16V, 500µA, 1 MHz CMOS Rail-to-Rail Input/Output Operational Amplifiers

Preliminary Technical Data

ADA4665

FEATURES

Lower Power at High voltage: 500 µA typ
Gain Bandwidth: 1 MHz
Slew Rate: 1 V/ µs
Low Input Bias Currents 1pA Max
Single-Supply Operation: 5 to 16 Volts
Dual-Supply Operation: +/-2.5 to +/-8 Volts
Output drive: 10 mA
Unity Gain Stable

APPLICATIONS

Portable Operated Systems
High density Power Budget Systems
Medical Equipment
Physiological Measurement
Precision References
Buffer / Level Shifting
Multi-pole Filters
Sensors
Transimpedance Amps

PIN CONFIGURATIONS

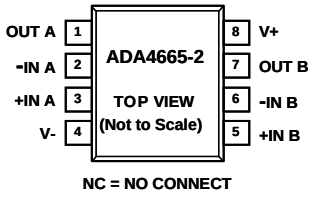

Figure 1. 8-Lead Narrow-Body SOIC

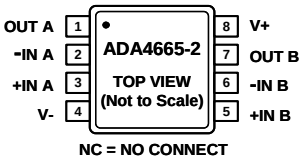

Figure 2. 8-Lead MSOP

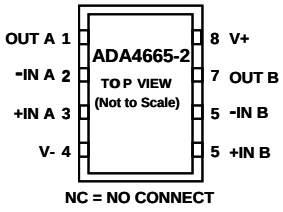

Figure 3. 8-Lead LFCSP 3mm x 3mm

GENERAL DESCRIPTION

The ADA4665 is a family of rail-to-rail input/output single supply and dual supply amplifiers optimized for lower power budget designs where the signal chain requires some gain stages requiring amplifiers higher gain bandwidth and faster response.

The ADA4665 family features an extended operating range with supply voltages from 5V up to 16 V for low power operation with I_{SY} of 500 µA typically and 900 µA over the extended industrial temperature. These devices offer 3MHz unity gain bandwidth. They also feature low input bias currents of 1pA and 10 mA output drive.

The combination of low supply currents, low offsets, very low input bias currents, and wide supply range make these amplifiers useful in a wide variety of low power applications.

REV. PrA

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ELECTRICAL CHARACTERISTICS

(V_S=+5V, V_{CM} = V_S/2, T_A=+25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}			TBD		mV
		V_{CM} = - 0.1V to 5.0V		5	TBD	mV
-40°<		T_A < +85°C			TBD	mV
-40°<		T_A < +125°C			TBD	mV
Input Bias Current	I_B			0.3	TBD	pA
		-40°< T_A < +85°C			TBD	pA
		-40°< T_A < +125°C			TBD	pA
Input Offset Current	I_{OS}			0.2		pA
		-40°< T_A < +85°C			20	pA
		-40°< T_A < +125°C			75	pA
Input Voltage Range	IVR		-0.1		5	V
Common-Mode Rejection Ratio	CMRR	V_{CM} = -0.1V to 5.0V	80	95		dB
Large Signal Voltage Gain	A_{VO} R	$_L$ = 2 kΩ V_O= 0.5V to 4.5V	70	85		V/mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$			5	tbd	µV/°C
Bias Current Drift				tbd		pA/°C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	I_L = 1mA		4.8		V
		-40°C < T_A < +125°C	4.6			V
Output Voltage Low	V_{OL}	I_L = 1mA		150		mV
		-40°C < T_A < +125°C			250	mV
Short Circuit Current	I_{SC}			±5		mA
Closed Loop Output Impedance	Z_{OUT} f=100kHz,	A_V = 1		100		Ω
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	V_S = 5 V to 16 V	70	95		dB
Supply Current/Amplifier	I_{SY}	V_O = 0V		500		µA
		-40°< T_A < +85°C		tbd		µA
		-40°< T_A < +125°C		900		µA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L =10 kΩ		1		V/µs
Settling Time	t_S	To 0.1%, 0 V to 1V step		tbd		µs
Gain Bandwidth Product	GBP			1		MHz
Phase Margin	Øo			60		degrees
NOISE PERFORMANCE						
Peak-to-Peak Noise	e_n p-p	f=0.1Hz to 10 Hz		TBD		µV p-p
Voltage Noise Density	e_n f=10kHz					nV/√Hz
Voltage Noise Density	e_n f=1kHz			40		nV/√Hz
Current Noise Density	i_n f=1kHz					pA/√Hz

ELECTRICAL CHARACTERISTICS

(V_S=16V, V_{CM} = V_S/2, T_A=+25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}			TBD		
		V_{CM} = - 0.1V to 16.0V		5	TBD	mV
		-40°< T_A < +85°C			TBD	mV
		-40°< T_A < +125°C			TBD	mV
Input Bias Current	I_B			0.3	TBD	pA
		-40°< T_A < +85°C			TBD	pA
		-40°< T_A < +125°C			TBD	pA
Input Offset Current	I_{OS}			0.2		pA
		-40°< T_A < +85°C			25	pA
		-40°< T_A < +125°C			150	pA
Input Voltage Range	IVR		-0.1		16	V
Common-Mode Rejection Ratio	CMRR	V_{CM} = -0.1V to +15.0V	80			dB
Large Signal Voltage Gain	A_{VO}	R_L=2 kΩ V_O= 0.5V to+15.5V	70	85		V/mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$			5	TBD	µV/°C
Bias Current Drift				tbd		pA/°C
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	I_L = 1mA	15.8	15.9		V
		I_L = 10mA	14.8	15.1		V
		-40°C < T_A < +125°C	14.6			V
Output Voltage Low	V_{OL}	I_L = 1mA		80	100	mV
		I_L = 10mA		600	750	mV
		-40°C < T_A < +125°C		800		mV
Short Circuit Current	I_{SC}			±50		mA
Closed Loop Output Impedance	Z_{OUT}	f=100 kHz, A_V = 1		100		Ω
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	V_S = 5V to 16V	70			dB
Supply Current/Amplifier	I_{SY}	V_O = 0V		500		µA
		-40°< T_A < +85°C		TBD		µA
		-40°< T_A < +125°C		900		µA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L =10 kΩ		1		V/µs
Settling Time	t_S	To 0.1%, 0 V to 1V step		tbd		µs
Gain Bandwidth Product	GBP			1		MHz
Phase Margin	Øo			60		degrees
NOISE PERFORMANCE						
Peak-to-Peak Noise	e_n p-p	f=0.1Hz to 10 Hz		tbd		µV p-p
Voltage Noise Density	e_n	f=10kHz		tbd		nV/√Hz
Voltage Noise Density	e_n	f=1kHz		40		nV/√Hz
Current Noise Density	i_n	f=1kHz		tbd		pA/√Hz