



SGM8276B-2

Low Noise, High Precision, High Voltage, Rail-to-Rail I/O Operational Amplifier

GENERAL DESCRIPTION

The SGM8276B-2 is a dual, low noise, precision, high voltage operational amplifier, which can operate from 3.3V to 36V single supply or from $\pm 1.65\text{V}$ to $\pm 18\text{V}$ dual power supplies. It provides rail-to-rail input with a wide input common mode voltage range and rail-to-rail output voltage swing.

The SGM8276B-2 provides high slew rate, low noise, low offset, drift and bias current.

The SGM8276B-2 is available in a Green SOIC-8 package. It is specified over the extended -40°C to $+125^{\circ}\text{C}$ temperature range.

FEATURES

- Rail-to-Rail Input and Output
- Wide Input Common Mode Voltage Range
- Low Offset Voltage: 0.3mV (TYP), 1.5mV (MAX)
- Low Input Bias Current
- Low Input Offset Current
- Output Short-Circuit Protection
- High Input Impedance
- Low Noise: $10\text{nV}/\sqrt{\text{Hz}}$ at 1kHz
- Gain-Bandwidth Product: 10MHz
- High Slew Rate: $8\text{V}/\mu\text{s}$
- -40°C to $+125^{\circ}\text{C}$ Operating Temperature Range
- Available in a Green SOIC-8 Package

APPLICATIONS

High Impedance Sensors
Photodiode Amplifiers
High End, Professional Audio
DAC Output Amplifiers
Medicals

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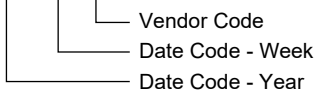
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8276B-2	SOIC-8	-40°C to +125°C	SGM8276B-2XS8G/TR	SGM 8276B2XS8 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

Supply Voltage, +V _S to -V _S	40V
Input/Output Voltage Range.....	(-V _S) - 0.3V to (+V _S) + 0.3V
Differential Input Voltage.....	(+V _S) - (-V _S)
Junction Temperature	+150°C
Storage Temperature Range.....	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility	
HBM.....	6000V
MM.....	300V
CDM	1000V

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.

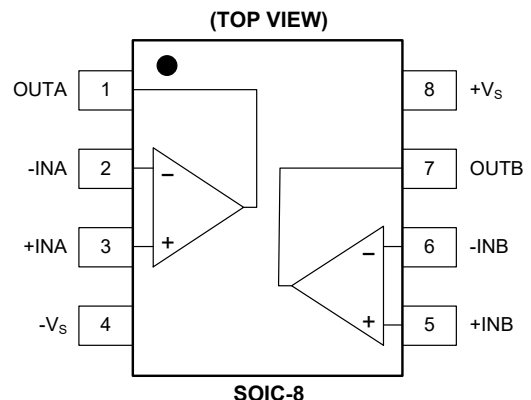
ESD SENSITIVITY CAUTION

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 CONFIGURATION



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ELECTRICAL CHARACTERISTICS

($V_S = \pm 1.65V$ to $\pm 18V$ and $R_L = 2k\Omega$ connected to $0V$, Full = $-40^\circ C$ to $+125^\circ C$, typical values are at $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Input Characteristics							
Input Offset Voltage	V_{OS}	$V_S = \pm 2.5V$ to $\pm 18V$, $V_{CM} = 0V$	+25°C		0.3	1.5	mV
			Full			1.8	
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$		Full		1		$\mu V/^\circ C$
Input Bias Current	I_B	$V_{CM} = 0V$	+25°C		± 50	± 300	pA
Input Offset Current	I_{OS}	$V_{CM} = 0V$	+25°C		± 10	± 300	pA
Input Common Mode Voltage Range	V_{CM}		Full	$(-V_S) - 0.1$		$(+V_S) + 0.1$	V
Common Mode Rejection Ratio	CMRR	$V_S = \pm 18V$, $(-V_S) - 0.1V < V_{CM} < (+V_S) - 2V$	+25°C	95	110		dB
			Full	92			
		$V_S = \pm 18V$, $(-V_S) - 0.1V < V_{CM} < (+V_S) + 0.1V$	+25°C	70	80		
			Full	64			
Open-Loop Voltage Gain	A_{OL}	$(-V_S) + 0.2V < V_{OUT} < (+V_S) - 0.2V$, $R_L = 10k\Omega$	+25°C	98	120		dB
			Full	95			
		$(-V_S) + 0.5V < V_{OUT} < (+V_S) - 0.5V$, $R_L = 2k\Omega$	+25°C	96	120		
			Full	75			
Input Impedance							
Differential	Z_{DIFF}	$V_S = \pm 18V$	+25°C		$10^{11} \parallel 6$		$\Omega \parallel pF$
Common Mode	Z_{CM}	$V_S = \pm 18V$	+25°C		$10^{12} \parallel 6$		$\Omega \parallel pF$
Output Characteristics							
Output Voltage Swing from Rail	V_{OUT}	$V_S = \pm 18V$, $R_L = 10k\Omega$	+25°C		60	90	mV
			Full			115	
		$V_S = \pm 18V$, $R_L = 2k\Omega$	+25°C		300	420	
			Full			560	
Output Short-Circuit Current	I_{SC}	$V_S = \pm 18V$	+25°C	± 40	± 55		mA
Power Supply							
Operating Voltage Range	V_S		Full	3.3		36	V
Quiescent Current	I_Q	$I_{OUT} = 0$	+25°C		2.7	3.6	mA
			Full			4.1	
Power Supply Rejection Ratio	PSRR	$V_S = 5V$ to $36V$	+25°C	100	120		dB
			Full	97			

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ELECTRICAL CHARACTERISTICS (continued)

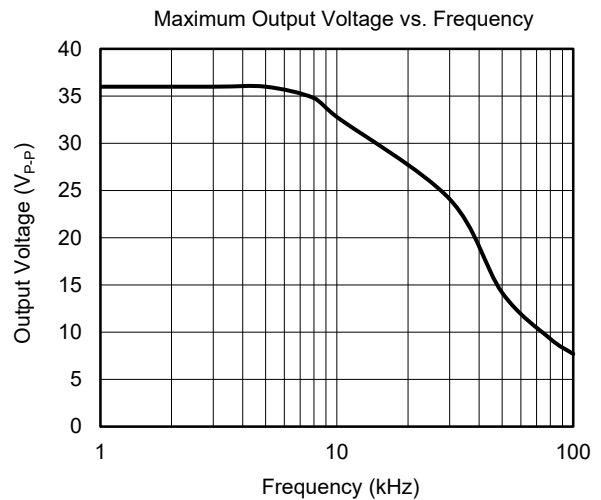
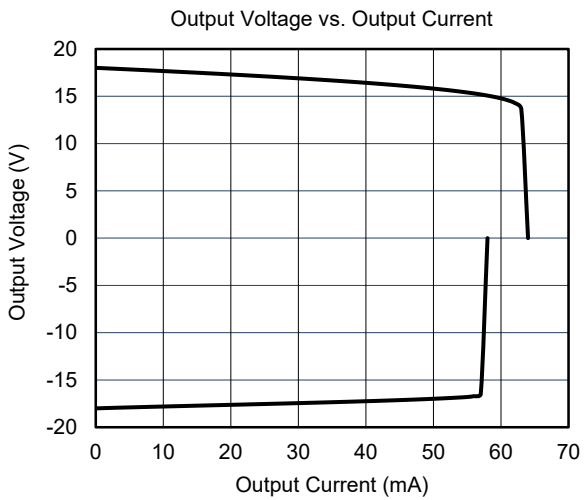
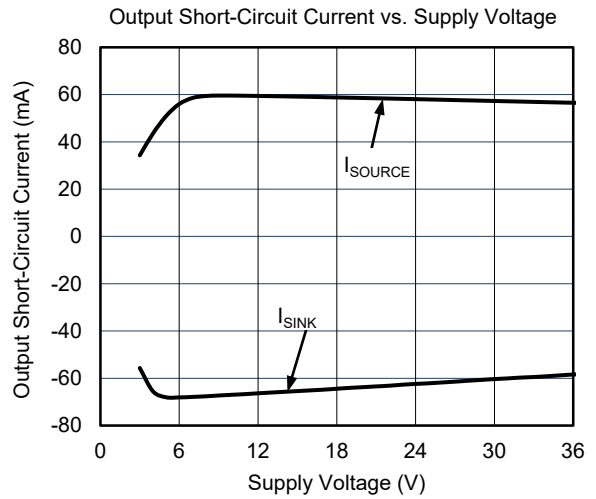
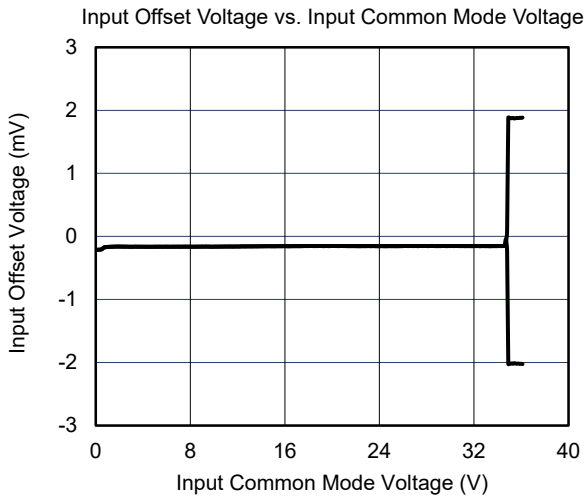
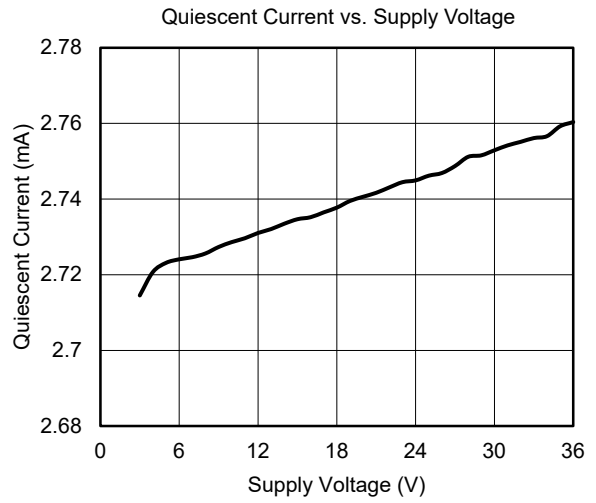
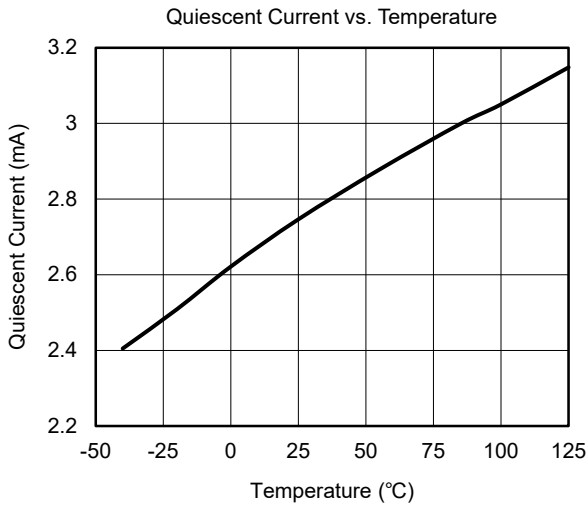
($V_S = \pm 1.65V$ to $\pm 18V$ and $R_L = 2k\Omega$ connected to $0V$, Full = $-40^\circ C$ to $+125^\circ C$, typical values are at $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Dynamic Performance							
Gain-Bandwidth Product	GBP	$C_L = 50pF$	$+25^\circ C$		10		MHz
Phase Margin	ϕ_o	$V_S = \pm 18V, C_L = 50pF$	$+25^\circ C$		45		$^\circ$
Slew Rate	SR	$V_S = \pm 2.5V$ to $\pm 18V, G = +1$	$+25^\circ C$		8		$V/\mu s$
Overload Recovery Time	ORT	$V_{IN} \times G > V_S$	$+25^\circ C$		1		μs
Total Harmonic Distortion + Noise	THD+N	$V_{OUT} = 2V_{P-P}, f = 1kHz, G = +1, R_L = 600\Omega$	$+25^\circ C$		0.005		%
		$V_{OUT} = 2V_{P-P}, f = 1kHz, G = +1, R_L = 2k\Omega$	$+25^\circ C$		0.0005		
Noise							
Input Voltage Noise		$f = 0.1Hz$ to $10Hz$	$+25^\circ C$		3		μV_{P-P}
Input Voltage Noise Density	e_n	$f = 10Hz$	$+25^\circ C$		80		nV/\sqrt{Hz}
		$f = 1kHz$	$+25^\circ C$		10		
Input Current Noise Density	i_n	$f = 1kHz$	$+25^\circ C$		500		fA/\sqrt{Hz}

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TYPICAL PERFORMANCE CHARACTERISTICS

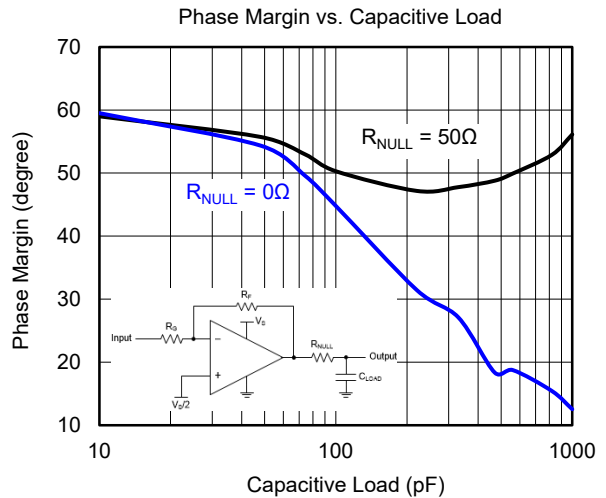
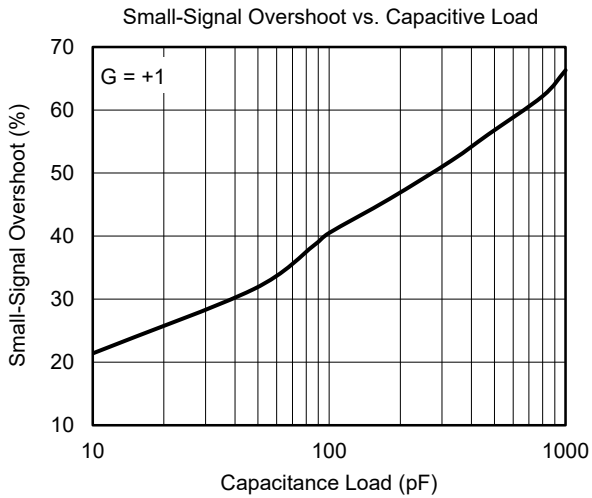
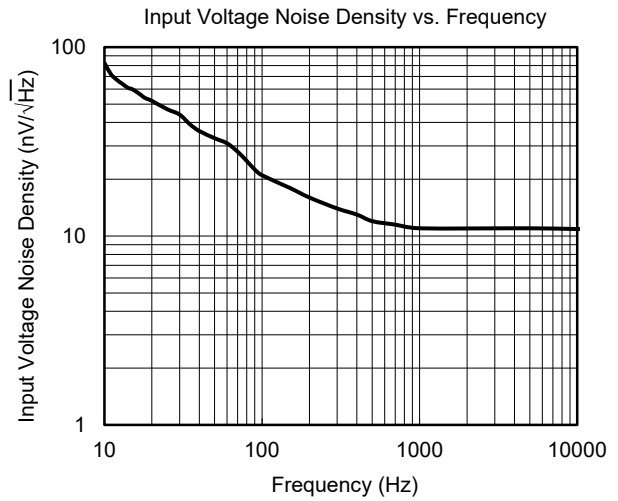
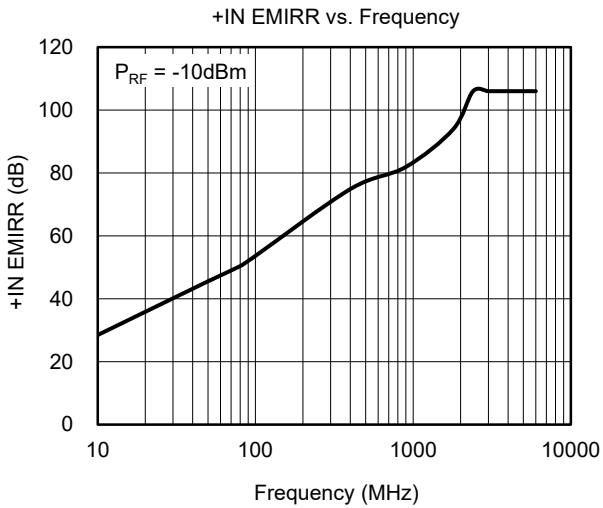
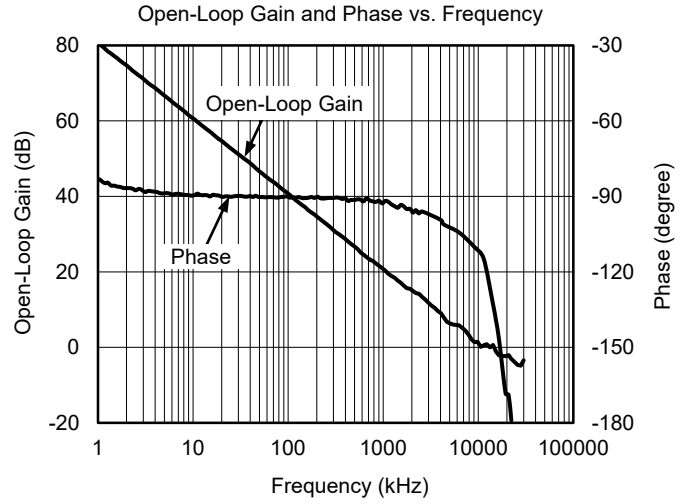
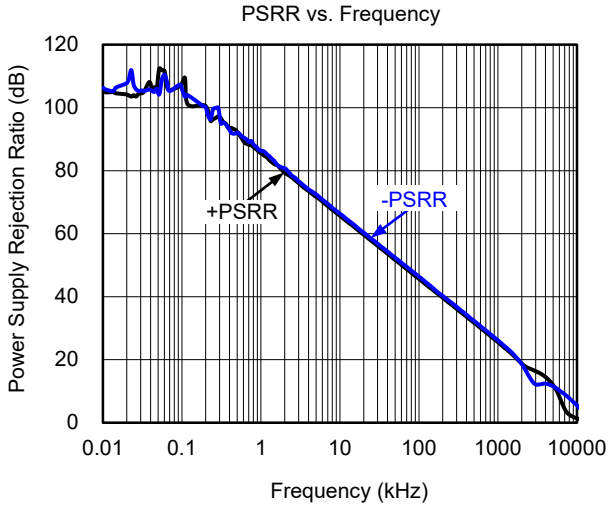
At $T_A = +25^\circ\text{C}$, $V_S = 36\text{V}$ and $R_L = 2\text{k}\Omega$, unless otherwise noted.



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TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_A = +25^\circ\text{C}$, $V_S = 36\text{V}$ and $R_L = 2\text{k}\Omega$, unless otherwise noted.

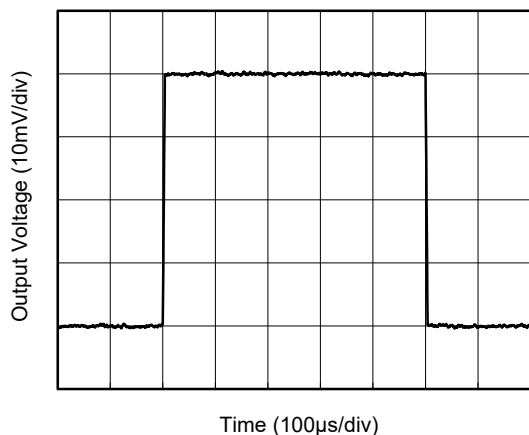


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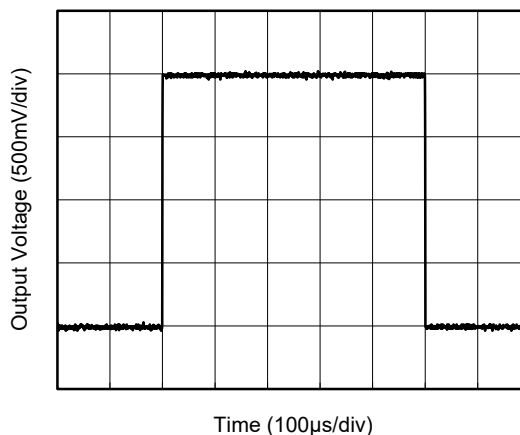
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_A = +25^\circ\text{C}$, $V_S = 36\text{V}$ and $R_L = 2\text{k}\Omega$, unless otherwise noted.

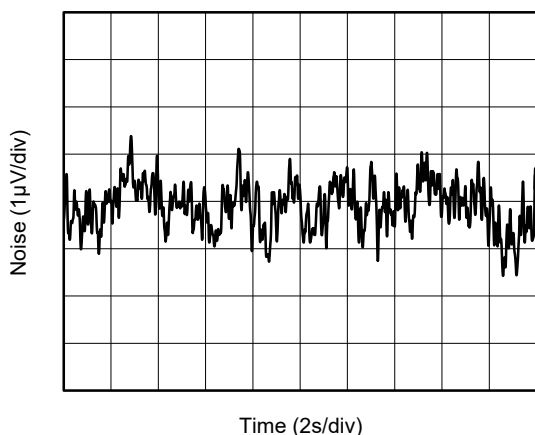
Small-Signal Step Response



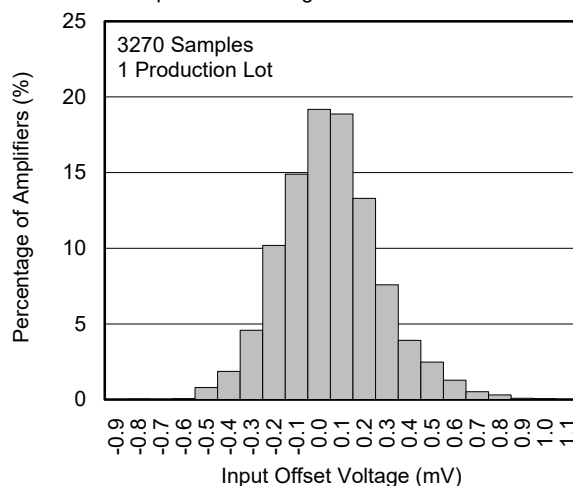
Large-Signal Step Response



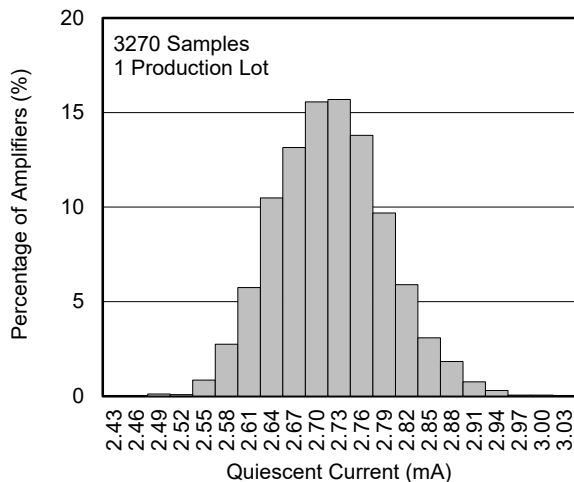
0.1Hz to 10Hz Input Voltage Noise



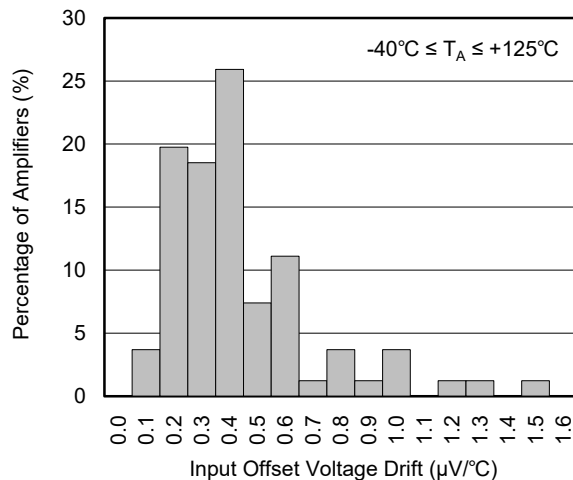
Input Offset Voltage Production Distribution



Quiescent Current Production Distribution



Input Offset Voltage Drift Distribution



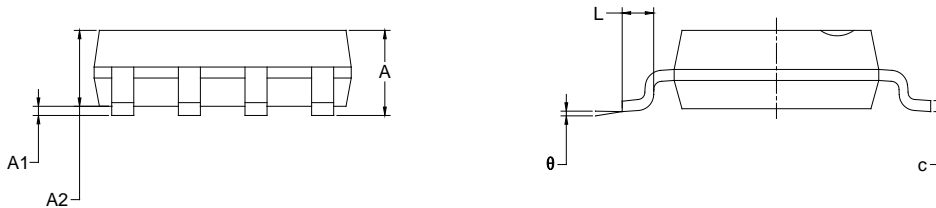
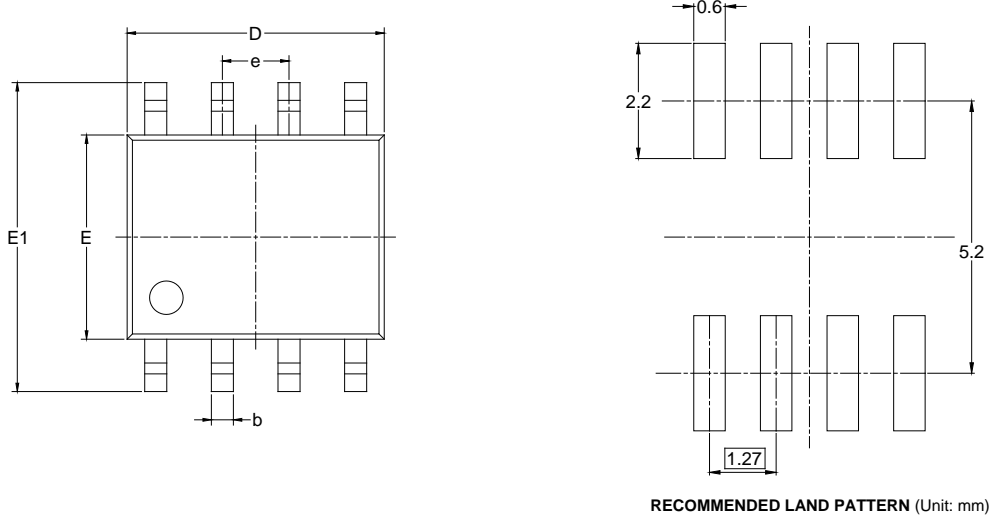
REVISION HISTORY

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

Changes from Original (JULY 2021) 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°

NOTES:
 1. Body dimensions do not include mode flash or protrusion.
 2. This drawing is subject to change without notice.

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

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