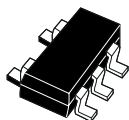


High bandwidth (5 MHz) rail-to-rail 5 V cost-effective op amp



TSL6101
SOT23-5

Features

- AEC-Q100 automotive qualification 
- Gain bandwidth product 5 MHz, unity gain stable
- Rail-to-rail input and output
- Wide supply voltage range: 2.0 V to 5.5 V
- Input offset voltage: 1.5 mV
- Low input bias current: 1 pA typ.
- Extended temperature range: - 40 °C to +125 °C

Applications

- Cost-sensitive applications
- Current measurement sensors and signal conditioning
- Automotive signal conditioning

Description

The **TSL6101** is a single 5 MHz-bandwidth unity-gain-stable amplifier. The rail-to-rail input stage and the wide supply range 2.0 V to 5.5 V make the **TSL6101** ideal for low-voltage, high-bandwidth signal conditioning.

Maturity status link

[TSL6101](#)

Products	Channel	Automotive	Package
TSL6101ILT	1		SOT23-5
TSL6101IYLT	1	•	

Related products

TSL6001	1 MHz rail-to-rail amplifier
TSL6201	8 MHz rail-to-rail amplifier

1 Pin description

1.1 TSL6101 single operational amplifier

Figure 1. Pin connections (top view)

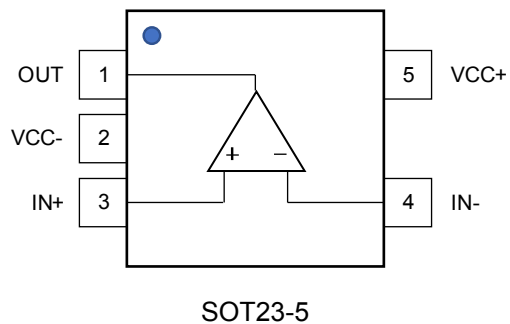


Table 1. Pin description

Pin n°	Pin name	Description
1	OUT	Output channel
2	VCC-	Negative supply voltage
3	IN+	Non-inverting input channel
4	IN-	Inverting input channel
5	VCC+	Positive supply voltage

2 Absolute maximum ratings and operating conditions

Table 2. Absolute maximum ratings

Symbol	Parameter ⁽¹⁾	Value	Unit
V _{CC}	Supply voltage	-0.3 to 6.0	V
V _{id}	Input voltage differential (V _{IN+} - V _{IN-}) ⁽²⁾	±V _{CC}	V
V _{in}	Input voltage	(V _{CC-}) - 0.2 to (V _{CC+}) + 0.2	V
I _{in}	Input current	±10	mA
T _{stg}	Storage temperature	-65 to +150	°C
T _j	Maximum junction temperature	150	°C
R _{th-ja} ⁽³⁾	Thermal resistance junction-to-ambient		°C / W
	SOT23-5	250	
T _j	Maximum junction temperature	150	°C
ESD	HBM: human body model ⁽⁴⁾	2	kV
	CDM: charged device model ⁽⁵⁾	1	kV

1. All voltage values are with respect to the VCC- pin, unless otherwise specified.

2. The maximum input voltage differential value may be extended to the condition that the input current is limited to ±10 mA.

3. R_{th-ja} is a typical value, obtained with PCB according to JEDEC 2s2p without vias.

4. Human body model: the test HBM is done in accordance with the standards ESDA-JS-001-2017 and Q100-002.

5. Charged device model: the test CDM is done in accordance with the standards ESDA-JS-002-2018 and Q100-011.

Table 3. Operating conditions

Symbol	Parameter	Value
V _{CC}	Supply voltage	2.0 V to 5.5 V
V _{icm}	Common-mode input voltage range	V _{CC-} - 0.1 V to V _{CC+} + 0.1 V
T _{oper}	Operating free air temperature range	-40 °C to +125 °C

3 Electrical characteristics

Table 4. Electrical characteristics at $V_{CC} = 2\text{ V to }5\text{ V}$, $V_{ICM} = V_{OUT} = V_{CC} / 2$, $T = 25\text{ }^{\circ}\text{C}$, $R_L = 10\text{ k}\Omega$ connected to $V_{CC} / 2$ and $C_L = 47\text{ pF}$ (unless otherwise specified). Production screening at $V_{CC} = 5\text{ V}$, operation on the full supply range ensured by design and characterization.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
DC performance						
V_{io}	Input offset voltage				± 1.5	mV
$\Delta V_{io}/\Delta T$	Input offset voltage temperature drift	$-40\text{ }^{\circ}\text{C} \leq T \leq 125\text{ }^{\circ}\text{C}$		± 2		$\mu\text{V}/^{\circ}\text{C}$
I_{ib}	Input bias current ⁽¹⁾			± 1		pA
I_{io}	Input offset current ⁽¹⁾			± 1		pA
A_{VD}	Open loop gain	$V_{CC-} + 500\text{ mV} \leq V_{OUT} \leq V_{CC+} - 500\text{ mV}$, $V_{CC} = 5\text{ V}$	80	95		dB
CMR	Common-mode rejection ratio $20.\log(\Delta V_{io}/\Delta V_{icm})$	$V_{CC-} - 100\text{ mV} \leq V_{icm} \leq V_{CC+} + 100\text{ mV}$, $V_{CC} = 5\text{ V}$	55	75		dB
SVR	Supply-voltage rejection ratio $20.\log(\Delta V_{io}/\Delta V_{CC})$	$2.0\text{ V} \leq V_{CC} \leq 5.5\text{ V}$, $V_{icm} = 0\text{ V}$		90		dB
V_{OH}	High level output voltage drop ($V_{OH} = V_{CC+} - V_{OUT}$)	$V_{CC} = 5\text{ V}$			35	mV
V_{OL}	Low level output voltage drop ($V_{OL} = V_{OUT}$)	$V_{CC} = 5\text{ V}$			35	mV
I_{OUT}		$V_{CC} = 2\text{ V}$		± 10		mA
		$V_{CC} = 5\text{ V}$		± 30		
I_{CC}	Supply current (per channel, $R_L > 1\text{ M}\Omega$)	No load, $-40\text{ }^{\circ}\text{C} \leq T \leq 125\text{ }^{\circ}\text{C}$		0.8	1.1	mA
AC performance						
GBP	Gain bandwidth product			5		MHz
SR	Slew rate ⁽²⁾	$A_V = 1\text{ V/V}$, 10% to 90%		3.5		V/ μs
Φ_m	Phase margin			45		Degrees
en	Input voltage noise density	$f = 10\text{ kHz}$		21		nV/ $\sqrt{\text{Hz}}$

1. Guaranteed by design and characterization on a sample of parts, not tested in production.

2. Slew rate value is the average of rising and falling values.

4 Package information

To meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: www.st.com. ECOPACK is an ST trademark.

4.1 SOT23-5 package information

Figure 2. SOT23-5 package outline

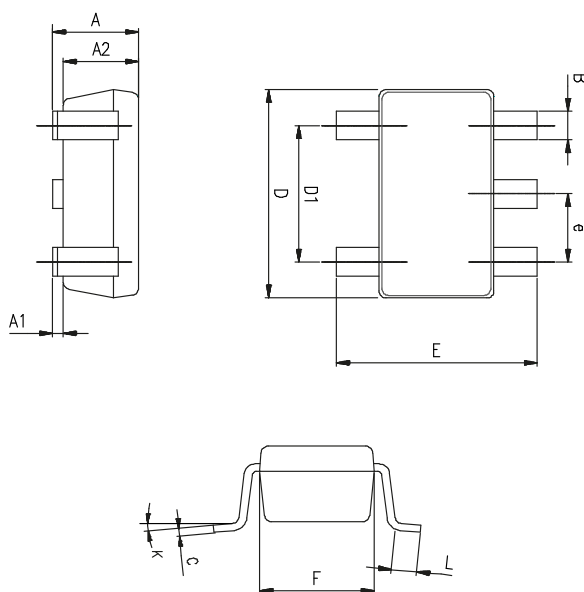


Table 5. SOT23-5 mechanical data

Dimensions						
Symbol	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90	1.20	1.45	0.035	0.047	0.057
A1			0.15			0.006
A2	0.90	1.05	1.30	0.035	0.041	0.051
B	0.35	0.40	0.50	0.014	0.016	0.020
C	0.09	0.15	0.20	0.004	0.006	0.008
D	2.80	2.90	3.00	0.110	0.114	0.118
D1		1.90			0.075	
e		0.95			0.037	
E	2.60	2.80	3.00	0.102	0.110	0.118
F	1.50	1.60	1.75	0.059	0.063	0.069
L	0.10	0.35	0.60	0.004	0.014	0.024
K	0°		0°	0°		0°

5 Ordering information

Table 6. Order code

Order code	Channel	Automotive	Package	Marking
TSL6101ILT	1		SOT23-5	K271
TSL6101IYLT	1	• (1)		K272

1. Qualification and characterization according to AEC Q100 and Q003 or equivalent, advanced screening according to AEC Q001 & Q002 or equivalent. For qualification status detail, check "Maturity Status Link" on product page ("Quality & Reliability" tab on www.st.com).

Revision history

Table 7. Document revision history

Date	Revision	Changes
10-Sep-2026	1	Initial release.

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