

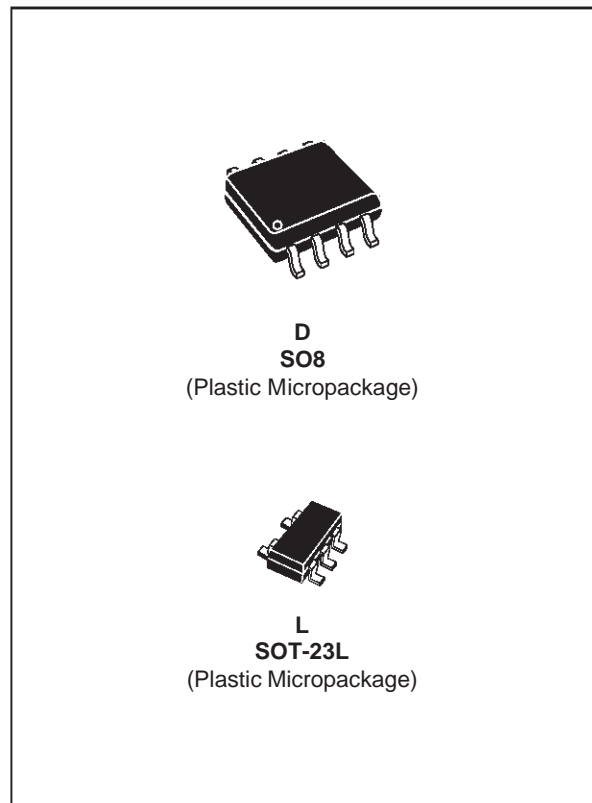


# TS461

## HIGH OUTPUT SWING SINGLE OPERATIONAL AMPLIFIER

PRODUCT PREVIEW

- HIGH DYNAMIC FEATURES
- LARGE OUTPUT SWING  
( $\pm 2.4V$  @  $V_{CC} = \pm 2.5V$ )
- LOW NOISE LEVEL :  $4nV/\sqrt{Hz}$
- LOW DISTORTION : **0.003%**
- OPERATING RANGE : 2.7V to 10V
  
- AVAILABLE IN **SOT23-5** MICROPACKAGE



### DESCRIPTION

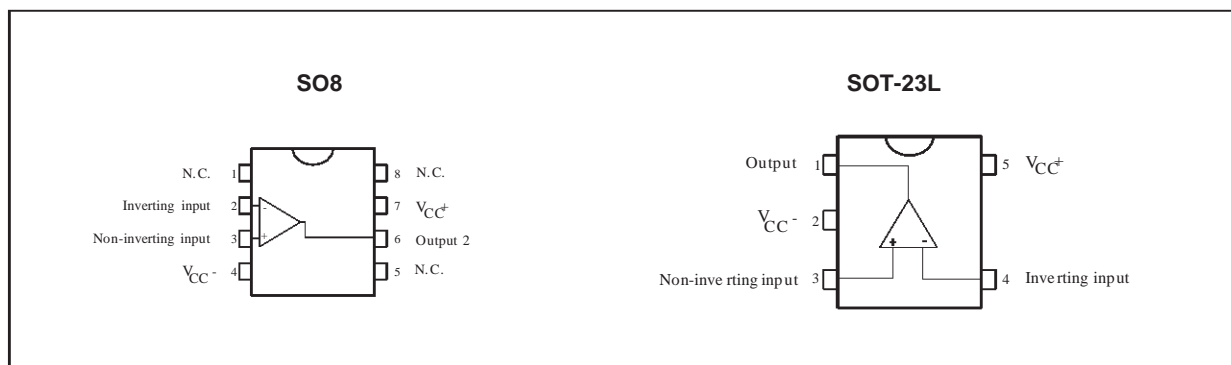
The TS461 is a single operational amplifier able to operate with voltages as low as  $\pm 1.35V$  and to reach a minimum of  $\pm 2V_{pp}$  of output swing (when supplied with  $\pm 2.5V$ ).

It is housed in the space-saving 5 pins SOT23-5 package which simplifies the board design because of the ability to be placed everywhere (outside dimensions are 2.8mm x 2.9mm)

### ORDER CODES

Part Number	Temperature Range	Package		SOT Marking
		D	L	
TS461C	-20, +70°C	•	•	K105

### PIN CONNECTIONS (top view)



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	12	V
V <sub>id</sub>	Differential Input Voltage - note 1	±V <sub>CC</sub>	V
T <sub>oper</sub>	Operating Free Air Temperature Range	-20 to +70	°C
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C
T <sub>j</sub>	Maximum Junction Temperature	150	°C
R <sub>thjc</sub>	Thermal Resistance Junction to Case	81	°C/W
R <sub>thja</sub>	Thermal Resistance Junction to Ambient	256	°C/W

Note : 1. Either or both input voltages must not exceed the magnitude of V<sub>CC</sub><sup>+</sup> or V<sub>CC</sub><sup>-</sup>

**OPERATING CONDITIONS**

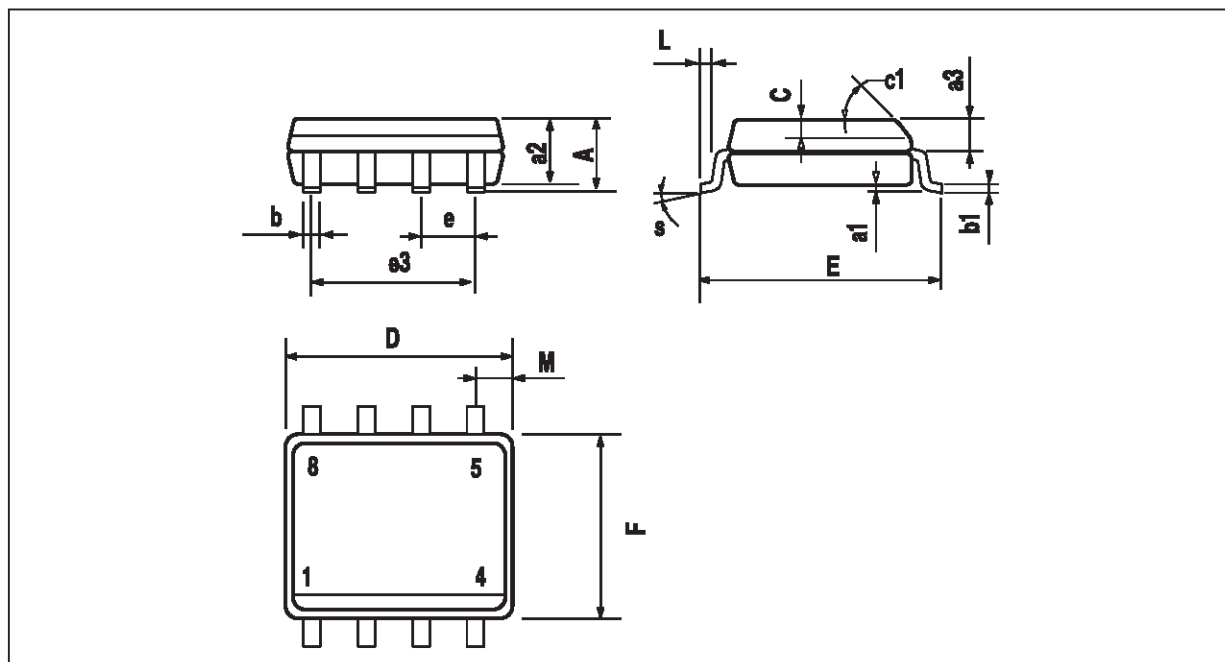
Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	2.7 to 10	V

**ELECTRICAL CHARACTERISTICS**

V<sub>CC</sub><sup>+</sup> = 2.5V, V<sub>CC</sub><sup>-</sup> = -2.5V, T<sub>amb</sub> = 25°C (unless otherwise specified)

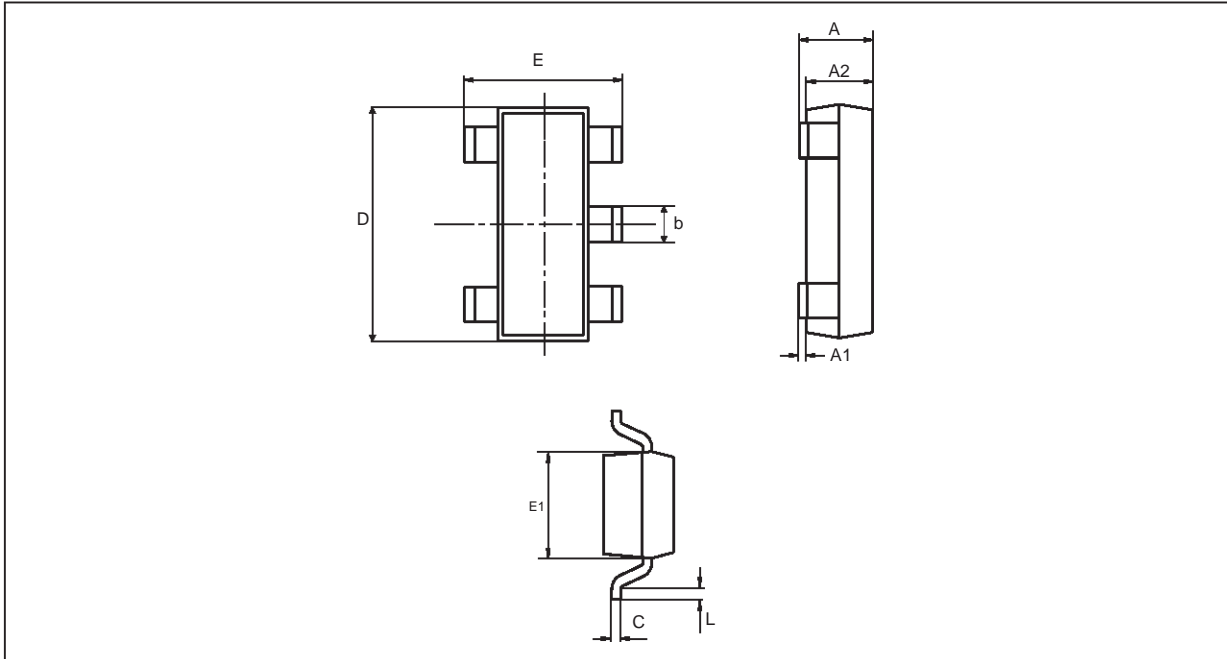
Symbol	Parameter	Min.	Typ.	Max.	Unit
V <sub>io</sub>	Input Offset Voltage T <sub>min.</sub> < T <sub>amb</sub> < T <sub>max.</sub>		1	5 7	mV
DV <sub>io</sub>	Input Offset Voltage Drift V <sub>ic</sub> = 0V, V <sub>o</sub> = 0V		5		µV/°C
I <sub>io</sub>	Input Offset Current T <sub>min.</sub> < T <sub>amb</sub> < T <sub>max.</sub> V <sub>ic</sub> = 0V, V <sub>o</sub> = 0V		10	150 T.B.D.	nA
I <sub>ib</sub>	Input Bias Current T <sub>min.</sub> < T <sub>amb</sub> < T <sub>max.</sub> V <sub>ic</sub> = 0V, V <sub>o</sub> = 0V		250	750 T.B.D.	nA
V <sub>icm</sub>	Common Mode Input Voltage Range		±1.5		V
CMR	Common Mode Rejection Ratio V <sub>ic</sub> = ±1.35V	60	85		dB
SVR	Supply Voltage Rejection Ratio V <sub>CC</sub> = ±2V to ±3V	60	70		dB
V <sub>oh</sub>	High Level Output Voltage R <sub>L</sub> = 2k	2	2.4		V
V <sub>ol</sub>	Low Level Output Voltage R <sub>L</sub> = 2k		-2.4	-2	V
A <sub>vd</sub>	Large Signal Voltage Gain R <sub>L</sub> = 2k	70	80		dB
GBP	Gain Bandwidth Product f = 100kHz, R <sub>L</sub> = 2kΩ, C <sub>L</sub> = 100pF	8.5	12		MHz
SR	Slew Rate A <sub>v</sub> = 1, V <sub>in</sub> = ±1V	2.8	4		V/µs
I <sub>CC</sub>	Supply Current Unity gain - no load		2	2.8	mA
e <sub>n</sub>	Equivalent Input Noise Voltage f = 100kHz		4		$\frac{nV}{\sqrt{Hz}}$
THD	Total Harmonic Distortion f = 1kHz, A <sub>v</sub> = -1, R <sub>L</sub> = 10k		0.003		%

**PACKAGE MECHANICAL DATA**  
**8 PINS - PLASTIC MICROPACKAGE (SO)**



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					

**PACKAGE MECHANICAL DATA**  
**5 PINS - TINY PACKAGE (SOT23)**



Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.45	0.034	0.057
A1	0	0.15		0.006
A2	0.90	1.30	0.034	0.051
b	0.35	0.50	0.013	0.020
C	0.09	0.20	0.003	0.008
D	2.80	3.00	0.110	0.118
E	2.60	3.00	0.102	0.118
E1	1.50	1.75	0.059	0.069
L	0.10	0.60	0.003	0.024

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