BURR - BROWN®

OPA340
OPA2340
OPA4340

Preliminary Information
Subject to Change
Without Notice

HIGH-SPEED, SINGLE SUPPLY, RAIL-TO-RAIL OPERATIONAL AMPLIFIERS
*MICRO*AMPLFIER™ SERIES

FEATURES

- RAIL-TO-RAIL INPUT SWING
- RAIL-TO-RAIL OUTPUT SWING
- MICROSIZE PACKAGES
- WIDE BANDWIDTH: 5MHz
- HIGH SLEW RATE: 5V/µs
- LOW THD+NOISE: 0.003% (f=1kHz)
- LOW QUIESCENT CURRENT: 800µA/channel
- SINGLE, DUAL, and QUAD

APPLICATIONS

- DRIVING A/D CONVERTERS
- PCMCIA CARDS
- DATA ACQUISITION
- PROCESS CONTROL
- AUDIO PROCESSING
- COMMUNICATIONS
- ACTIVE FILTERS
- TEST EQUIPMENT

DESCRIPTION

OPA340 series rail-to-rail CMOS operational amplifiers are optimized for low voltage, single supply operation. They operate on a single supply with operation as low as 2.5V. Applications include driving A/D converters and I/V conversion at the output of D/A converters. Single, dual, and quad versions have identical specifications for maximum design flexibility

Special features include high input impedance and rail-to-rail input and output swing. The input common-mode range includes both the negative and positive supplies. Output voltage swing is from within 5mV of the negative supply to within 5mV of the positive supply. In addition, the combination of high slew rate (5V/µs) and wide bandwidth (5MHz) provide fast settling time assuring good dynamic response. Dual and quad designs feature completely independent circuitry for lowest crosstalk and freedom from interaction.

The single (OPA340) packages are the tiny 5-lead SOT-23-5 surface mount, SO-8 surface-mount, and 8-pin DIP. The dual (OPA2340) comes in the miniature MSOP-8 surface-mount, SO-8 surface-mount, and 8-pin DIP packages. The quad (OPA4336) packages are the space-saving SSOP-16 surface mount, SO-14 surface-mount, and the 14-pin DIP. All are specified from -40°C to +85°C and operate from -55°C to +125°C.

PRELIMINARY SPECIFICATIONS: V_S = 2.7V to 5V

At T_A = +25°C, R_L = 10kΩ connected to V_S/2, and V_{OUT} = V_S/2, unless otherwise noted.
Boldface limits apply over the specified temperature range, T_A = -40°C to +85°C. V_S = 5V.

PARAMETER		CONDITION	OPA340NA, PA, UA OPA2340EA, PA, UA OPA4340EA, PA, UA MIN	TYP[1]	MAX	UNITS
OFFSET VOLTAGE						
Input Offset Voltage	V_{OS}	V_S = 5V		±0.5	±1	mV
vs. Temperature	dV_{OS}/dT			**±1.5**		µV/°C
vs. Power Supply	PSRR	V_S = 2.7V to 5.5V		25	100	µV/V
T_A = -40°C to +85°C		V_S = 2.7V to 5.5V			**130**	µV/V
Channel Separation, dc				0.2		µV/V
INPUT BIAS CURRENT						
Input Bias Current	I_B			±5	±50	pA
T_A = -40°C to +85°C					**±300**	pA
Input Offset Current	I_{OS}			±2	±30	pA
NOISE						
Input Noise Voltage, f=0.1 to 50kHz				500		µVrms
Input Noise Voltage Density, f=1kHz	e_n			25		nV/√Hz
Current Noise Density, f=1kHz	i_n			2		fA/√Hz
INPUT VOLTAGE RANGE						
Common-Mode Voltage Range	V_{CM}		-0.3		(V+) +0.3	V
Common-Mode Rejection	CMRR	-0.3V < V_{CM} < (V+) -1.5V	80	90		dB
T_A = -40°C to +85°C		-0.3V < V_{CM} < (V+) -1.5V	**76**			dB
		V_S = 2.7V, -0.3V < V_{CM} < 3V	60	70		dB
T_A = -40°C to +85°C		V_S = 2.7V, -0.3V < V_{CM} < 3V	**56**			dB
		V_S =5V, -0.3V < V_{CM} <5. 3V	60	70		dB
T_A = -40°C to +85°C		V_S =5V, -0.3V < V_{CM} < 5.3V	**56**			dB
INPUT IMPEDANCE						
Differential				10^{13} || 3		Ω || pF
Common-Mode				10^{13} || 3		Ω || pF
OPEN-LOOP GAIN						
Open-Loop Voltage Gain	A_{OL}	R_L = 100kΩ, 5mV < V_O < (V+)-5mV	90	100		dB
T_A = -40°C to +85°C		R_L = 100kΩ, 5mV < V_O < (V+)-5mV	**86**			dB
		R_L = 10kΩ, 50mV < V_O < (V+)-50mV	90	100		dB
T_A = -40°C to +85°C		R_L = 10kΩ, 50mV < V_O < (V+)-50mV	**86**			dB
		R_L = 2kΩ, 200mV < V_O < (V+)-200mV	90	100		dB
T_A = -40°C to +85°C		R_L = 2kΩ, 200mV < V_O < (V+)-200mV	**86**			dB
FREQUENCY RESPONSE		C_L = 100pF				
Gain-Bandwidth Product	GBW	G = 1		5		MHz
Slew Rate	SR	V_S = 5V, G = 1		5		V/µs
Settling Time, 0.01%		V_S = 5V, 4.8V Step		2		µs
Overload Recovery Time		V_{IN} * Gain = V_S		0.5		µs
Total Harmonic Distortion + Noise	THD+N	V_S = 5V, V_O = 3Vpp[2], G = 1, f = 1kHz		0.003		%
OUTPUT						
Voltage Output[3]		R_L = 100kΩ, A_{OL} ≥ 90dB		1	5	mV
T_A = -40°C to +85°C		R_L = 100kΩ, A_{OL} ≥ 86dB			**10**	mV
		R_L = 10kΩ, A_{OL} ≥ 90dB		10	50	mV
T_A = -40°C to +85°C		R_L = 10kΩ, A_{OL} ≥ 86dB			**75**	mV
		R_L = 2kΩ, A_{OL} ≥ 90dB		40	200	mV
T_A = -40°C to +85°C		R_L = 2kΩ, A_{OL} ≥ 86dB			**250**	mV
Short-Circuit Current[4]	I_{SC}			50		mA
Capacitive Load Drive	C_{LOAD}			300		pF
POWER SUPPLY						
Specified Voltage Range	V_S		2.7		5	V
Operating Voltage Range			2.5		5.5	V
Quiescent Current	I_Q	I_O = 0		800	1000	µA
T_A = -40°C to +85°C		I_O = 0			**1200**	µA
TEMPERATURE RANGE						
Specified Range			-40		85	°C
Operating Range			-55		125	°C
Storage Range			-55		125	°C
Thermal Resistance	Θ_{JA}					
SOT-23-5 Surface-Mount				200		°C/W
MSOP-8 Surface-Mount				150		
SO-8 Surface-Mount				150		
8-Pin DIP				100		
SSOP-16 Surface-Mount				100		
SO-14 Surface-Mount				100		°C/W
14-Pin DIP				80		°C/W

NOTE: (1) V_S = +5V. (2) V_{OUT} = 0.25V to 3.25V. (3) Output voltage swings are measured between the output and power supply rails. (4) One channel at a time.