

钍地半导体
Tudi Semiconductor

Product Specification

TUDI-AD8515ARTZ

1.8 V Low Power CMOS Rail-to-Rail Input/ Output Operational Amplifier

网址 www.sztdbdt.com

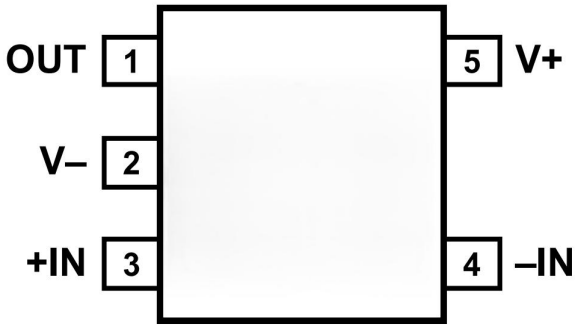
用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

FEATURES

- Single-supply operation: 1.8 V to 5 V
- Offset voltage: 6 mV maximum
- Space-saving SOT-23 and SC70 packages
- Slew rate: 2.7 V/μs
- Bandwidth: 5 MHz
- Rail-to-rail input and output swing
- Low input bias current: 2 pA typical
- Low supply current @ 1.8 V: 450 μA maximum



SOT-23 Pin Configuration

DESCRIPTION

The AD8515 is a rail-to-rail amplifier that can operate from a single-supply voltage as low as 1.8 V. The AD8515 single amplifier, available in 5-lead SOT-23 and 5-lead SC70 packages, is small enough to be placed next to sensors, reducing external noise pickup.

The AD8515 is a rail-to-rail input and output amplifier with a gain bandwidth of 5 MHz and typical offset voltage of 1 mV from a 1.8 V supply. The low supply current makes these parts ideal for battery-powered applications. The 2.7 V/μs slew rate makes the AD8515 a good match for driving ASIC inputs such as voice codecs.

The AD8515 is specified over the extended industrial temperature range of -40°C to +125°C.

APPLICATIONS

- Portable communications
- Portable phones
- Sensor interfaces
- Laser scanners
- PCMCIA cards
- Battery-powered devices
- New generation phones
- Personal digital assistants

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise noted.

Table 4.

Parameter	Rating
Supply Voltage	6V
Input Voltage	GND to V_S
Differential Input Voltage	±6V or ±V_S
Output Short-Circuit Duration to GND	Observe derating curves
Storage Temperature Range	
KS and RJ Packages	-65℃ to +150℃
Operating Temperature Range	
AD8515	-40℃ to +125℃
Junction Temperature Range	
KS and RJ Packages	-65℃ to +150℃
Lead Temperature(Soldering,60 sec)	300℃

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

THERMAL RESISTANCE

θ_{JA} is specified for the worst-case conditions, that is, a device soldered in a circuit board for surface-mount packages.

Table 2. Thermal Resistance

Package Type	θ_{JA}	θ_{Jc}	Unit
5-Lead SOT-23(RJ)	230	146	℃/W

SPECIFICATIONS ELECTRICAL CHARACTERISTICS

Table 3.

V_S = 1.8 V, V_{CM} = $V_{S/2}$, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	Vos	V_{CM}=Vs/2		1	6	mV
		-40℃<T_A<+125℃			8	mV
Input Bias Current	I_B	Vs=1.8V		2	30	pA
		-40℃<T_A<+85℃			600	pA
		-40℃<T_A<+125℃			8	nA
Input Offset Current	Ios	-40℃<T_A<+125℃		1	10500	pApA
Input Voltage Range			0		1.8	V
Common-Mode Rejection Ratio	CMRR	0V≤VCM≤1.8V	50			dB
		-40℃<T_A<+125℃	47			dB
Large Signal Voltage Gain	Avo	R_L=100 kΩ, 0.3V≤V_{OUT}≤1.5V	110	400		V/mV
Offset Voltage Drift	△Vos/△T			4		μV/ ℃
OUTPUTCHARACTERISTICS						
Output Voltage High	V_{OH}	I_L=100μA, -40℃<T_A<+125℃	1.79			V
		I_L=750μA, -40℃<T_A<+125℃	1.77			V
Output Voltage Low	V_{OL}	I_L=100μA,-40℃<T_A<+125℃			10	mV
		I_L=750μA,-40℃<T_A<+125℃			30	mV
Short-Circuit Limit	Isc			20		mA
POWER SUPPLY						
Supply Current/Amplifier	I_{SY}	V_{OUT}=Vs/2		325	450	μA
		-40℃<T_A<+125℃			500	μA
DYNAMIC PERFORMANCE						
Slew Rate	SR	RL=10 kΩ		2.7		V/μs
Gain Bandwidth Product	GBP			5		MHz

Table 3. (continued)

V_S = 1.8 V, V_{CM} = $V_{S/2}$, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
NOISE PERFORMANCE						
Voltage Noise Density	e_n	f=1kHz		22		nV/ √Hz
		f=10 kHz		20		nV/ √Hz
Current Noise Density	i_n	f=1kHz		0.05		pA/ √Hz

Table 4.

V_S = 3.0 V, V_{CM} = V_S/2, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	Vos	V_{CM}=Vs/2		1	6	mV
		-40°C<T_A<+125°C			8	mV
Input Bias Current	I_B	Vs=3.0V		2	30	pA
		-40°C<T_A<+85°C			600	pA
		-40°C<T_A<+125°C			8	nA
Input Offset Current	Ios			1	10	pA
		-40°C<T_A<+125°C			500	pA
Input Voltage Range			0		3	V
Common-Mode Rejection Ratio	CMRR	0V≤V_{CM}≤3.0V	54			dB
		-40°C<T_A<+125°C	50			dB
Large Signal Voltage Gain	Avo	R_L=100 kΩ, 0.3V≤V_{OUT}≤2.7V	250	1000		V/mV
Offset Voltage Drift	△Vos/△T			4		μV/ °C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	I_L=100μA,-40°C<T_A<+125°C	2.99			V
		I_L=750μA,-40°C<T_A<+125°C	2.98			V
Output Voltage Low	V_{OL}	I_L=100μA,-40°C<T_A<+125°C			10	mV
		I_L=750μA,-40°C<T_A<+125°C			20	mV
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	Vs=1.8Vto 5.0V	65	85		dB
		-40°C<T_A<+125°C	57	80		dB
Supply Current/Amplifier	I_{SY}	V_{OUT}=Vs/2		350	450	μA
		-40°C<T_A<+125°C			500	μA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L=10 kΩ		2.7		V/μs
Gain Bandwidth Product	GBP			5		MHz
NOISE PERFORMANCE						
Voltage Noise Density	e_n	f=1kHz		22		nV/√Hz
		f=10 kHz		20		nV/√Hz
Current Noise Density	i_n	f=1 kHz		0.05		pAV/√Hz

Table 5.

V_S = 5.0 V, V_{CM} = V_S/2, T_A = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	Vos	V_{CM}=Vs/2		1	6	mV
		-40°C<T_A<+125°C			8	mV
Input Bias Current	I_B	Vs=5.0V		5	30	pA
		-40°C<T_A<+85°C			600	pA
		-40°C<T_A<+125°C			8	nA
Input Offset Current	Ios			1	10	pA
		-40°C<T_A<+125°C			500	pA
Input Voltage Range			0		5.0	V
Common-Mode Rejection Ratio	CMRR	0V≤V_{CM}≤5.0V	60	75		dB
		-40°C<T_A<+125°C	54			dB
Large Signal Voltage Gain	Avo	R_L=100 k2, 0.3V≤V_{OUT}≤4.7V	450	2000		V/mV
Offset Voltage Drift	△Vos/△T			4		μV/ °C
OUTPUT CHARACTERISTICS			4.99			
Output Voltage High	V_{OH}	I_L=100 μA,-40°C<T_A<+125°C	4.98			V
		I_L=750μA,-40°C<T_A<+125°C				V
Output Voltage Low	V_{OL}	I_L=100μA,-40°C<T_A<+125°C			10	mV
		I_L=750μA,-40°C<T_A<+125°C			20	mV
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	Vs=1.8Vt o 5.0V	65	85		dB
		-40°C<T_A<+125°C	57	80		dB
Supply Current/Amplifier	I_{SY}	V_{OUT}=Vs/2		410	550	μA
		-40°C<T_A<+125°C			600	μA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L=10 kΩ		2.7		V/μs
Gain Bandwidth Product	GBP			5		MHz

Table 5. (continued)

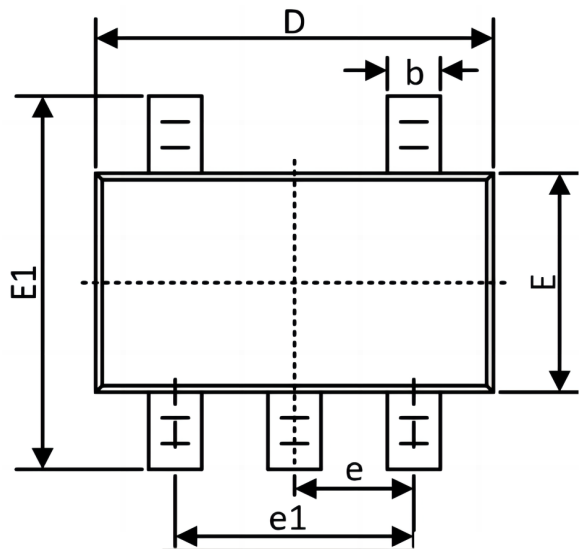
V_S = 5.0 V, V_{CM} = V_S/2, T_A = 25°C, unless otherwise noted.

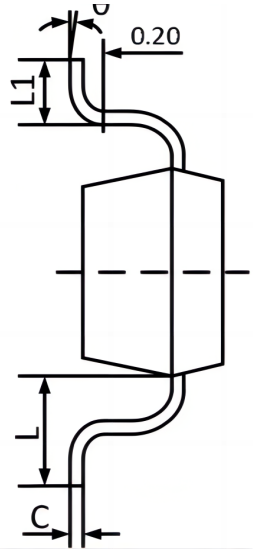
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
NOISE PERFORMANCE						
Voltage Noise Density	en	f=1 kHz		22		nV/√Hz
		f=10 kHz		20		nV/√Hz
Current Noise Density	in	f=1kHz		0.05		pA/√Hz

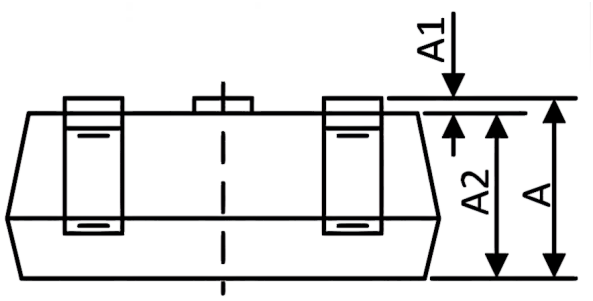
Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
AD8515ARTZ-REEL	SOT23-5	Tape,Reel,3000	BDA	−40°C to +125°C

Package SOT23-5







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	0.400	0.012	0.016
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	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.700REF		0.028REF	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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 quallity products.