CMOS Rail to Rail Operational Amplifier

AT8605ARTZ

FEATURES

- Single-Supply Operation from 2.2V to 5.5V
- Rail-to-Rail Input and Output
- Gain-Bandwidth Product: 10MHz (Typ.)
- Low Input Bias Current: 10pA (Typ.)
- Low Offset Voltage:5mV (Max.)
- Quiescent Current: 800μA per Amplifier (Typ.)
- Operating Temperature: −40°C to +125°C
- Available in SOT23-5 Packages

APPLICATIONS

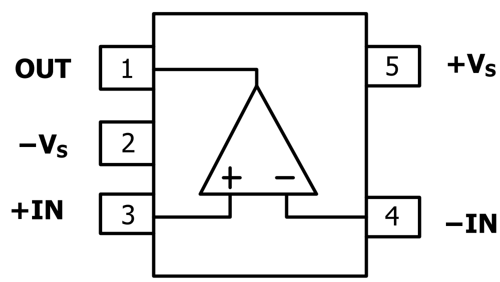
- Portable Equipment
- Mobile Communications
- Smoke Detector
- Sensor Interface
- Medical Instrumentation

DESCRIPTION

This AT8506ARTZ is wideband, low noise, low distortion dual operation amplifier, that offer rail to rail input/output and single supply operation down to 0.2V. They draw 1.6mA of quiescent supply current while featuring ultra-low distortion (0.0002% THD+N), as well as low input voltage noise density(15Nv/Hz) and low input current noise density(0.5Fa/hZ). These features make the devices an ideal choice for applications that require low distortion and/or low noise. These amplifiers have inputs and outputs which swing rail-to-rail and their input common mode voltage range includes ground. The maximum input offset of these amplifiers is less than 5mV.

The AT8605ARTZ are unity gain stable with a gain bandwidth of 10MHz. The AT8605ARTZ is available in SOT23-5 packages. The extended temperature range of −40°C to +125°C over all supply voltages offers additional design flexibility.

PIN CONFIGURATIONS



SOT23-5

ABSOLUTE MAXIMUM RATINGS

Table 1.

Parameter	Min.	Max.
Power Supply Voltage (V_{DD} to V_{SS})	−0.5V	+7V
Analog Input Voltage (IN+ or IN−)	V_{SS} − 0.5V	V_{SS} + 0.5V
PDB Input Voltage	V_{SS} − 0.5V	+7V
Operating Temperature Range	−40°C	+125°C
Junction Temperature	150°C	
Storage Temperature Range	−65°C	+150°C
Lead Temperature (Soldering, 10s)	+300°C	
Package Thermal Resistance @ T_A = +25°C		
SOP-8, θ_{JA}	130°C	
MSOP-8, θ_{JA}	210°C	

ELECTRICAL CHARACTERISTICS

(V_{DD} = +5V, V_{SS} =0V, V_{CM} = 0V, V_{OUT} = V_{DD}/2, R_L = 100kΩ tied to V_{DD}/2, SHDNB = V_{DD}, T_A = −40°C to +125°C, unless otherwise noted. Typical values are at T_A = +25°C.)

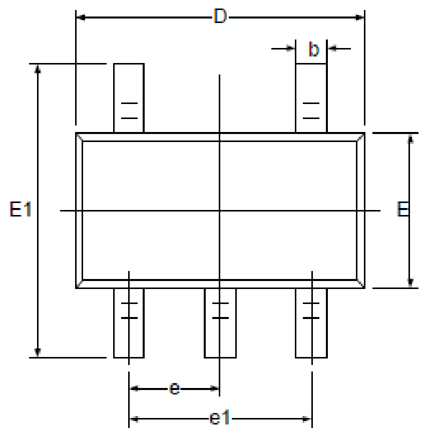
Table 2.

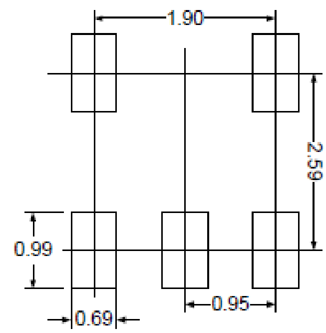
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Power Supply Voltage Range	V_{DD}	Guaranteed by the PSRR test	2.2	-	5.5	V
Quiescent Supply Current per Amplifier	V_{OS}	V_{DD} = 3V	-	0.8	-	mA
		V_{DD} = 5V	-	0.8	1.2	
Input Offset Voltage	V_{OS}	T_A = +25°C	-	-	±5	mV
		T_A = −40°C to +85°C	-	-	-	
		T_A = −40°C to +125°C	-	-	±1.5	
Input Offset Voltage Tempco	$\Delta V_{OS}/\Delta T$			±0.3	±6	μV/°C
Input Bias Current	I_B			±1	±100	pA
Input Offset Current	I_{OS}			±1	±100	pA
Input Common Mode Voltage Range	V_{CM}	Guaranteed by the T_A = +25°C	−0.2		V_{DD}+0.2	V
		CMRR test T_A = −40°C to +125°C	0		V_{DD}	
Common-Mode Rejection Ratio	CMRR	V_{SS} − 0.2V ≤ V_{CM} ≤ V_{DD} + 0.2V T_A = +25°C		75		dB
		V_{SS} < V_{CM} < 5V T_A = +25°C	65	80		
		V_{SS} − 0.2V ≤ V_{CM} ≤ V_{DD} + 0.2V T_A = −40°C to +125°C		65		
Power Supply Rejection Ratio	PSRR	V_{DD} = +2.2V to +5.5V	75	90		dB
Open-Loop Voltage Gain	A_V	R_L=100kΩ to V_{DD}/2, 100mV ≤ V_O ≤ V_{DD} − 125mV	90	100		dB
		R_L=1kΩ to V_{DD}/2, 200mV ≤ V_O ≤ V_{DD} − 250mV	75	85		
		R_L=500Ω to V_{DD}/2, 350mV ≤ V_O ≤ V_{DD} − 500mV	55	65		

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage Swing	V_{OUT}	$\lvert V_{IN+} - V_{IN-} \rvert \geq 10mV$ $V_{DD} - V_{OH}$		10	35	mV
		R_L=10kΩ to $V_{DD}/2$ $V_{OL} - V_{SS}$		10	30	
		$\lvert V_{IN+} - V_{IN-} \rvert \geq 10mV$ $V_{DD} - V_{OH}$		80	200	
		R_L=1kΩ to $V_{DD}/2$ $V_{OL} - V_{SS}$		50	150	
		$\lvert V_{IN+} - V_{IN-} \rvert \geq 10mV$ $V_{DD} - V_{OH}$		100	350	
		R_L=500Ω to $V_{DD}/2$ $V_{OL} - V_{SS}$		80	260	
Output Short Circuit Current	I_{SC}	Sinking ot Sourcing		±50		mA
PDB Logic Low	V_{IL}				0.8	V
PDB Logic High	V_{IH}		2			V
Turn On Time	T_{ON}			2.2		μs
Turn Off Time	T_{OFF}			0.8		μs
Output Leakage Current	I_{LEAK}	Shutdown Mode(PDB = V_{SS}), VOUT = V_{SS} to V_{DD}		±0.001	±1.0	μA
Input Capacitance	C_{IN}			10		pF
Gain Bandwidth Product	GBW	A_V = +1V/V		10		MHz
Slew Rate	SR	A_V = +1V/V		4.5		V/μs
Full Power Bandwidth		A_V = +1V/V		0.4		MHz
Phase Margin	φ_m	A_V = +1V/V		55		Deg
Gain Margin	G_m	A_V = +1V/V		12		Db
Setting Time	t_s	To 0.01%, V_{OUT} = 2V step A_V = +1V/V		1		μs
Capacitive Load Stability	C_{LOAD}	No sustained oscillations. A_V = +1V/V		200		pF
Peak to Peak Input Density	e_n	f = 10Hz		60		nV/√Hz
		f = 1kHz		30		
		f = 30kHz		15		

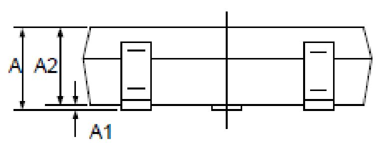
OUTLINE DIMENSIONS

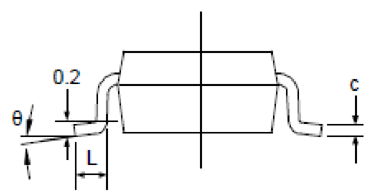
SOT23-5





RECOMMENDED LAND PATTERN (Unit: mm)





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

ORDERING INFORMATION

Table 3. Ordering Information

Part Number	Buy Now
AT8605ARTZ	* *

*: both and are our online store icons. Our products can be ordered from either one of them with the same pricing and delivery time.

NOTICE

1. It is important to carefully read and follow the warnings, cautions, and product-specific notes provided with electronic components. These instructions are designed to ensure the safe and proper use of the component and to prevent damage to the component or surrounding equipment. Failure to follow these instructions could result in malfunction or failure of the component, damage to surrounding equipment, or even injury or harm to individuals. Always take the necessary precautions and seek professional assistance if unsure about proper use or handling of electronic components.
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9. ATI retains ownership of all rights for special technologies, techniques, and designs for its products and projects, as well as any modifications, improvements, and inventions made by ATI.

10. Despite operating the electronic modules as specified, malfunctions or failures may occur before the end of their usual service life due to the current state of technology. Therefore, it is crucial for customer applications that require a high level of operational safety, especially in accident prevention or life-saving systems where the malfunction or failure of electronic modules could pose a risk to human life or health, to ensure that suitable measures are taken. The customer should design their application or implement protective circuitry or redundancy to prevent injury or damage to third parties in the event of an electronic module malfunction or failure.