

Features

- · Wide Operating Voltage
- · Low input offset voltage
- · Low Quiescent Current
- · Unity Gain Stable
- · Rail to Rail input and output operation
- -40°C to +85°C Operating Temperature Range
- Dual amplifiers per package
- Package types: 8-pin SOP

Applications

- · Portable Test Equipment
- · Medical Instrument
- · Sensor Applications
- Temperature Measurements
- · Battery Powered Systems

General Description

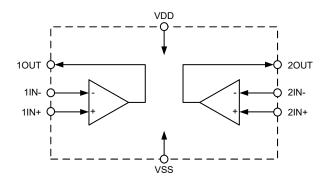
The HT92632/HT92652 family of precision operational amplifiers offers the benefits of low offset voltage and low offset drift. They are unity gain stable, have low 1/f noise as well as good PSRR and CMRR characteristics. The devices also provide full rail-to-rail input and output operation. The HT92632 has a gain bandwidth product of 300kHz while the HT92652 has a gain bandwidth product of 1.5MHz.

These characteristics along with their single supply operation and low power consumption features provide a range of low offset voltage operational amplifiers suitable for use in a wide range of applications, especially for portable devices and battery powered equipment. With regard to packaging, both devices are supplied in 8-pin SOP package formats.

Selection Table

Device Name	Amplifiers	Operating Voltage	Gain Bandwidth (Typ.)	Vos (Typ.)	ΔV _{OS} /ΔT _A (Typ.)	Slew Rate (Typ.)	Package Type
HT92632	2	2.0V~5.5V	300kHz	15µV	50nV	0.15V/µs	8SOP
HT92652	2	2.0V~5.5V	1.5MHz	10µV(Max.)	50nV(Max.)	0.5V/µs	8SOP

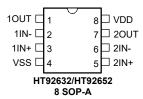
Block Diagram



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Pin Assignment



Pin Description

Pin Number	Pin Name	Description
1	1OUT	Output – OPA1
2	1IN-	Inverting Input – OPA1
3	1IN+	Non-inverting Input – OPA1
4	VSS	Negative Power Supply
5	2IN+	Non-inverting Input – OPA2
6	2IN-	Inverting Input – OPA2
7	2OUT	Output – OPA2
8	VDD	Positive Power Supply

Absolute Maximum Ratings

Supply VoltageV _{SS} -0.3V to 6.0V	I _{OL} Total80mA
Input Voltage V_{SS} -0.3V to V_{DD} +0.3V	I _{OH} Total80mA
Storage Temperature50°C to 150°C	Total Power Dissipation
Operating Temperature40°C to 85°C	

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

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Electrical Characteristics

HT92632

Unless otherwise indicated, Ta=25°C, V_{DD}=2.0V to 5.5V, V_{SS}=GND, V_{CM}=V_{DD}/3, V_{OUT}≈V_{DD}/2, V_L=V_{DD}/2, R_L=100k Ω to V_L and C_L=30pF

0	Parameter		Test Conditions				
Symbol			Conditions	Min	Тур	Max	Units
V _{DD}	Supply Voltage	_	Ta=25°C	2.0	_	5.5	V
Vos	Input Offset Voltage	_	Ta=25°C	_	15	40	μV
ΔV _{OS} /ΔT _A	Drift with Temperature	_	Ta=-40°C~125°C	-50	_	+50	nV/°C
los	Input Offset Current	_	Ta=25°C	_	100	_	рА
I _B	Input Bias Current	_	Ta=25°C	_	50	_	pА
V _{CML}	Input Common Mode Range Low	_	_	_	_	Vss-0.1	V
V _{CMH}	Input Common Mode Range High	_	_	V _{DD} +0.1	_	_	V
Vol	Minimum Output Voltage Swing	_	R_L =10k Ω to V_L , G=+2, 0.5V input overdrive	Vss	V _{SS} +35	V _{SS} +80	mV
V _{OH}	Maximum Output Voltage Swing		R_L =10k Ω to V_L , G=+2, 0.5V input overdrive	V _{DD} -80	V _{DD} -35	V _{DD}	mV
A _{OL}	Large Signal DC Open Loop Gain —		V _{OUT} =0.3V~V _{DD} -0.3V	100	130	_	dB
GBW	Gain Bandwidth Product	_	_	_	300	_	kHz
PM	Phase Margin		_	_	70	_	degree
CMRR	Common Mode Rejection Ratio		V _{CM} =-0.1V~V _{DD} +0.1V	100	120	_	dB
PSRR	Power Supply Rejection Ratio		_	100	120	_	dB
ΙQ	Quiescent Current/Amplifier		I _{OUT} =0	10	30	40	μΑ
SR	Slew Rate		_	_	0.15	_	V/µs
	Output Shart Circuit Current	3V	_	_	±6	_	mA
Isc	Output Short Circuit Current	5V	_	_	±21	_	mA
Eni	Input Noise Voltage	_	f=0.1Hz to 10Hz	_	1	_	μV _{P-P}
e _{ni}	Input Noise Voltage Density	_	F<2kHz	_	50	_	nV/√Hz
TOOR	Output Overdrive Recovery Time	_	G=-10, ± 0.5 V input overdrive to V _{DD} /2, V _{IN} 50% point to V _{OUT} 90%	_	120	_	μs
TOCS	Offset Correction Settling Time	_	G=+1, V _{IN} step of 2V, V _{OS} within 100uV of its final value		100	_	μs
Tstart	Start Up Time		G=+1, 0.1% V _{OUT} settling	_	2	_	ms

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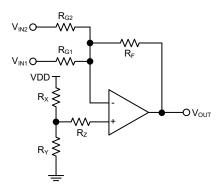
HT92652

Unless otherwise indicated, Ta=25°C, V_{DD}=2.0V to 5.5V, V_{SS}=GND, V_{CM}=V_{DD}/3, V_{OUT} \approx V_{DD}/2, V_L=V_{DD}/2, R_L=20k Ω to V_L and C_L=60pF

Councile of	Bouwardon		Test Conditions				Units
Symbol	Parameter	V _{DD}	Conditions	Min	Тур	Max	Units
V _{DD}	Supply Voltage	_	Ta=25°C	2.0	_	5.5	V
Vos	Input Offset Voltage	_	Ta=25°C	-10	_	+10	μV
ΔV _{OS} /ΔT _A	Drift with Temperature	_	Ta=-40°C~125°C	-50	_	+50	nV/°C
Ios	Input Offset Current	_	Ta=25°C	_	100	_	pА
I _B	Input Bias Current	_	Ta=25°C	_	50	_	pА
V _{CML}	Input Common Mode Range Low	_	_	_	_	V _{SS} -0.1	V
V _{СМН}	Input Common Mode Range High	_	_	V _{DD} +0.1	_	_	V
Vol	Minimum Output Voltage Swing	_	R_L =10k Ω to V_L , G=+2, 0.5V input overdrive	Vss	V _{SS} +35	V _{SS} +80	mV
V _{он}	Maximum Output Voltage Swing	_	R_L =10k Ω to V_L , G=+2, 0.5V input overdrive	V _{DD} -80	V _{DD} -35	V_{DD}	mV
Aol	Large Signal DC Open Loop Gain	_	V _{OUT} =0.3V~V _{DD} -0.3V	100	130	_	dB
GBW	Gain Bandwidth Product	_	_	1.3	1.5	_	MHz
PM	Phase Margin	_	_	_	70	_	degree
CMRR	Common Mode Rejection Ratio	_	V _{CM} =-0.1V~V _{DD} +0.1V	100	120	_	dB
PSRR	Power Supply Rejection Ratio		_	100	120	_	dB
IQ	Quiescent Current/Amplifier	_	I _{OUT} =0	_	_	500	μA
SR	Slew Rate	_	_	_	0.5	_	V/µs
I _{sc}	Output Short Circuit Current	3V	_	_	±7	_	mA
ISC	Output Short Circuit Current	5V	_	_	±22	_	mA
Eni	Input Noise Voltage	_	f=0.1Hz to 10Hz	_	1	_	μV_{P-P}
e _{ni}	Input Noise Voltage Density	_	F<2.5kHz	_	120	_	nV/√Hz
TOOR	Output Overdrive Recovery Time	_	G=-100, ±0.5V input overdrive to V _{DD} /2, V _{IN} 50% point to V _{OUT} 90%	_	120	_	μs
TOCS	Offset Correction Settling Time	_	G=+1, V _{IN} step of 2V, V _{OS} within 100uV of its final value	_	300	_	μs
Tstart	Start Up Time		G=+1, 0.1% V _{OUT} settling	_	2	_	ms



Application Circuits



$$R_{VIN\text{-}} = \frac{1}{\frac{1}{R_{G1}} + \frac{1}{R_{G2}} + \frac{1}{R_F}}, \ R_{VIN\text{-}} = total \ resistance \ at the inverting input.}$$

$$R_{VIN^+} = \frac{1}{\frac{1}{R_X} + \frac{1}{R_Y}} + R_Z, \ R_{VIN^+} = \text{total resistance at the non-inverting input, } \\ R_{VIN^+} = R_{VIN^-}.$$

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Package Information

Note that the package information provided here is for consultation purposes only. As this information may be updated at regular intervals users are reminded to consult the <u>Holtek website</u> for the latest version of the <u>Package/Carton Information</u>.

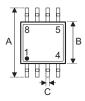
Additional supplementary information with regard to packaging is listed below. Click on the relevant section to be transferred to the relevant website page.

- Package Information (include Outline Dimensions, Product Tape and Reel Specifications)
- The Operation Instruction of Packing Materials
- Carton information

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8-pin SOP (150mil) Outline Dimensions







Symbol	Dimensions in inch						
Symbol	Min.	Nom.	Max.				
A	_	0.236 BSC	_				
В	_	0.154 BSC	_				
С	0.012	_	0.020				
C'	_	0.193 BSC	_				
D	_	_	0.069				
E	_	0.050 BSC	_				
F	0.004	_	0.010				
G	0.016	_	0.050				
Н	0.004	_	0.010				
α	0°	_	8°				

Ormah al	Dimensions in mm						
Symbol	Min.	Nom.	Max.				
A	_	6.00 BSC	_				
В	_	3.90 BSC	_				
С	0.31	_	0.51				
C'	_	4.90 BSC	_				
D	_	_	1.75				
Е	_	1.27 BSC	_				
F	0.10	_	0.25				
G	0.40	_	1.27				
Н	0.10	_	0.25				
α	0°	_	8°				

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