



SGMOP17C

2.8MHz, High Voltage, High Precision, Low Noise Rail-to-Rail Output Operational Amplifier

GENERAL DESCRIPTION

The SGMOP17C is a single, high voltage, low noise and high precision operational amplifier which can operate from 4.5V to 36V single supply, consuming only 450 μ A quiescent current. The device provides rail-to-rail output operation.

The SGMOP17C offers a low offset voltage less than 120 μ V and a low bias current. The combination of characteristics makes the SGMOP17C a good choice for temperature measurements, pressure and position sensors, strain gauge amplifiers and medical instrumentation, or any other 4.5V to 36V applications requiring precision and long-term stability.

The SGMOP17C is available in a Green SOT-23-5 package. It is rated over the -40 $^{\circ}$ C to +125 $^{\circ}$ C temperature range.

FEATURES

- **Low Offset Voltage: 120 μ V (MAX)**
- **Open-Loop Voltage Gain: 150dB (TYP)**
- **PSRR: 150dB (TYP)**
- **CMRR: 135dB (TYP)**
- **0.1Hz to 10Hz Noise: 0.4 μ V_{P,P}**
- **Input Voltage Noise Density: 20nV/ $\sqrt{\text{Hz}}$ at 1kHz**
- **Gain-Bandwidth Product: 2.8MHz**
- **Overload Recovery Time: 3 μ s**
- **Rail-to-Rail Output Swing**
- **Supply Voltage Range: 4.5V to 36V**
- **Low Supply Current: 450 μ A (TYP)**
- **-40 $^{\circ}$ C to +125 $^{\circ}$ C Operating Temperature Range**
- **Available in a Green SOT-23-5 Package**

APPLICATIONS

Pressure Sensors
Temperature Measurements
Precision Current Sensing
Electronic Scales
Strain Gauge Amplifiers
Handheld Test Equipment
Thermocouple Amplifiers
Medical Instrumentation

2.8MHz, High Voltage, High Precision, Low Noise SGMOP17C Rail-to-Rail Output Operational Amplifier

ELECTRICAL CHARACTERISTICS

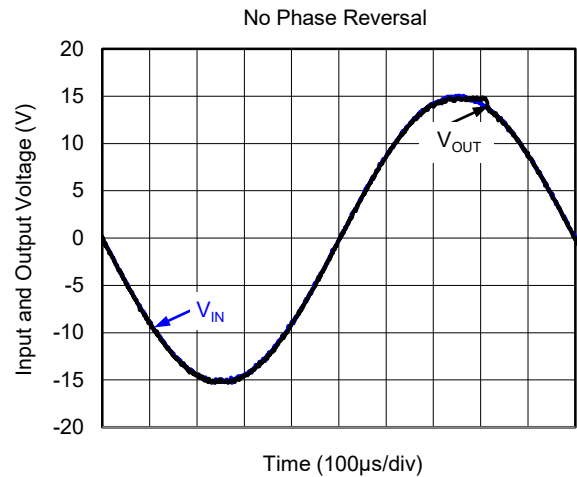
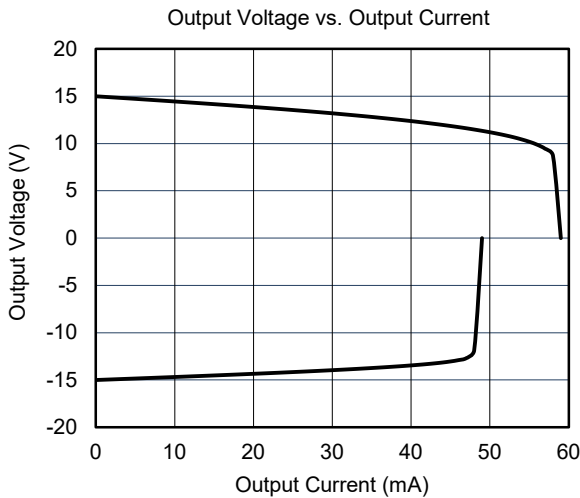
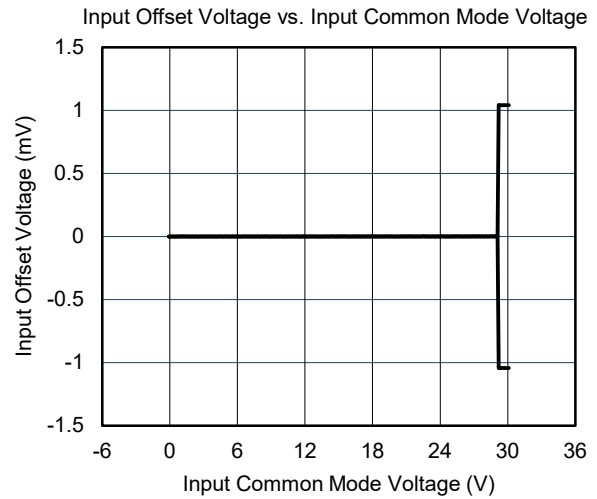
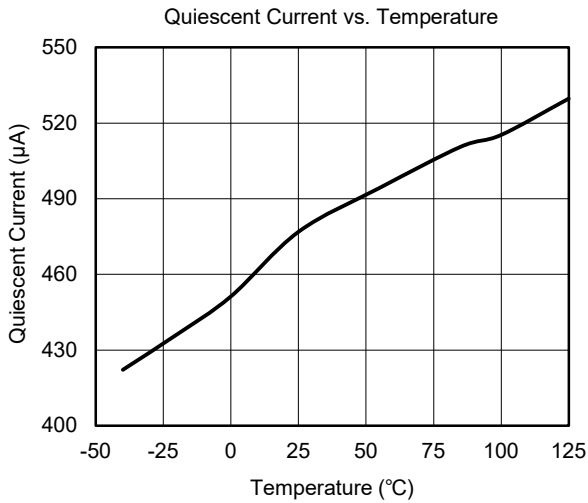
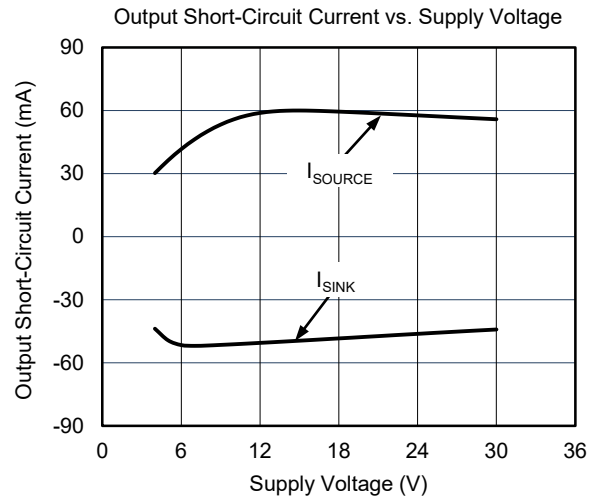
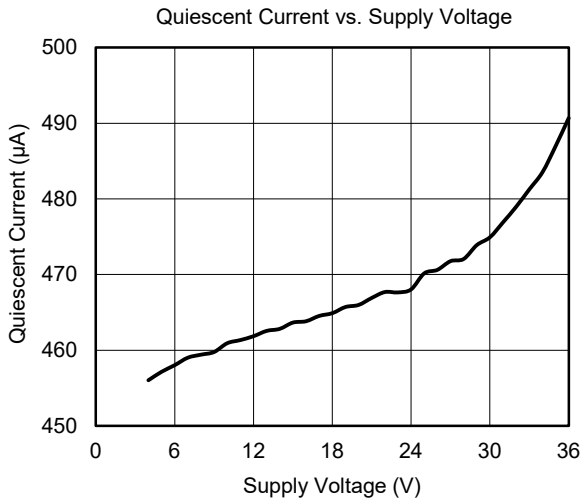
(At $T_A = +25^\circ\text{C}$, $V_S = \pm 2.5\text{V}$ to $V_S = \pm 18\text{V}$, $V_{CM} = 0\text{V}$ and $R_L = 10\text{k}\Omega$ connected to 0V , Full = -40°C to $+125^\circ\text{C}$, unless otherwise noted.)

PARAMETER	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Input Characteristics						
Input Offset Voltage (V_{OS})		+25°C		25	120	μV
Input Offset Voltage Drift ($\Delta V_{OS}/\Delta T$)		Full		20		$\text{nV}/^\circ\text{C}$
Input Bias Current (I_B)		+25°C		± 100	± 400	pA
Input Offset Current (I_{OS})		+25°C		± 200	± 600	pA
Input Common Mode Voltage Range (V_{CM})		Full	$(-V_S) - 0.05$		$(+V_S) - 1.5$	V
Common Mode Rejection Ratio ⁽¹⁾ (CMRR)	$V_{CM} = (-V_S) - 0.05\text{V}$ to $(+V_S) - 1.5\text{V}$	+25°C	115	135		dB
		Full	112			
Open-Loop Voltage Gain (A_{OL})	$V_S = \pm 2.5\text{V}$, $V_{OUT} = \pm 2.0\text{V}$	+25°C	118	140		dB
		Full	115			
	$V_S = \pm 18\text{V}$, $V_{OUT} = \pm 17.5\text{V}$	+25°C	128	150		
		Full	125			
Output Characteristics						
Output Voltage Swing from Rail	$V_S = \pm 2.5\text{V}$	+25°C		12	25	mV
		Full			30	
	$V_S = \pm 18\text{V}$	+25°C		95	140	
		Full			200	
Output Short-Circuit Current (I_{SC})	$V_S = \pm 2.5\text{V}$	+25°C	± 20	± 32		mA
		Full	± 11			
	$V_S = \pm 18\text{V}$	+25°C	± 38	± 50		
		Full	± 18			
Power Supply						
Operating Voltage Range (V_S)		Full	4.5		36	V
Quiescent Current (I_Q)	$I_{OUT} = 0$	+25°C		450	660	μA
		Full			750	
Power Supply Rejection Ratio ⁽¹⁾ (PSRR)	$V_S = 4.5\text{V}$ to 36V	+25°C	128	150		dB
		Full	125			
Dynamic Performance						
Gain-Bandwidth Product (GBP)	$V_{OUT} = 100\text{mV}_{P-P}$, $C_L = 10\text{pF}$	+25°C		2.8		MHz
Slew Rate (SR)		+25°C		1.3		$\text{V}/\mu\text{s}$
Settling Time to 0.1% (t_s)	$V_{IN} = 1\text{V}$ Step, $A_V = +1$	+25°C		0.8		μs
Overload Recovery Time	$V_{IN} \times A_V > V_S$	+25°C		3		μs
Total Harmonic Distortion + Noise (THD+N)	$V_{IN} = 2\text{V}_{P-P}$, $A_V = +1$, $f = 1\text{kHz}$	+25°C		0.0002		%
Noise						
Input Voltage Noise	$f = 0.1\text{Hz}$ to 10Hz	+25°C		0.4		μV_{P-P}
Input Voltage Noise Density (e_n)	$f = 0.1\text{kHz}$	+25°C		20		$\text{nV}/\sqrt{\text{Hz}}$
	$f = 1\text{kHz}$	+25°C		20		
	$f = 10\text{kHz}$	+25°C		23		

NOTE: 1. PSRR and CMRR are affected by the matching between external gain-setting resistor ratios.

TYPICAL PERFORMANCE CHARACTERISTICS

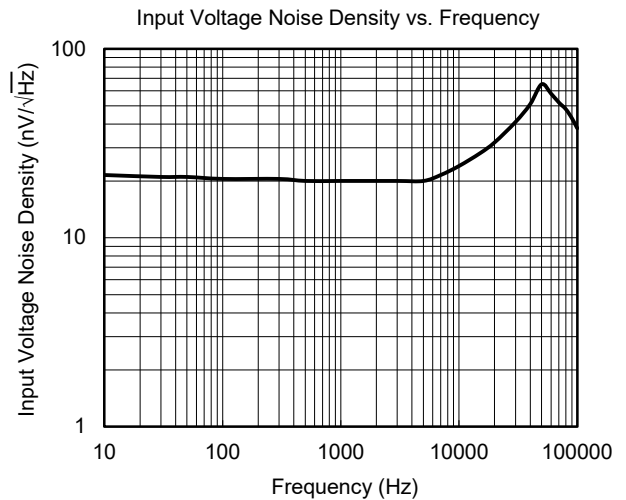
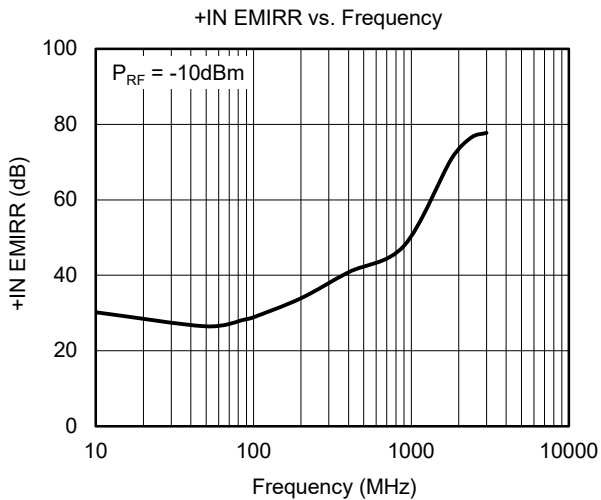
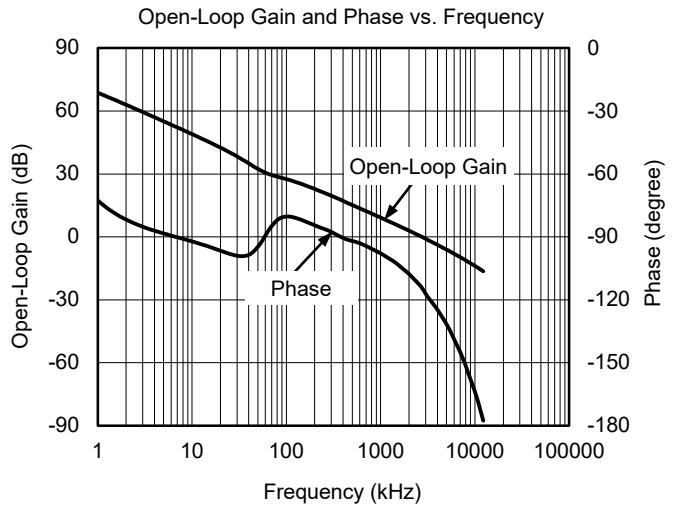
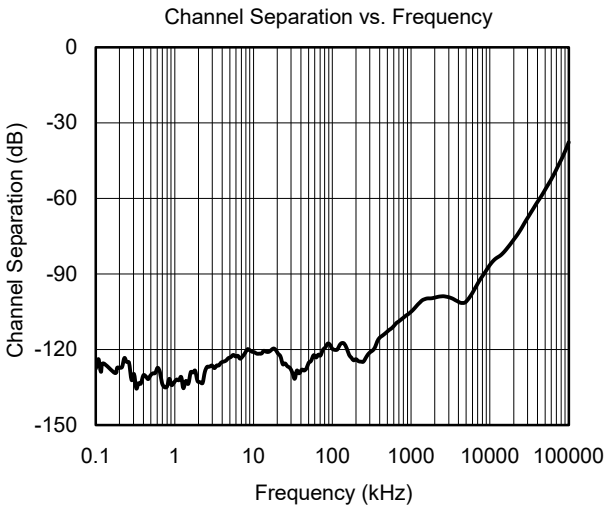
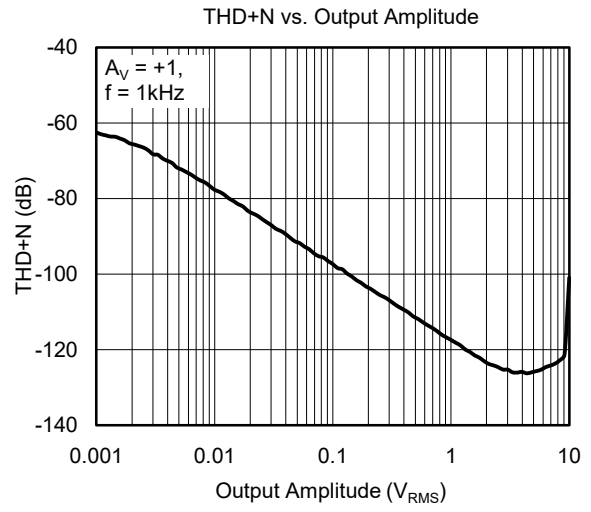
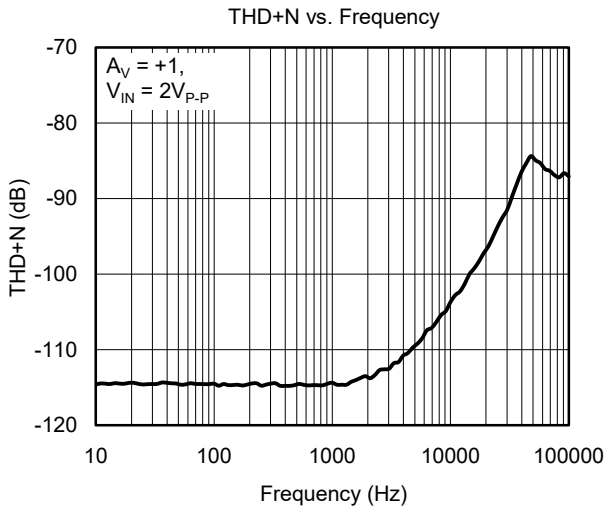
At $T_A = +25^\circ\text{C}$, $V_S = \pm 15\text{V}$, $C_L = 10\text{pF}$ and $R_L = 10\text{k}\Omega$, unless otherwise noted.



2.8MHz, High Voltage, High Precision, Low Noise SGMOP17C Rail-to-Rail Output Operational Amplifier

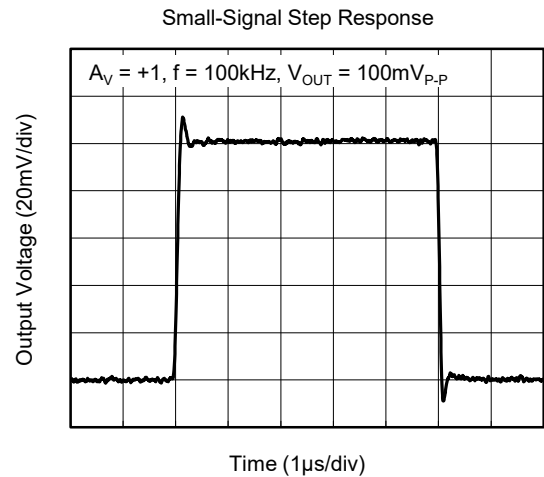
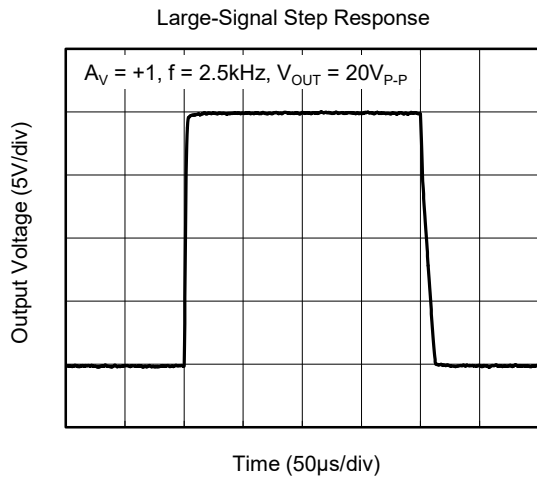
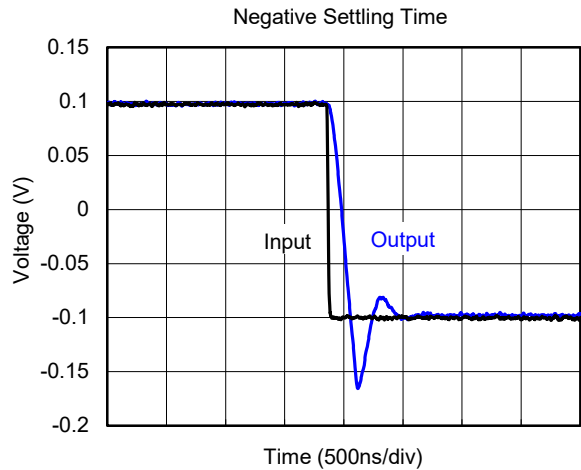
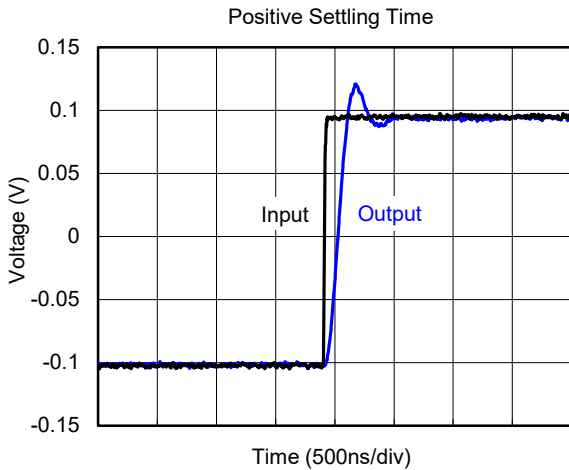
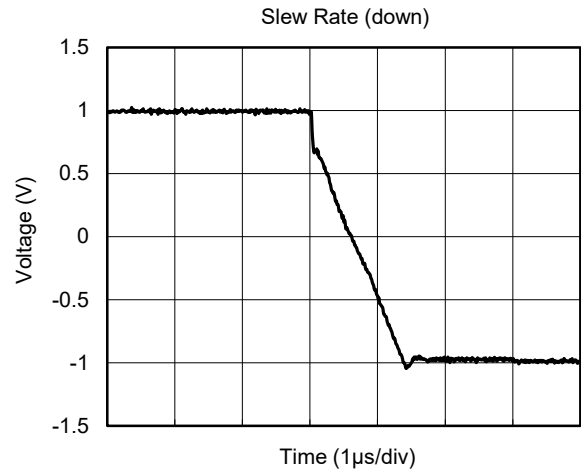
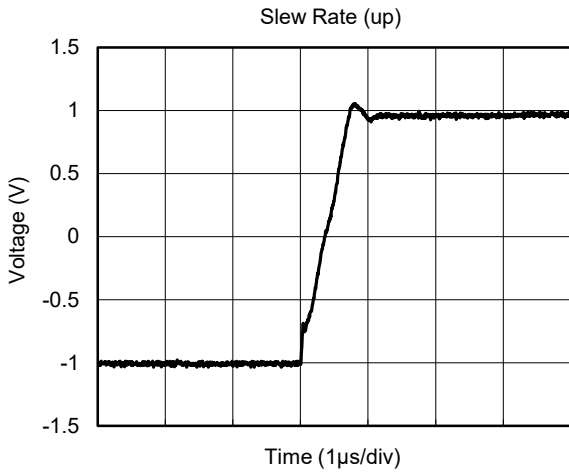
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_A = +25^\circ\text{C}$, $V_S = \pm 15\text{V}$, $C_L = 10\text{pF}$ and $R_L = 10\text{k}\Omega$, unless otherwise noted.



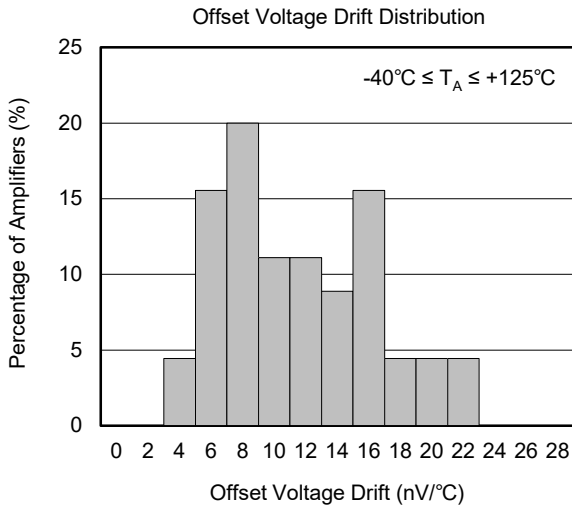
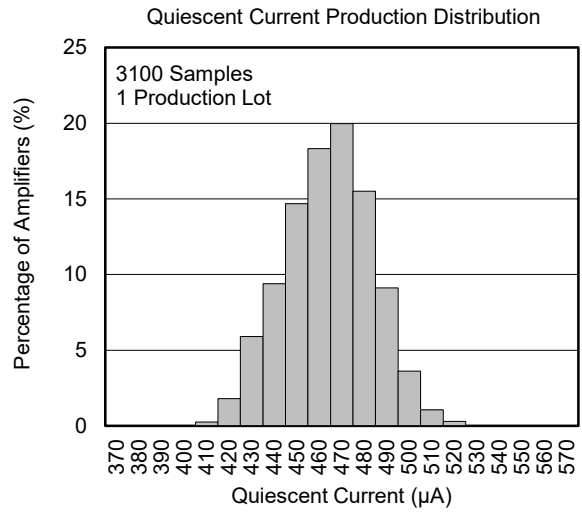
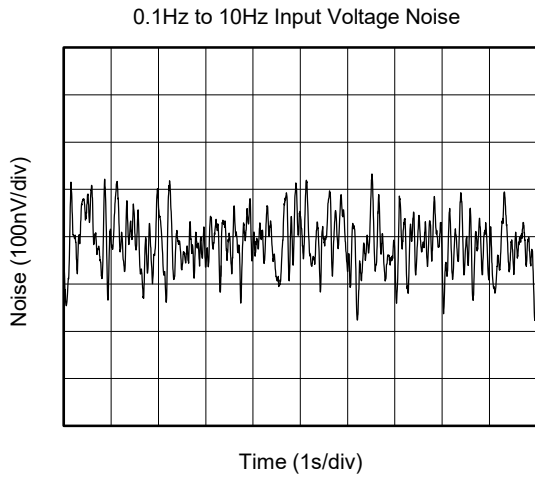
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_A = +25^\circ\text{C}$, $V_S = \pm 15\text{V}$, $C_L = 10\text{pF}$ and $R_L = 10\text{k}\Omega$, unless otherwise noted.



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_A = +25^\circ\text{C}$, $V_S = \pm 15\text{V}$, $C_L = 10\text{pF}$ and $R_L = 10\text{k}\Omega$, unless otherwise noted.



REVISION HISTORY

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

SEPTEMBER 2019 – REV.A.1 to REV.B	Page
New version.....	All

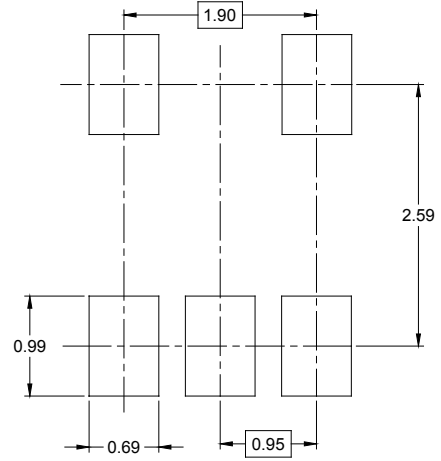
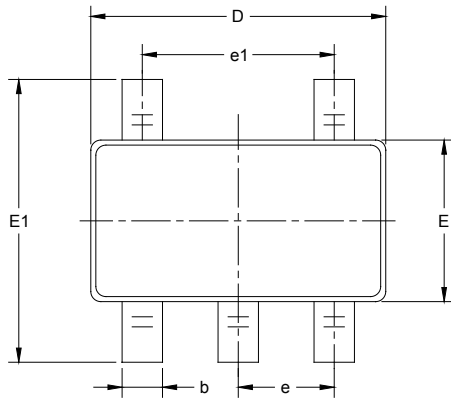
JULY 2016 – REV.A to REV.A.1	Page
Changed V_{OS}	3~5

Changes from Original (MARCH 2016) to REV.A	Page
Changed from product preview to production data.....	All

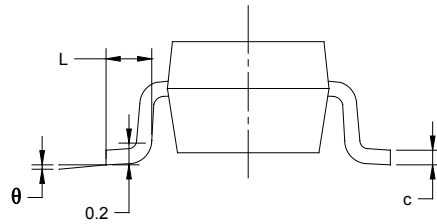
PACKAGE INFORMATION

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 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

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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

DD0002