

## Features

- Supply Voltage: 3.3V to 36V
- Offset Voltage:  $\pm 100\mu$ V Maximum
- Differential Input Voltage Range to Supply Rail, can

### Work as Comparator

- Input Rail to  $-V_S$ , Rail to Rail Output
- Bandwidth: 11MHz
- Slew Rate: 23V/ $\mu$ s
- Excellent EMI Suppress Performance: 45dB at

1GHz

- Quiescent Current: 2.7mA per Amplifier (Typ)
- $-40^\circ\text{C}$  to  $125^\circ\text{C}$  Operation Temperature Range
- Small Package:

GS2261 Available in SOT23-5 Package

GS2262 Available in SOP-8 and MSOP-8 Packages

GS2264 Available in SOP-14 and TSSOP-14 Packages

## General Description

The GS226X series amplifiers are newest high supply voltage amplifiers with low offset, low power and stable high frequency response. Good AC performance with 11MHz bandwidth, 23V/ $\mu$ s slew rate and low distortion while drawing only 2.7mA of quiescent current per amplifier. The input common-mode voltage range extends to  $-V_S$ , and the outputs swing rail-to-rail. The GS226X family can be used as plug-in replacements for many commercially available Op-Amps to reduce power and improve input/output range and performance. The GS2261 single is available in SOT23-5 package. The GS2262 Dual is available in Green SOP-8 and MSOP-8 packages. The GS2264 Quad is available in Green SOP-14 and TSSOP-14 packages.

## Applications

- Instrumentation
- Active Filters, ASIC Input or Output Amplifier
- Sensor Interface
- Motor Control
- Industrial Control

## Pin Configuration

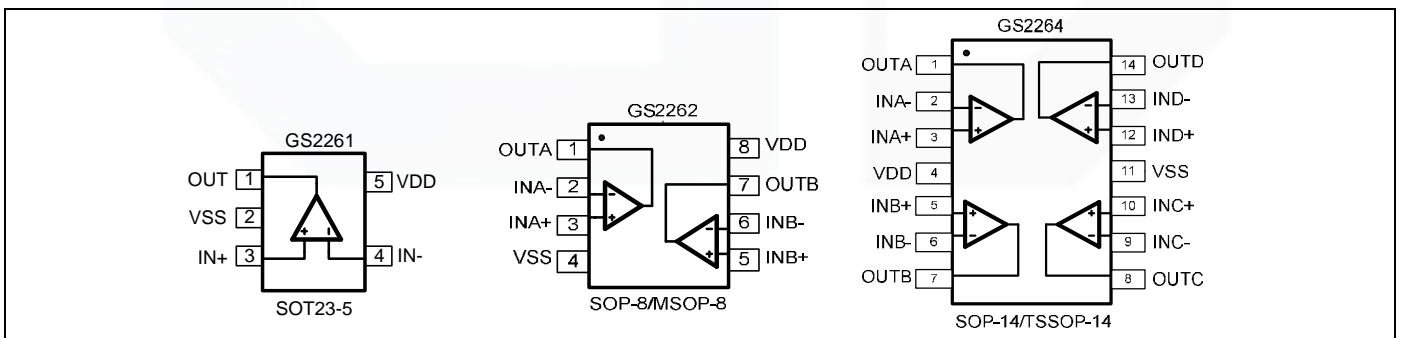


Figure 1. Pin Assignment Diagram

## Absolute Maximum Ratings

Condition	Min	Max
Power Supply Voltage ( $V_{DD}$ to $V_{SS}$ )	-0.5V	+40V
Analog Input Voltage (IN+ or IN-)	$V_{SS}-0.5V$	$V_{DD}+0.5V$
PDB Input Voltage	$V_{SS}-0.5V$	+40V
Operating Temperature Range	-40°C	+125°C
Junction Temperature	+160°C	
Storage Temperature Range	-55°C	+150°C
Lead Temperature (soldering, 10sec)	+260°C	
<b>Package Thermal Resistance (<math>T_A=+25^\circ\text{C}</math>)</b>		
SOP-8, $\theta_{JA}$	125°C/W	
MSOP-8, $\theta_{JA}$	216°C/W	
SOT23-5, $\theta_{JA}$	190°C/W	
SOP-14, $\theta_{JA}$	120°C/W	
TSSOP-14, $\theta_{JA}$	180°C/W	
<b>ESD Susceptibility</b>		
HBM	2KV	
MM	300V	

**Note:** Stress greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions outside those indicated in the operational sections of this specification are not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

## Package/Ordering Information

MODEL	CHANNEL	ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	MARKING INFORMATION
GS2261	Single	GS2261-TR	SOT23-5	Tape and Reel,3000	2261
GS2262	Dual	GS2262-SR	SOP-8	Tape and Reel,4000	GS2262
		GS2262-MR	MSOP-8	Tape and Reel,3000	GS2262
GS2264	Quad	GS2264-TR	TSSOP-14	Tape and Reel,3000	GS2264
		GS2264-SR	SOP-14	Tape and Reel,2500	GS2264

## Electrical Characteristics

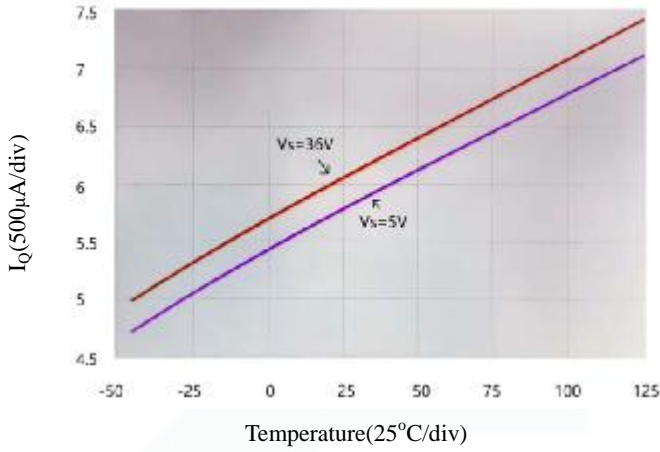
(All test condition is  $V_S = 30V$ ,  $T_A = 25^\circ C$ ,  $R_L = \infty$ , unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	GS2261/2262/2264			
			TYP	MIN	MAX	UNITS
<b>INPUT CHARACTERISTICS</b>						
Input Offset Voltage	$V_{OS}$	$V_{CM} = V_S/2$	1.4	-100	100	$\mu V$
Input Bias Current	$I_B$		100			pA
Input Offset Current	$I_{OS}$		25			pA
Common-Mode Voltage Range	$V_{CM}$	$V_S = 30V$	0 to $(V_S - 1.5V)$			V
Common-Mode Rejection Ratio	CMRR	$V_S = 30V, V_{CM} = 0V$ to 28.5V	120	100		dB
Open-Loop Voltage Gain	$A_{OL}$	$V_S = 30V, R_L = 10k\Omega, V_{CM} = 0V$ to 28.5V	130	100		dB
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$		2.0			$\mu V/^\circ C$
<b>OUTPUT CHARACTERISTICS</b>						
Output Voltage Swing from Rail	$V_{OH}$	$V_S = 30V, R_L = 10k\Omega$	29.85	29.65		V
	$V_{OL}$		100		300	mV
	$V_{OH}$	$V_S = 30V, R_L = 2k\Omega$	29.25	28.0		V
	$V_{OL}$		500		1500	mV
Output Current	$I_{SOURCE}$	$V_S = 30V$	39			mA
	$I_{SINK}$		35			
<b>POWER SUPPLY</b>						
Operating Voltage Range			3.3			V
			36			V
Power Supply Rejection Ratio	PSRR	$V_S = +3.3V$ to +30V, $V_{CM} = +0.5V$	120	100		dB
Quiescent Current / Amplifier	$I_Q$		2.7			mA
<b>DYNAMIC PERFORMANCE</b>						
Gain-Bandwidth Product	GBP		11			MHz
Slew Rate	SR	$G = +1, 5V$ Output Step	23			V/ $\mu s$
<b>NOISE PERFORMANCE</b>						
Input Voltage Noise	$e_{nP-P}$	$f = 0.1Hz$ to 10Hz	3.0			$\mu V_{RMS}$
Input Voltage Noise	$e_n$	$f = 1kHz$	34			nV/ $\sqrt{Hz}$
		$f = 10kHz$	13			

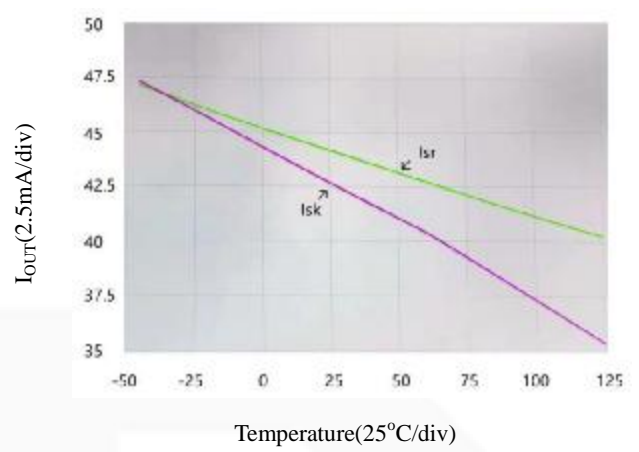
## Typical Performance Characteristics

$T_A=+25^{\circ}\text{C}$ ,  $V_S=+30\text{V}$ , and  $R_L= \infty$  connected to  $V_S/2$ , unless otherwise specified.

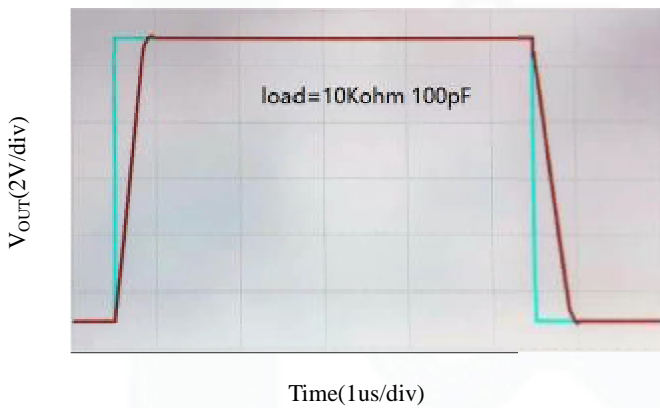
Supply Current(GS2262) vs. Temperature



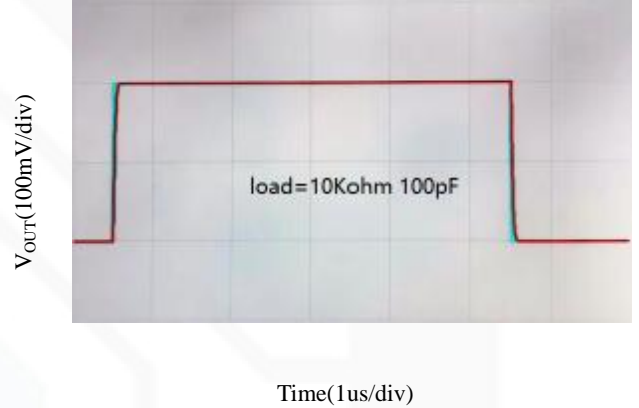
Output Short-Circuit Current vs. Temperature



Large Signal Pulse Response

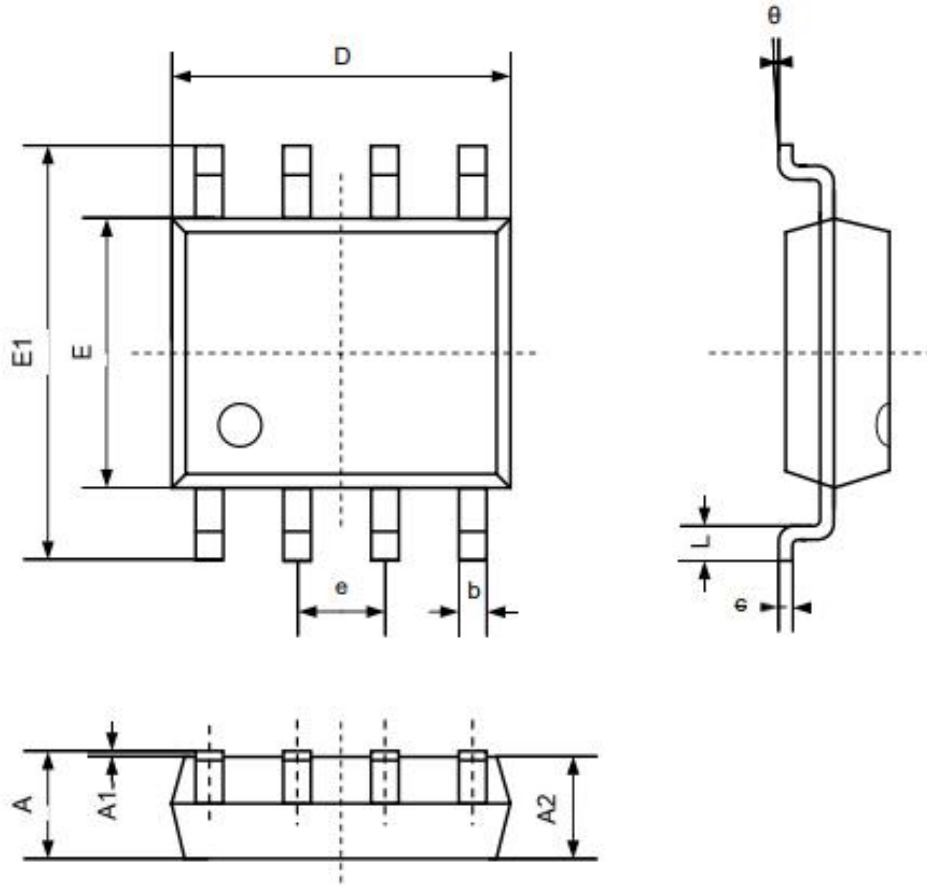


Small Signal Pulse Response



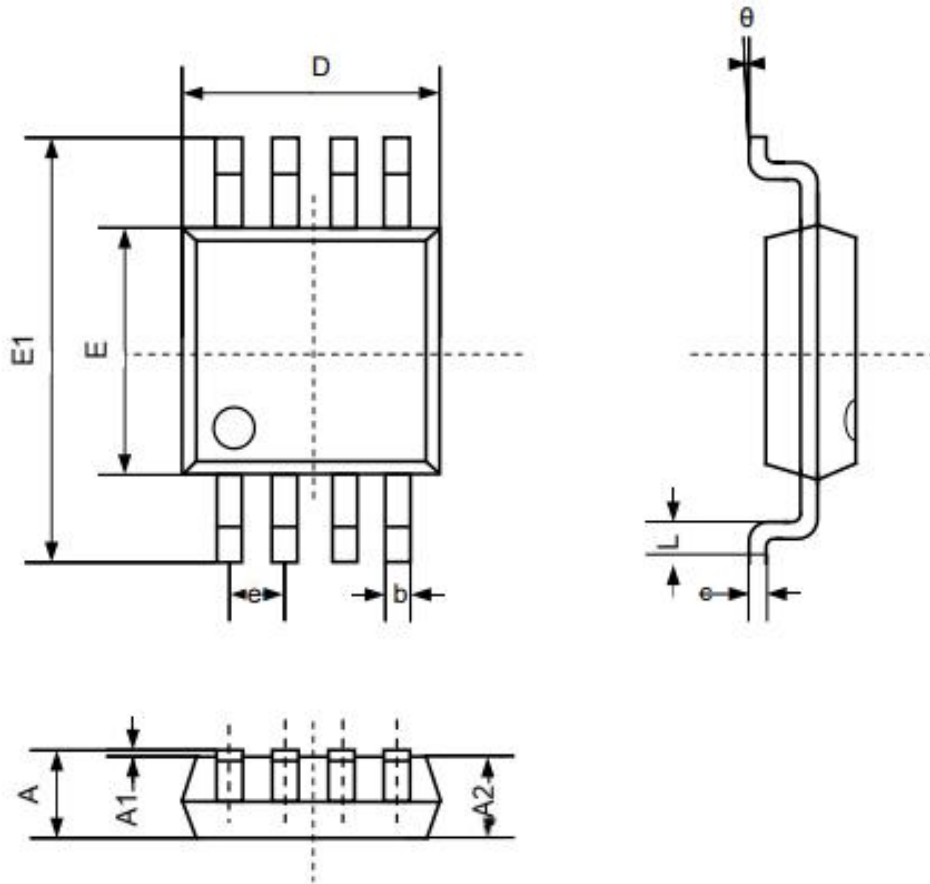
Package Information

SOP-8



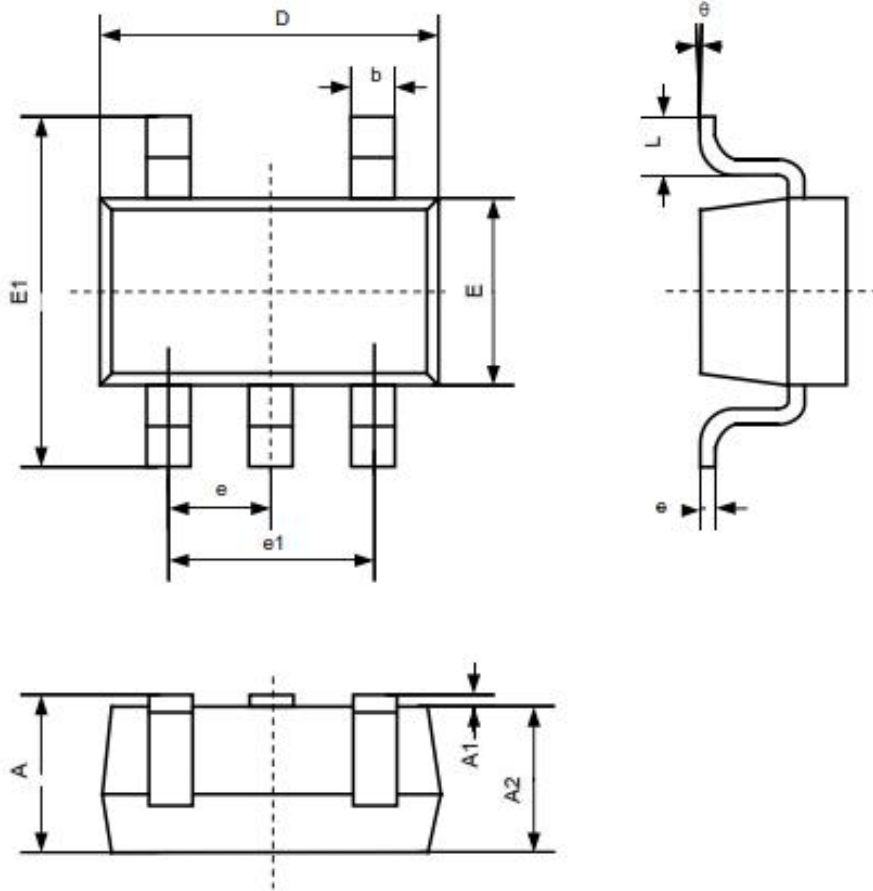
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050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

MSOP-8



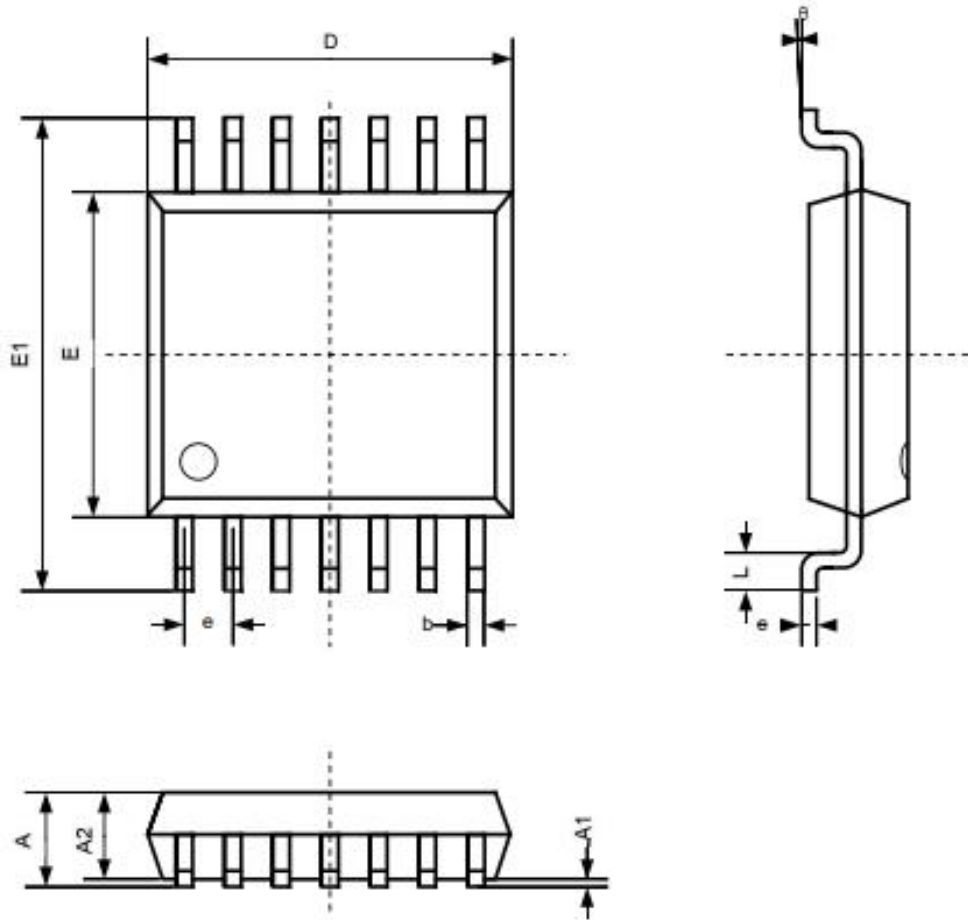
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026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

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
$\theta$	0°	8°	0°	8°

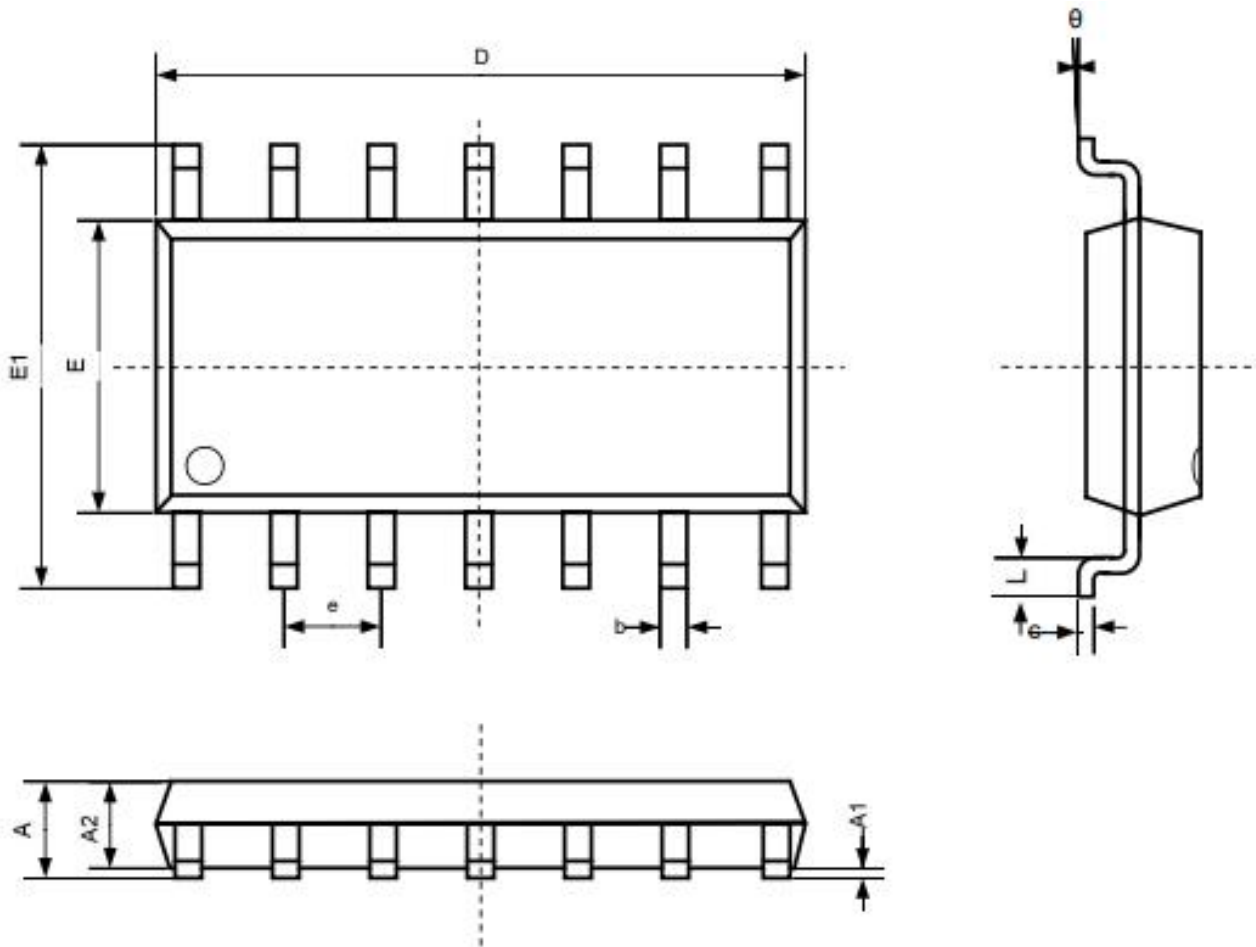
TSSOP-14



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.000	0.031	0.039
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.900	5.100	0.193	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 BSC		0.026 BSC	
L	0.500	0.700	0.020	0.028
θ	1°	7°	1°	7°



SOP-14



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	1.250	1.650	0.049	0.065
b	0.360	0.490	0.014	0.019
c	0.130	0.250	0.005	0.010
D	8.530	8.730	0.336	0.344
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050 BSC	
L	0.450	0.800	0.018	0.032
θ	0°	8°	0°	8°

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