

钍地半导体
Tudi Semiconductor

Product Specification

TUDI-AD8531/AD8532/AD8534

Low Cost, 250 mA Output, Single-Supply Amplifiers

网址 www.sztdbdt.com

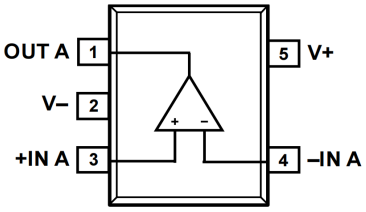
用芯智造·卓越品质

semiconductor device manufacturer

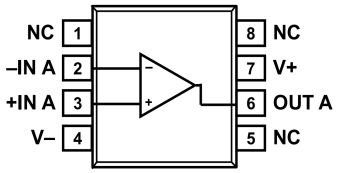
- Design
- research and development
- production
- and sales

FEATURES

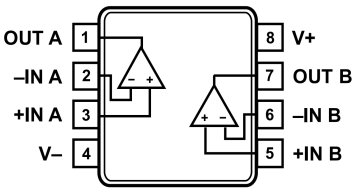
- Single-supply operation: 2.7 V to 6 V
- High output current: ±250 mA
- Low supply current: 750 µA/amplifier
- Wide bandwidth: 1 MHz
- Slew rate: 5 V/µs
- No phase reversal
- Low input currents
- Unity gain stable
- Rail-to-rail input and output



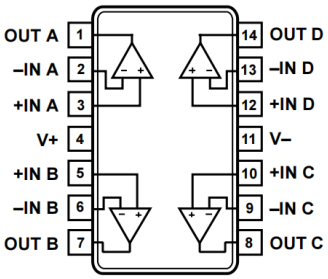
AD8531
5-Lead SC70 and 5-Lead SOT-23



AD8531
8-Lead SOIC



AD8532
8-Lead SOIC, 8-Lead TSSOP,
and 8-Lead MSOP



AD8534
14-Lead SOIC and
14-Lead TSSOP

APPLICATIONS

- Multimedia audio
- LCD drivers
- ASIC input or output amplifiers
- Headphone drivers

DESCRIPTION

The AD8531, AD8532, and AD8534 are single, dual, and quad rail-to-rail input/output single-supply amplifiers featuring 250 mA output drive current. This high output current makes these amplifiers excellent for driving either resistive or capacitive loads. AC performance is very good with 1 MHz bandwidth, 5 V/µs slew rate, and low distortion. All are guaranteed to operate from a 3 V single supply as well as a 5 V supply.

The very low input bias currents enable the AD853x to be used for integrators, diode amplification, and other applications requiring low input bias current. Supply current is only 750 µA per amplifier at 5 V, allowing low current applications to control high current loads.

Applications include audio amplification for computers, sound ports, sound cards, and set-top boxes. The AD853x family is very stable, and it is capable of driving heavy capacitive loads such as those found in LCDs.

The ability to swing rail-to-rail at the inputs and outputs enables designers to buffer CMOS DACs, ASICs, or other wide output swing devices in single-supply systems.

The AD8531/AD8532/AD8534 are specified over the extended industrial temperature range (-40°C to +85°C). The AD8531 is available in 8-lead SOIC, 5-lead SC70, and 5-lead SOT-23 packages. The AD8532 is available in 8-lead SOIC, 8-lead MSOP, and 8-lead TSSOP surface-mount packages. The AD8534 is available in narrow 14-lead SOIC and 14-lead TSSOP surface-mount packages.

ABSOLUTE MAXIMUM RATINGS

Table 1.

Parameter	Rating
Supply Voltage(Vs)	7V
Input Voltage	GND to Vs
Differential Input Voltage(1)	±6V
Storage Temperature Range	-65℃ to+150℃
Operating Temperature Range	-40℃ to+85℃
Junction Temperature Range	-65℃ to+150℃
Lead Temperature(Soldering,60 sec)	300℃

(1)For supplies less than 6 V, the differential input voltage is equal to ±Vs.

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; the functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

THERMAL RESISTANCE

θ_{JA} is specified for the worst-case conditions, that is, a device soldered in a circuit board for surface-mount packages

Table 2.

Package Type	θ_{JA}	θ_{JC}	Unit
5-Lead SC70(KS)	376	126	℃/W
5-Lead SOT-23(RJ)	230	146	℃/W
8-Lead SOIC(R)	158	43	℃/W
8-Lead MSOP(RM)	210	45	℃/W
8-Lead TSSOP(RU)	240	43	℃/W
14-Lead SOIC(R)	120	36	℃/W
14-Lead TSSOP(RU)	240	43	℃/W

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Table 3.

V_S= 3.0 V, V_{CM}= 1.5 V, T_A= 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	Vos				25	mV
		-40°C≤T_A≤+85°C			30	mV
Input Bias Current	I_B			5	50	pA
		-40°C≤T_A≤+85°C			60	pA
Input Offset Current	Ios			1	25	pA
		-40°C≤T_A≤+85°C			30	pA
Input Voltage Range			0		3	V
Common-Mode Rejection Ratio	CMRR	V_{CM}=0V to 3V	38	45		dB
Large Signal Voltage Gain	Avo	R_L=2kΩ,Vo=0.5V to 2.5V		25		V/mV
Offset Voltage Drift	△Vos/△T			20		μV/ °C
Bias Current Drift	△Is/ΔT			50		fA/°C
Offset Current Drift	△Ios/ΔT			20		fA/°C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	I_L=10 mA	2.85	2.92		V
		-40°C≤TA≤+85°C	2.8			V
Output Voltage Low	V_{OL}	I_L= 10 mA		60	100	mV
		-40°C≤TA≤+85°C			125	mV
Output Current	I_{OUT}			±250		mA
Closed-Loop Output Impedance	Z_{OUT}	f=1MHz,Av=1		60		Ω
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	Vs=3V to 6V	45	55		dB
Supply Current/Amplifier	I_{SY}	Vo=0V		0.70	1	mA
		-40°C≤T_A≤+85°C			1.25	mA

Table 3 . (Continue)

V_S= 3.0 V, V_{CM}= 1.5 V, T_A= 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L=2kΩ		3.5		V/us
Settling Time	ts	To 0.01%		1.6		μs
Gain Bandwidth Product	GBP			2.2		MHz
Phase Margin	φo			70		Degrees
Channel Separation	CS	f=1kHz,R_L=2kΩ		65		dB
NOISE PERFORMANCE						
Voltage Noise Density	e_n	f=1kHz		45		nV/√Hz
		f=10kHz		30		nV/√Hz
Current Noise Density	i_n	f=1kHz		0.05		pA/√Hz

V_S= 5.0 V, V_{CM} = 2.5 V, T_A = 25°C, unless otherwise noted.

Table 4.

V_S= 5.0 V, V_{CM} = 2.5 V, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	Vos				25	mV
		-40°C≤T_A≤+85°C			30	mV
Input Bias Current	I_B			5	50	pA
		-40°C≤T_A≤+85°C			60	pA
Input Offset Current	Ios			1	25	pA
		-40°C≤T_A≤+85°C			30	pA
Input Voltage Range			0		5	V
Common-Mode Rejection Ratio	CMRR	V_{CM}=0V to 5V	38	47		dB
Large Signal Voltage Gain	Avo	R_L=2kΩ,Vo=0.5V to 4.5V	15	80		V/mV
Offset Voltage Drift	△Vos/△T	-40°C≤T_A≤+85°C		20		μV/ °C
Bias Current Drift	△Is/ΔT			50		fA/°C
Offset Current Drift	△Ios/△T			20		fA/°C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	I_L= 10mA	4.9	4.94		V
		-40°C≤T_A≤+85°C	4.85			V
Output Voltage Low	V_{OL}	I_L=10mA		50	100	mV
		-40°C≤T_A≤+85°C			125	mV
Output Current	I_{OUT}			±250		mA
Closed-Loop Output Impedance	Z_{OUT}	f=1MHz,Av=1		40		Ω
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	Vs=3V to 6V	45	55		dB
Supply Current/Amplifier	I_{SY}	Vo=0V		0.75	1.25	mA
		-40°C≤T_A≤+85°C			1.75	mA

Table 4.(Continued)

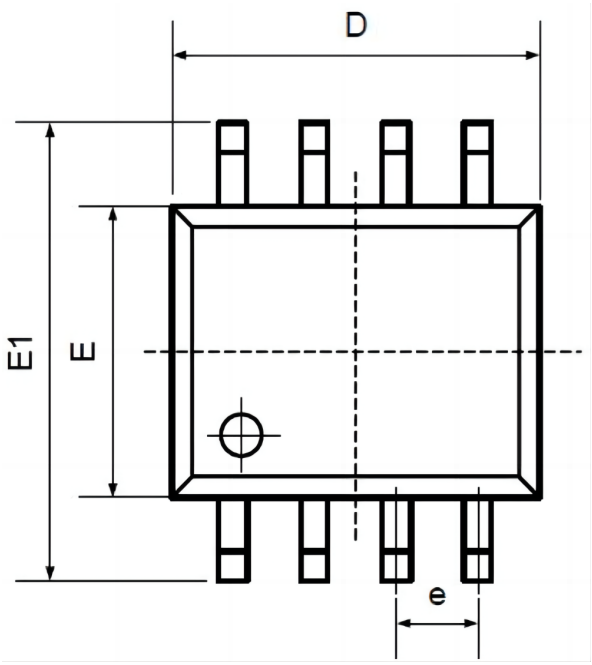
V_S= 5.0 V, V_{CM} = 2.5 V, T_A = 25°C, unless otherwise noted.

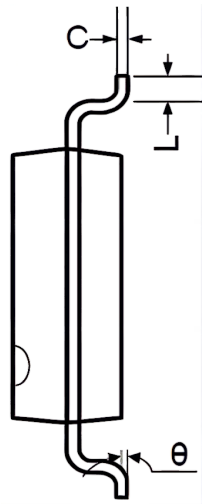
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L=2kΩ		5		V/μs
Full-Power Bandwidth	BWp	1%distortion		350		kHz
Settling Time	t_s	To 0.01%		1.4		μs
Gain Bandwidth Product	GBP			1		MHz
Phase Margin	φo			70		Degrees
Channel Separation	CS	f=1kHz,RL=2kΩ		65		dB
NOISE PERFORMANCE						
Voltage Noise Density	e_n	f=1kHz		45		nV/√Hz
		f=10 kHz		30		nV/√Hz
Current Noise Density	i_n	f=1kHz		0.05		pA/√Hz

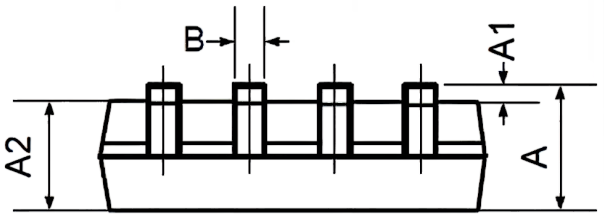
Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
AD8531AKSZ-REEL-TUDI	SC70-5	Tape,Reel,3000	A7B	−40°C to +85°C
AD8531ARTZ-REEL-TUDI	SOT23-5	Tape,Reel,3000	A0Q	
AD8531ARZ-REEL-TUDI	SOP8	Tape,Reel,4000	8531A	
AD8532ARUZ-REEL-TUDI	TSSOP8	Tape,Reel,4000	8532A	
AD8532ARMZ-REEL-TUDI	MSOP8	Tape,Reel,4000	A0R	
AD8532ARZ-REEL-TUDI	SOP8	Tape,Reel,4000	8532A	
AD8534ARUZ-REEL-TUDI	TSSOP14	Tape,Reel,4000	AD8534	
AD8534ARZ-REEL-TUDI	SOP14	Tape,Reel,4000	8534A	

Package SOP8

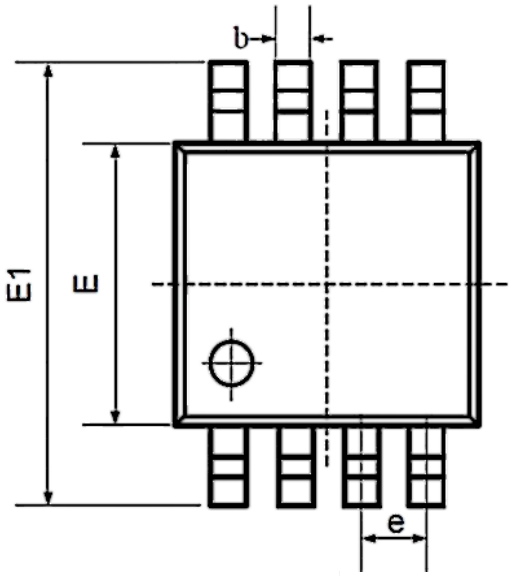


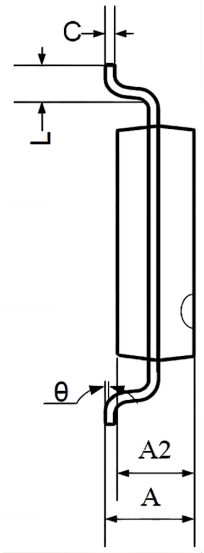


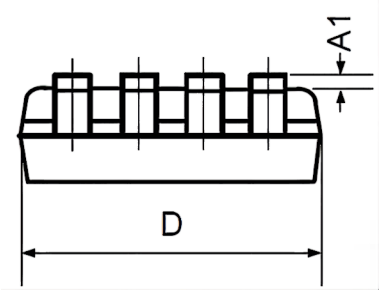


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Package MSOP8

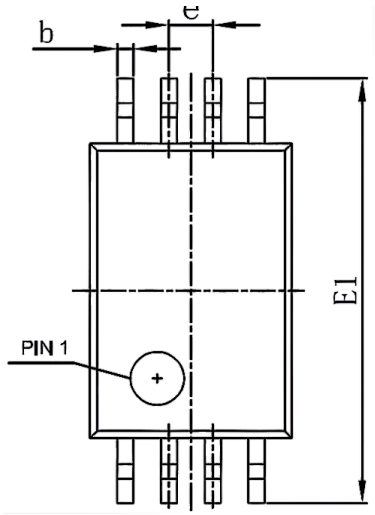


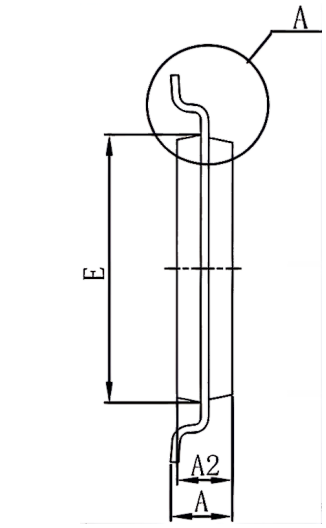


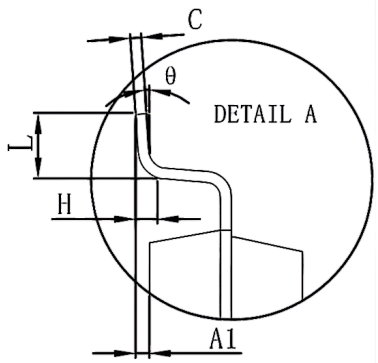


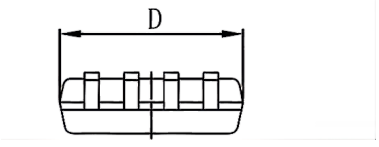
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
A1	0.000	0.200	0.000	0.008
A2	0.760	0.970	0.030	0.038
b	0.30 TYP		0.012 TYP	
C	0.15 TYP		0.006 TYP	
D	2.900	3.100	0.114	0.122
e	0.65 TYP		0.026 TYP	
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201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

Package TSSOP8



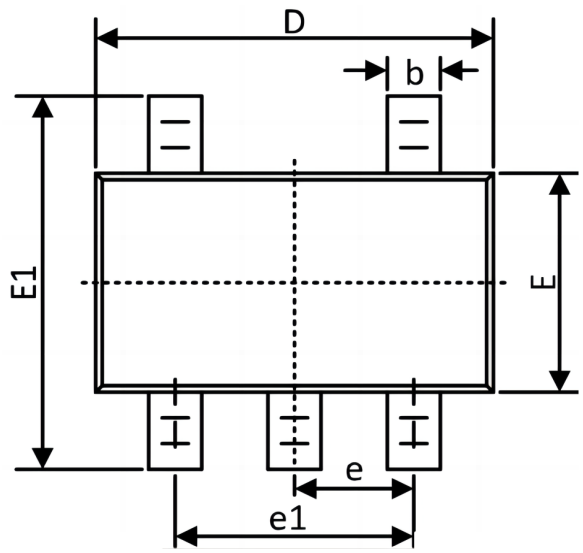


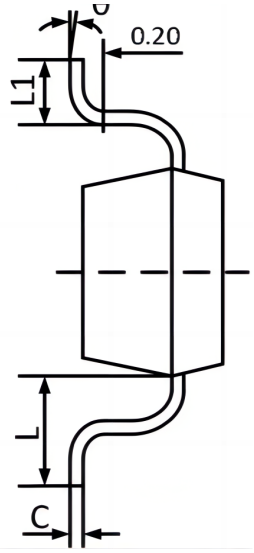


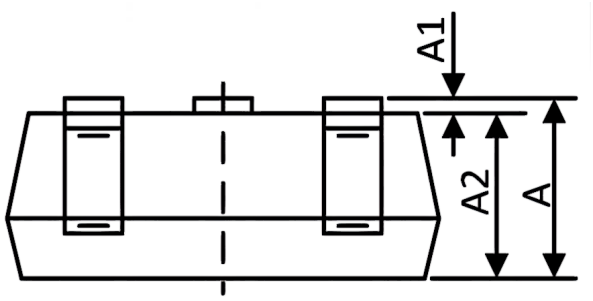


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	2.900	3.100	0.114	0.122
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
C	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.200		0.047
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65(BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°		1°	

Package SOT23-5

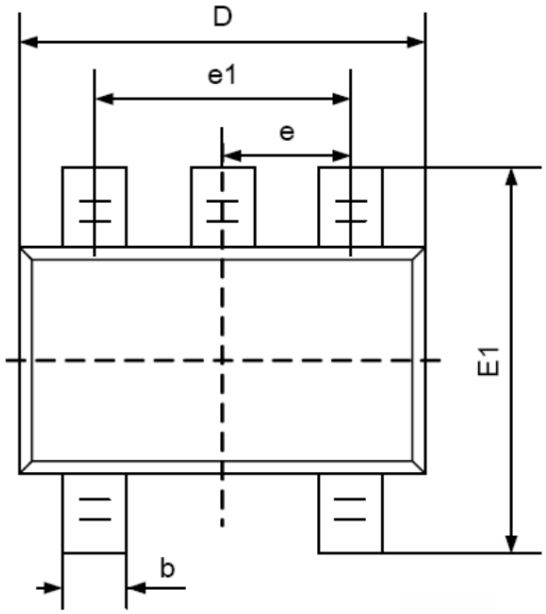


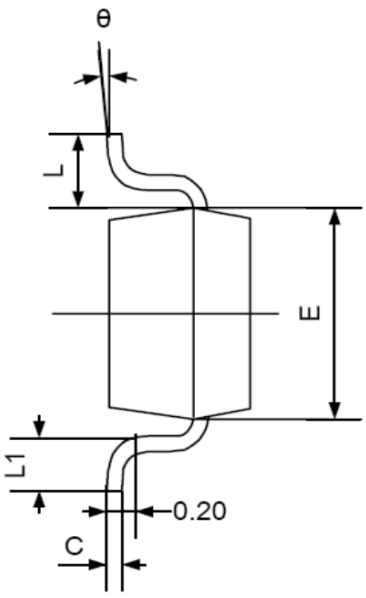


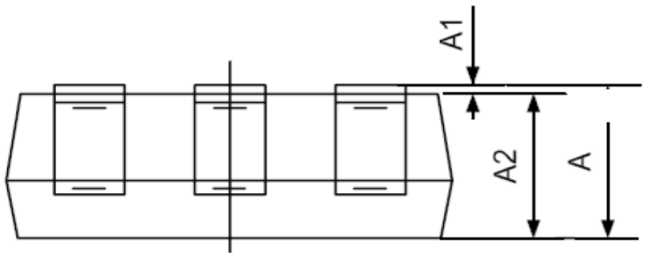


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.400	0.012	0.016
C	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Package SC70-5

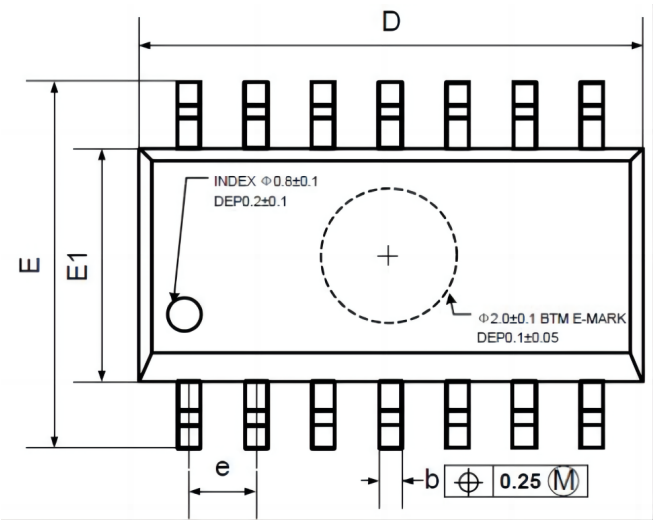


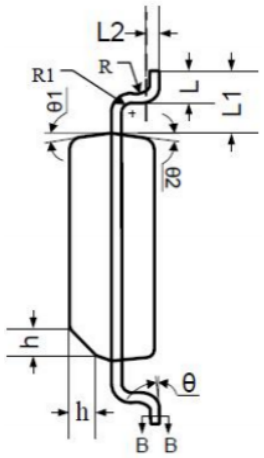


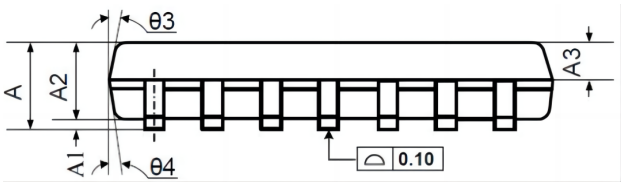


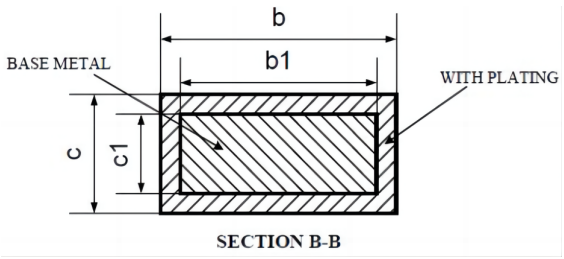
Symbol	DimensionsIn Millimeters		DimensionsIn Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
C	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

Package SOP14



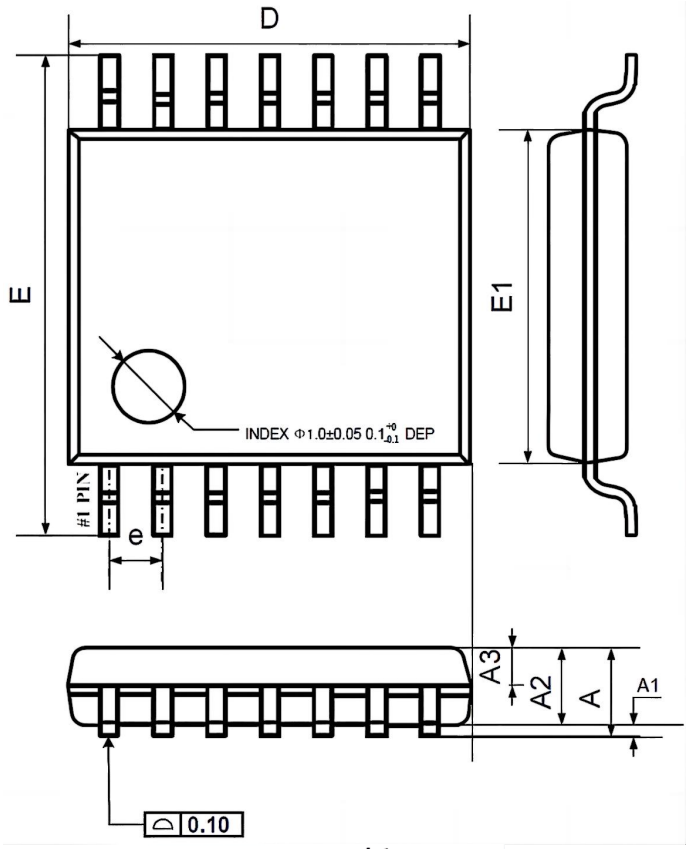


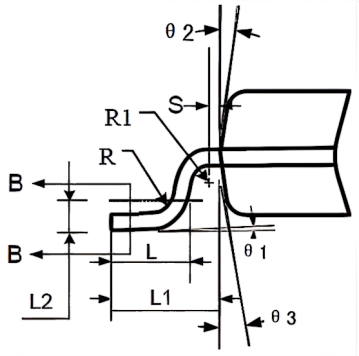


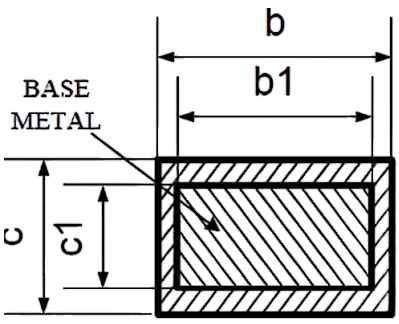


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	1.35	1.60	1.75
A1	0.10	0.15	0.25
A2	1.25	1.45	1.65
A3	0.55	0.65	0.75
b	0.36		0.49
b1	0.35	0.40	0.45
C	0.16		0.25
c1	0.15	0.20	0.25
D	8.53	8.63	8.73
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
L	0.45	0.60	0.80
L1	1.04 REF		
L2	0.25 BSC		
R	0.07		
R1	0.07		
h	0.30	0.40	0.50
θ	0°		8°
θ1	6°	8°	10°
θ2	6°	8°	10°
θ3	5°	7°	9°
θ4	5°	7°	9°

Package TSSOP14







Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	—	0.15
A2	0.90	1.00	1.05
A3	0.34	0.44	0.54
b	0.20	—	0.28
b1	0.20	0.22	0.24
C	0.10	—	0.19
c1	0.10	0.13	0.15
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	—	—
R1	0.09	—	—
S	0.20	—	—
θ1	0°	—	8°
θ2	10°	12°	14°
θ3	10°	12°	14°

Important statement:

●TUDI Semiconductor reserves the right to modify the product manual without prior notice! Before placing an order, customers need to confirm whether the obtained information is the latest version and verify the completeness of the relevant information.

●Any semi-guide product is subject to failure or malfunction under specified conditions. It is the buyer's responsibility to comply with safety standards when using TUDI Semiconductor products for system design and whole machine manufacturing.And take the appropriate safety measures to avoid the potential in the risk of loss of personal injury or loss of property situation!

●TUDI Semiconductor products have not been licensed for life support, military, and aerospace applications,and therefore TUDI Semiconductor is not responsible for any consequences arising from the use of this product in these areas.

●If any or all TUDI Semiconductor products (including technical data, services) described or contained in this document are subject to any applicable local export control laws and regulations, they may not be exported without an export license from the relevant authorities in accordance with such laws.

●The specifications of any and all TUDI Semiconductor products described or contained in this document specify the performance, characteristics, and functionality of said products in their standalone state, but do not guarantee the performance, characteristics, and functionality of said products installed in Customer's products or equipment. In order to verify symptoms and conditions that cannot be evaluated in a standalone device, the Customer should ultimately evaluate and test the device installed in the Customer's product device.

●TUDI Semiconductor documentation is only allowed to be copied without any alteration of the content and with the relevant authorization.TUDI Semiconductor assumes no responsibility or liability for altered documents.

●TUDI Semiconductor is committed to becoming the preferred semiconductor brand for customers, and TUDI Semiconductor will strive to provide customers with better performance and better quallity products.