

Features

- Single-Supply Operation from +2.1V ~ +5.5V
- Low Noise : $12.5\text{nV}/\sqrt{\text{Hz}}$ @1kHz
- Gain-Bandwidth Product: 6MHz (Typ)
- Low Input Bias Current: 1pA (Typ)
- Low Offset Voltage: 0.2mV (Typ)
- High Slew Rate: 4V/ μs
- Quiescent Current: 550uA per Amplifier (Typ)
- Rail-to-Rail Input / Output
- Operating Temperature: -40°C ~ +125°C
- Small Package:
 BL3711 Available in SOT23-5 Packages
 BL3712 Available in SOP-8 and MSOP-8 Packages
 BL3714 Available in SOP-14 and TSSOP-14 Packages

General Description

BL371X series operates from a single 2.1V to 5.5V supply or dual $\pm 1.05\text{V}$ to $\pm 2.75\text{V}$ supplies ,The BL371X have a high gain-bandwidth product of 6MHz, a slew rate of 4V/ μs , and a quiescent current of 550uA per amplifier at 5V. The BL371X are designed to provide optimal performance in low voltage and low noise systems. The input common mode voltage range includes ground, They are specified over the extended industrial temperature range (-40°C to +125°C). The operating range is from 2.1V to 5.5V. The BL3711 single is available in Green SOT23-5 packages. The BL3712 dual is available in Green SOP-8 and MSOP-8 packages. The BL3714 Quad is available in Green SOP-14 and TSSOP-14 packages.

Applications

- servo motor
- Home appliance control panel
- BMS
- Handheld Test Equipment
- Battery-Powered Instrumentation

Package/Ordering Information

MODEL	CHANNEL	ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
BL3711	Single	BL3711FR	SOT23-5	Tape and Reel,3000
BL3712	Dual	BL3712SR	SOP-8	Tape and Reel,2500
		BL3712MR	MSOP-8	Tape and Reel,3000
BL3714	Quad	BL3714TR	TSSOP-14	Tape and Reel,3000
		BL3714SR	SOP-14	Tape and Reel,2500

Pin Configuration

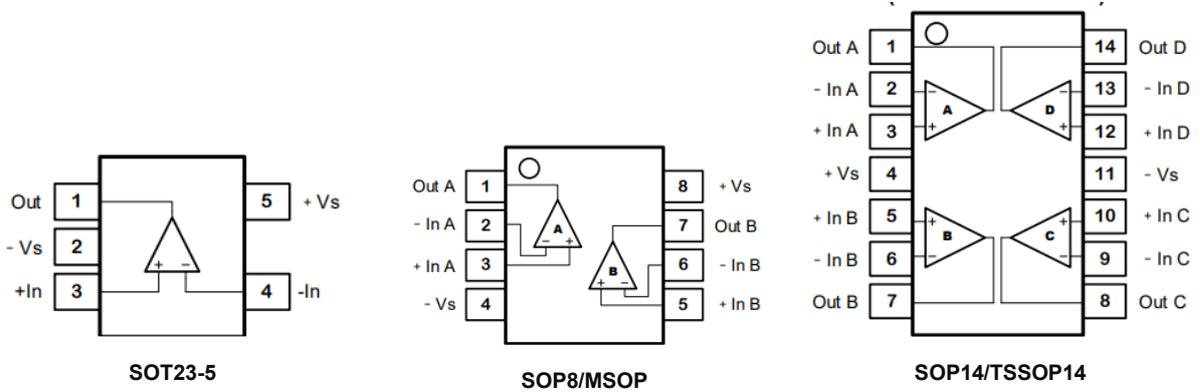


Figure 1. Pin Assignment Diagram

Absolute Maximum Ratings

Condition	Min	Max
Power Supply Voltage (V_{DD} to V_{SS})	-0.5V	+6V
Analog Input Voltage (IN+ or IN-)	$V_{SS}-0.3V$	$V_{DD}+0.5V$
PDB Input Voltage	$V_{SS}-0.3V$	+6V
Operating Temperature Range	-40°C	+125°C
Junction Temperature	+160°C	
Storage Temperature Range	-55°C	+150°C
Lead Temperature (soldering, 10sec)	+260°C	
Package Thermal Resistance ($T_A=+25^\circ\text{C}$)		
SOP-8, θ_{JA}	125°C/W	
MSOP-8, θ_{JA}	216°C/W	
SOT23-5, θ_{JA}	190°C/W	
SC70-5, θ_{JA}	333°C/W	
ESD Susceptibility		
HBM	2KV	

ELECTRICAL CHARACTERISTICS

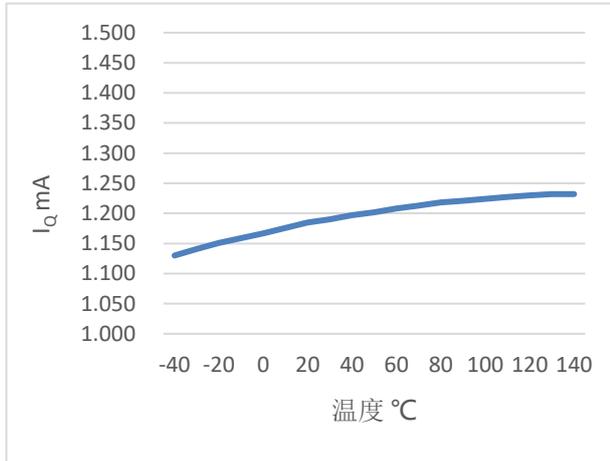
(At TA = +25°C, VS = +5V, VCM = VS/2, RL = 600Ω, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	BL3711 /BL3712 /BL3714			
			MIN	TYP	MAX	UNITS
INPUT CHARACTERISTICS						
Input Offset Voltage	V _{OS}	V _{CM} = V _S /2	-2.5	±0.2	2.5	mV
Input Bias Current	I _B			1		pA
Input Offset Current	I _{OS}			1		pA
Common-Mode Voltage Range	V _{CM}	V _S = 5.5V	(-V _S) - 0.1		(+V _S) + 0.1	V
Common-Mode Rejection Ratio	CMRR	V _S = 5.5V, V _{CM} = -0.1V to 4V	65	80		dB
		V _S = 5.5V, V _{CM} = -0.1V to 5.6V	60	73		
Open-Loop Voltage Gain	A _{OL}	RL = 600Ω, V _{OUT} = 0.15V to 4.85V	80	95		dB
		RL = 10kΩ, V _{OUT} = 0.05V to 4.95V	95	105		
Input Offset Voltage Drift	ΔV _{OS} /ΔT	V _{CM} = +V _S /2, -40°C ≤ TA ≤ +125°C		2		μV/°C
OUTPUT CHARACTERISTICS						
Output Voltage Swing from Rail	V _{OH}	RL = 600Ω	4.97			V
	V _{OL}				30	mV
	V _{OH}	RL = 10KΩ	4.995			V
	V _{OL}				5	mV
Short Circuit Current	I _{SOURCE}	V _S =5V	95	100		mA
POWER SUPPLY						
Operating Voltage Range			2.1		5.5	V
Power Supply Rejection Ratio	PSRR	V _S = 2.1V to 5.5V, V _{CM} = 0.5V	75	90		dB
Quiescent Current / Amplifier	I _Q			0.55	0.9	mA
DYNAMIC PERFORMANCE						
Gain-Bandwidth Product	GBP			6		MHZ
Slew Rate	SR	G = +1, 2V Output Step		4		V/μs
Phase Margin	PM	+V _S = 1.4V to 5.5V		62		°
Full-Power Bandwidth	BWp	<1% distortion		160		KHZ
Settling Time to 0.1%	T _s	G = 1, 2V output step		0.45		μs
Overload Recovery Time		V _{IN} × G = V _S		0.7		μs
Input Voltage Noise Density	e _n	f = 1KHZ		12.5		nV/√Hz
		f = 10KHZ		6.5		nV/√Hz

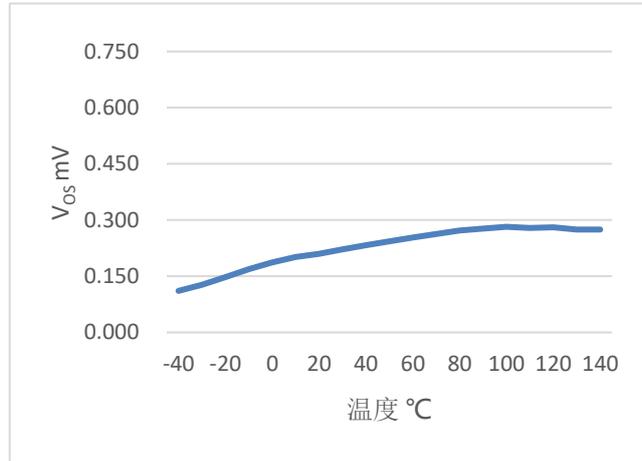
Typical Performance characteristics

(At $V_S=5V$, $T_A = +25^\circ C$, $V_{CM} = V_S/2$, $R_L = 600\Omega$, unless otherwise noted.)

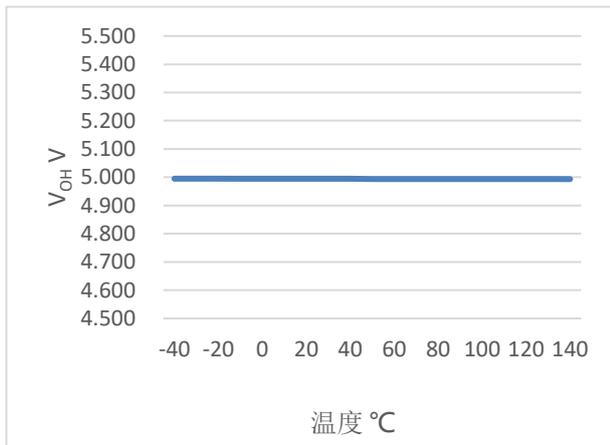
Supply Current vs. Temperature



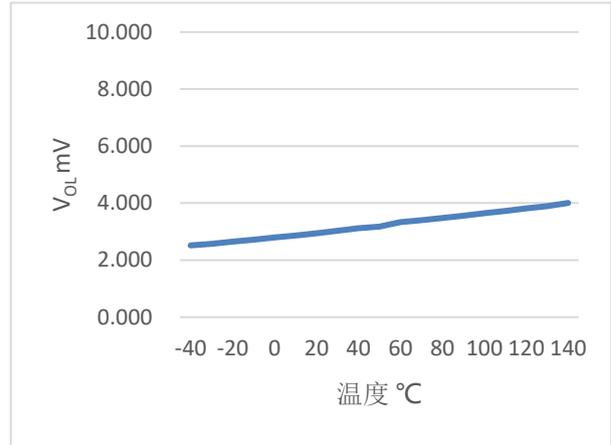
V_{OS} vs. Temperature



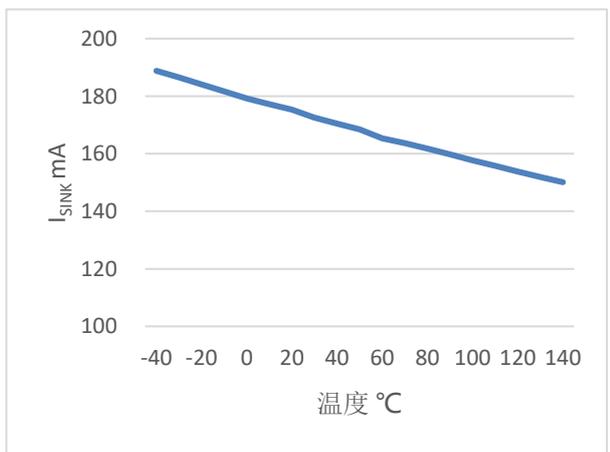
V_{OH} vs. Temperature



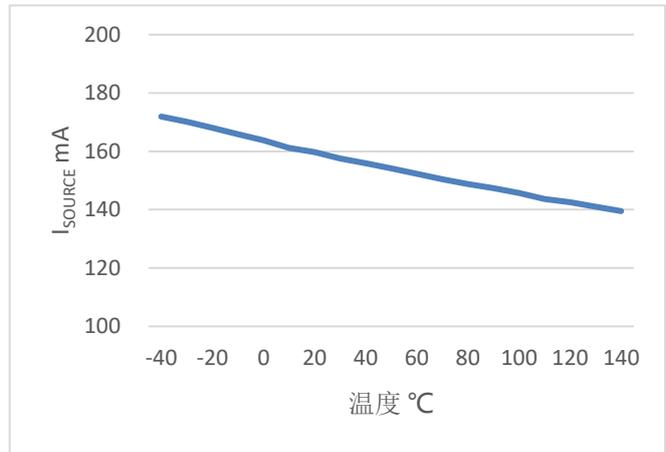
V_{OL} vs. Temperature



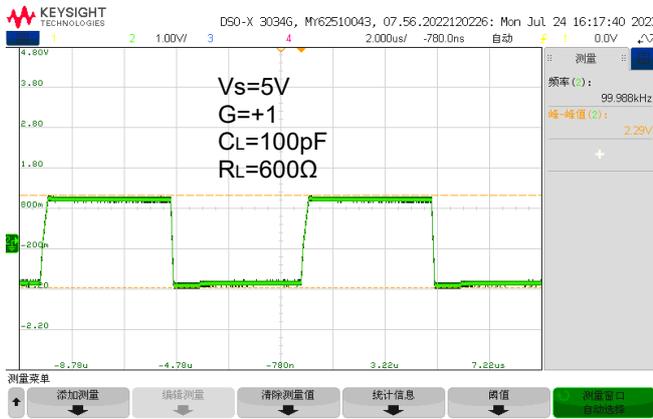
I_{SINK} vs. Temperature



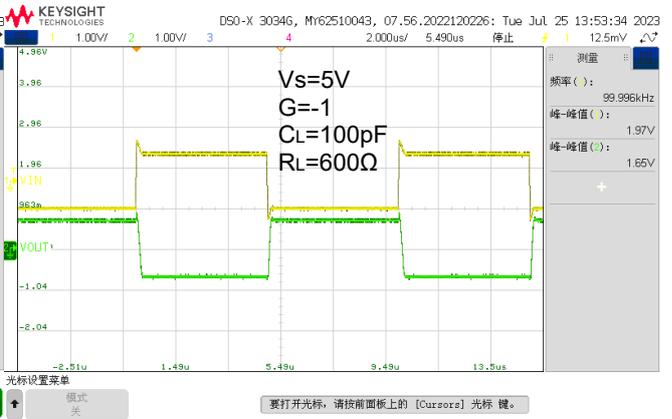
I_{SOURCE} vs. Temperature



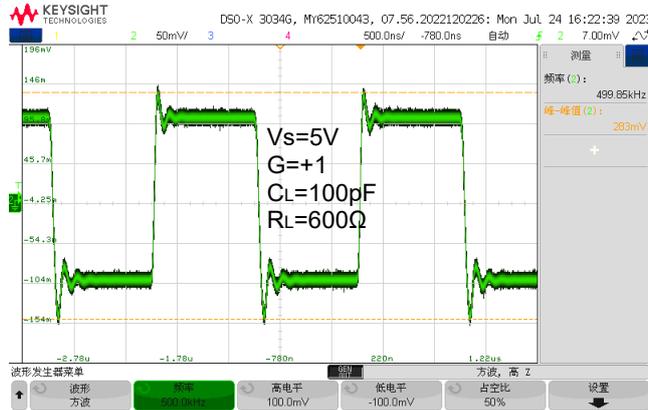
Large-Signal Step Response



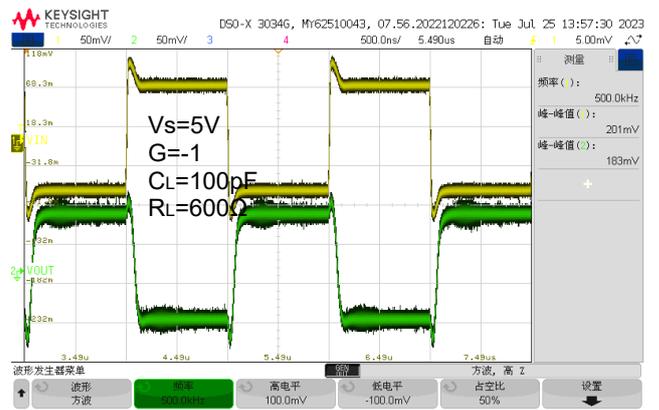
Large-Signal Step Response



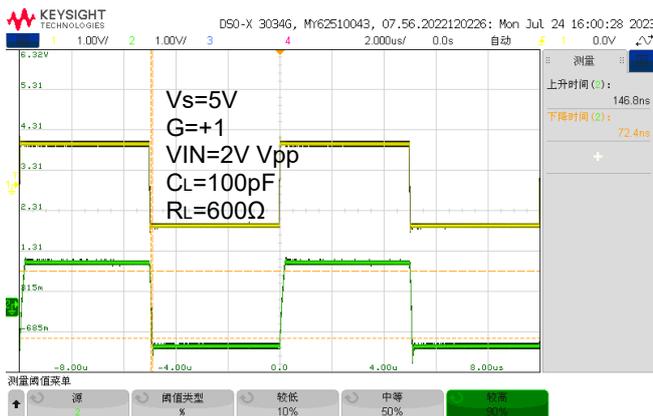
Small-Signal Step Response



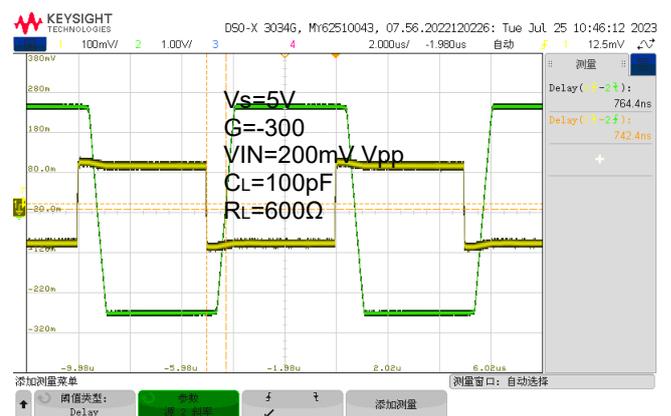
Small-Signal Step Response



Slew Rate

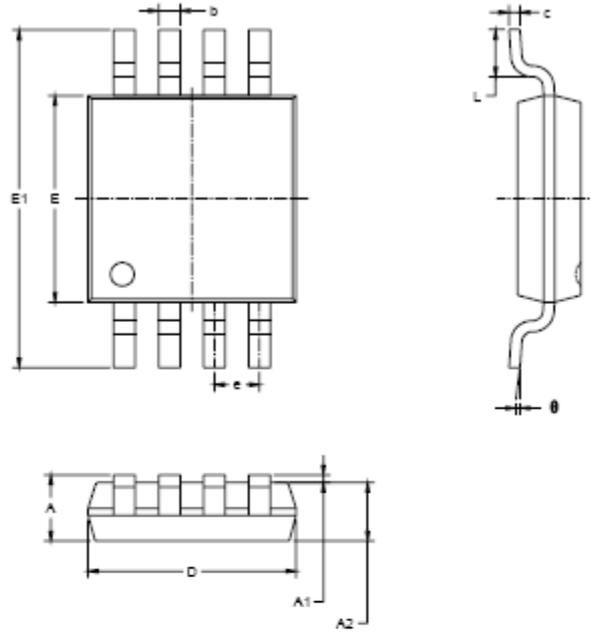


Overload Recovery Time



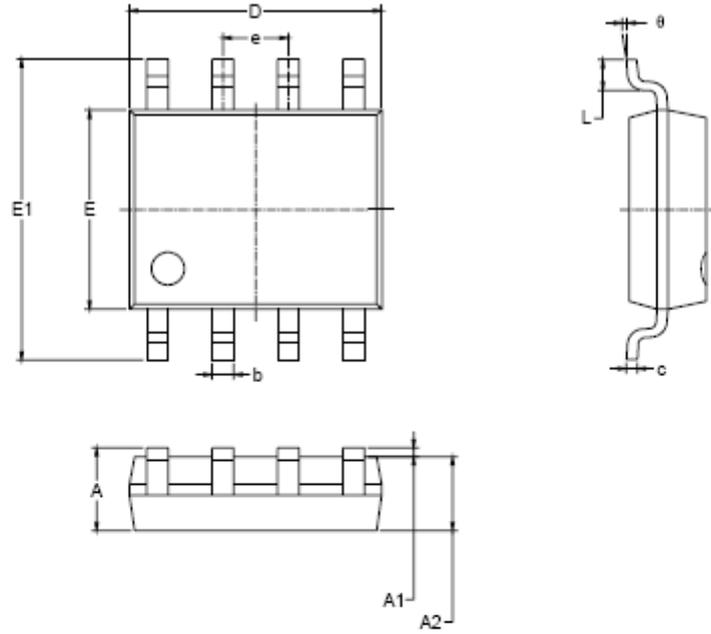
Package Information

MSOP-8



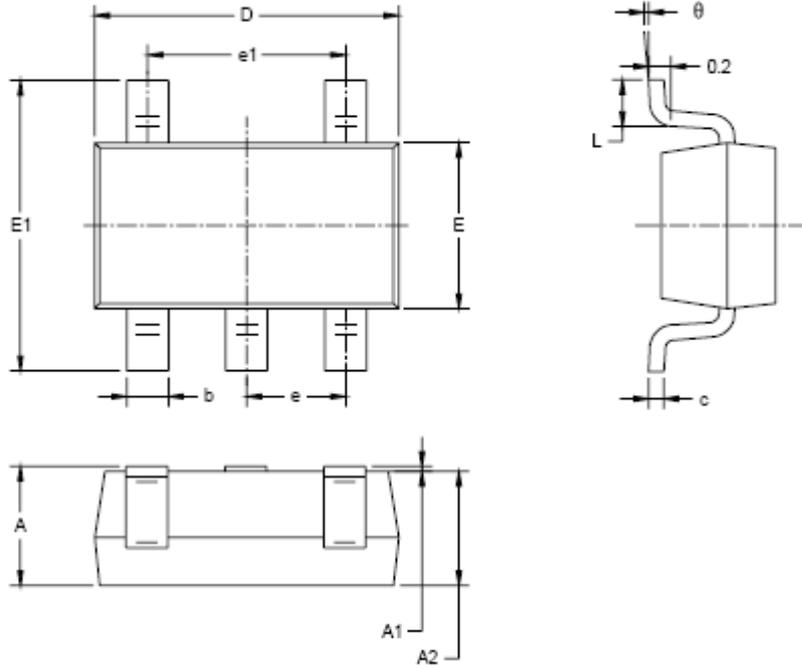
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

SOP-8

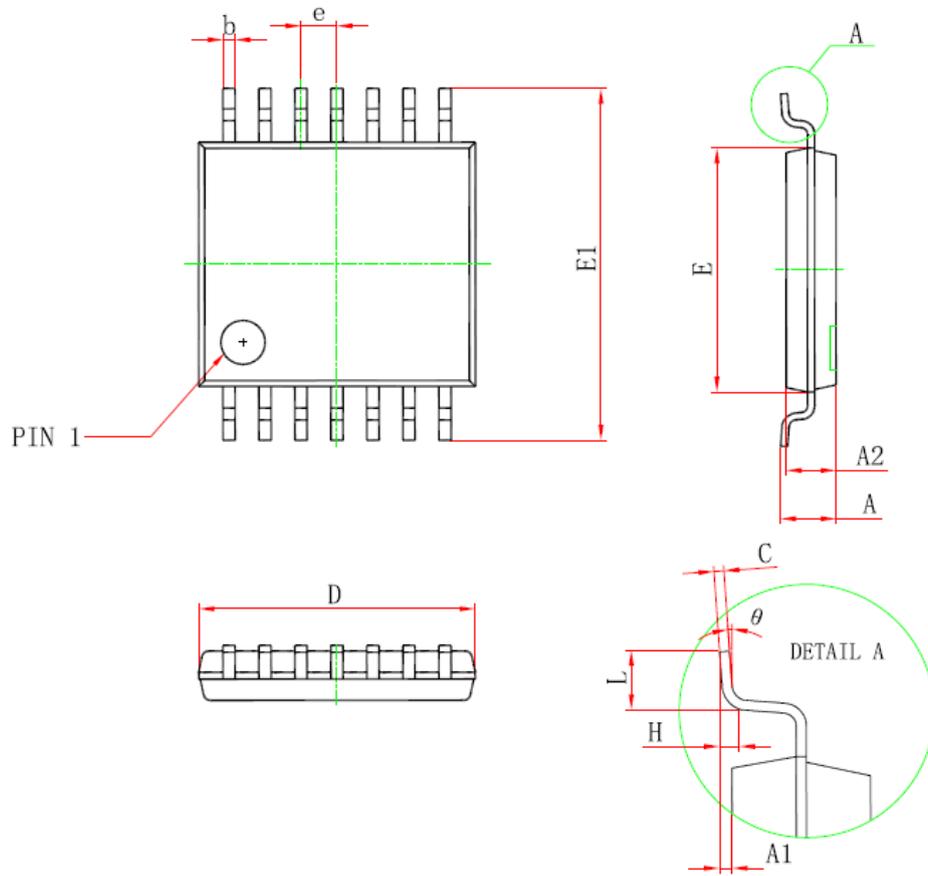


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050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

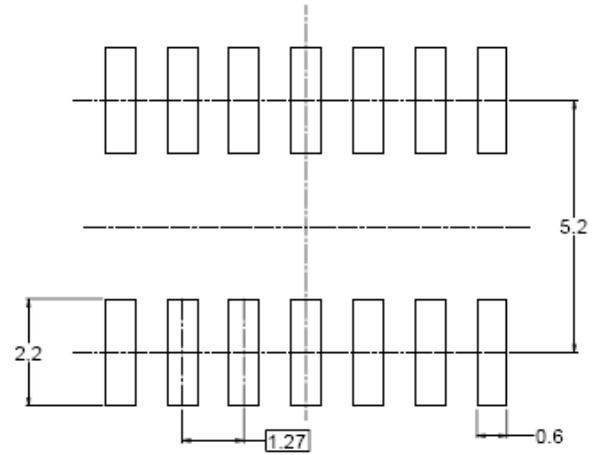
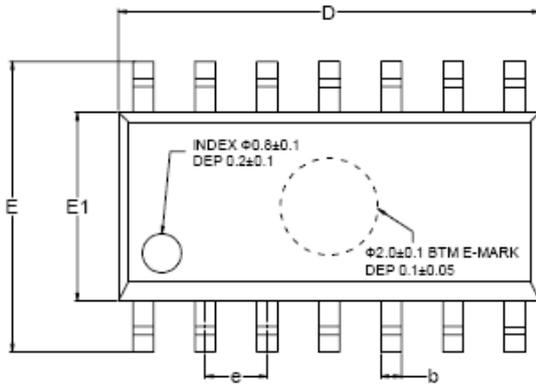
SOT23-5



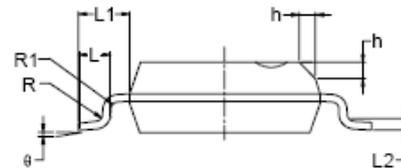
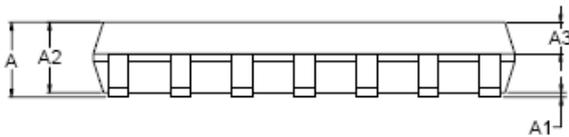
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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°

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°