



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-ICL7611/ICL7612/ICL7621

Single/Dual/Triple/Quad 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



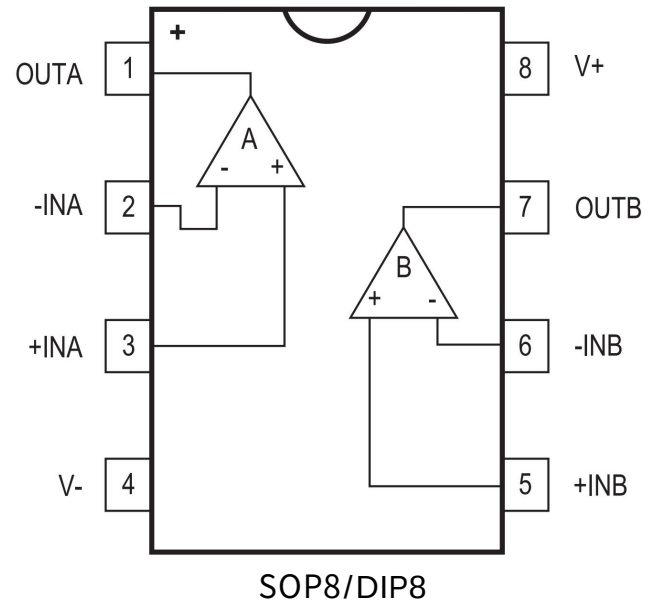
Features

- Pin-for-Pin Second Source
- 1pA Typical Bias Current—4nA (max) at +125°C
- $\pm 1\text{V}$ to $\pm 8\text{V}$ Wide Supply Voltage Range
- Industry-Standard Pinouts
- Programmable Quiescent Currents of 10 μA , 100 μA , and 1000 μA
- Monolithic, Low-Power CMOS Design

Description

The ICL761X – ICL764X family of monolithic CMOS op amps combine ultra-low input current with low-power operation over a wide supply voltage range. With pin-selectable quiescent currents of 10 μA , 100 μA , or 1000 μA per amplifier, these op amps will operate from $\pm 1\text{V}$ to $\pm 8\text{V}$ power supplies, or from single supplies from 2V to 16V. The CMOS outputs swing to within milli-volts of the supply voltages.

The ultra-low bias current of 1pA makes this family of op amps ideal for long time constant integrators, picoammeters, low droop rate sample/hold amplifiers and other applications where input bias and offset currents are critical. A low noise current of 0.01pA $\sqrt{\text{Hz}}$ and an input impedance of 10¹² Ω ensure optimum performance with very high source impedances in such applications as pH meters and photodiode amplifiers.



Applications

- Battery-Powered Instruments
- Low-Leakage Amplifiers
- Long-Time Constant Integrators
- Low-Frequency Active Filters
- Hearing Aids and Microphone Amplifiers
- Low Droop Rate Sample/Hold Amplifiers
- Picoammeters



Absolute Maximum Ratings (Single/Dual)

Total Supply Voltage (V+ to V-)	+18V Input Voltage
(V+ + 0.3V) to (V- - 0.3V)	
Differential Input Voltage (Note 1)	$\pm(V+ + 0.3V)$ to (V- - 0.3V)
Duration of Output Short Circuit (Note 2)	Unlimited
Continuous Power Dissipation (TA = +25°C)	
8-Pin Minidip (derate 2mW/°C above +25°C)	250mW
Operating Temperature Ranges:	
E Series	-40°C to +85°C
C Series	-0°C to +70°C
Storage Temperature Range	-55°C to +150°C
Lead Temperature (soldering, 10s) .	+300°C
Soldering Temperature (reflow)	
Lead(Pb)-Free Packages	+260°C
Packages Containing Lead.....	+240°C

Stresses beyond those listed under “ Absolute Maximum Ratings ” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 1: Long-term offset voltage stability will be degraded if large input differential voltages are applied for long periods of time.

Note 2: The outputs may be shorted to ground or to either supply for $V_{SUPP} \leq 10V$. Care must be taken to insure that the dissipation rating is not exceeded.



Electrical Characteristics (Single/Dual)

($V_{SUPP} = \pm 1.0V$, $I_Q = 10\mu A$, $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	ICL76XXA			ICL76XXB			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	V_{OS}	$R_S \leq 100k\Omega, T_A = +25^\circ C$			2			5	mV
		$R_S \leq 100k\Omega, T_{MIN} \leq T_A \leq T_{MAX}$			3			7	
Temperature Coefficient of V_{OS}	$\Delta V_{OS}/\Delta T$	$R_S \leq 100k\Omega$		10			15		$\mu V/^\circ C$
Input Offset Current	I_{OS}	$T_A = +25^\circ C$		0.5	30		0.5	30	pA
		$0^\circ C \leq T_A \leq +70^\circ C$			300			300	
Input Bias Current	I_{BIAS}	$T_A = +25^\circ C$		1.0	50		1.0	50	pA
		$0^\circ C \leq T_A \leq +70^\circ C$			500			500	
Common-Mode Voltage Range(Except ICL7612/ ICL7616)	V_{CMR}		-0.4		+0.6	-0.4		+0.6	V
Extended Common-Mode Voltage Range(ICL7612 Only)	V_{CMR}		-1.1		+0.6	-1.1		+0.6	V
Extended Common-Mode Voltage Range(ICL7616 Only)	V_{CMR}	$I_Q = 10\mu A$	-1.3		-0.3	-1.3		-0.3	V
Output Voltage Swing	V_{OUT}	$R_L = 1M\Omega, T_A = +25^\circ C$		± 0.98			± 0.98		V
		$R_L = 1M\Omega, 0^\circ C \leq T_A \leq +70^\circ C$		± 0.96			± 0.96		
Large-Signal Voltage Gain	A_{VOL}	$V_O = \pm 0.1V, R_L = 1M\Omega, T_A = +25^\circ C$		90			90		dB
		$V_Q = \pm 0.1V, R_L = 1M\Omega, 0^\circ C \leq T_A \leq +70^\circ C$		80			80		



Electrical Characteristics (Single/Dual)(continued)

($V_{SUPP} = \pm 1.0V$, $I_Q = 10\mu A$, $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	ICL76XXA			ICL76XXB			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Unity-Gain Bandwidth	GBW			0.044			0.044		MHz
Input Resistance	R_{IN}			10^{12}			10^{12}		Ω
Common-Mode Rejection Ratio	CMRR	$R_S \leq 100k\Omega$		80			80		dB
Power-Supply Rejection Ratio	PSRR	$R_S \leq 100k\Omega$		80			80		dB
Input-Referred Noise Voltage	e_n	$R_S = 100\Omega, f = 1kHz$		100			100		nV/Hz
Input-Referred Noise Current	i_n	$R_S = 100\Omega, f = 1kHz$		0.01			0.01		pA/Hz
Supply Current (Per Amplifier)	I_{SUPP}	No signal, no load		6	15		6	15	μA
Slew Rate	SR	$A_{VOL} = 1, C_L = 100pF$, $V_{IN} = 0.2V_{P-P}$, $R_L = 1M\Omega$		0.016			0.016		V/ μs
Rise Time	t_r	$V_{IN} = 50mV, C_L = 100pF$, $R_L = 1M\Omega$		20			20		μs
Overshoot Factor		$V_{IN} = 50mV, C_L = 100pF$, $R_L = 1M\Omega$		5			5		%



Electrical Characteristics (Single/Dual)

($V_{SUPP} = \pm 5.0V$, $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	ICL76XXA			ICL76XXB			ICL76XXD			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	V_{OS}	$R_S \leq 100k\Omega$, $T_A = +25^\circ C$			2			5			15	mV
		$R_S \leq 100k\Omega$, $T_{MIN} \leq T_A \leq T_{MAX}$			3			7			20	
Temperature Coefficient of V_{OS}	$\Delta V_{OS}/\Delta T$	$R_S \leq 100k\Omega$		10			15			25		$\mu V/^\circ C$
Input Offset Current	I_{OS}	$T_A = +25^\circ C$		0.5	30		0.5	30		0.5	30	pA
		C: $0^\circ C \leq T_A \leq +70^\circ C$			300			300			300	
		E: $-40^\circ C \leq T_A \leq +85^\circ C$			800			800			800	
Input Bias Current	I_{BIAS}	$T_A = +25^\circ C$		1.0	50		1.0	50		1.0	50	pA
		C: $0^\circ C \leq T_A \leq +70^\circ C$			400			400			400	
		E: $-40^\circ C \leq T_A \leq +85^\circ C$			4000			4000			4000	
Common-Mode Voltage Range (Except ICL7612/ICL7616)	V_{CMR}	$I_Q = 10\mu A$ (Note 3)	+4.4			+4.4			+4.4			V
			-4.0			-4.0			-4.0			
		$I_Q = 100\mu A$ (Note 3)	+4.2			+4.2			+4.2			
			-4.0			-4.0			-4.0			
		$I_Q = 1mA$ (Note 3)	+3.7			+3.7			+3.7			
			-3.7			-3.7			-3.7			



Electrical Characteristics (Single/Dual)(continued)

(V_{SUPP} = ±5.0V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		ICL76XXA			ICL76XXB			ICL76XXD			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Extended Common-Mode Voltage Range (ICL7612 Only)	V _{CMR}	I _Q =10μA		±5.3			±5.3			±5.3			V
		I _Q =100μA		+5.3			+5.3			+5.3			
				-5.1			-5.1			-5.1			
		I _Q =1mA		+5.3			+5.3			+5.3			
				-4.5			-4.5			-4.5			
Extended Common-Mode Voltage Range (ICL7616 Only)	V _{CMR}	I _Q =10μA		-5.3			-5.3			-5.3			V
				+3.7			+3.7			+3.5			
		I _Q =100μA		-5.1			-5.1			-5.1			
				+3.0			+3.0			+2.7			
		I _Q =1mA		-4.5			-4.5			-4.5			
				+2.0			+2.0			+1.7			
Output Voltage Swing	V _{OUT}	I _Q =10μA, R _L =1MΩ (Note3)	T _A =+25°C	±4.9			±4.9			±4.9			V
			C: 0°C ≤ T _A ≤ +70°C	±4.8			±4.8			±4.8			
			E: -40°C ≤ T _A ≤ +85°C	±4.7			±4.7			±4.7			
			M: -55°C ≤ T _A ≤ +125°C	±4.7			±4.7			±4.7			



Electrical Characteristics (Single/Dual)(continued)

(V_{SUPP} = ±5.0V, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		ICL76XXA			ICL76XXB			ICL76XXD			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Output Voltage Swing	V _{OUT}	I _Q =100μA, R _L =100kΩ	T _A =+25°C	±4.9			±4.9			±4.9			V
			C: 0°C ≤ T _A ≤ +70°C	±4.8			±4.8			±4.8			
			E: -40°C ≤ T _A ≤ +85°C	±4.5			±4.5			±4.5			
		I _Q =1mA, R _L =10kΩ (Note3)	T _A =+25°C	±4.5			±4.5			±4.5			
			C: 0°C ≤ T _A ≤ +70°C	±4.3			±4.3			±4.3			
			E: -40°C ≤ T _A ≤ +85°C	±4.0			±4.0			±4.0			
Large-Signal Voltage Gain	A _{VOL}	V _O =±4.0V R _L =1MΩ, I _Q =10μA	T _A =+25°C	86	104		80	104		80	104		dB
			C: 0°C ≤ T _A ≤ +70°C	80			75			75			
			E: -40°C ≤ T _A ≤ +85°C	74			68			68			



Electrical Characteristics (Single/Dual)(continued)

($V_{SUPP} = \pm 5.0V$, $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		ICL76XXA			ICL76XXB			ICL76XXD			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Large-Signal Voltage Gain	A_{VOL}	$V_O = \pm 4.0V$, $R_L = 100k\Omega$, $I_Q = 100\mu A$	$T_A = +25^\circ C$	86	102		80	102		80	102		dB
			C: $0^\circ C \leq T_A \leq +70^\circ C$	80			75			75			
			E: $-40^\circ C \leq T_A \leq +85^\circ C$	74			68			68			
			M: $-55^\circ C \leq T_A \leq +125^\circ C$	74			68			68			
		$V_O = \pm 4.0V$, $R_L = 10k\Omega$, $I_Q = 1mA$ (Note 3)	$T_A = +25^\circ C$	80	83		76	83		76	83		
			C: $0^\circ C \leq T_A \leq +70^\circ C$	76			72			72			
			E: $-40^\circ C \leq T_A \leq +85^\circ C$	72			68			68			
			M: $-55^\circ C \leq T_A \leq +125^\circ C$	72			68			68			



Electrical Characteristics (Single/Dual)(continued)

($V_{SUPP} = \pm 5.0V$, $T_A = +25^{\circ}C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		ICL76XXA			ICL76XXB			ICL76XXD			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Unity-Gain Bandwidth	GBW	$I_Q = 10\mu A$ (Note3)			0.044			0.044			0.044		MHz
		$I_Q = 100\mu A$			0.48			0.48			0.48		
		$I_Q = 1mA$ (Note3)			1.4			1.4			1.4		
Input Resistance	R_{IN}				1012			1012			1012		Ω
Common-Mode Rejection Ratio	$CMRR$	$R_S \leq 100k\Omega$, $I_Q = 10\mu A$ (Note3)		76	96		70	96		70	96		dB
		$R_S \leq 100k\Omega$, $I_Q = 100\mu A$		76	91		70	91		70	91		
		$R_S \leq 100k\Omega$, $I_Q = 1mA$ (Note3)		66	87		60	87		60	87		
Power-Supply Rejection Ratio	$PSRR$	$R_S \leq 100k\Omega$, $I_Q = 10\mu A$ (Note3)		80	94		80	94		80	94		dB
		$R_S \leq 100k\Omega$, $I_Q = 100\mu A$		80	86		80	86		80	86		
		$R_S \leq 100k\Omega$, $I_Q = 1mA$ (Note3)		70	77		70	77		70	77		
Input-Referred Noise Voltage	e_n	$R_S = 100\Omega, f = 1kHz$			100			100			100		nV/Hz
Input-Referred Noise Current	i_n	$R_S = 100\Omega, f = 1kHz$			0.01			0.01			0.01		pA/Hz
Supply Current (Per Amplifier)	I_{SUPP}	No signal, no load	$I_Q = 10\mu A$ (Note 3)		0.01	0.02		0.01	0.02		0.01	0.02	mA
			$I_Q = 100\mu A$		0.1	0.25		0.1	0.25		0.1	0.25	
			$I_Q = 1mA$ (Note 3)		1.0	2.5		1.0	2.5		1.0	2.5	



Electrical Characteristics (Single/Dual)(continued)

($V_{SUPP} = \pm 5.0V$, $T_A = +25^{\circ}C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		ICL76XXA			ICL76XXB			ICL76XXD			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Channel Separation	V_{O1}/V_{O2}	$A_{VOL}=100$			120			120			120		dB
Slew Rate (Note 4)	SR	$A_{VOL}=1, C_L=100pF, V_{IN}=8V_{P-P}$	$I_Q=10\mu A$ (Note3), $R_L=1M\Omega$		0.016			0.016			0.016		V/ μs
			$I_Q=100\mu A$, $R_L=100k\Omega$		0.16			0.16			0.16		
			$I_Q=1mA$ (Note 3), $R_L=10k\Omega$		1.6			1.6			1.6		
Rise Time (Note 4)	t_r	$V_{IN}=50mV, C_L=100pF$	$I_Q=10\mu A$ (Note 3), $R_L=1M\Omega$		20			20			20		μs
			$I_Q=100\mu A$, $R_L=100k\Omega$		2			2			2		
			$I_Q=1mA$ (Note 3), $R_L=10k\Omega$		0.9			0.9			0.9		
Overshoot Factor (Note 4)		$V_{IN}=50mV, C_L=100pF$	$I_Q=10\mu A$ (Note 3), $R_L=1M\Omega$		5			5			5		%
			$I_Q=100\mu A$, $R_L=100k\Omega$		10			10			10		
			$I_Q=1mA$ (Note 3), $R_L=10k\Omega$		40			40			40		

Note 3: AICL7611, ICL7612, ICL7616 only.

Note 4: ICL7814; 39pF from pin 6 to pin 8.



Detailed Description

Quiescent Current Selection

The voltage input to the I_Q pin of the single and triple amplifiers selects a quiescent current (I_Q) of $10\mu A$, $100\mu A$, or $1000\mu A$. The dual and quad amplifiers have fixed quiescent current (I_Q) settings. Unity-gain band-width and slew-rate increase with increasing quiescent current, as does output sink current capability. The output source current capability is independent of quiescent current. The lowest I_Q setting that results in sufficient bandwidth and slew rate should be selected for each specific application.

The I_Q pin of the single and triple amplifiers controls the quiescent current as follows:

$I_Q = 10\mu A$	I_Q pin to V^+
$I_Q = 100\mu A$	I_Q pin between $V^- + 0.8V$ and $V^+ - 0.8V$
$I_Q = 1mA$	I_Q pin to V

Input Offset Nulling

The input offset can be nulled by connecting a $25k\Omega$ pot between the OFFSET terminals with the wiper connected to V^+ . At quiescent currents of $1mA$ and $100\mu A$, the null-ing range provided is adequate for all V_{OS} selections. However, with higher values of V_{OS} , and an I_Q of $10\mu A$, nulling may not be possible.

Frequency Compensation

All of the ICL7611 and ICL7621 series except the ICL7614 are internally compensated for unity-gain operation. The ICL7614 is externally compensated by a capacitor connected between COMP and OUT pins, with $39pF$ being greater than unity. The compensation capacitor value may be reduced to increase the bandwidth and slew rate. The ICL7132 is not compensated and does not have frequency compensation pins. Use only at gains 20 at I_Q of $1mA$; at gains > 10 at I_Q of $100\mu A$; at gain > 5 at I_Q of $10\mu A$.

Output Loading Considerations

Approximately 70% of the amplifier's quiescent current flows in the output stage. The output swing can approach the supply rails for output loads of $1M\Omega$, $100k\Omega$, and $10k\Omega$, using the output stage in a highly linear Class A mode. Crossover distortion is avoided and the voltage gain is maximized in this mode. The output stage, however, can also be operated in Class AB, which supplies higher output currents (see the Typical Operating Characteristics). The voltage gain decreases and the output transfer characteristic is non-linear during the transition from Class A to Class B operation.

The output stage, with a gain that is directly proportional to load impedance, approximates a transconductance amplifier. Approximately the same open-loop gains are obtained at each of the I_Q settings if corresponding loads of $10k\Omega$, $100k\Omega$, and $1M\Omega$ are used.



The maximum output source current is higher than the maximum sink current, and is independent of I_Q .

Like most amplifiers, there are output loads for which the amplifier stability is not guaranteed. In particular, avoid capacitive loads greater than 100pF; and while on the 1mA I_Q setting, avoid loads less than 5k Ω . Since the output stage is a transconductance output, very large (>10 μ F) capacitive loads will create a dominant pole and the output will be stable, even with loads that are less than 5k Ω .

Extended Common-Mode Voltage Range (ICL7612/ICL7616)

A common-mode voltage range that includes both V^+ and V^- is often desirable, especially in single-supply operation. The ICL7612/ICL7616 extended common-mode range op amps are designed specifically to meet this need. The ICL7612 input common-mode voltage range (CMVR) extends beyond both power-supply rails when operated with at least 3V total supply and an I_Q of 10 μ A or 100 μ A. The ICL7616 CMVR includes the negative supply voltage (or ground when operated with a single supply) at an I_Q of 10 μ A or 100 μ A.

PC Board Layout

Careful PC board layout techniques must be used to take full advantage of the very low bias current of the ICL7611 family. The inputs should be encircled with a low-impedance trace, or guard, that is at the same potential as the inputs. In an inverting amplifier, this is normally ground; in a unity-gain buffer connect the guard to the output. A convenient way of guarding the 8-pin TO-99 version of the ICL7611 is to use a 10-pin circle, with the two extra pads on either side of the input pins to provide space for a guard ring (see Figure 8). Assembled boards should be carefully cleaned, and if a high humidity environment is expected, conformally coated.

Single-Supply Operation

The ICL7611 family will operate from a single 2V to 16V power supply. The common-mode voltage range of the standard amplifier types when operated from a single supply is 1.0V to ($V^+ - 0.6V$) at 10 μ A I_Q . At 100 μ A I_Q , the CMVR is 1.0V to ($V^+ - 0.8V$), and at 1mA I_Q , the CMVR is 1.3V to ($V^+ - 1.3V$). If this CMVR range is insufficient, use the ICL7612, whose CMVR includes both ground and V^+ , or the ICL7616, whose CMVR includes ground.

A convenient way to generate a psuedo-ground at $V^+/2$ is to use one op amp of a quad to buffer a $V^+/2$ voltage from a high-impedance resistive divider.

Low-Voltage Operation

Operation at $V_{SUPP} = \pm 1.0V$ is only guaranteed at $I_Q = 10\mu A$. Output swings to within a few millivolts of the supply rails are achievable for $R_L (> \text{ or } =) 1M\Omega$. Guaranteed input CMVR is $\pm 0.6V$ minimum and typically +0.9V to -0.7V at $V_{SUPP} = \pm 1.0V$. For applications where greater common-mode range is desirable, see the description of ICL7612 and ICL7616 above.



Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
ICL7612ACSA-TUDI	SOP8	Tape,Reel,4000	7612ACSA	0°C to 70°C
ICL7612BCSA-TUDI	SOP8	Tape,Reel,4000	7612BCSA	
ICL7612BESA-TUDI	SOP8	Tape,Reel,4000	7612BESA	-40°C to +85°C
ICL7612DCSA-TUDI	SOP8	Tape,Reel,4000	7612DCSA	0°C to 70°C
ICL7612DCBAZ-T-TUDI	SOP8	Tape,Reel,4000	7612DCBAZ	
ICL7612DESA-TUDI	SOP8	Tape,Reel,4000	7612DESA	-40°C to +85°C
ICL7612ACPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7612ACPA	0°C to 70°C
ICL7612BCPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7612BCPA	
ICL7612DCPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7612DCPA	
ICL7611ACPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7611ACPA	
ICL7611ACSA-TUDI	SOP8	Tape,Reel,4000	7611ACSA	
ICL7611BCPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7611BCPA	
ICL7611BCSA-TUDI	SOP8	Tape,Reel,4000	7611BCSA	
ICL7611DCBAZ-T-TUDI	SOP8	Tape,Reel,4000	7611DCBAZ	
ICL7611DCPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7611DCPA	
ICL7611DCSAZ-T-TUDI	SOP8	Tape,Reel,4000	7611DCSAZ	
ICL7621ACPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7621ACPA	
ICL7621ACSA-TUDI	SOP8	Tape,Reel,4000	7621ACSA	
ICL7621BCPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7621BCPA	
ICL7621BCSA-TUDI	SOP8	Tape,Reel,4000	7621BCSA	
ICL7621DCPA-TUDI	DIP8	Tube,50,A box of 2000	ICL7621DCPA	
ICL7621DCSA-TUDI	SOP8	Tape,Reel,4000	7621DCSA	
ICL7621ECSA-TUDI	SOP8	Tape,Reel,4000	7621ECSA	

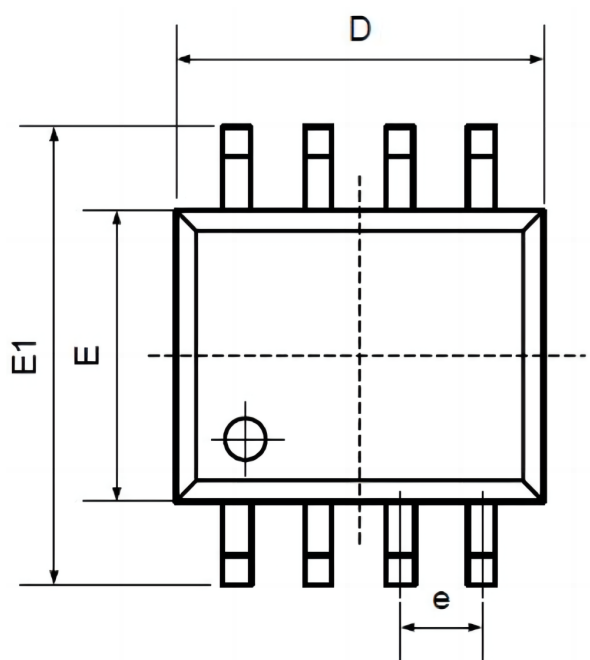
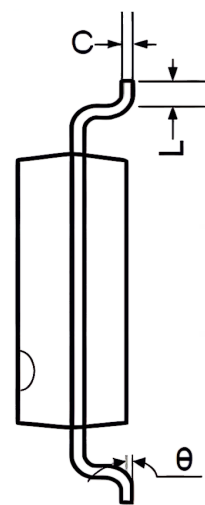


Revision history

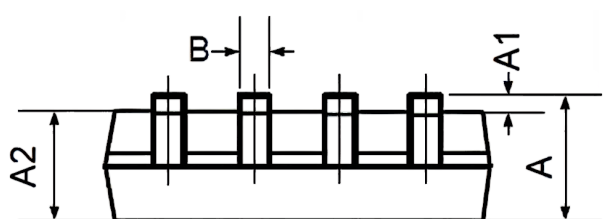
	Date	Revision	Page
V1.0	2022/8	New	1-17
V1.1	2025/6	Update model and PDF template	1-18



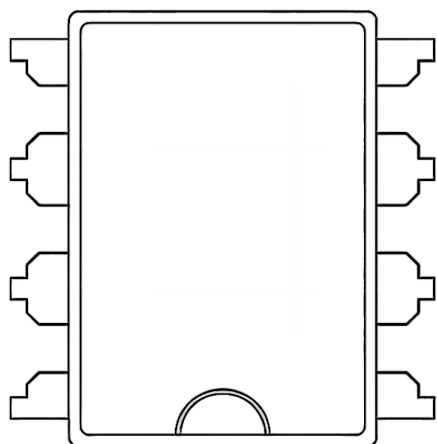
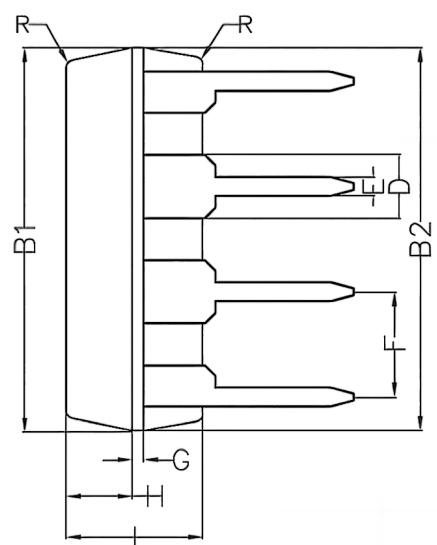
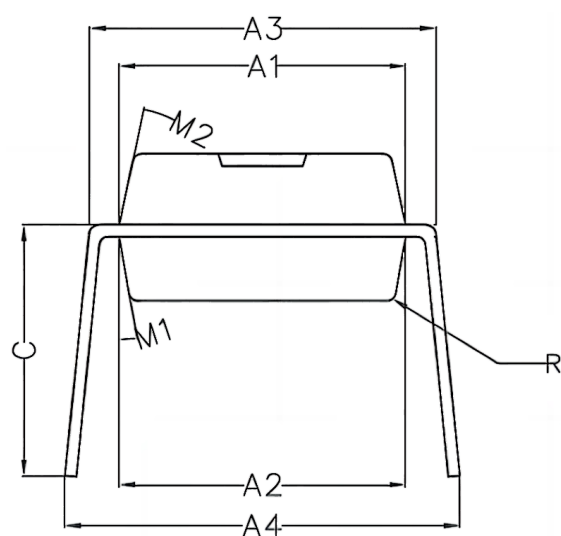
Package SOP8



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 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°



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 quality products.