



钰地半导体  
Tudi Semiconductor

## Product Specification

TUDI-RC4558

网址 [www.sztdbdt.com](http://www.sztdbdt.com) Q

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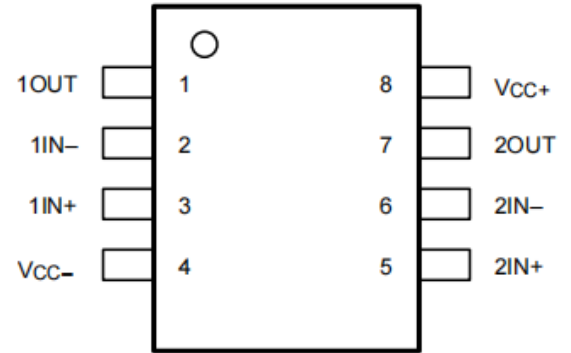
**semiconductor device  
manufacturer**

- Design
- research and development
- production
- and sales



## Features

- Wide common-mode and differential voltage ranges
- No frequency compensation required
- low power consumption
- No latch
- Gain Bandwidth Product: Typical Value: 4 MHz
- Gain and Phase Matching Between Amplifiers
- Low noise: The typical value at 10 kHz is 6.5nV/ Hz.
- Low distortion and noise: 0.0001% at 1 kHz



Pin description

## Description

The RC4558 is a dual-channel universal operational amplifier featuring a wide supply voltage range (10 V to 30 V), low noise (6.5nV/ Hz), and excellent distortion performance (0.0001% THD+N), making it suitable for a variety of audio applications.

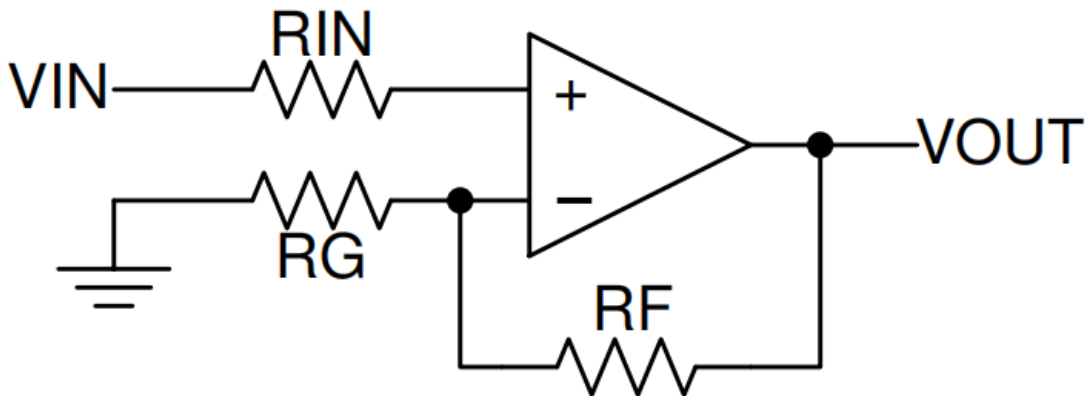
The wide common-mode input voltage range and latch-free characteristics make this device highly suitable for voltage follower applications. Its internal frequency compensation ensures stability without the need for external components.

## Applications

- AV receiver
- Professional mixer
- Soundbar
- Wireless speaker



Electrostatic discharge (ESD) can damage this integrated circuit. Recommends handling all integrated circuits with proper precautions. Failure to follow correct and installation procedures may damage the integrated circuit.ESD damage can range from minor performance degradation to total device failure. Precision integrated circuits may be more susceptible to damage because even very slight changes can cause the device to deviate from its published specifications.



Schematic Diagram of an in-Phase Amplifier



## Pin description

NAME	NO.	TYPE	DESCRIPTION
1IN+	3	I	Noninverting input
1IN-	2	I	Inverting Input
1OUT	1	O	Output
2IN+	5	I	Noninverting input
2IN -	6	I	Inverting Input
2OUT	7	O	Output
Vcc+	8	—	Positive Supply
Vcc-	4	—	Negative Supply

## Absolute Maximum Ratings

over operating ambient temperature range (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
Vcc+	Supply voltage <sup>(2)</sup>		18	V
Vcc-			-18	
V <sub>ID</sub>	Differential input voltage <sup>(3)</sup>		±30	V
v <sub>1</sub>	Input voltage (any input) <sup>(2)(4)</sup>		±15	V
I <sub>o</sub>	Output Current <sup>(5)</sup>		±125	mA
T <sub>j</sub>	Operating virtual junction temperature		150	°C
T <sub>STG</sub>	Storage temperature	-65	150	°C

(1) Operation outside the Absolute Maximum Ratings may cause permanent device damage. Absolute Maximum Ratings do not imply functional operation of the device at these or any other conditions beyond those listed under Recommended Operating Conditions. If used outside the Recommended Operating Conditions but within the Absolute Maximum Ratings, the device may not be fully functional, and this may affect device reliability, functionality, performance, and shorten the device lifetime.

(2) All voltage values, unless otherwise noted, are with respect to the midpoint between VCC+ and VCC-.

(3) Differential voltages are at IN+ with respect to IN-.

(4) The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15V, whichever is less

(5) Temperature and supply voltages must be limited to ensure that the dissipation rating is not exceeded.



## Electrical Characteristics

For  $V_{CC+} = 15\text{ V}$ ,  $V_{CC-} = -15\text{ V}$  at  $T_A \cong 25^\circ\text{C}$ ,  $R_L = 2\text{ k}\Omega$  unless otherwise noted.

PARAMETER		TEST CONDITIONS <sup>(1)</sup>	$T_A$	MIN	TYP	MAX	UNIT
$V_{OS}$	Input offset voltage	$V_O = 0\text{ V}$			0.3	6	mV
			Full range <sup>(2)</sup>			7.5	
$I_{IO}$	Input offset current	$V_O = 0\text{ V}$			5	200	nA
			Full range <sup>(2)</sup>			300	
$I_{IB}$	Input bias current	$V_O = 0\text{ V}$			80	500	nA
			Full range <sup>(2)</sup>			800	
$V_{ICR}$	Common-mode input voltage range			$\pm 12$	$\pm 14$		V
$V_{OUT}$	Maximum output voltage swing	$R_L = 10\text{ k}\Omega$		$\pm 12$	$\pm 14.1$		V
		$R_L = 2\text{ k}\Omega$		$\pm 10$	$\pm 13.8$		
$A_{VD}$	Large-signal differential voltage amplification	$R_L \geq 2\text{ k}\Omega$ , $V_O = \pm 10\text{ V}$			20	830	V/mV
					86	118	dB
			Full range <sup>(2)</sup>		15		V/mV
					83		dB
GBW	Gain-bandwidth product	$f = 10\text{ kHz}$		4		MHz	
SSBW	Small-signal bandwidth	$V_O = 200\text{ mV}_{PP}$ , $< 1\text{ dB}$ peaking			3		MHz
CMRR	Common-mode rejection ratio	$(V_-) + 3\text{ V} < V_{ICR} < (V_+) - 3\text{ V}$		70	94		dB
	Input impedance	Common-mode			$550 \parallel 5.6$		$\text{M}\Omega \parallel \text{pF}$
		Differential			$450 \parallel 0.8$		$\text{k}\Omega \parallel \text{pF}$
$k_{SVS}$	Supply-voltage sensitivity ( $\Delta V_{IO} / \Delta V_{CC}$ )	$V_{CC} = \pm 5\text{ V}$ to $\pm 15\text{ V}$			25	150	$\mu\text{V}/\text{V}$
					76	92	dB
$e_N$	Input voltage noise	$f = 0.1\text{ Hz}$ to $10\text{ Hz}$			0.38		$\mu\text{V}_{PP}$
					0.063		$\mu\text{V}_{RMS}$
	Input voltage noise density		$f = 1\text{ kHz}$		7		$\text{nV}/\sqrt{\text{Hz}}$
		$f = 10\text{ kHz}$		6.5			
$I_N$	Input current noise density	$f = 1\text{ kHz}$		0.15			$\text{pA}/\sqrt{\text{Hz}}$
THD+N	Total harmonic distortion + noise	$V_{CC} = 30\text{ V}$ , $A_{VD} = 1\text{ V}/\text{V}$ , $f = 1\text{ kHz}$ , $V_O = 3\text{ V}_{RMS}$ , $R_L = 2\text{ k}\Omega$			0.0001		%
					120		dB
$I_{CC}$	Supply current (both amplifiers)	$V_O = 0\text{ V}$ , No load			2.5	5.6	mA
			Full range <sup>(2)</sup>			2.65	
$V_{O1}/V_{O2}$	Crosstalk attenuation	$R_S = 1\text{ k}\Omega$ , $f = 10\text{ kHz}$ , $A_{VD} = 1\text{ V}/\text{V}$			120		dB
$t_r$	Rise time	$V_I = 20\text{ mV}$ , $C_L = 100\text{ pF}$			67		ns
	Overshoot	$V_I = 20\text{ mV}$ , $C_L = 100\text{ pF}$			16.8		%
SR	Slew rate	$V_{STEP} = 10\text{ V}$ , $C_L = 100\text{ pF}$		1.1	2.2		$\text{V}/\mu\text{s}$

(1) All characteristics are measured under open-loop conditions with zero common-mode input voltage, unless otherwise specified.

(2) Full range is  $0^\circ\text{C}$  to  $70^\circ\text{C}$  for RC4558 and  $-40^\circ\text{C}$  to  $85^\circ\text{C}$  for RC4558L.



## Recommended Operating Conditions

		MIN	MAX	UNIT
V <sub>CC+</sub>	Supply voltage	5	15	V
V <sub>CC-</sub>		-5	-15	
TA	Operating free-air temperature	-40	85	°C

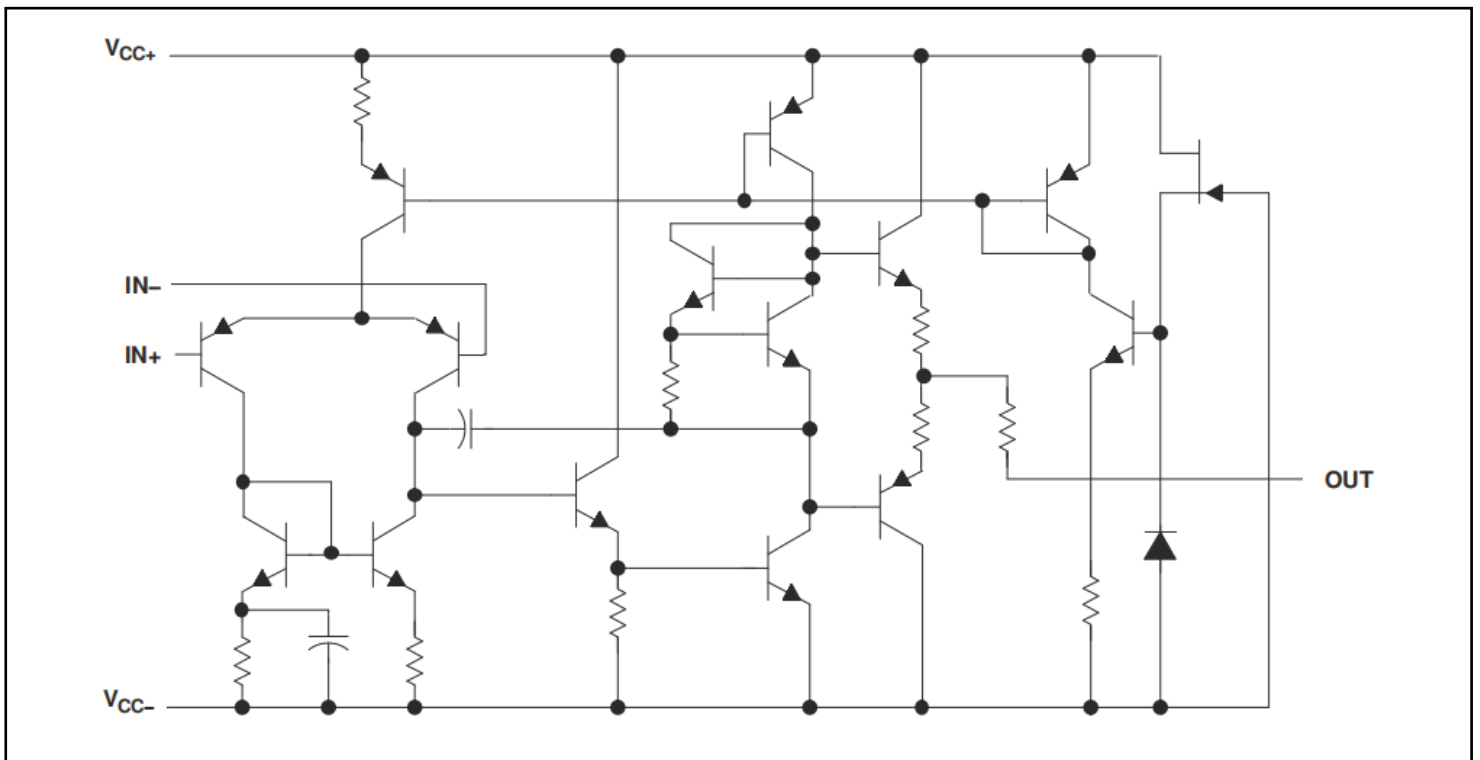
## ESD Ratings

			VALUE	UNIT
V <sub>(ESD)</sub>	Electrostatic discharge	Human-body model (HBM),per ANSI/ESDAJEDEC JS-001(1)	±2500	V
		Charged-device model(CDM),per ANSIESDAJEDEC JS-002(2)	± 1500	

(1) JEDEC document JEP155 states that 500V HBM allows safe manufacturing with a standard ESD control process.

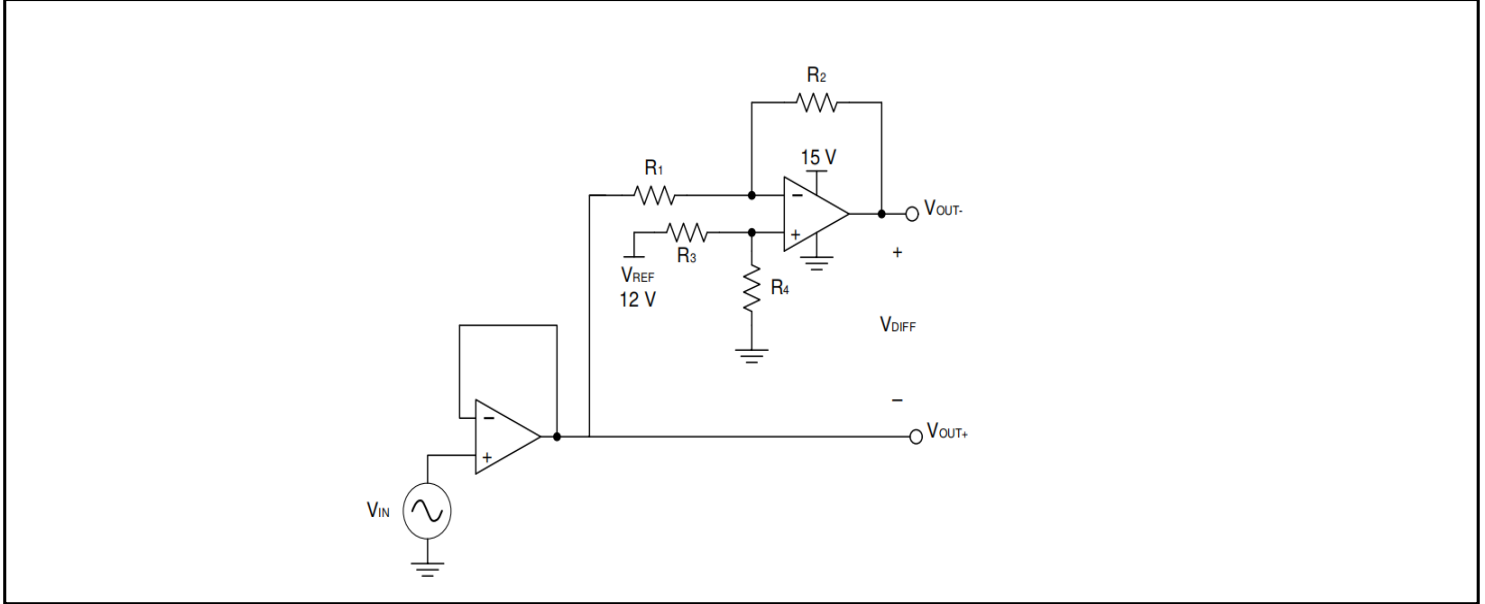
(2) JEDEC document JEP157 states that 250V CDM allows safe manufacturing with a standard ESD control process.

## Functional Block Diagram





## Typical Application

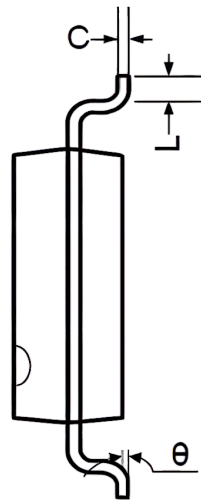
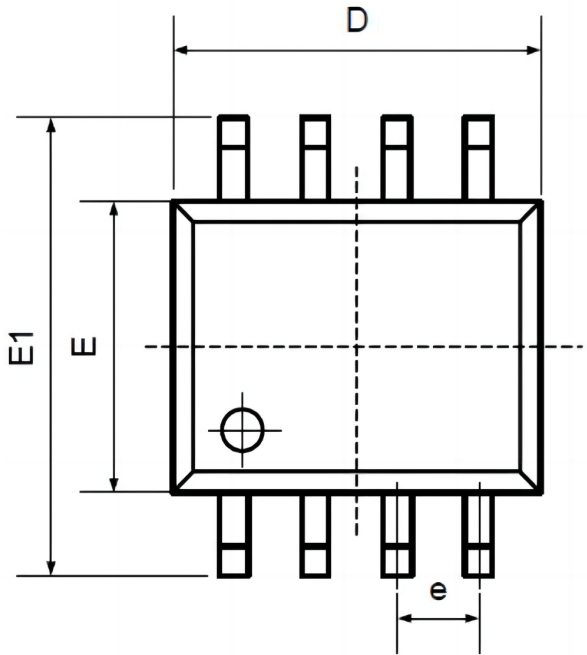


## Order information

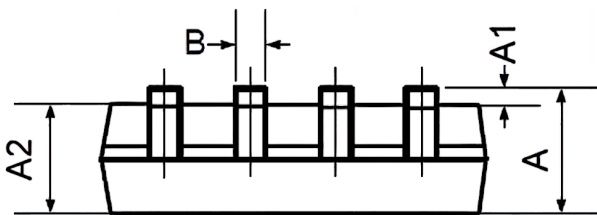
Order Number	Package	Package Quantity	Marking On The park	Temperature
RC4558DGKR-TUDI	MSOP8	Tape,Reel,2500	YRP	0°C to 70°C
RC4558DR-TUDI	SOP8	Tape,Reel,2500	RC4558	
RC4558P-TUDI	DIP8	Tube,50,A box of 2000	RC4558P	
RC4558PWR-TUDI	TSSOP8	Tape,Reel,2500	R4558	
RC4558IDGKR-TUDI	MSOP8	Tape,Reel,2500	YSP	-40°C to 85°C
RC4558IDR-TUDI	SOP8	Tape,Reel,2500	R4558I	
RC4558IP-TUDI	DIP8	Tube,50,A box of 2000	RC4558IP	
RC4558IPWR-TUDI	TSSOP8	Tape,Reel,2500	R4558I	



## Package SOP8

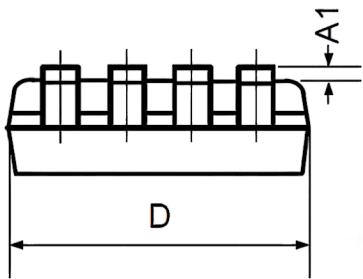
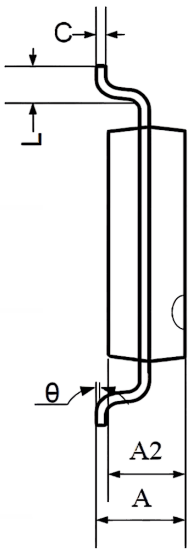
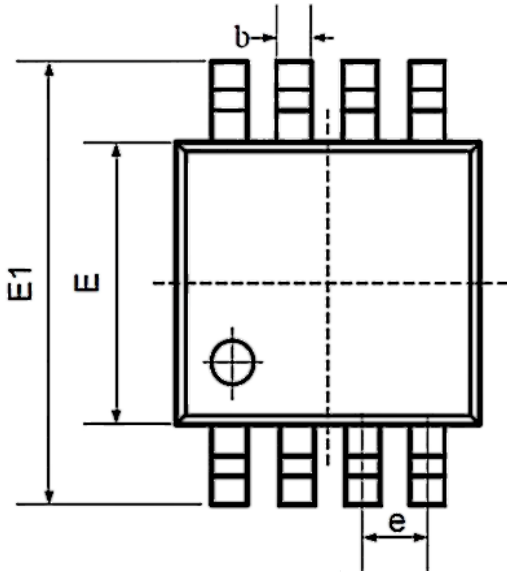


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP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





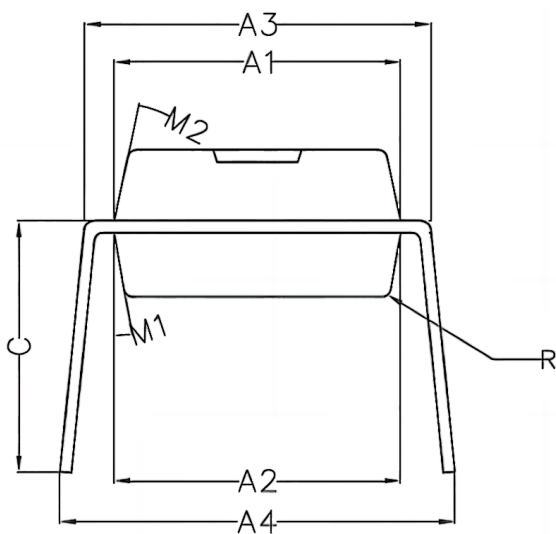
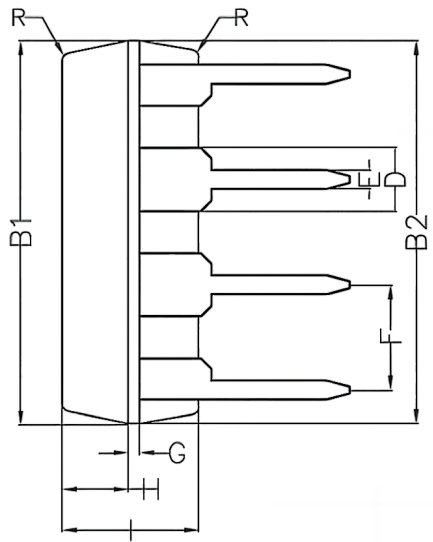
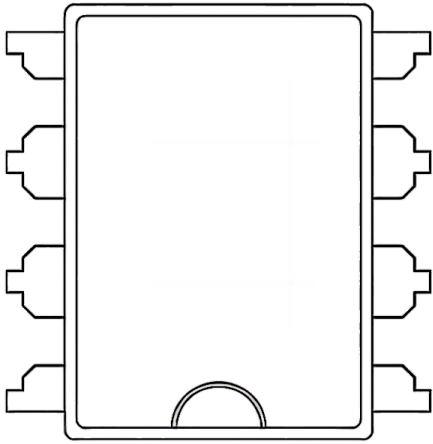
## Package MSOP8



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°



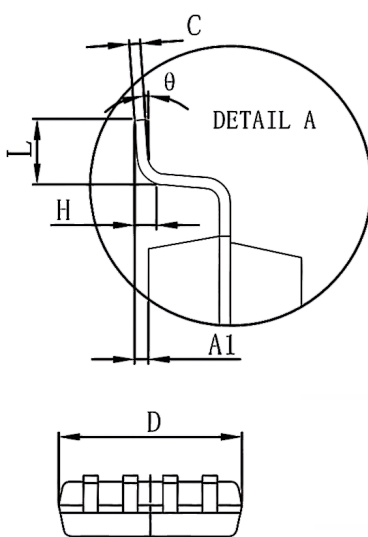
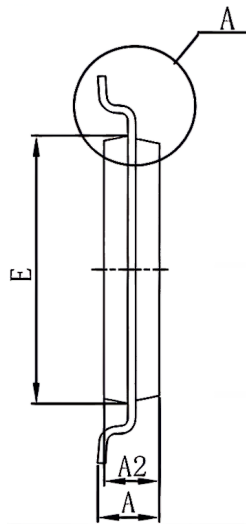
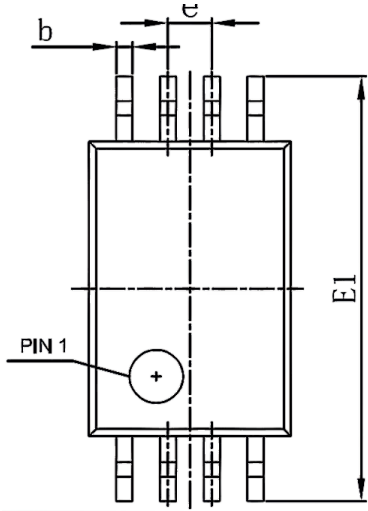
## Package DIP8



Symbol	Min	Non	Max
A1	6.28	6.33	6.38
A2	6.33	6.38	6.43
A3	7.52	7.62	7.72
A4	7.80	8.40	9.00
B1	9.15	9.20	9.25
B2	9.20	9.25	9.30
C		5.57	
D		1.52	
E	0.43	0.45	0.47
F		2.54	
G		0.25	
H	1.54	1.59	1.64
I	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°



# 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)	
$\theta$	1°		1°	



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