THD+N)	$V_{OUT} = 2V_{P-P}$, $f = 1kHz$, $G = 1$, $R_L = 600\Omega$	0.018					%	TYP
	$V_{OUT} = 2V_{P-P}$, $f = 1kHz$, $G = 1$, $R_L = 2k\Omega$	0.009						

ELECTRICAL CHARACTERISTICS (continued)

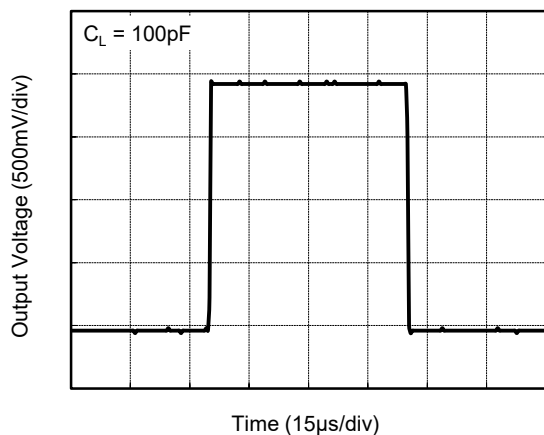
($V_S = \pm 18V$, $R_L = 2k\Omega$ connected to 0V, unless otherwise noted.)

PARAMETER		CONDITIONS	TYP	MIN/MAX OVER TEMPERATURE				
			+25°C	+25°C	-40°C to +85°C	-40°C to +125°C	UNITS	MIN/MAX
Input Offset Voltage (V _{OS})		V _{CM} = 0V	0.6	3.0	3.8	3.9	mV	MAX
Input Offset Voltage Drift (ΔV _{OS} /ΔT)			3				μV/°C	TYP
Input Bias Current (I _B)			20				pA	TYP
Input Offset Current (I _{OS})			20				pA	TYP
Open-Loop Voltage Gain (A _{OL})		V _{OUT} = -17.5V to 17.5V, R _L = 5kΩ	101	87	84	82	dB	MIN
Output Voltage Swing from Rail	V _{OH}	R _L = 10kΩ	81	208	231	251	mV	MAX
	V _{OL}	R _L = 10kΩ	73	119	146	172		MAX
Output Current (I _{OUT})			60				mA	TYP
Input Common Mode Voltage Range (V _{CM})			-18.1 to 16.5				V	TYP
Common Mode Rejection Ratio (CMRR)		V _{CM} = -18.1V to 16.5V	91	78	72	69	dB	MIN
Quiescent Current/Amplifier		I _{OUT} = 0A	157	299	332	352	μA	MAX
Gain-Bandwidth Product (GBP)		C _L = 100pF, V _{CM} = 0V	1.4				MHz	TYP
Gain Margin		C _L = 100pF, V _{CM} = 0V	-10				dB	TYP
Phase Margin		C _L = 100pF, V _{CM} = 0V	50				°	TYP
Channel-to-Channel Crosstalk		f = 1MHz	-80				dB	TYP
Slew Rate (SR)	Up	V _{OUT} = 2V _{P-P} step, C _L = 100pF, G = 1	7				V/μs	TYP
	Down	V _{OUT} = 2V _{P-P} step, C _L = 100pF, G = 1	4					TYP
Overload Recovery Time (ORT)	Up	V _{IN} × G = V _S	0.5				μs	TYP
	Down	V _{IN} × G = V _S	1.0					
Settling Time (t _s)		C _L = 100pF, G = 1, 200mV output step	2				μs	TYP
Input Voltage Noise Density (e _n)		f = 20kHz, V _{CM} = 0V	29				nV/√Hz	TYP
		f = 1kHz, V _{CM} = 0V	43					
Total Harmonic Distortion + Noise (THD+N)		V _{OUT} = 2V _{P-P} , f = 1kHz, G = 1, R _L = 600Ω	0.018				%	TYP
		V _{OUT} = 2V _{P-P} , f = 1kHz, G = 1, R _L = 2kΩ	0.009					

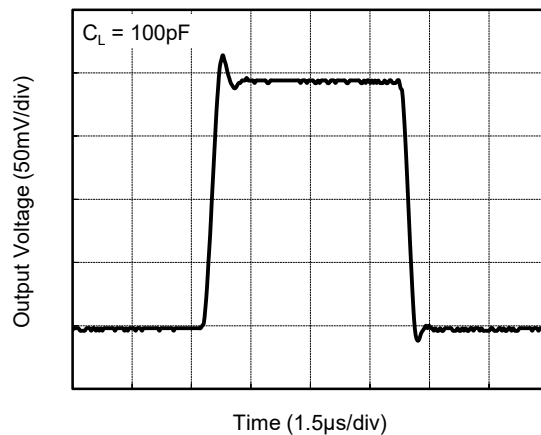
TYPICAL PERFORMANCE CHARACTERISTICS

At $V_S = \pm 15V$, $R_L = 2k\Omega$ connected to 0V, unless otherwise noted.

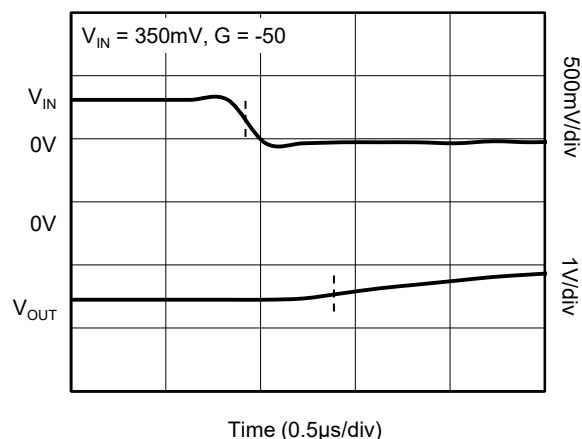
Large-Signal Step Response



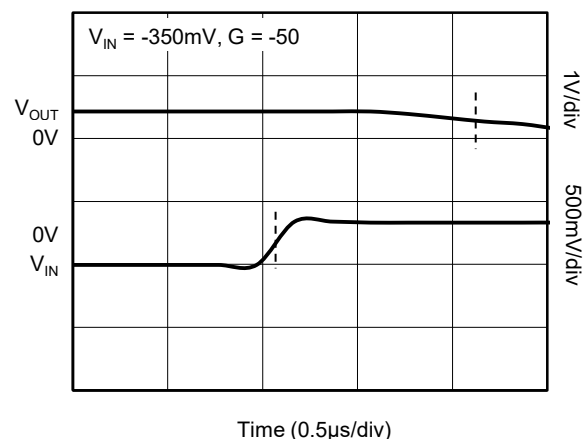
Small-Signal Step Response



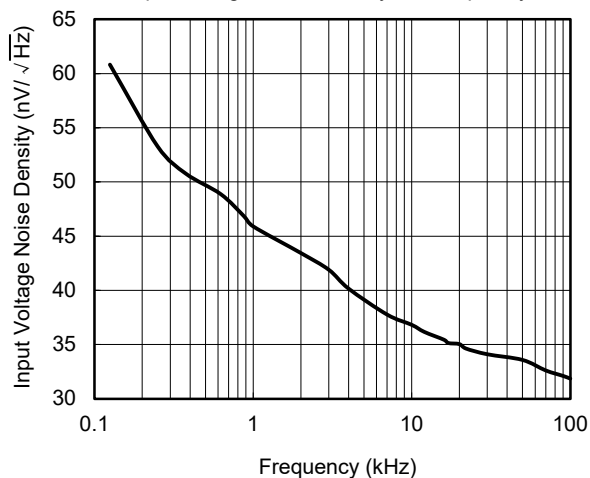
Negative Overload Recovery



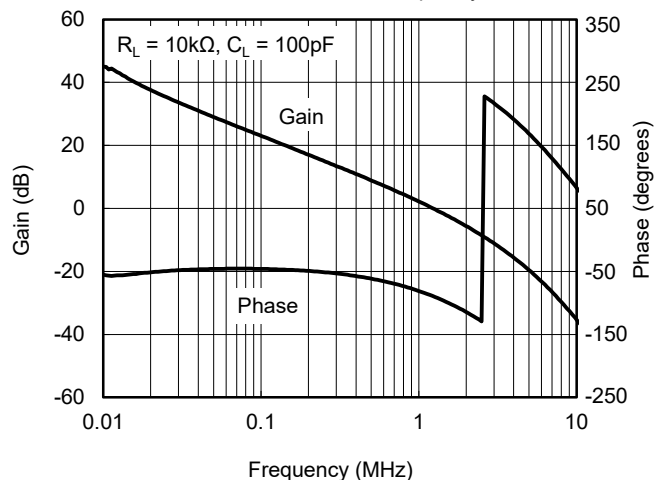
Positive Overload Recovery



Input Voltage Noise Density vs. Frequency



Gain and Phase vs. Frequency



TYPICAL APPLICATION CIRCUITS

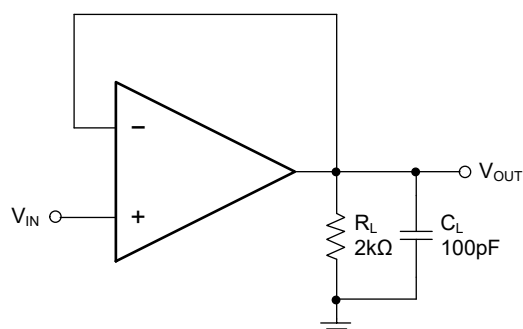


Figure 1

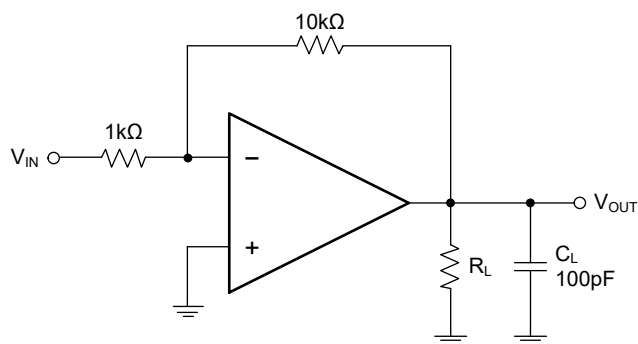


Figure 2

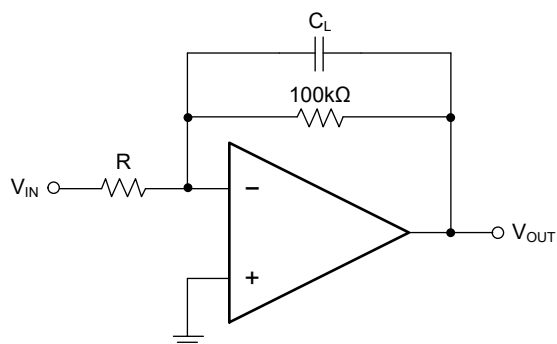


Figure 3

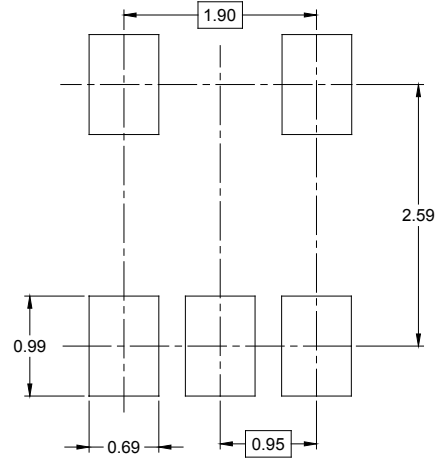
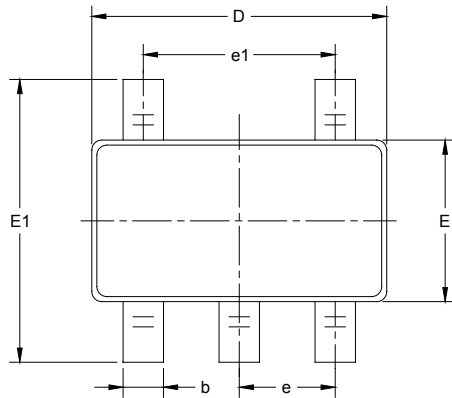
REVISION HISTORY

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

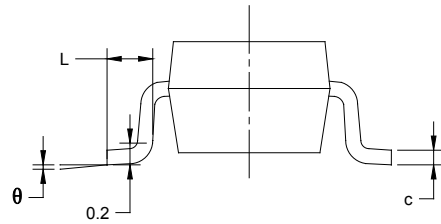
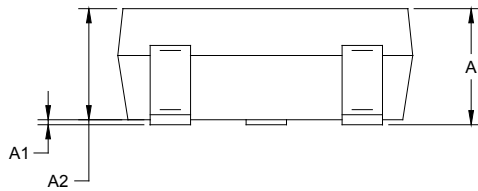
JANUARY 2017 – REV.A.1 to REV.A.2	Page
Added Differential Input Voltage	3
JANUARY 2016 – REV.A to REV.A.1	Page
Changed CMRR minimum at $V_S = 5V, \pm 5V$	5~6
Deleted Output Current (I_{OUT}) conditions	6~8
Updated SOIC-14 and TSSOP-14 packages	14~15
Deleted differential voltage	1
Changes from Original (AUGUST 2012) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



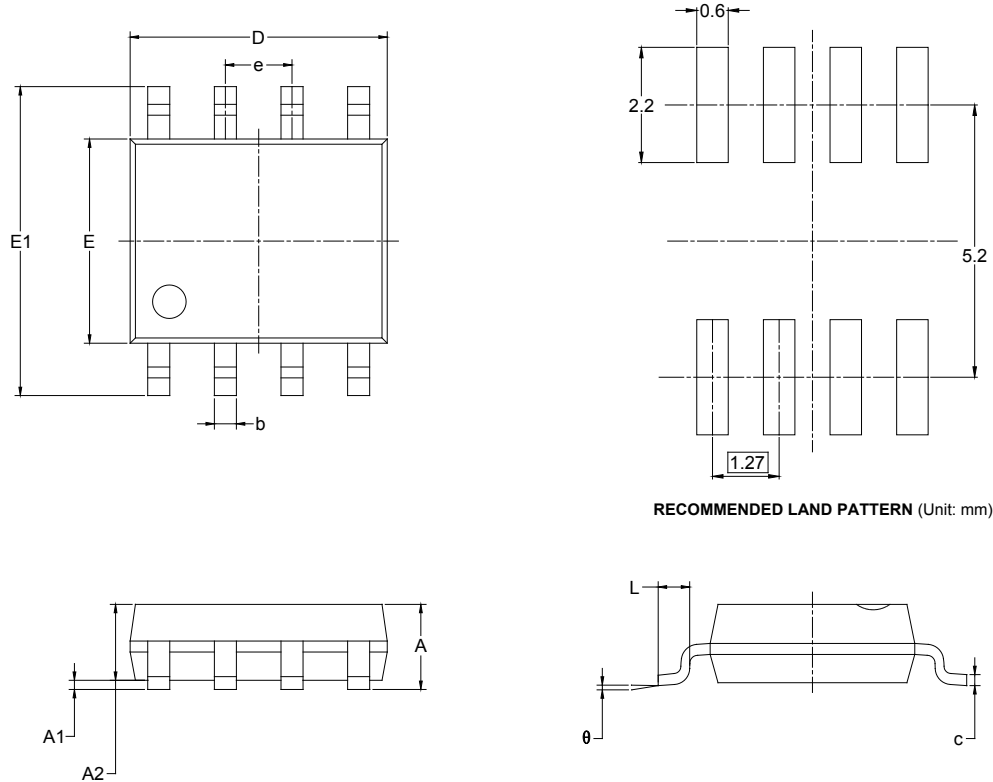
RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

PACKAGE OUTLINE DIMENSIONS

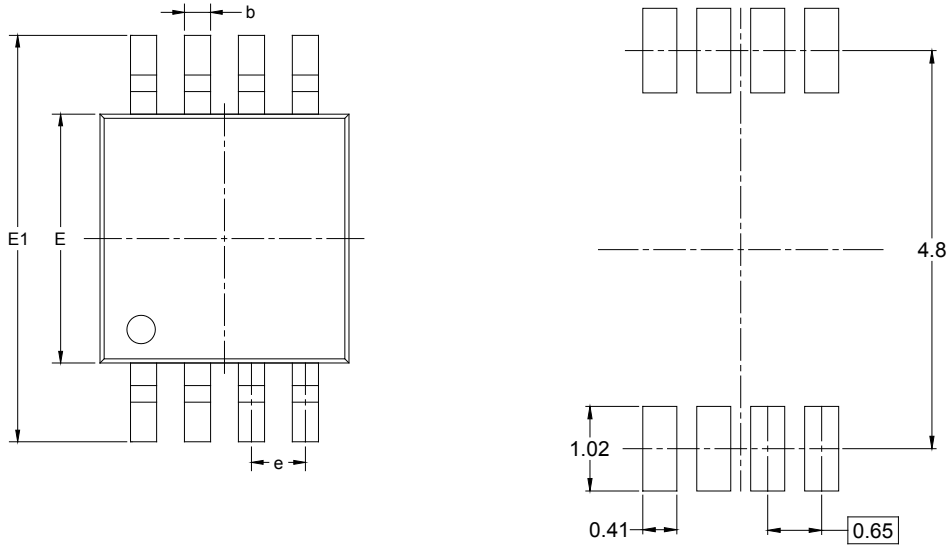
SOIC-8



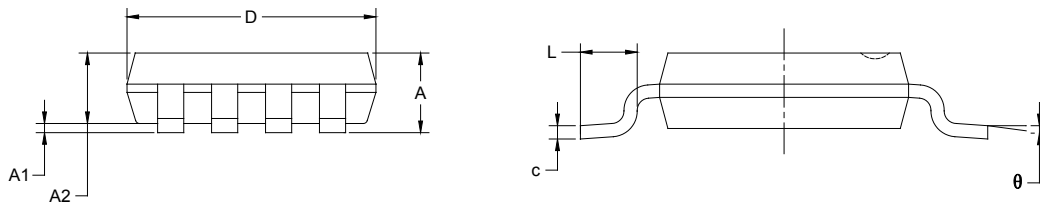
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050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

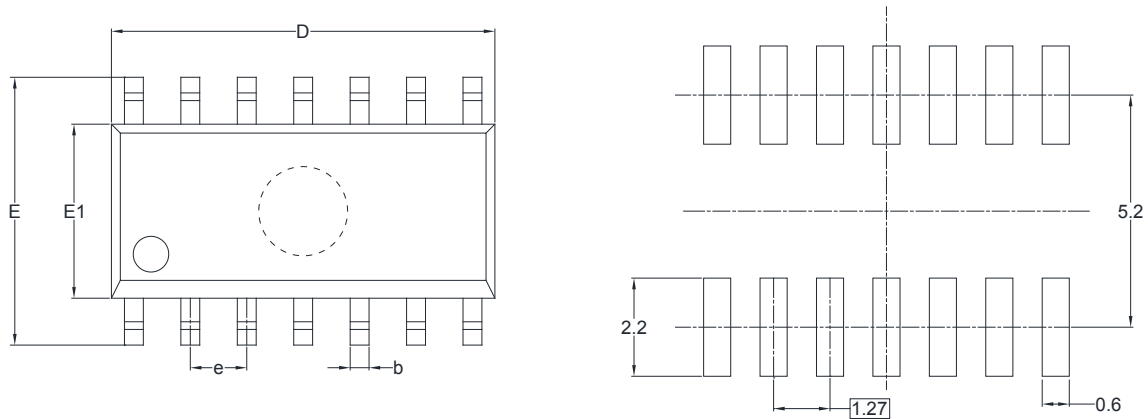


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

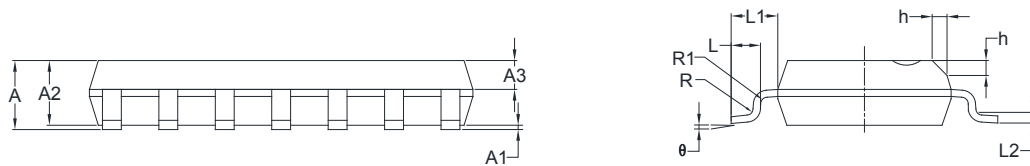
PACKAGE INFORMATION

PACKAGE OUTLINE DIMENSIONS

SOIC-14



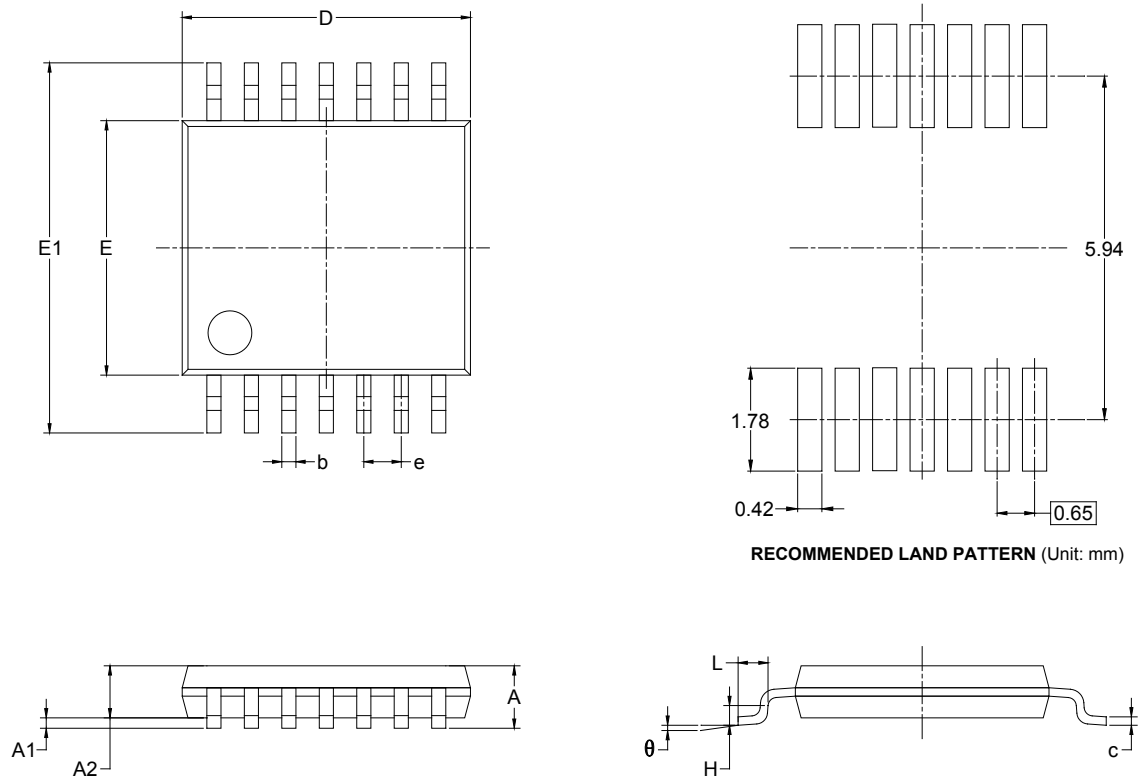
RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	1.65	0.049	0.065
A3	0.55	0.75	0.022	0.030
b	0.36	0.49	0.014	0.019
D	8.53	8.73	0.336	0.344
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.45	0.80	0.018	0.032
L1	1.04 REF		0.040 REF	
L2	0.25 BSC		0.01 BSC	
R	0.07		0.003	
R1	0.07		0.003	
h	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

PACKAGE OUTLINE DIMENSIONS

TSSOP-14

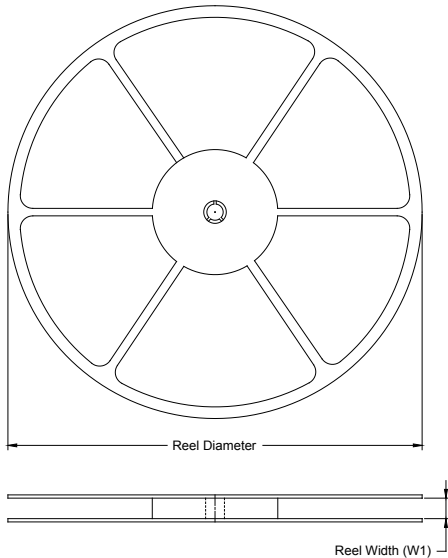


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 BSC		0.026 BSC	
L	0.500	0.700	0.02	0.028
H	0.25 TYP		0.01 TYP	
θ	1°	7°	1°	7°

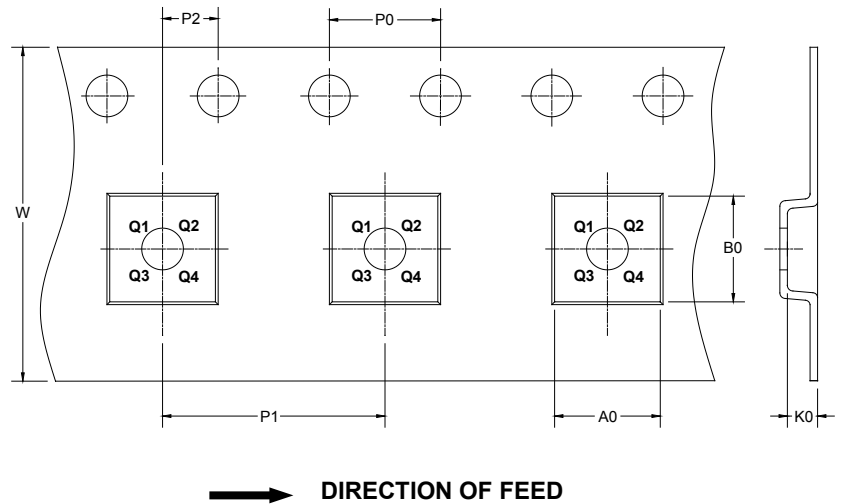
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

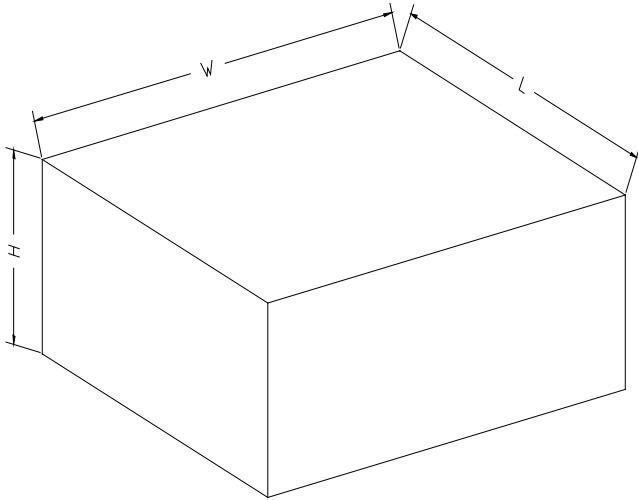
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT-23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
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
SOIC-14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
TSSOP-14	13"	12.4	6.95	5.60	1.20	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