



SGM8271/2/4 High Voltage Rail-to-Rail Output Operational Amplifiers

GENERAL DESCRIPTION

The SGM8271 (single), SGM8272 (dual) and SGM8274 (quad) are high voltage operational amplifiers that are designed to offer a wide input common mode voltage range and output voltage swing. These devices can operate from $\pm 2.25\text{V}$ to $\pm 18\text{V}$ dual power supplies or from $+4.5\text{V}$ to $+36\text{V}$ single supplies.

The devices feature high slew rate, low input bias and offset current, low offset voltage and low offset-voltage temperature coefficient.

The SGM8271/2/4 are specified over the extended -40°C to $+125^{\circ}\text{C}$ temperature range. The SGM8271 single is available in Green SOT-23-5, MSOP-8 and SOIC-8 packages. The SGM8272 dual is available in Green SOIC-8 and MSOP-8 packages. The SGM8274 quad is available in Green SOIC-14 and TSSOP-14 packages.

FEATURES

- **Low Power Consumption:** $150\mu\text{A}/\text{Amplifier}$
- **Wide Input Common Mode and Differential Voltage Ranges**
- **Low Input Bias and Offset Currents**
- **Output Short-Circuit Protection**
- **Rail-to-Rail Output**
- **High Input Impedance**
- **Low Offset Voltage:** 3mV (MAX)
- **High Slew Rate:** $7\text{V}/\mu\text{s}$
- **Small Packaging:**
 - SGM8271 Available in SOT-23-5, MSOP-8 and SOIC-8 Packages
 - SGM8272 Available in MSOP-8 and SOIC-8 Packages
 - SGM8274 Available in TSSOP-14 and SOIC-14 Packages

APPLICATIONS

High Impedance Sensors
Photodiode Amplifier
Precision Instrumentation
Phase-Locked Loop Filters
High End, Professional Audio
DAC Output Amplifier
ATE
Medical



PACKAGE/ORDERING INFORMATION

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

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

MARKING INFORMATION**SYX X X**

Date code - Month ("A" = Jan. "B" = Feb. ... "L" = Dec.)

Date code - Year ("A" = 2010, "B" = 2011 ...)

Chip I.D.

For example: SBDCA (2012, January)

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 $(+V_S) + 0.3V$
Storage Temperature Range	$-65^{\circ}C$ to $+150^{\circ}C$
Junction Temperature	$150^{\circ}C$
Operating Temperature Range	$-40^{\circ}C$ to $+125^{\circ}C$
Lead Temperature (Soldering 10sec)	$260^{\circ}C$
ESD Susceptibility	
HBM	4000V
MM (SGM8271/2)	150V
MM (SGM8274)	300V

NOTES:

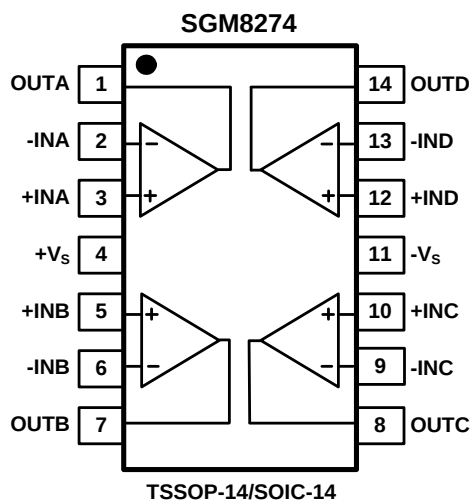
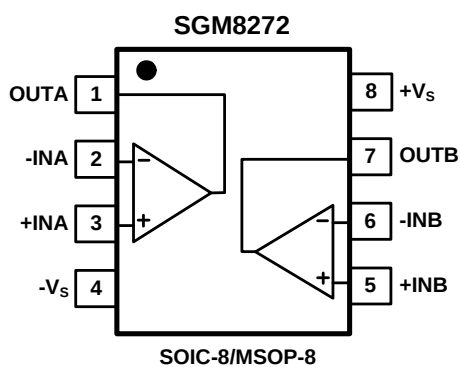
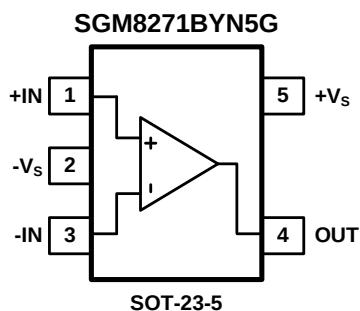
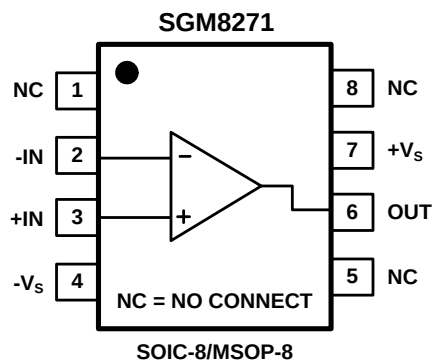
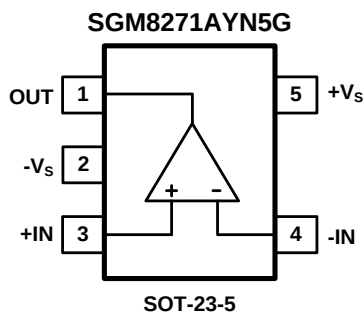
1. Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.
2. Proper power-supply sequencing is recommended for the CMOS device. Always sequence V_S on first, followed by the inputs and outputs.

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.

SGMICRO reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact SGMICRO sales office to get the latest datasheet.

PIN CONFIGURATIONS (TOP VIEW)



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

PARAMETER	CONDITIONS	SGM8271/2/4					
		TYP	MIN/MAX OVER TEMPERATURE				MIN/MAX
		+25°C	+25°C	-40°C to 85°C	-40°C to 125°C	UNITS	
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	mV	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 (per 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				°	TYP
Channel-to-Channel Crosstalk	$f = 1MHz$	-80				dB	TYP
Slew Rate (SR)	Up $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	5				V/ μs	TYP
	Down $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	5				V/ μs	TYP
Overload Recovery Time (ORT)	Up $V_{IN} \times Gain = V_S$	2.0				μs	TYP
	Down $V_{IN} \times Gain = V_S$	4.0					
Settling Time (t_s)	$C_L = 100pF$, $A_V = 1$, 200mV output step	2				μs	TYP
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)	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 600\Omega$	0.018				%	TYP
	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 2k\Omega$	0.009					

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

PARAMETER	CONDITIONS	SGM8271/2/4					
		TYP	MIN/MAX OVER TEMPERATURE				MIN/ MAX
		+25°C	+25°C	-40°C to 85°C	-40°C to 125°C	UNITS	
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	mV	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 (per 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 $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	6				V/ μs	TYP
	Down $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	4				V/ μs	TYP
Overload Recovery Time (ORT)	Up $V_{IN} \times Gain = V_S$	1.5				μs	TYP
	Down $V_{IN} \times Gain = V_S$	2.5					
Settling Time (t_s)	$C_L = 100pF$, $A_V = 1$, 200mV output step	2				μs	TYP
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)	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 600\Omega$	0.018				%	TYP
	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 2k\Omega$	0.009					

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

PARAMETER	CONDITIONS	SGM8271/2/4					
		TYP	MIN/MAX OVER TEMPERATURE				MIN/MAX
		+25°C	+25°C	-40°C to 85°C	-40°C to 125°C	UNITS	
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	mV	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 (per 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 $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	7				V/ μs	TYP
	Down $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	4				V/ μs	TYP
Overload Recovery Time (ORT)	Up $V_{IN} \times Gain = V_S$	0.5				μs	TYP
	Down $V_{IN} \times Gain = V_S$	1.0					
Settling Time (t_s)	$C_L = 100pF$, $A_V = 1$, 200mV output step	2				μs	TYP
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)	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 600\Omega$	0.018				%	TYP
	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 2k\Omega$	0.009					

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

PARAMETER	CONDITIONS	SGM8271/2/4					
		TYP	MIN/MAX OVER TEMPERATURE				MIN/ MAX
		+25°C	+25°C	-40°C to 85°C	-40°C to 125°C	UNITS	
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})	$V_{OUT} = -17.5V$ to $+17.5V$, $R_L = 5k\Omega$	101	87	84	82	dB	MIN
Output Voltage Swing from Rail	V_{OH} $R_L = 10k\Omega$	81	208	231	251	mV	MAX
	V_{OL} $R_L = 10k\Omega$	73	119	146	172	mV	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 (per 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 $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	7				V/ μs	TYP
	Down $V_{OUT} = 2V_{PP}$ step, $C_L = 100pF$, $A_V = 1$	4				V/ μs	TYP
Overload Recovery Time (ORT)	Up $V_{IN} \times \text{Gain} = V_S$	0.5				μs	TYP
	Down $V_{IN} \times \text{Gain} = V_S$	1.0					
Settling Time (t_s)	$C_L = 100pF$, $A_V = 1$, 200mV output step	2				μs	TYP
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)	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 600\Omega$	0.018				%	TYP
	$V_{OUT} = 2V_{PP}$, $f = 1kHz$, $A_V = 1$, $R_L = 2k\Omega$	0.009					

TYPICAL APPLICATION CIRCUITS

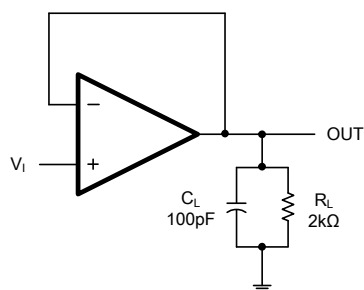


Figure 1

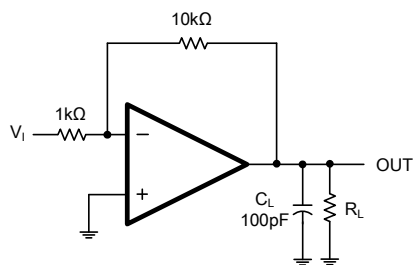


Figure 2

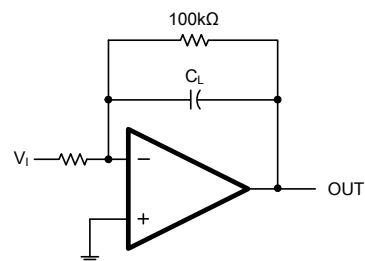
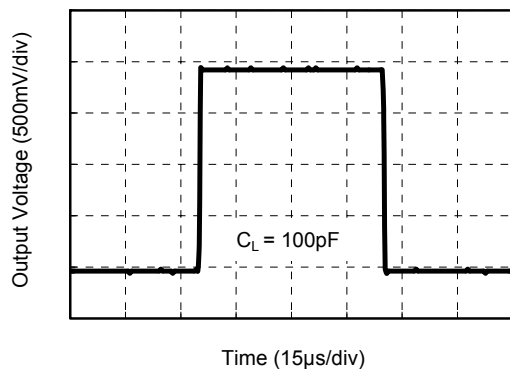


Figure 3

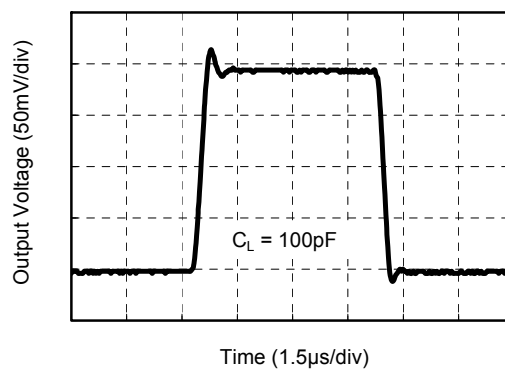
TYPICAL PERFORMANCE CHARACTERISTICS

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

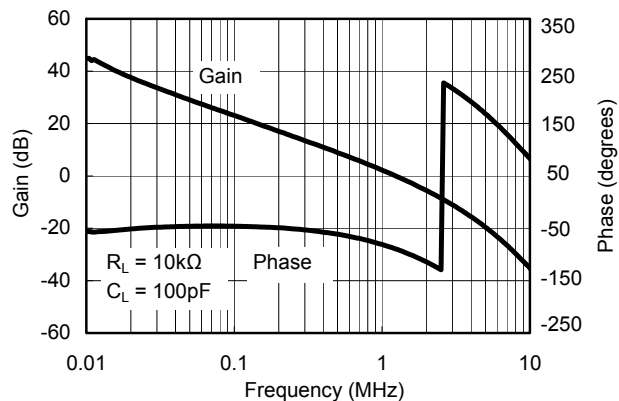
Large Signal Step Response



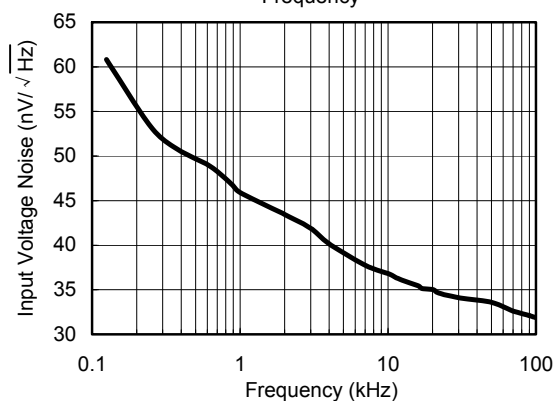
Small Signal Step Response



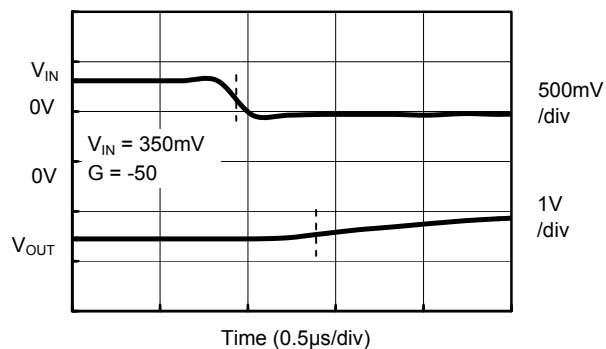
Gain and Phase vs. Frequency



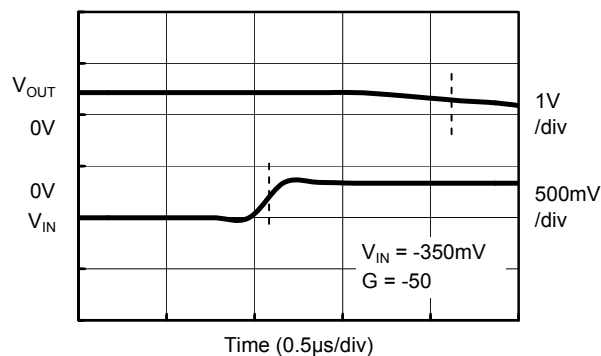
Input Voltage Noise Spectral Density vs. Frequency



Negative Overload Recovery Time

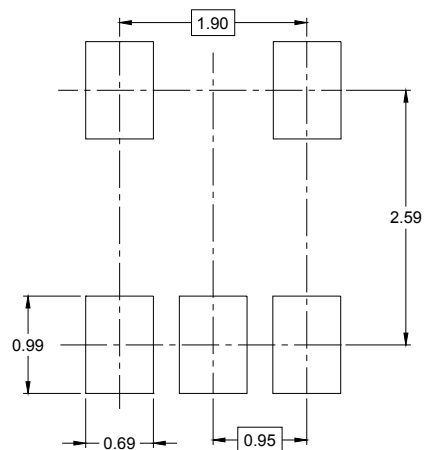
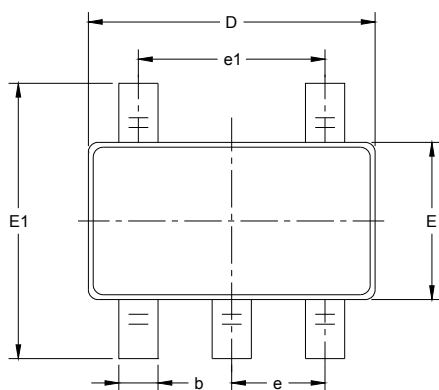


Positive Overload Recovery Time

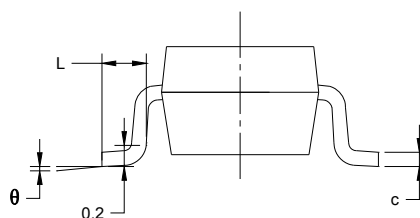
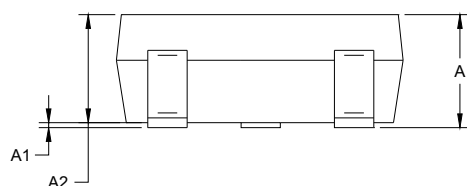


PACKAGE OUTLINE DIMENSIONS

SOT-23-5



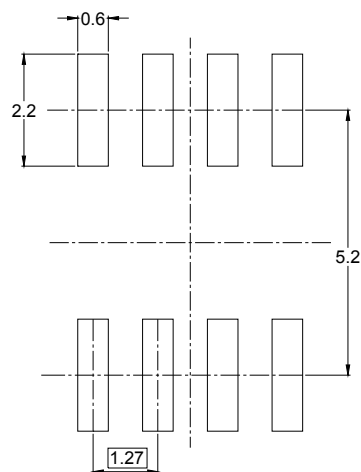
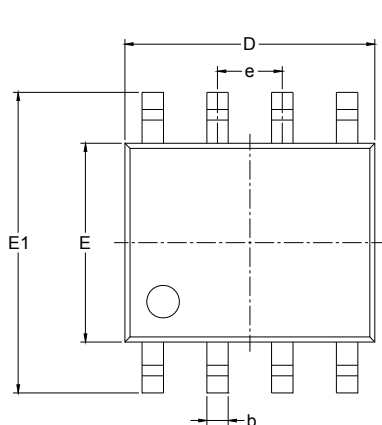
RECOMMENDED LAND PATTERN (Unit: mm)



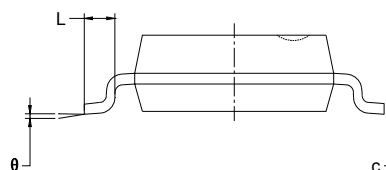
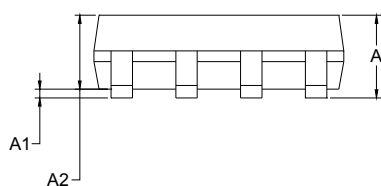
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037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



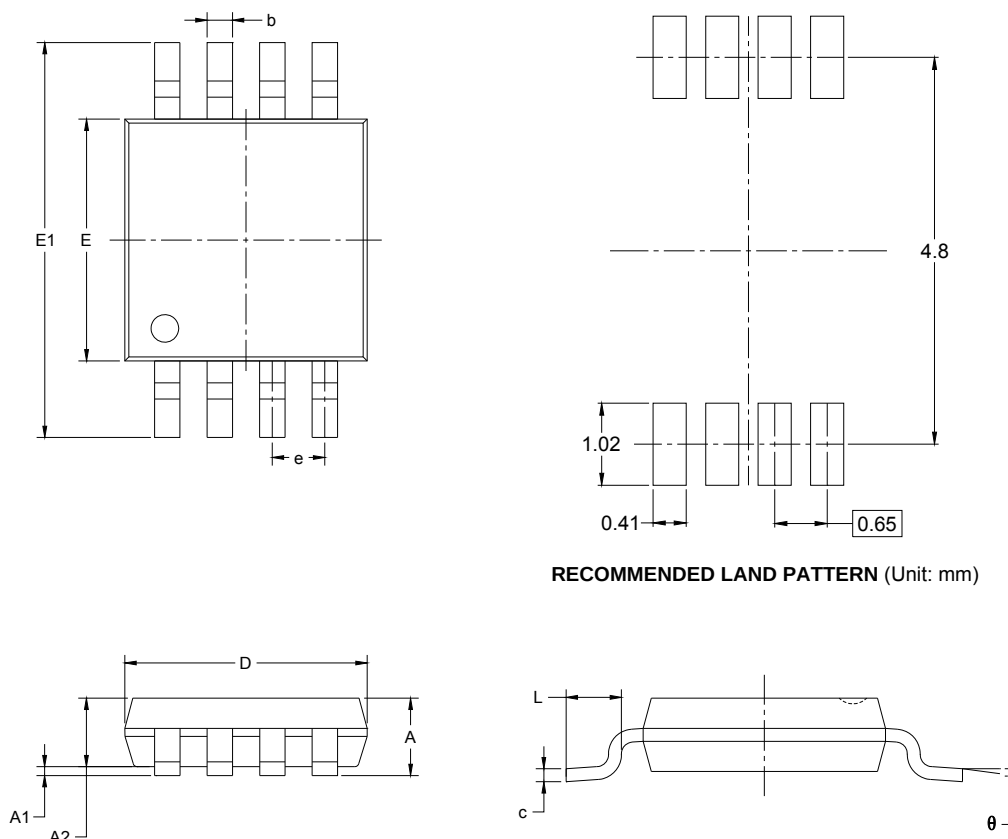
RECOMMENDED LAND PATTERN (Unit: mm)



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

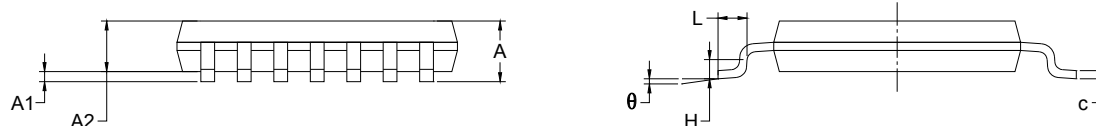
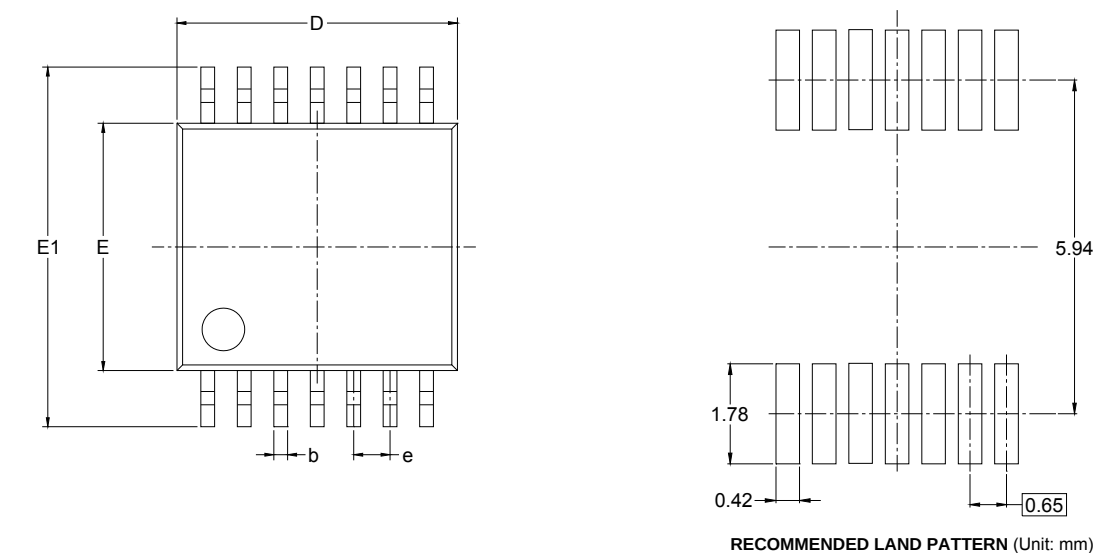
MSOP-8



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

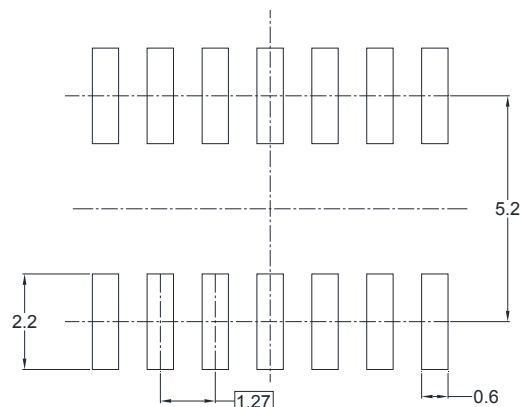
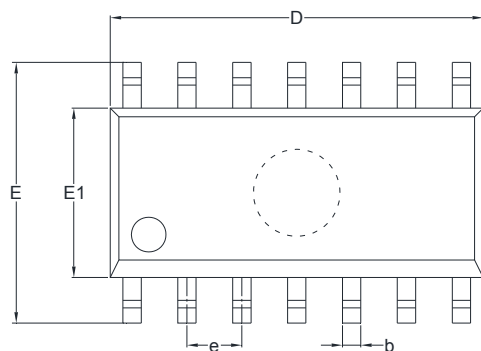
TSSOP-14



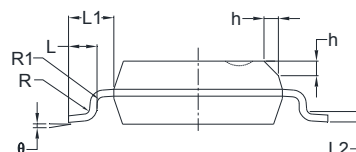
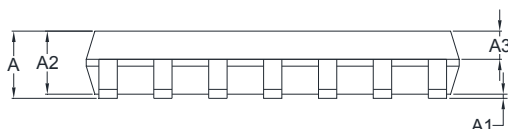
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 BSC		0.026 BSC	
L	0.500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

PACKAGE OUTLINE DIMENSIONS

SOIC-14



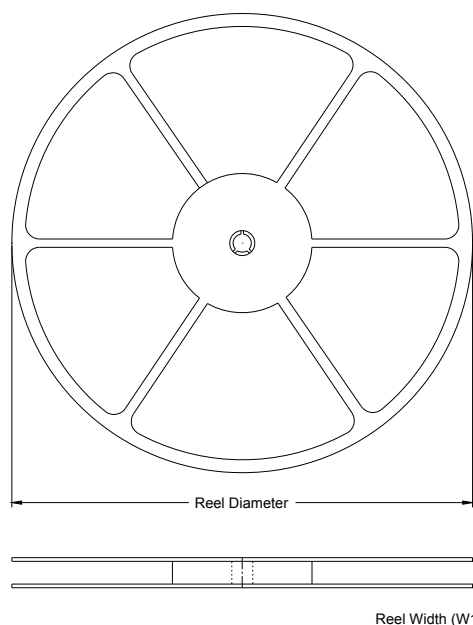
RECOMMENDED LAND PATTERN (Unit: mm)



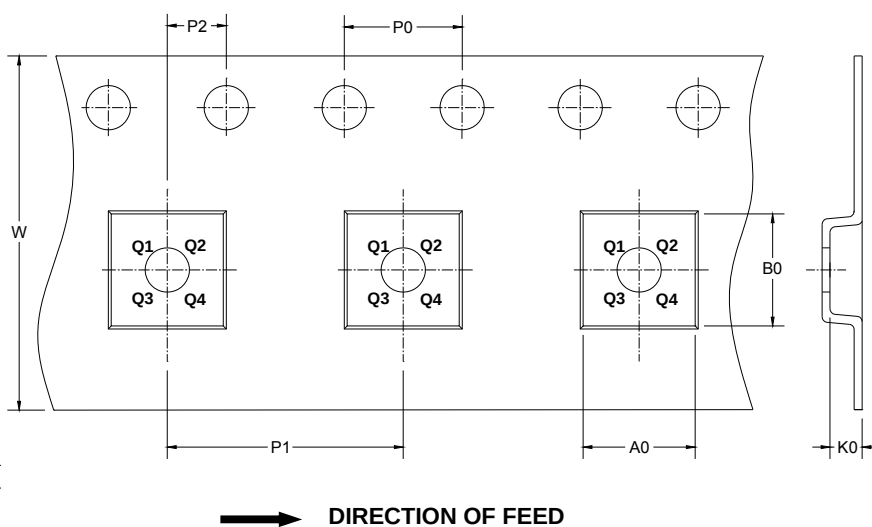
Symbol	Dimensions In Millimeters			Dimensions In Inches		
	MIN	MOD	MAX	MIN	MOD	MAX
A	1.35		1.75	0.053		0.069
A1	0.10		0.25	0.004		0.010
A2	1.25		1.65	0.049		0.065
A3	0.55		0.75	0.022		0.030
b	0.36		0.49	0.014		0.019
D	8.53		8.73	0.336		0.344
E	5.80		6.20	0.228		0.244
E1	3.80		4.00	0.150		0.157
e	1.27 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°

TAPE AND REEL INFORMATION

REEL DIMENSIONS



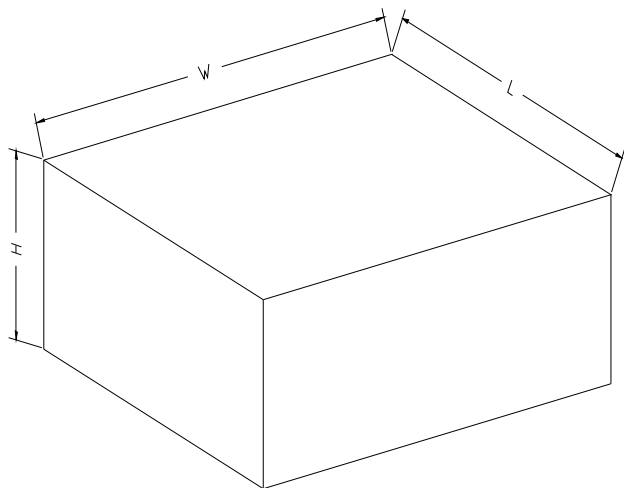
TAPE DIMENSIONS



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	3.17	3.23	1.37	4.0	4.0	2.0	8.0	Q3
SOIC-8	13"	12.4	6.4	5.4	2.1	4.0	8.0	2.0	12.0	Q1
MSOP-8	13"	12.4	5.2	3.3	1.5	4.0	8.0	2.0	12.0	Q1
SOIC-14	13"	16.4	6.6	9.3	2.1	4.0	8.0	2.0	16.0	Q1
TSSOP-14	13"	12.4	6.95	5.6	1.2	4.0	8.0	2.0	12.0	Q1

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