

钍地半导体
Tudi Semiconductor

Product Specification

TUDI-AD8571/AD8572/AD8574

Zero-Drift, Single-Supply, Rail-to-Rail Input /Output Operational Amplifiers

网址 www.sztdbdt.com

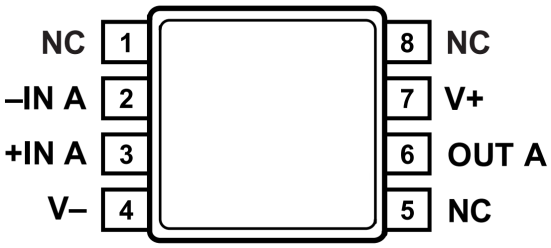
用芯智造·卓越品质

semiconductor device manufacturer

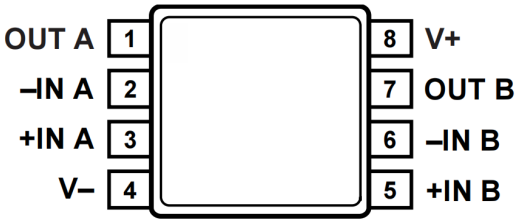
- Design
- research and development
- production
- and sales

FEATURES

- Low offset voltage: 1 μV
- Input offset drift: 0.005 μV/°C
- Rail-to-rail input and output swing
- 5 V/2.7 V single-supply operation
- High gain: 145 dB typical
- CMRR: 140 dB typical
- PSRR: 130 dB typical
- Ultralow input bias current: 10 pA typical
- Low supply current: 750 μA per op amp
- Overload recovery time: 50 μs
- No external capacitors required



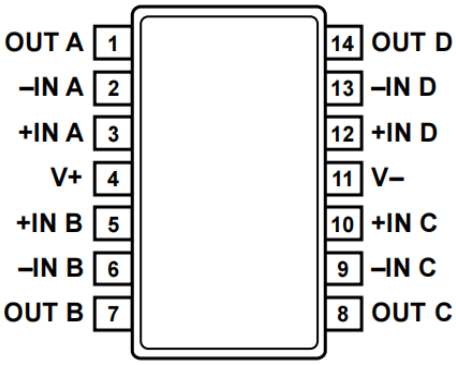
AD8571 SOP8/MSOP8



AD8572 SOP8/TSSOP8

APPLICATIONS

- Temperature sensors
- Pressure sensors
- Precision current sensing
- Strain gage amplifiers
- Medical instrumentation
- Thermocouple amplifiers



AD8574 SOP14/TSSOP14

DESCRIPTION

This family of amplifiers has ultralow offset, drift, and bias current. The AD8571/AD8572/AD8574 are single, dual, and quad amplifiers, respectively, featuring rail-to-rail input and output swings. All are guaranteed to operate from 2.7 V to 5 V single supply.

The AD8571/AD8572/AD8574 provide benefits previously found only in expensive auto-zeroing or chopper-stabilized amplifiers. Using Analog Devices, Inc., topology, these zero-drift amplifiers combine low cost with high accuracy. (No external capacitors are required.) Using a spread-spectrum,auto-zero technique, the AD8571/AD8572/AD8574 eliminate the intermodulation effects from interaction of the chopping function with the signal frequency in ac applications.

With an offset voltage of only 1 μV and drift of 0.005 μV/°C, the AD8571/AD8572/AD8574 are perfectly suited for applications where error sources cannot be tolerated. Position and pressure sensors, medical equipment, and strain gage amplifiers benefit greatly from nearly zero drift over their operating temperature range. Many more systems require the rail-to-rail input and output swings provided by the AD8571/AD8572/AD8574.

The AD8571/AD8572/AD8574 are specified for the extended industrial/ automotive temperature range (-40°C to +125°C). The AD8571 single amplifier is available in 8-lead MSOP and narrow SOIC packages. The AD8572 dual amplifier is available in 8-lead narrow SOIC and surface-mount TSSOP packages. The AD8574 quad amplifier is available in 14-lead narrow SOIC and TSSOP packages.

ABSOLUTE MAXIMUM RATINGS

Table 1.

Parameter	Rating
Supply Voltage	6V
Input Voltage	GND-0.3Vto V_S+0.3V
Differential Input Voltage(1)	±5.0V
ESD(Human Body Model)	2000V
Output Short-Circuit Duration to GND	Indefinite
Storage Temperature Range	-65℃ to +150℃
Operating Temperature Range	-40℃ to +125℃
Junction Temperature Range	-65℃ to+150℃
Lead Temperature(Soldering,60 sec)	300℃

(1)Differential input voltage is limited to ±5.0 V or the supply voltage, whichever is less.

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

SPECIFICATIONS

5 V ELECTRICAL CHARACTERISTICS

Table 2.

V_S = 5 V, V_{CM} = 2.5 V, V_O = 2.5 V, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	Vos			1	5	μV
		-40°C≤T_A≤+125°C			10	μ V
Input Bias Current	I_B			10	50	pA
AD8571/AD8574		-40°C≤T_A≤+125°C		1.0	1.5	nA
AD8572		-40°C≤T_A≤+85°C		160	300	pA
		-40°C≤T_A≤+125°C		2.5	4	nA
Input Offset Current	Ios			20	70	pA
AD8571/AD8574		-40°C≤T_A≤+125°C		150	200	pA
AD8572		-40°C≤T_A≤+85°C		30	150	pA
		-40°C≤T_A≤+125°C		150	400	pA
Input Voltage Range			0		5	V
Common-Mode Rejection Ratio	CMRR	V_{CM}=0V to 5V	120	140		dB
Large Signal Voltage Gain	Avo	-40°C≤T_A≤+125°C	115	130		dB
		R_L=10kΩ,Vo=0.3V to 4.7V	125	145		dB
		-40°C≤T_A≤+125°C	120	135		dB
Offset Voltage Drift	△Vos/ ΔT	-40°C≤T_A≤+125°C		0.005	0.04	μV/ °C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	R_L=100 kΩ to GND	4.99	4.998		V
		R_L=100 kΩ to GND@-40°C to+125°C	4.99	4.997		V
		R_L=10kΩ to GND	4.95	4.98		V
		R_L=10 kΩ to GND@-40°C to +125°C	4.95	4.975		V
Output Voltage Low	V_{OL}	R_L=100 kΩ toV+		1	10	mV
		R_L=100 kΩ to V+@-40°C to +125°C		2	10	mV
		RL=10kΩ to V+		10	30	mV
		R_L=10 kΩ toV+@-40°C to +125°C		15	30	mV

Table 2.(Continued)

V_S = 5 V, V_{CM} = 2.5 V, V_O = 2.5 V, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Short-Circuit Limit	Isc		±25	±50		mA
		-40℃ to+125℃		±40		mA
Output Current	I_O			±30		mA
		-40℃ to+125℃		±15		mA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	Vs=2.7V to 5.5V	120	130		dB
		-40℃≤T_A≤+125℃	115	130		dB
Supply Current per Amplifier	I_{SY}	Vo=0V		850	975	μA
		-40℃≤T_A≤+125℃		1000	1075	μA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L=10 kΩ		0.4		V/μs
Overload Recovery Time				0.05	0.3	ms
Gain Bandwidth Product	GBP			1.5		MHz
NOISE PERFORMANCE						
Voltage Noise	e_n p-p	0Hz to 10 Hz		1.3		μV p-r
		0Hz to 1 Hz		0.41		μV p-p
Voltage Noise Density	e_n	f=1kHz		51		nV/√Hz
Current Noise Density	i_n	f=10Hz		2		fA/√ Hz

2.7 V ELECTRICAL CHARACTERISTICS

Table 3.

V_S = 2.7 V, V_{CM} = 1.35 V, V_O = 1.35V , T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	Vos			1	5	μV
		-40°C≤T_A≤+125°C			10	μV
Input Bias Current	I_B			10	50	pA
AD8571/AD8574		-40°C≤T_A≤+125°C		1.0	1.5	nA
AD8572		-40°C≤T_A≤+85°C		160	300	pA
		-40°C≤T_A≤+125°C		2.5	4	nA
Input Offset Current	Ios			10	50	pA
AD8571/AD8574		-40°C≤T_A≤+125°C		150	200	pA
AD8572		-40°C≤T_A≤+85°C		30	150	pA
		-40°C≤T_A≤+125°C		150	400	pA
Input Voltage Range			0		2.7	V
Common-Mode Rejection Ratio	CMRR	VCM=0V to 2.7V	115	130		dB
		-40°C≤T_A≤+125°C	110	130		dB
Large Signal Voltage Gain	Avo	R_L=10kΩ,Vo=0.3 Vto 2.4V	110	140		dB
		-40°C≤T_A≤+125°C	105	130		dB
Offset Voltage Drift	△Vos/△T	-40°C≤T_A≤+125°C		0.005	0.04	μV/ °C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	R_L=100 kΩ to GND	2.685	2.697		V
		R_L=100 kQ to GND@-40°C to +125°C	2.685	2.696		V
		R_L=10kΩ to GND	2.67	2.68		V
		R_L=10kQ to GND@-40°C to+125°C	2.67	2.675		V
Output Voltage Low	V_{OL}	R_L=100 kΩ to V+		1	10	mV
		R_L=100 kΩ to V+@-40°C to+125°C		2	10	mV
		R_L=10kΩ to V+		10	20	mV
		R_L=10 k toV+@-40°C to +125°C		15	20	mV

Table 3.(Continued)

V_S = 2.7 V, V_{CM} = 1.35 V, V_O = 1.35V , T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Short-Circuit Limit	Isc		±10	±15		mA
		-40℃ to +125℃		±10		mA
Output Current	Io			±10		mA
		-40℃ to+125℃		±5		mA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	Vs=2.7V to 5.5V	120	130		dB
		-40℃≤T_A≤+125℃	115	130		dB
Supply Current per Amplifier	I_{SY}	Vo=0V		750	900	μA
		-40℃≤T_A≤+125℃		950	1000	μA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L=10kΩ		0.5		V/μs
Overload Recovery Time				0.05		ms
Gain Bandwidth Product	GBP			1		MHz
NOISE PERFORMANCE						
Voltage Noise	e_n p-p	0 Hz to 10 Hz		2.0		μV p-p
Voltage Noise Density	e_n	f=1kHz		94		nV/ √Hz
Current Noise Density	i_n	f=10Hz		2		fA/√ Hz

THERMAL CHARACTERISTICS

θ_{JA} is specified for the worst-case conditions, that is, θ_{JA} is specified for a device soldered in a circuit board for SOIC and TSSOP packages.

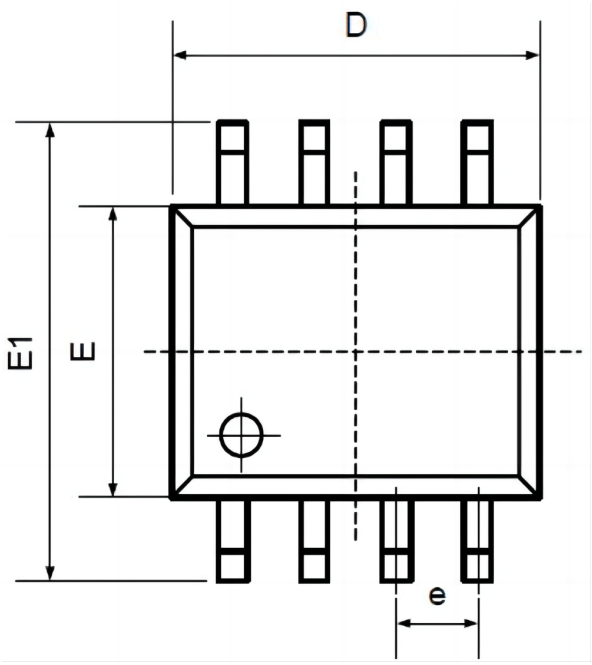
Table 4. Thermal Resistance

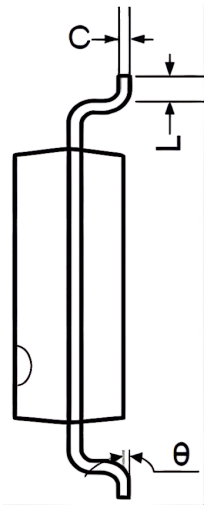
Package Type	θ_{JA}	θ_{JC}	Unit
8-Lead SOIC(R)	158	43	℃/W
8-Lead MSOP(RM)	190	44	℃/W
8-Lead TSSOP(RU)	240	43	℃/W
14-Lead SOIC(R)	120	36	℃/W
14-Lead TSSOP(RU)	180	36	℃/W

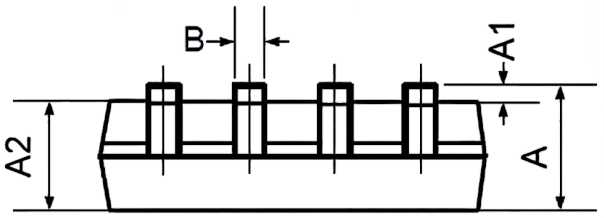
Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
AD8571ARZ-REEL-TUDI	SOP8	Tape,Reel,4000	8571A	−40°C to +125°C
AD8571ARMZ-REEL-TUDI	MSOP8	Tape,Reel,4000	AJA	
AD8572ARUZ-REEL-TUDI	TSSOP8	Tape,Reel,4000	8572A	
AD8572ARZ-REEL-TUDI	SOP8	Tape,Reel,4000	8572A	
AD8574ARUZ-REEL-TUDI	TSSOP14	Tape,Reel,4000	8574A	
AD8574ARZ-REEL-TUDI	SOP14	Tape,Reel,4000	AD8574A	

Package SOP8

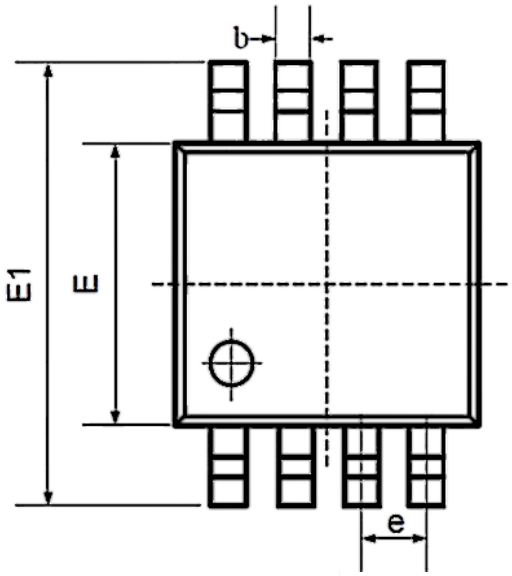


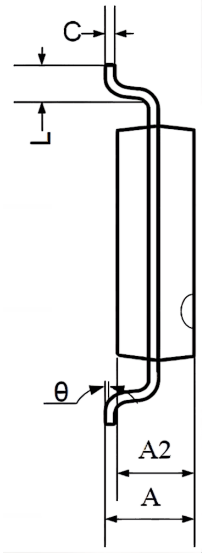


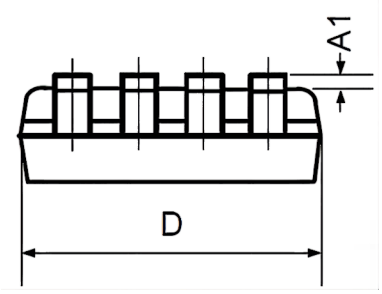


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP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

Package MSOP8

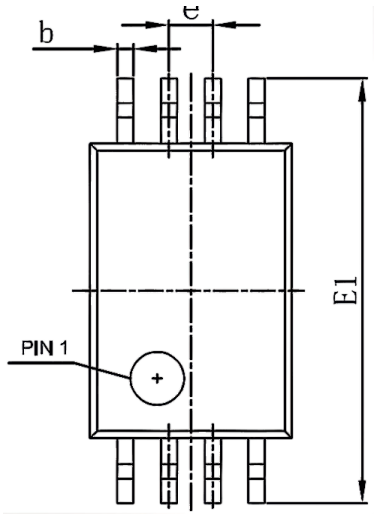


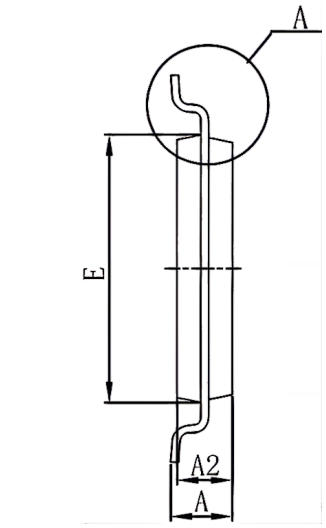


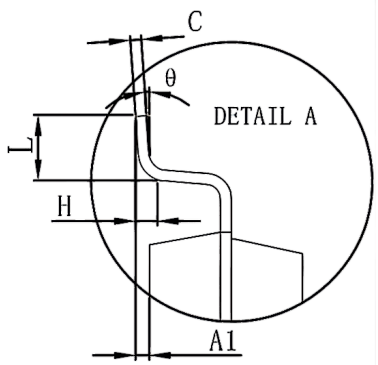


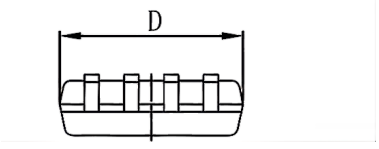
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
A1	0.000	0.200	0.000	0.008
A2	0.760	0.970	0.030	0.038
b	0.30 TYP		0.012 TYP	
C	0.15 TYP		0.006 TYP	
D	2.900	3.100	0.114	0.122
e	0.65 TYP		0.026 TYP	
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201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

Package TSSOP8



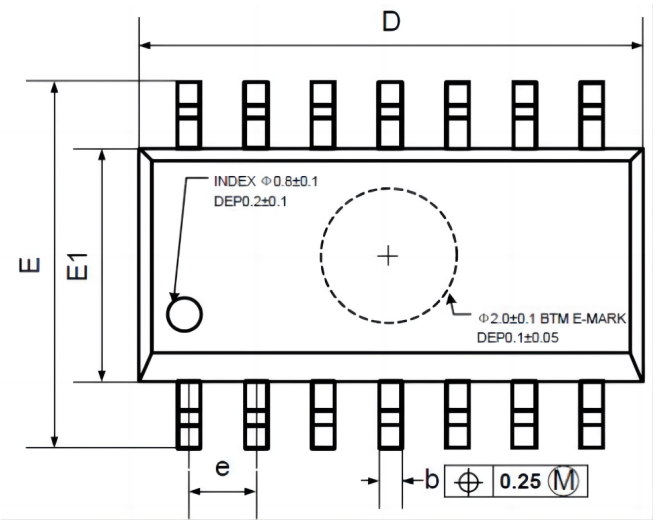


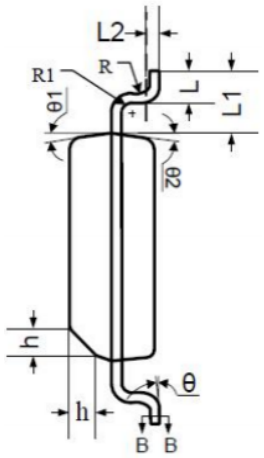


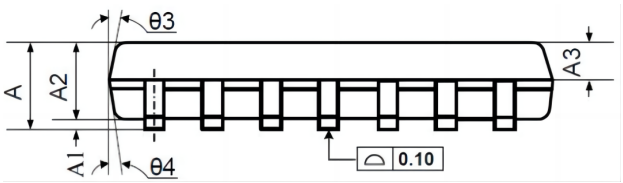


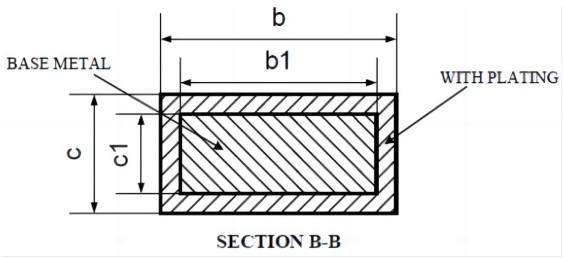
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	2.900	3.100	0.114	0.122
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
C	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.200		0.047
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65(BSC)		0.026(BSC)	
L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

Package SOP14



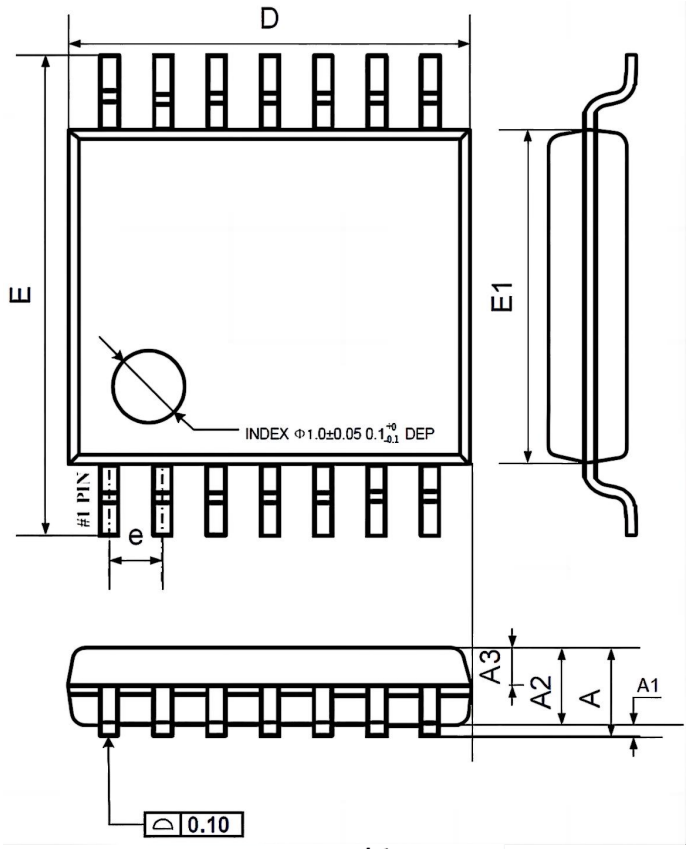


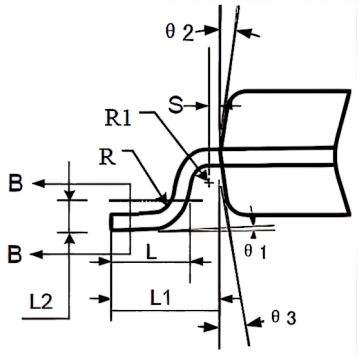


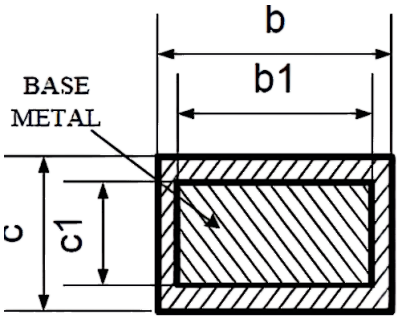


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	1.35	1.60	1.75
A1	0.10	0.15	0.25
A2	1.25	1.45	1.65
A3	0.55	0.65	0.75
b	0.36		0.49
b1	0.35	0.40	0.45
C	0.16		0.25
c1	0.15	0.20	0.25
D	8.53	8.63	8.73
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
L	0.45	0.60	0.80
L1	1.04 REF		
L2	0.25 BSC		
R	0.07		
R1	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.