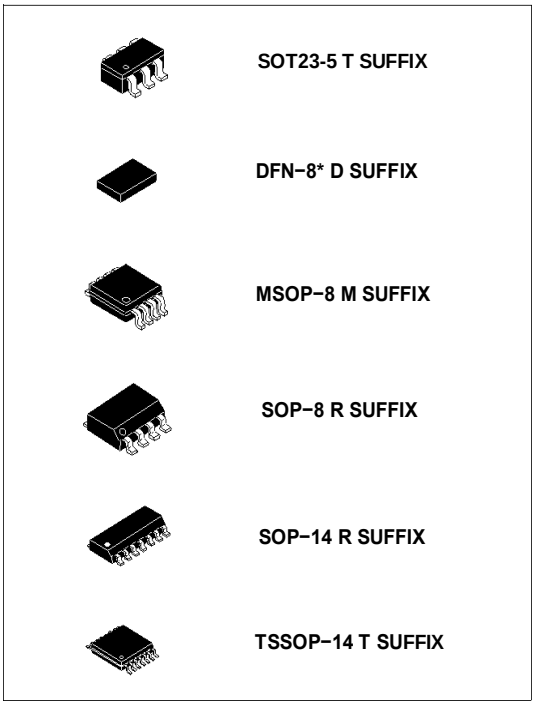
1MHZ CMOS Rail-to-Rail IO Opamp with RF Filter

The HT600x is a dual low power CMOS operational amplifiers IC which provides high performance operation at low supply voltages. The basic amplifier can operate at supply voltage as low as 1.4V with very low power consumption and makes it perfect for battery-powered application. The input common-mode voltage extends to the negative rail. The output swings to both rails with light load. The input bias current is inherently low and the input impedance is extremely high. The devices are ideal upgrades for industrial standards operational amplifiers.

FEATURES

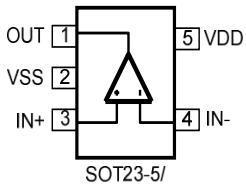
- Low Power Replacement for Standard OP Amps
- Wide supply operating range (1.4V to 7V)
- Input common-mode voltage range includes negative rail
- Output swing to rail
- Low input bias current (typical 1ρA)
- High input impedance
- Single supply operation
- Internal compensated
- Output short circuit protection

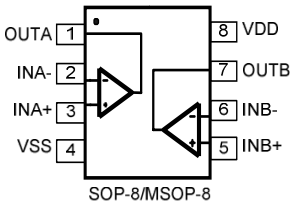


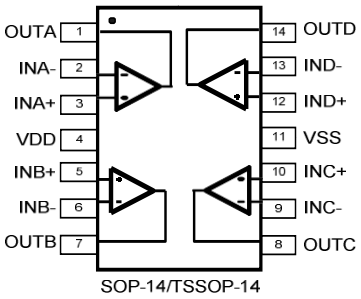
APPLICATIONS

- Portable Instruments
- Battery-Powered Systems
- Transducer Interfacing
- Active Filter
- High Impedance Buffer

Pin Description







ABSOLUTE MAXIMUM RATINGS

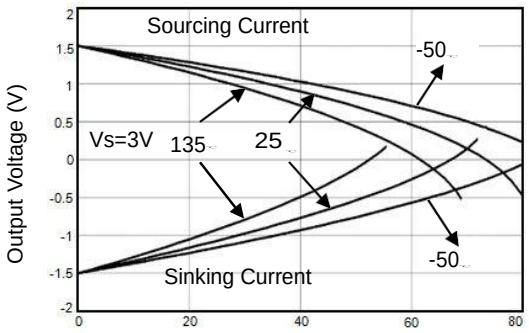
Characteristic	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	8.5	V
Input Voltage	V_{IN}	-0.3 to V_{CC} + 0.3	V
Output Shot Circuit to GND	I_{SC}	Continuous	
Operating Temperature Range	T_{opr}	-40~125	°C
Storage Temperature Range	T_{stg}	-65 ~ +150	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 3.0V, T_A = 25°C, unless otherwise specified)

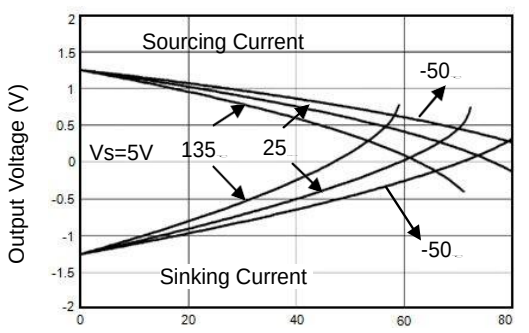
Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	V_{ICM} =0V to V_{CC}-1.5V		1.5	3.0	mV
Input Offset Voltage Drift	$\Delta V_{IO}/\Delta T$			0.7		μV/°C
Input Offset Current	I_{IO}			1		ρA
Input Bias Current	I_{IB}			1		ρA
Input Common Mode Voltage Range	V_{ICR}		0		V_{CC}– 1.3	V
Supply Current (per amplifier)	I_{CC}			5	9	μA
Large Signal Voltage Gain	A_V	V_O=1V to 2V; V_{IN}=1.4V; R_L=1MΩ	20	100		V/mV
Output Voltage Swing		V_{IN}=10mV; R_L=1MΩ (to V-)	2.95	2.99		V
	V_{OH}	V_{IN}=10mV; R_L=10KΩ (to V-)		2.6		
	V_{OL}	V_{IN}=10mV; R_L=1MΩ (to V+)		0.2	0.5	
Common Mode Rejection Ratio	CMRR	V_O=1V; V_{IN}=0V to 2.0V;	60	80		dB
Output Current	I_{source}		1.5	2.5		mA
	I_{sink}		3	5		μA
Differential Input Voltage	V_{ID}				V_{CC}	V

At T_A=+25°C, R_L=100KΩ connected to V_S/2 and V_{OUT}= V_S/2, unless otherwise noted.

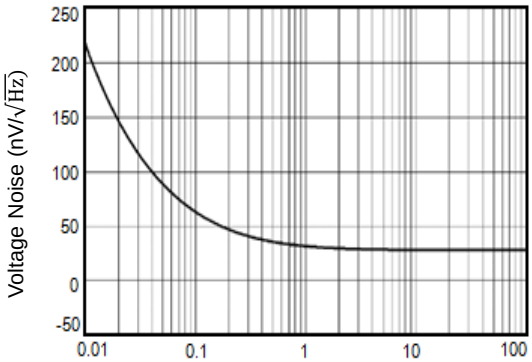
Output Voltage Swing vs.Output Current



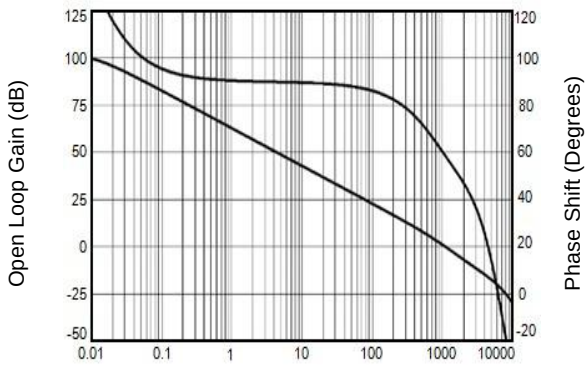
Output Voltage Swing vs.Output Current



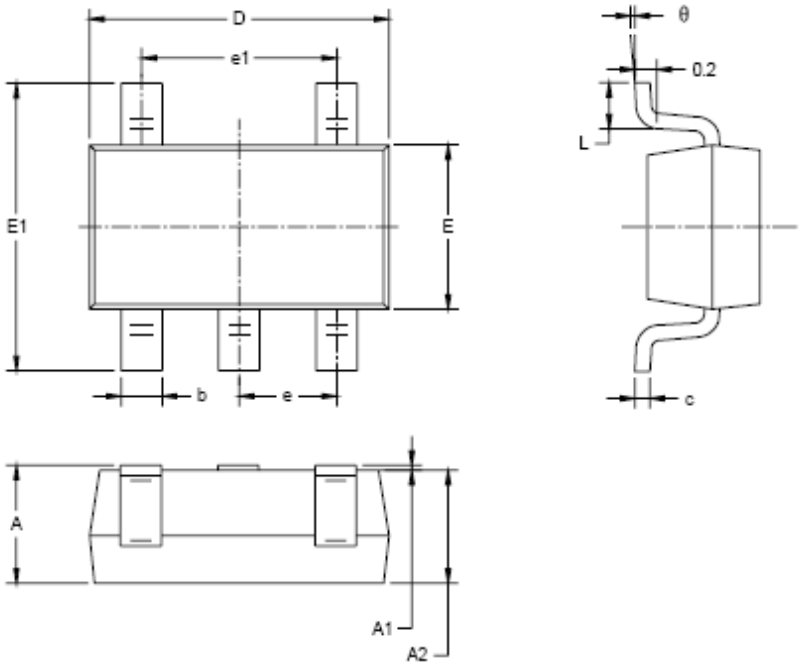
Input Voltage Noise Spectral Density vs. Frequency



Open Loop Gain, Phase Shift vs. Frequency



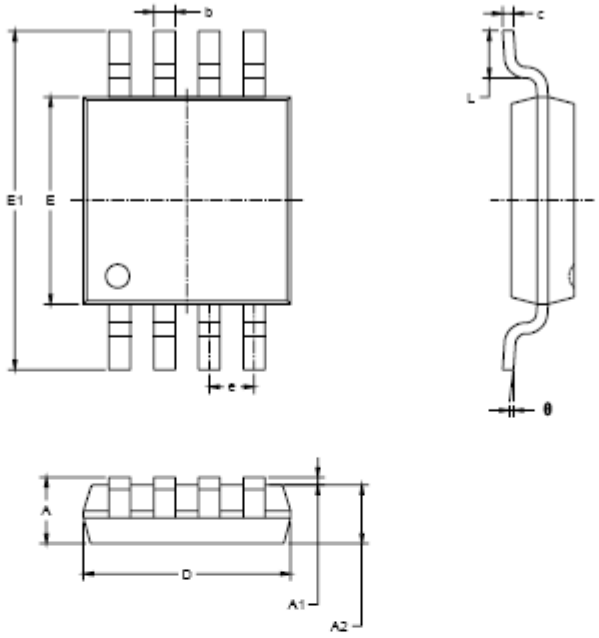
SOT23-5



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°

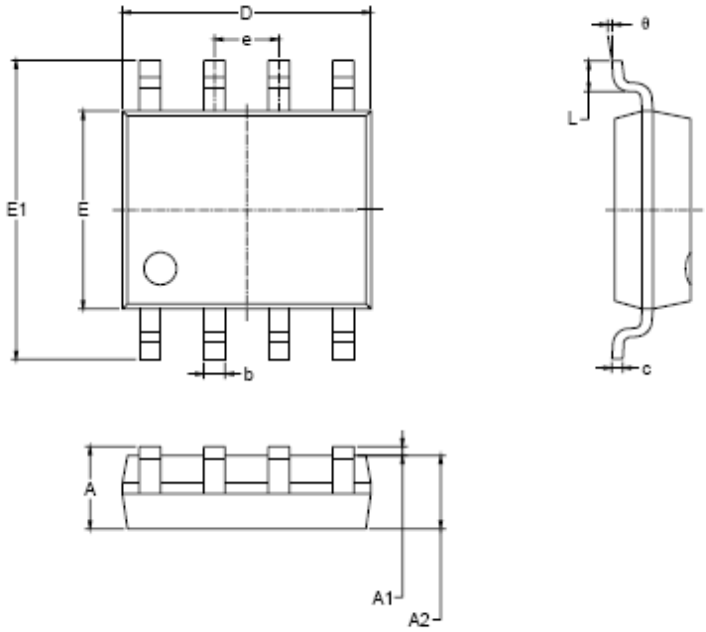
Package Information

MSOP-8



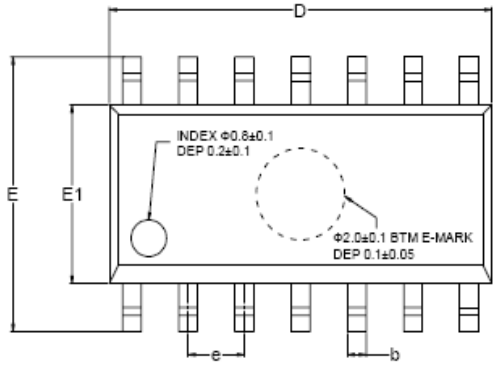
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

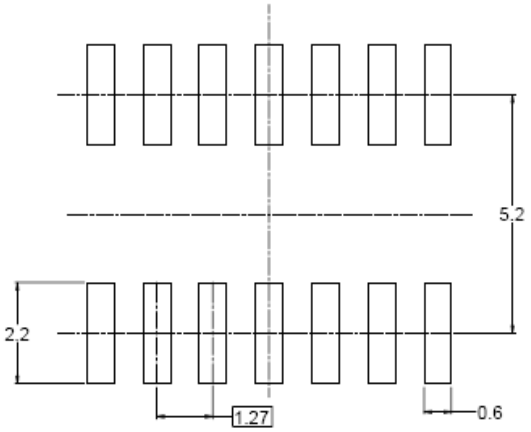
SOP-8



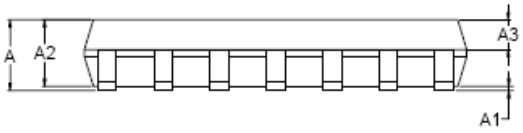
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

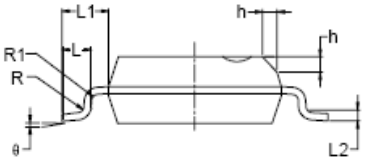
SOP-14





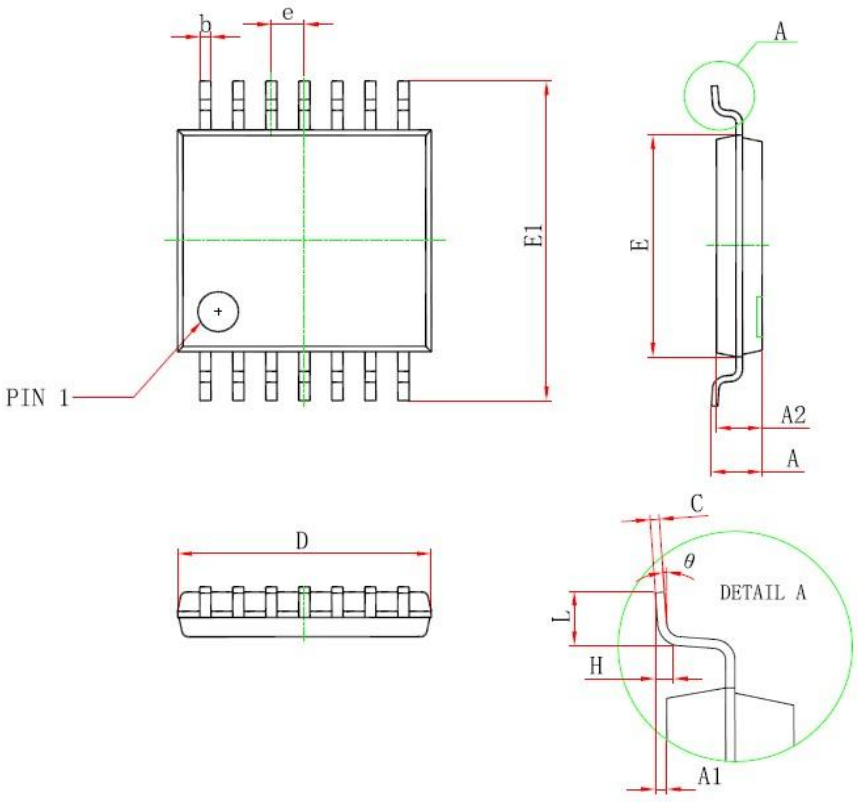
RECOMMENDED LAND PATTERN (Unit: mm)





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°

TSSOP-14



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
D	4.900	5.100	0.193	0.201
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.200		0.047
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65 (BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°

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