



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-GC8551/GC8552/GC8554

Zero-Drift,RRIO,CMOS,Op Amps

网址 www.sztdbdt.com Q

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 $\mu\text{V}/^\circ\text{C}$
- Rail-to-rail input and output swing
- 5 V/2.7 V single-supply operation
- High gain, CMRR, PSRR: 130 dB
- Ultralow input bias current: 20 pA
- Low supply current: 700 μA /op amp Overload
- recovery time: 50 μs
- No external capacitors required

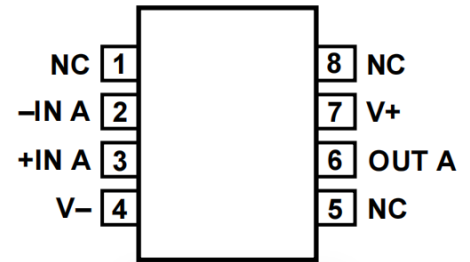
DESCRIPTION

This family of amplifiers has ultralow offset, drift, and bias current. The AD8551, AD8552, and AD8554 are single, dual, and quad amplifiers featuring rail-to-rail input and output swings. All are guaranteed to operate from 2.7 V to 5 V with a single supply. With an offset voltage of only 1 μV and drift of 0.005 $\mu\text{V}/^\circ\text{C}$, the AD8551/AD8552/AD8554 are perfectly suited for applications in which error sources cannot be tolerated. Temperature, position and pressure sensors, medical equipment, and strain gage amplifiers benefit greatly from nearly zero drift over their operating temperature range. The rail-to-rail input and output swings provided by the AD8551/AD8552/AD8554 make both high-side and low-side sensing easy.

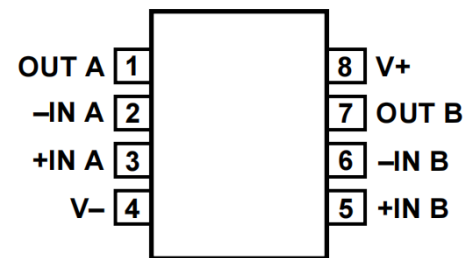
The AD8551/AD8552/AD8554 are specified for the extended industrial/automotive temperature range (40 $^\circ\text{C}$ to +125 $^\circ\text{C}$). The AD8551 single amplifier is available in 8-lead MSOP and 8-lead narrow SOIC packages. The AD8552 dual amplifier is available in 8-lead narrow SOIC and 8-lead TSSOP surface mount packages. The AD8554 quad is available in 14-lead narrow SOIC and 14-lead TSSOP packages.

APPLICATIONS

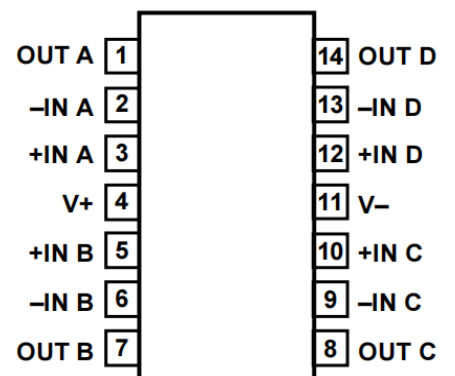
- Temperature sensors
- Pressure sensors
- Precision current sensing
- Strain gage amplifiers
- Medical instrumentation
- Thermocouple amplifiers



AD8551 SOP8/MSOP8 Pin Diagram



AD8552 SOP8/TSSOP8 Pin Diagram



AD8554 SOP8/TSSOP8 Pin Diagram



Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)⁽¹⁾

PARAMETER	MIN	MAX	UNIT
Supply Voltage, $V_s = (V^+) - (V^-)$		6	V
Input Terminal Voltage ⁽²⁾	$(V^-) - 0.5$	$(V^+) + 0.5$	V
Input Terminal Current ⁽²⁾	-10	+10	mA
Signal Output Current	-35	+35	mA
Maximum Junction Temperature		+150	°C
Storage Temperature Range	-65	+150	°C

Note 1: Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

Note 2: Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.5V beyond the supply rails should be current-limited to 10mA or less.

ESD Ratings

SYMBOL	PARAMETER		VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM)	±2000	V

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

PARAMETER		MIN	TYP	MAX	UNIT
Supply Voltage, $V_s = (V^+) - (V^-)$	Signal-supply	2.7		5.5	V
	Dual-supply	±1.35		±2.75	V
Operating Temperature Range		-40	+25	+125	°C



ELECTRICAL CHARACTERISTICS

(At $T_A = +25^{\circ}\text{C}$, $V_S = 5\text{V}$, $R_L = 10\text{k}\Omega$ connected to $V_S/2$, and $V_{OUT} = V_S/2$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
POWER SUPPLY						
Operating Voltage Range	V_S		2.7		5.5	V
Quiescent Current/Amplifier	I_Q			700		μA
Power-Supply Rejection Ratio	PSRR	$V_S = 2.7\text{V to } 5.5\text{V}$, $V_{CM} = 0\text{V}$	110	130		dB
INPUT						
Input Offset Voltage	V_{OS}	$V_{CM} = V_S/2$		± 1	± 5	μV
Input Offset Voltage Average Drift	dV_{OS}/dT			0.005		$\mu\text{V}/^{\circ}\text{C}$
Input Bias Current	I_B	$V_{CM} = V_S/2$		± 50		pA
Input Offset Current	I_{OS}	$V_{CM} = V_S/2$		± 10		pA
Common-Mode Voltage Range	V_{CM}		(V-) -0.1		(V+) +0.1	V
Common-Mode Rejection Ratio	CMRR	$(V-) -0.1\text{V} < V_{CM} < (V+) +0.1\text{V}$	110	130		dB
Input Differential Capacitance				1		pF
Input Common Capacitance				5		pF
OUTPUT						
Open-Loop Voltage Gain	A_{OL}	$R_L = 10\text{k}\Omega$, $V_O = 0.3\text{V}$ to 4.7V	110	130		dB
Output Voltage High	V_{OH}	$R_L = 100\text{k}\Omega$ to GND	4.99	4.998		V
		$R_L = 10\text{k}\Omega$ to GND	4.95	4.98		V
Output Voltage Low	V_{OL}	$R_L = 100\text{k}\Omega$ to V+		1	10	mV
		$R_L = 10\text{k}\Omega$ to V+		10	30	mV
Short-Circuit Current	I_{OUT}			35		mA
FREQUENCY RESPONSE						
Slew Rate	SR	$G = +1$		5		V/ μs
Gain-Bandwidth Product	GBW			1.5		MHz
Overload Recovery Time				1		μs
NOISE						
Input Voltage Noise	$e_{n\text{-p-p}}$	$f = 0.01\text{Hz to } 10\text{Hz}$		0.75		μV_{pp}
		$f = 0.01\text{Hz to } 1\text{Hz}$		0.22		μV_{pp}
Input Voltage Noise Density	e_n	$f = 1\text{kHz}$		35		nV/ $\sqrt{\text{Hz}}$



TYPICAL CHARACTERISTICS

At $T_A = +25^{\circ}\text{C}$, $V_S = 5\text{V}$, $R_L = 10\text{k}\Omega$ connected to $V_S/2$, $V_{OUT} = V_S/2$, unless otherwise noted.

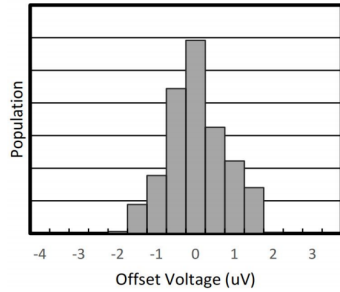


Figure 1. Offset Voltage Production Distribution

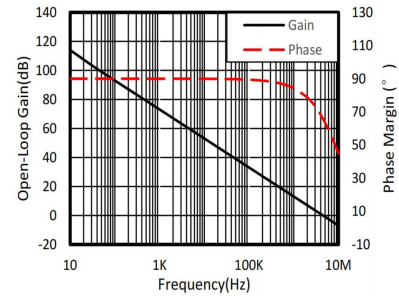


Figure 2. Open-Loop Gain And Phase vs Frequency

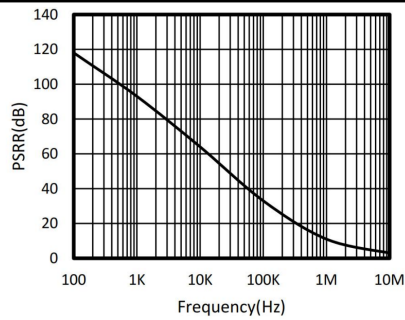


Figure 3. Power-Supply Rejection Ratio vs Frequency

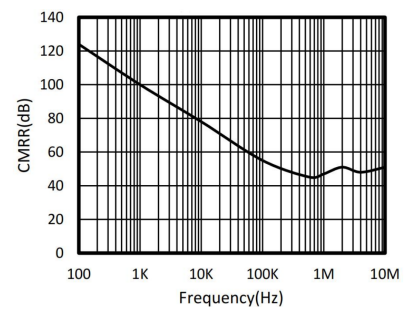


Figure 4. Common-Mode Rejection Ratio vs Frequency

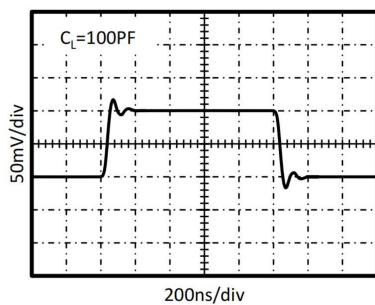


Figure 5. Small-Signal Step Response

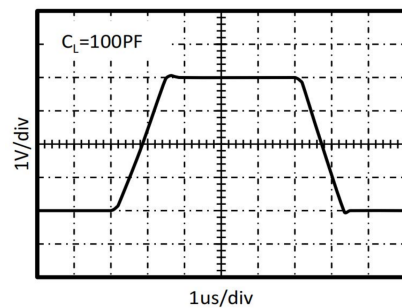


Figure 6. Large-Signal Step Response

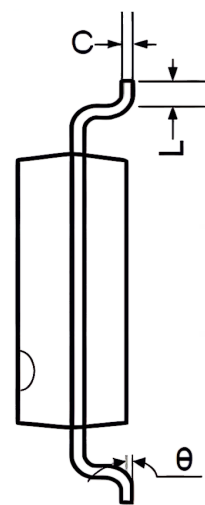
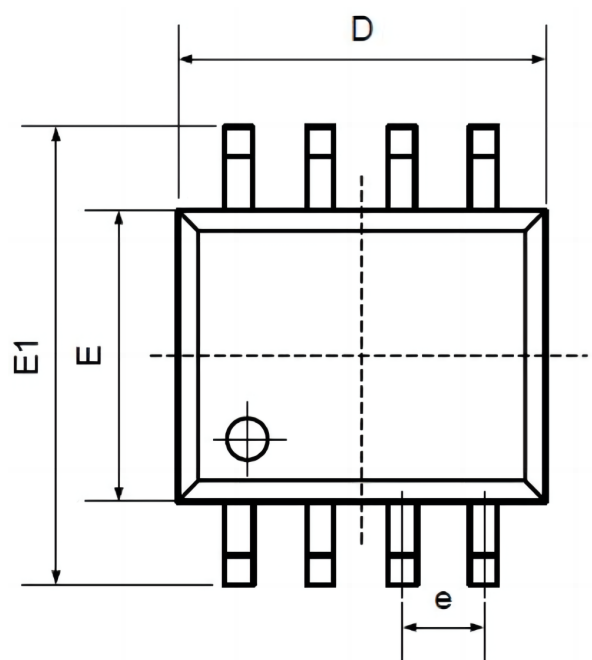


Order information

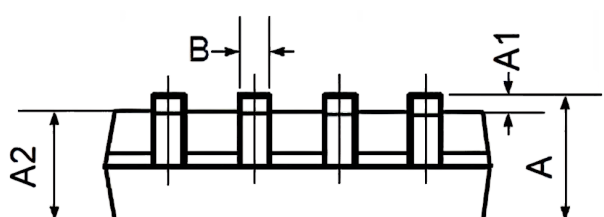
Order Number	Package	Package Quantity	Marking On The park	Temperature
AD8551ARZ-REEL-TUDI	SOP8	Tape,Reel,4000	8551A	-40°C to +125°C
AD8551ARMZ-REEL-TUDI	MSOP8	Tape,Reel,4000	AHA	
AD8552ARZ-REEL-TUDI	SOP8	Tape,Reel,4000	AD8552A	
AD8552ARUZ-REEL-TUDI	TSSOP8	Tape,Reel,4000	8552	
AD8554ARZ-REEL-TUDI	SOP14	Tape,Reel,4000	AD8554A	
AD8554ARUZ-REEL-TUDI	TSSOP14	Tape,Reel,4000	8554A	



Package SOP8

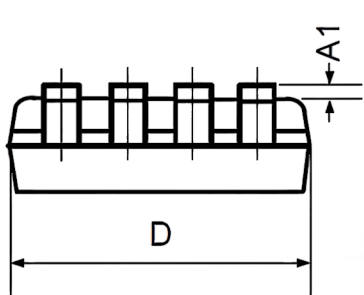
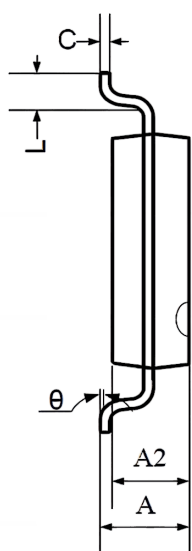
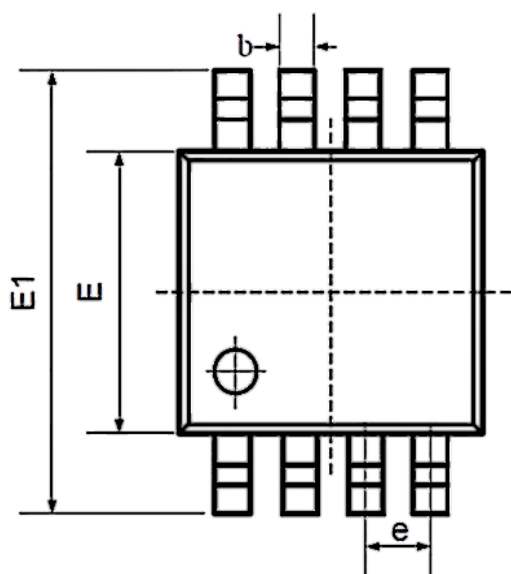


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP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



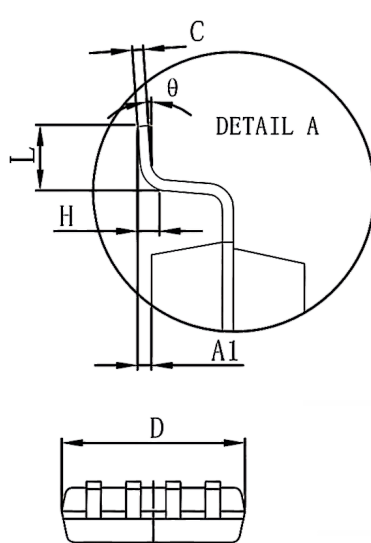
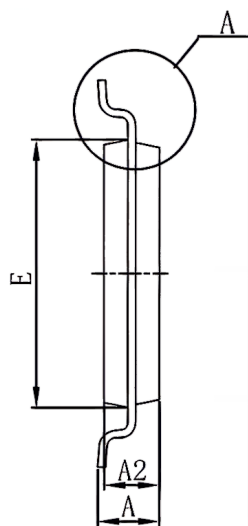
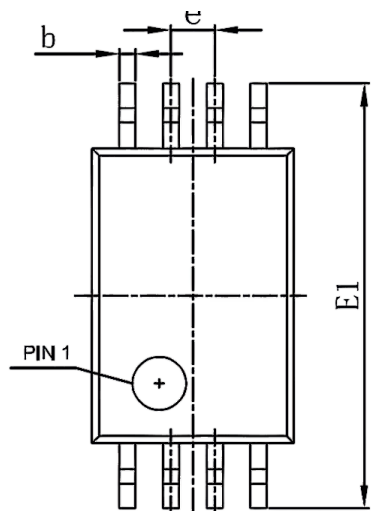


Package MSOP8



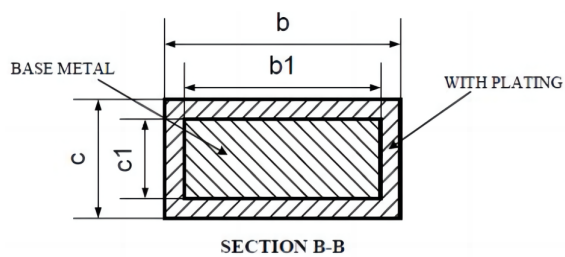
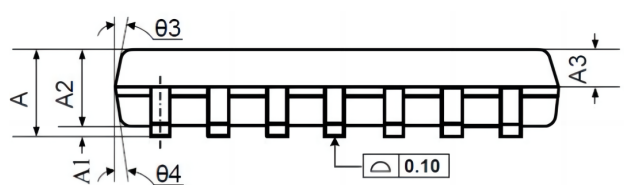
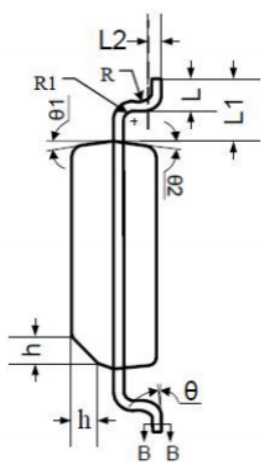
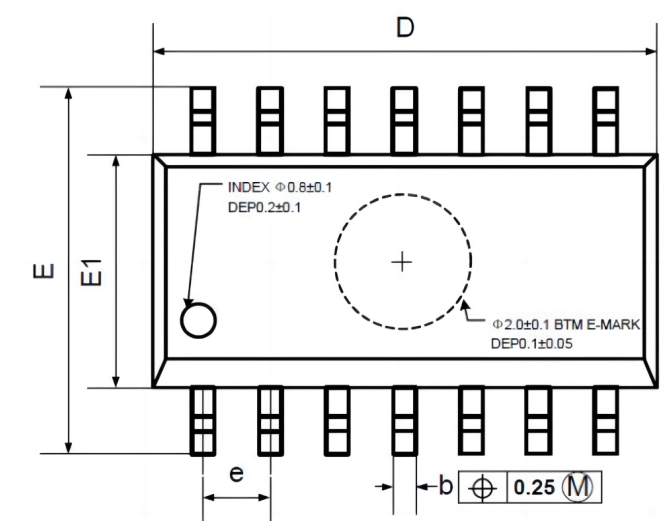
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
A1	0.000	0.200	0.000	0.008
A2	0.760	0.970	0.030	0.038
b	0.30 TYP		0.012 TYP	
C	0.15 TYP		0.006 TYP	
D	2.900	3.100	0.114	0.122
e	0.65 TYP		0.026 TYP	
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201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

Package TSSOP8



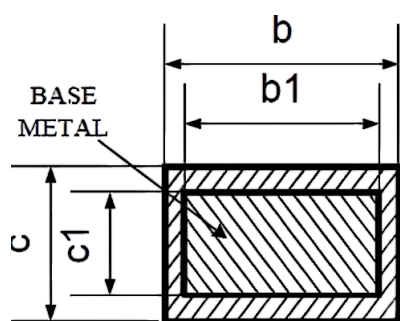
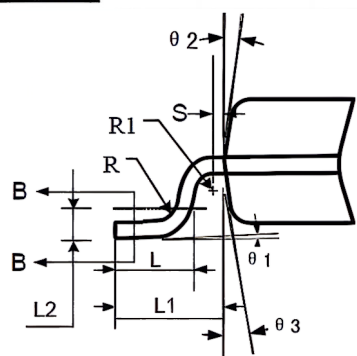
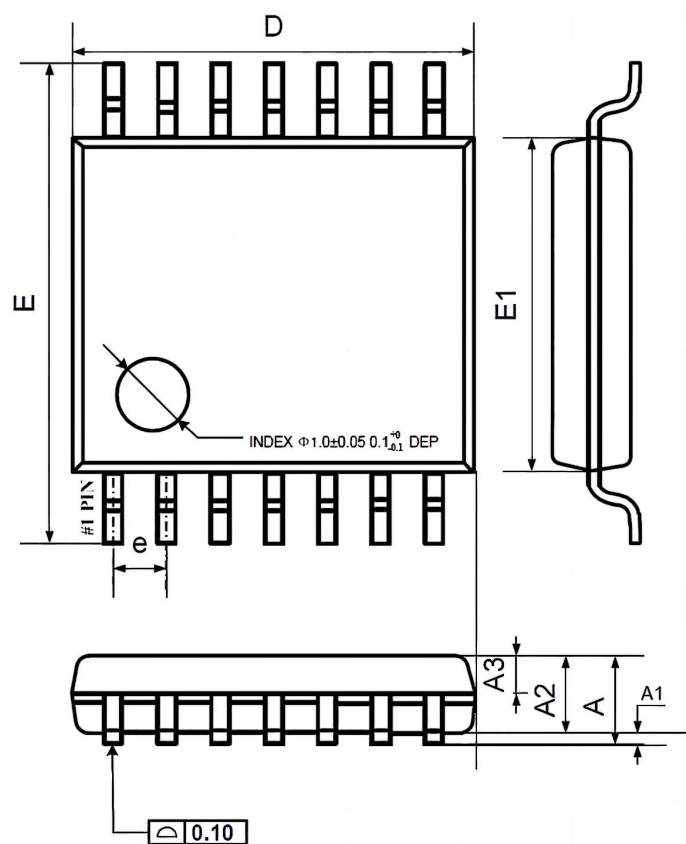
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	2.900	3.100	0.114	0.122
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
C	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.200		0.047
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65(BSC)		0.026(BSC)	
L	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	—	—
$\theta 1$	0°	—	8°
$\theta 2$	10°	12°	14°
$\theta 3$	10°	12°	14°



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