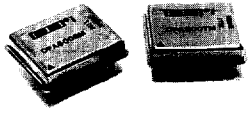
BURR-BROWN®



OPA600

ABRIDGED DATA SHEET
For Additional Technical Information, Request PDS-672.

Fast-Settling Wideband OPERATIONAL AMPLIFIER

FEATURES

- FAST SETTLING: 80ns to ±0.1%
  100ns to ±0.01%
- FULL DIFFERENTIAL FET INPUT
- –25°C to +85°C AND –55°C to +125°C TEMPERATURE RANGES
- ±10V OUTPUT: 200mA
- GAIN BANDWIDTH PRODUCT: 5GHz

APPLICATIONS

- VOLTAGE CONTROLLED OSCILLATOR DRIVER
- LARGE SIGNAL, WIDEBAND DRIVERS
- HIGH SPEED D/A CONVERTER OUTPUT AMPLIFIER
- VIDEO PULSE AMPLIFIER

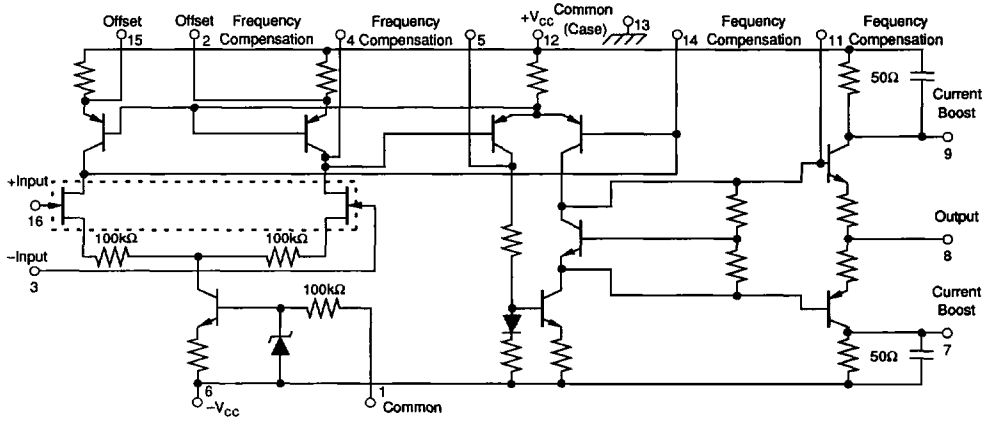
DESCRIPTION

The OPA600 is a wideband operational amplifier specifically designed for fast settling to ±0.01% accuracy. It is stable, easy to use, has good phase margin with minimum overshoot, and it has excellent DC performance. It utilizes an FET input stage to give low input bias current. Its DC stability over temperature is outstanding. The slew rate exceeds 400V/µs. All of this combines to form an outstanding amplifier for large and small signals.

High accuracy with fast settling time is achieved by using a high open-loop gain which provides the accuracy at high frequencies. The thermally balanced design maintains this accuracy without droop or thermal tail. External frequency compensation allows the user to optimize the settling time for various gains and load conditions.

The OPA600 is useful in a broad range of video, high speed test circuits and ECM applications. It is particularly well suited to operate as a voltage controlled oscillator (VCO) driver. It makes an excellent digital-to-analog converter output amplifier. It is a workhorse in test equipment where fast pulses, large signals, and 50Ω drive are important. It is a good choice for sample/holds, integrators, fast waveform generators, and multiplexers.

The OPA600 is specified over the industrial temperature range (OPA600BM, CM) and military temperature range (OPA600SM, TM). The OPA600 is housed in a welded, hermetic metal package.



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SPECIFICATIONS

ELECTRICAL

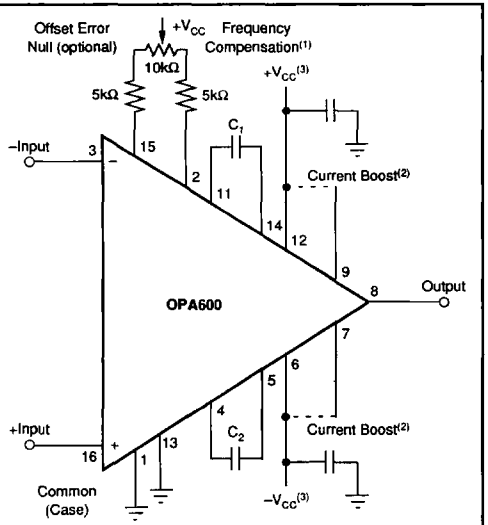
At V_{CC} = ±15VDC and T_A = +25°C unless otherwise noted.

PARAMETER	CONDITIONS	OPA600CM,TM[1] MIN	OPA600CM,TM[1] TYP	OPA600CM,TM[1] MAX	OPA600BM,SM MIN	OPA600BM,SM TYP	OPA600BM,SM MAX	UNITS
OUTPUT								
Voltage	R_L = 2kΩ	±10			*			V
	R_L = 50Ω[2]	±9			*			V
Current	R_L = 50Ω[2]	±180	±200		*	*		mA
Current Pulse	R_L = 50Ω[3]	±180	±200		*	*		mA
Resistance	Open Loop DC		75			*		Ω
Short-Circuit Current	To COMMON Only, t_{MAX} = 1s[4]		250	300		*	*	mA
DYNAMIC RESPONSE								
Settling Time[5]: to ±0.01% (±1mV)	ΔV_{OUT} = 10V		100	125		*	*	ns
to ±0.1% (±10mV)	ΔV_{OUT} = 10V		80	105		*	*	ns
to ±1% (±100mV)	ΔV_{OUT} = 10V		70	95		*	*	ns
Gain-Bandwidth Product (open-loop)	C_C = 0pF, G = 1V/V		150			*		MHz
	C_C = 0pF, G = 10V/V		500			*		MHz
	C_C = 0pF, G = 100V/V		1.5			*		GHz
	C_C = 0pF, G = 1000V/V		5			*		GHz
	C_C = 0pF, G = 10,000V/V		10			*		GHz
Bandwidth (–3dB small signal)[6]	G = +1V/V		125			*		MHz
	G = –1V/V		90			*		MHz
	G = –10V/V		95			*		MHz
	G = –100V/V		20			*		MHz
	G = –1000V/V		6			*		MHz
Full Power Bandwidth	V_{OUT} = ±5V, G = –1V/V, C_C = 3.3pF, R_L = 100Ω		16			*		MHz
Slew Rate	V_{OUT} = ±5V, G = –1000V/V, C_C = 0pF, R_L = 100Ω		500			*		V/µs
	V_{OUT} = ±5V,G = –1V/V[4]	400	440		*	*		V/µs
Phase Margin	G = –1V/V, C_C = 3.3pF		40			*		Degrees
GAIN								
Open-Loop Voltage Gain	f = DC, R_L = 2kΩ, T_A = +25°C	86	94		*	*		dB
INPUT								
Offset Voltage[7]	T_A = +25°C		±1	±4		±2	±5	mV
	T_A = –25°C to +85°C			±5			±10	mV
	T_A = –55°C to +125°C			±6			±15	mV
Offset Voltage Drift	T_A = –25°C to +85°C			±20			±80	µV/°C
	T_A = –55°C to +125°C			±20			±100	µV/°C
Bias Current	T_A = +25°C		–20	–100		*	*	pA
	T_A = –25°C to +125°C		–20	–100		*	*	nA
Offset Current	T_A = +25°C		20			*		pA
	T_A = –55°C to +125°C		20			*		nA
Power Supply Rejection Ratio	V_{CC} = ±15V, ±1V		200	500		*	*	µV/V
Common-Mode Voltage Range		–10		+7	*		*	V
Common-Mode Rejection Ratio	V_{CM} = –5V to +5V	60	80		*	*		dB
Impedance	Differential and Common-Mode		10^{11} || 2			*		Ω || pF
Voltage Noise	10kHz Bandwidth		20			*		nV/√Hz
POWER SUPPLY								
Rated (V_{CC})			±15			*		VDC
Operating Range		±9		±16	*		*	VDC
Quiescent Current			±30	±38		*	*	mA
TEMPERATURE RANGE (Ambient)								
Operating: BM, CM		–25		+85	*		*	°C
SM, TM		–55		+125	*		*	°C
Storage		–65		+150	*		*	°C
θ_{JC}, (junction-to-case)			30			*		°C/W
θ_{CA}, (case-to-ambient)			35			*		°C/W

*Specification same as OPA600CM, TM.

NOTES: (1) BM, CM grades: –25°C to +85°C. SM, TM grades: –55°C to +125°C. (2) Pin 9 connected to +V_{CC}, pin 7 connected to –V_{CC}. Observe power dissipation ratings. (3) Pin 9 and 7 open. Single pulse t = 100ns. Observe power dissipation ratings. (4) Pin 9 and 7 open. See section on Current Boost. (5) G = –1V/V. Optimum settling time and slew rate achieved by individually compensating each device. Refer to section on Compensation. (6) Frequency compensation as discussed in section on Compensation. (7) Adjustable to zero.

CONNECTION DIAGRAM



NOTES: (1) Refer to Figure 4 for recommended frequency compensation. (2) connect pin 9 to pin 12 and connect pin 7 to pin 6 for maximum output current. See Application Information for further information. (3) Bypass each power supply lead as close as possible to the amplifier pins. A 1µF CS13 tantalum capacitor is recommended. (4)There is no internal conenction. An external connection may be made. (5) It is recommended that the amplifier be mounted with the case in contact with a ground plane for good thermal transfer and optimum AC performance.

ABSOLUTE MAXIMUM RATINGS(1)

Supply Voltage, $+V_{CC}$ to $-V_{CC}$	±17V
Power Dissipation, At T_{CASE} +125°C(2)	1.6W
Input Voltage: Differential	$\pm V_{CC}$
Common-Mode	$\pm V_{CC}$
Output Short Circuit Duration to Common	<5s
Temperature: pin (soldering, 20s)	+300°C
Junction(1) ,T_J	+175°C
Temperature Range: Storage	–65°C to +150°C
Operating (case)	–55°C to +125°C

NOTES: (1) Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. Exposure to absolute maximum conditions for extended periods may affect device reliability. (2) Long term operation at the maximum junction temperature will result in reduced product life. Derate internal power dissipation to achieve high MTTF.

ORDERING INFORMATION

MODEL	TEMPERATURE RANGE (°C)	VOLTAGE OFFSET DRIFT (µV/°C)
OPA600BM	–25 to +85	±80
OPA600CM	–25 to +85	±20
OPA600SM	–55 to +125	±100
OPA600TM	–25 to +125	±20

PACKAGE INFORMATION(1)

MODEL	PACKAGE	PACKAGE DRAWING NUMBER
OPA600CM	16-Pin	142
OPA600BM	16-Pin	142
OPA600SM	16-Pin	142
OPA600TM	16-Pin	142

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix D of Burr-Brown IC Data Book.