Features

- **LOW OFFSET VOLTAGE: 10 μV (Max)**
- **ZERO DRIFT: 0.008 μV/°C**
- **0.1Hz to 10Hz Noise: 1.1 μV_{PP}**
- **Low Supply Current: 34 μA per Amplifier**
- **Bandwidth: 350 kHz**
- **Slew Rate: 0.16 V/μs**
- **High Gain, 130 dB High CMRR and PSRR**
- **Rail-to-rail Input and Output Swing**
- **–40°C to 125°C Operation Range**
- **Small Packages: SC70 and SOT23 (XPT2231)**

Applications

- **Transducer Amplifier**
- **Bidirectional Current Sense**
- **DC Offset Correction**
- **Temperature Measurement**
- **Remote Located Sensors**
- **Battery-Powered Instruments**
- **Electronic Weigh Scales**

Description

The XPTEK XPT2231/2/4 low-power chopper stabilized operational amplifiers provide input offset voltage correction for very low offset and offset drift over time and temperature. The devices operate with a single supply voltage as low as 1.8V, while drawing 34μA per amplifier of quiescent current with a gain bandwidth product of 350kHz. They are unity gain stable, have no 1/f noise, have good Power Supply Rejection Ratio (PSRR) and Common Mode Rejection Ratio (CMRR), and feature rail-to-rail input and output swing.

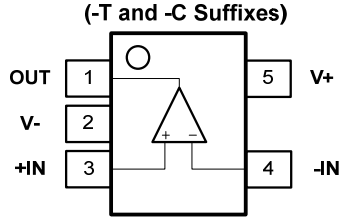
The devices were designed using an advanced CMOS process. The XPT2231 (single version) is available in SC70-5, SOT23-5 and SO-8 packages. The XPT2232 (dual version) is offered in MSOP-8 and SO-8 package. The XPT2234 (quad version) is available in TSSOP-14 and SOIC-14 package. All versions are specified for operation from -40°C to 125°C.

Related Zero-Drift Op-amps

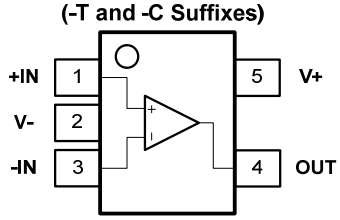
V_{OS} (Max.)	10 μV	5 μV	5 μV
GBWP	350 kHz	1.5 MHz	3.5 MHz
Supply Current	34 μA	220 μA	500 μA
e_N at 1 kHz	55 nV/√Hz	25 nV/√Hz	15 nV/√Hz
Single	XPT2231		
Dual	XPT2232		
Quad	**XPT22**34		

Pin Configuration (Top View)

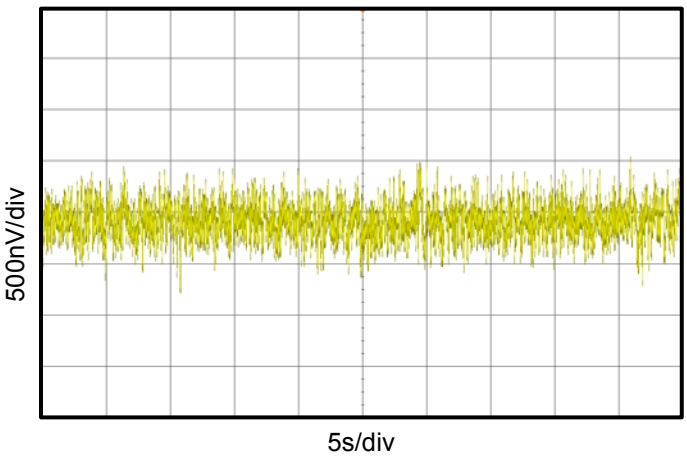
SOT23-5/SC70-5
(-T and -C Suffixes)



SOT23-5/SC70-5
(-T and -C Suffixes)

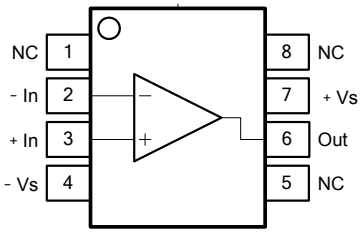


0.1Hz to 10Hz NOISE

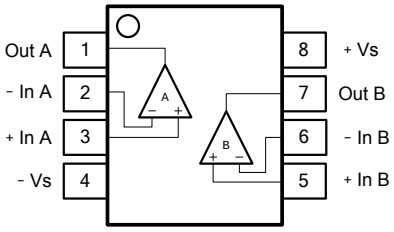


Pin Configuration (Top View, continued)

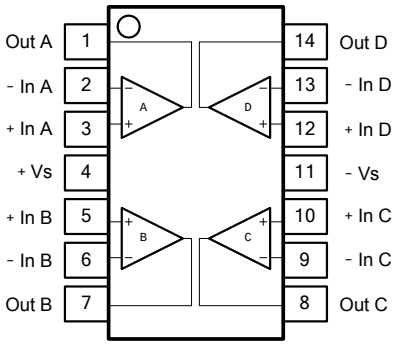
XPT2231
8-Pin SOIC
(-S Suffix)XP



XPT2232
8-Pin SOIC/MSOP
(-S and -V Suffixes)



XPT2234
14-Pin SOIC/TSSOP
(-S and -T Suffixes)



Order Information

Model Name	Order Number	Package	Transport Media, Quantity	Marking Information
XPT2231	XPT2231-TR	SOT23-5	Tape and Reel, 3,000	E31T
	XPT2231-CR	SC70-5 (SOT353)	Tape and Reel, 3,000	E31C
	XPT2231-SR	SOIC-8	Tape and Reel, 4,000	E31S
XPT2231U	XPT2231U-TR	SOT23-5	Tape and Reel, 3,000	E31U
	XPT2231U-CR	SC70-5	Tape and Reel, 3,000	E31V
XPT2232	XPT2232-SR	SOIC-8	Tape and Reel, 4,000	E32S
	XPT2232-VR	MSOP-8	Tape and Reel, 3,000	E32V
XPT2234	XPT2234-SR	SOIC-14	Tape and Reel, 2,500	E34S
	XPT2234-TR	TSSOP-14	Tape and Reel, 3,000	E34T

Absolute Maximum Ratings Note 1

Supply Voltage: 6V
Input Voltage: ..... ……V^- – 0.2 to V^+ + 0.2
Input Current: +IN, –IN Note 2..... ±20mA
Output Current: OUT..... ±60mA
Output Short-Circuit Duration Note 3..... Indefinite
Current at Supply Pins……..... ±50mA
Operating Temperature Range.....–40°C to 125°C
Maximum Junction Temperature..... 150°C
Storage Temperature Range..... –65°C to 150°C
Lead Temperature (Soldering, 10 sec) ..... 260°C

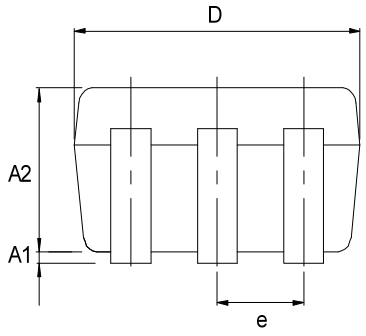
Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

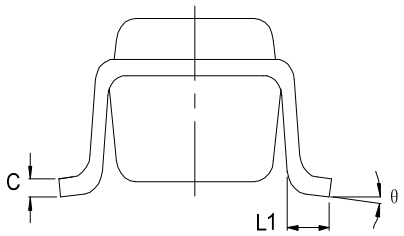
Note 2: The inputs are protected by ESD protection diodes to each power supply. If the input extends more than 500mV beyond the power supply, the input current should be limited to less than 10mA.

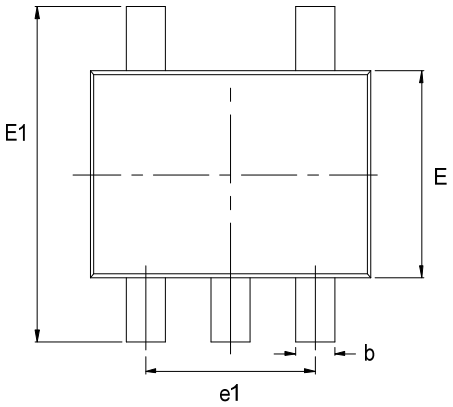
Note 3: A heat sink may be required to keep the junction temperature below the absolute maximum. This depends on the power supply voltage and how many amplifiers are shorted. Thermal resistance varies with the amount of PC board metal connected to the package. The specified values are for short traces connected to the leads.

Package Outline Dimensions

SC-70-5 (SOT353)



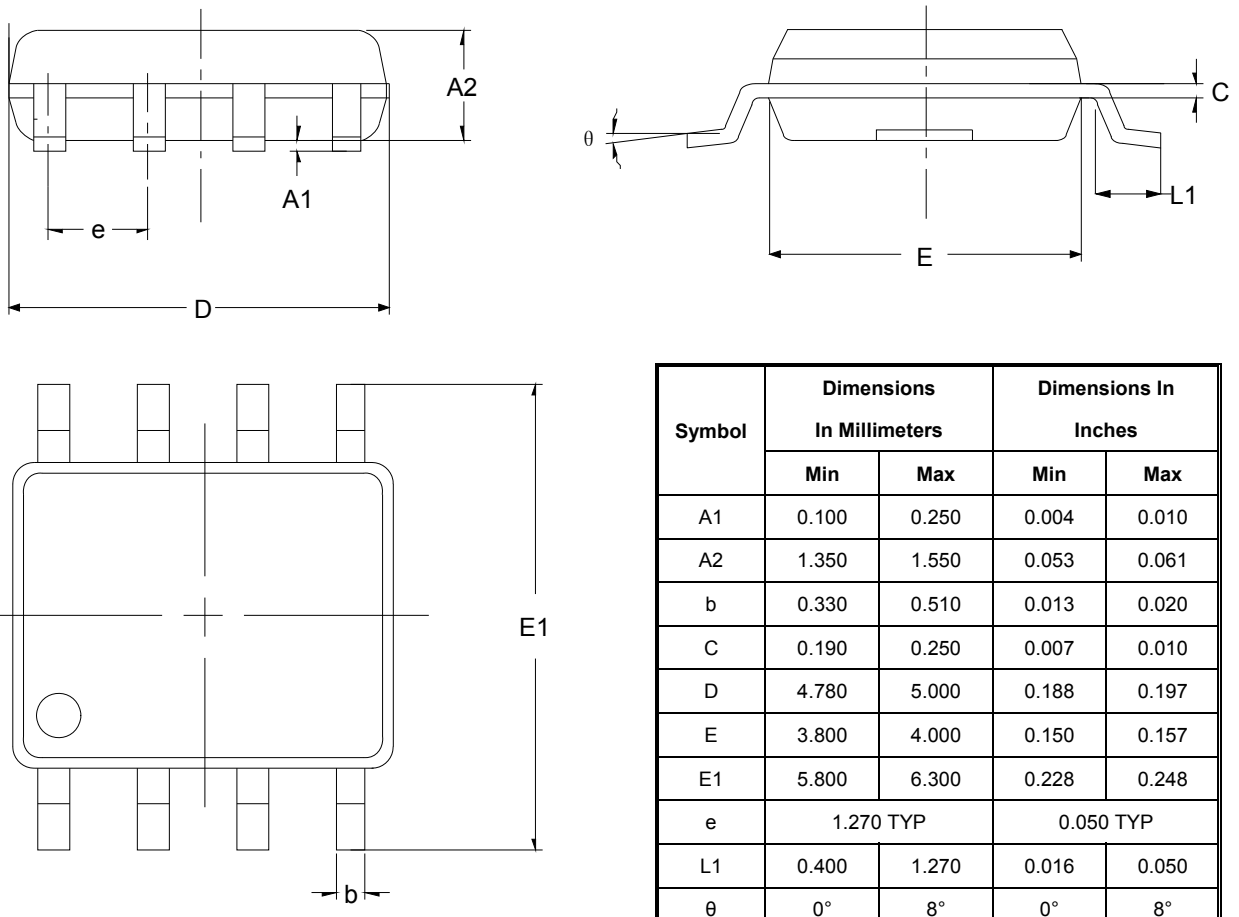




Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
C	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Package Outline Dimensions

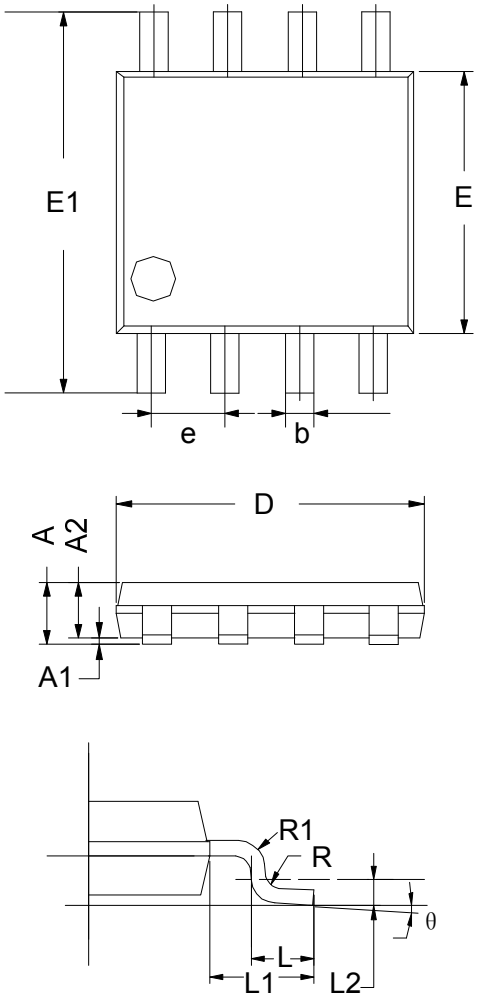
SOP-8 (SOIC-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
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	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270 TYP		0.050 TYP	
L1	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Package Outline Dimensions

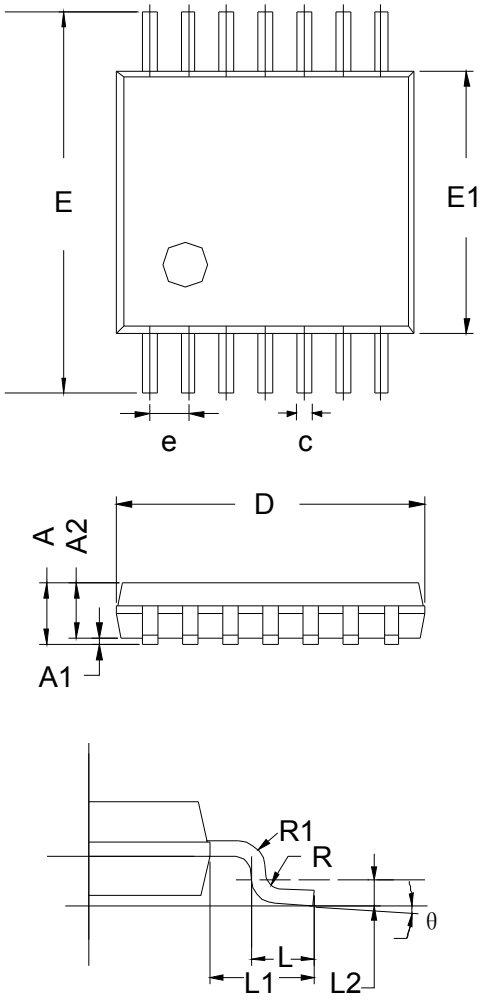
MSOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
A1	0.000	0.200	0.000	0.008
A2	0.760	0.970	0.030	0.038
b	0.30 TYP		0.012 TYP	
C	0.15 TYP		0.006 TYP	
D	2.900	3.100	0.114	0.122
e	0.65 TYP		0.026	
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201
L1	0.410	0.650	0.016	0.026
θ	0°	6°	0°	6°

Package Outline Dimensions

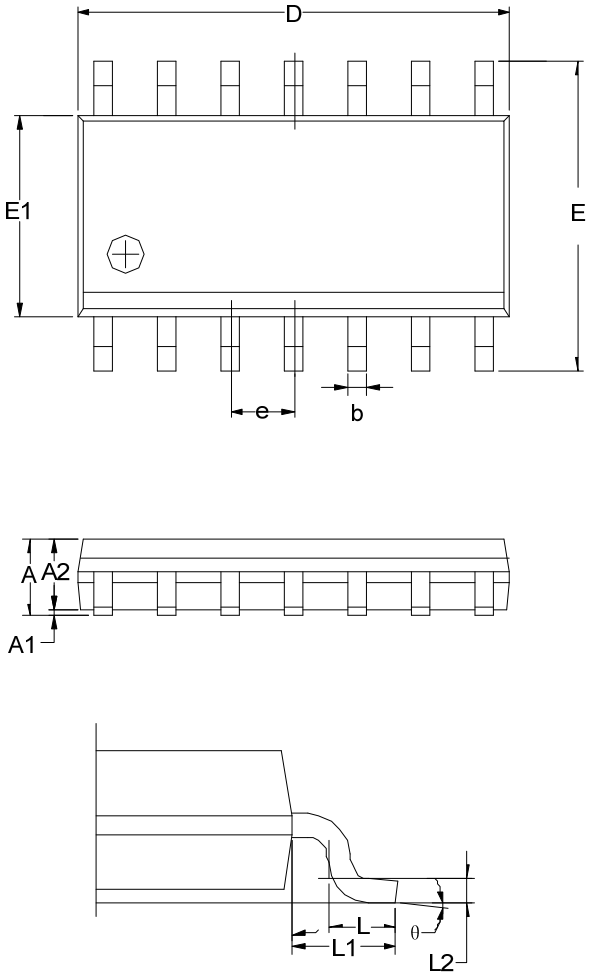
TSSOP-14



Symbol	Dimensions In Millimeters		
	MIN	TYP	MAX
A	-	-	1.20
A1	0.05	-	0.15
A2	0.90	1.00	1.05
b	0.20	-	0.28
c	0.10	-	0.19
D	4.86	4.96	5.06
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	0.65 BSC		
L	0.45	0.60	0.75
L1	1.00 REF		
L2	0.25 BSC		
R	0.09	-	-
θ	0°	-	8°

Package Outline Dimensions

SOP-14 (SOIC-14)



Symbol	Dimensions In Millimeters		
	MIN	TYP	MAX
A	1.35	1.60	1.75
A1	0.10	0.15	0.25
A2	1.25	1.45	1.65
b	0.36		0.49
D	8.53	8.63	8.73
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
L	0.45	0.60	0.80
L1	1.04 REF		
L2	0.25 BSC		
θ	0°		8°