PLESSEY
Semiconductors

TAB1042

QUAD PROGRAMMABLE OPERATIONAL AMPLIFIER

The TAB1042 is an advanced bipolar integrated circuit containing four separate programmable operational amplifiers. The four amplifiers are programmed by current into a common bias pin which determines the main characteristics of each amplifier, supply current, frequency response and slew rate.

For example, with a suitable choice of bias current, the TAB1042 will perform in a manner similar to four amplifiers of the 741 type, but with improved frequency response and input characteristics.

The TAB1042 is especially suitable for use in active filter applications.

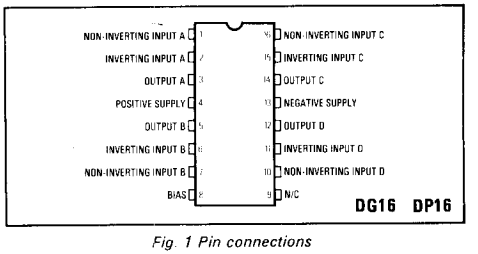

Fig. 1 Pin connections

FEATURES

- Four Independent Op. Amps. in One Package
- Internally Compensated
- Wide Range of Supply Voltages from ±1.5V to ±12V
- No Latch-Up
- Programmable Over 100:1 Current Range
- Gain Bandwidth Product Up to 4MHz
- Built-In Short Circuit Protection

APPLICATIONS

- Active Filters
- Oscillators
- Low Voltage Amplifiers

QUICK REFERENCE DATA

- Supply Voltages ±1.5V to ±12V
- Supply Current ±40μA to ±2mA
- Operating Frequency Range 1MHz
- Gain 95dB

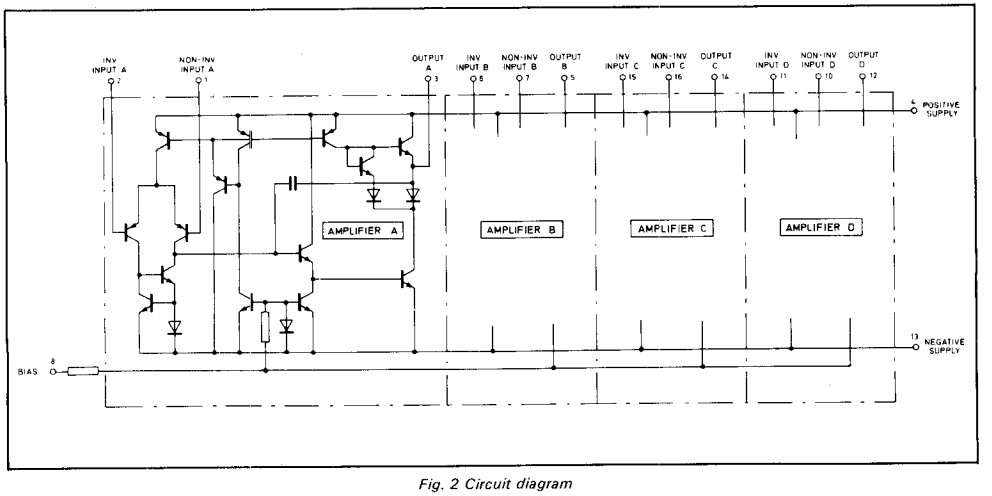

Fig. 2 Circuit diagram

ELECTRICAL CHARACTERISTICS

Test conditions (unless otherwise stated):
T_{amb} 25°C
Operating mode A: Supply volts ±12V Bias set current 75µA
Operating mode B: Supply volts ±12V Bias set current 1µA
Operating mode C: Supply volts ±1.5V Bias set current 1µA

Characteristics	Operating Mode									Units	Conditions
	A			B			C				
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
Input offset voltage		1	5		1	5		1	5	mV	Rs 10kΩ
Input offset current		20	200		5	50		5	50	nA	
Input bias current		250	500		30	100		30	100	nA	
Input resistance	0.1	0.6		0.5	2		0.5	2		MΩ	
Supply current	1000	1600	2200		42		20	40	60	µA	
Large signal volt gain	74	95		66	90		66	90		dB	RL = 4kΩ(A) RL=100kΩ (B) RL=100kΩ (C)
Input voltage range	10	10.5		10	10.5		0.2	0.4		±V	Rs 10kΩ
Common mode rejection ratio	70	110			82			82		dB	
Output voltage swing	9	10.8		9	10.8		0.2	0.3		±V	RL=4kΩ(A) RL=100kΩ(B) RL=4kΩ(C)
Supply voltage rejection ratio	75	96		75	86		75	86		dB	Rs 10kΩ
Short circuit current	2.5	4		0.1	0.25			0.22		mA	Tamb 0°C to 70°C
Gain bandwidth product		3.5			50			50		kHz MHz	Gain=20dB
Slew rate		1.5			0.02			0.02		V/µs	Gain=20dB

OPERATING NOTES

Bias set current

The amplifiers are programmed by the I_{SET} current into the BIAS pin to determine the frequency response, slew rate and the value of supply current. The relationship is summarised as follows:

Gain bandwidth product	I_{SET} x 50kHz
Power supply current (each supply)	I_{SET} x 25µA
Slew rate	I_{SET} x 0.02 V/µs (I_{SET} in µA)

The open loop voltage gain is largely unaffected by change in bias set current but tends to peak slightly at 10µA.

Since the voltage on the BIAS pin is approximately 0.65V more positive than the negative supply, a resistor may be connected between the bias pin and either 0V or the positive supply to set the current. Thus, if the resistor is connected to 0V, the I_{SET} current is determined by:

$$I_{SET} = \frac{V_S - 0.65}{R}$$

where R is value of the 'set' resistor.

The output goes high if the non-inverting input is taken lower than 1V above the negative power supply.

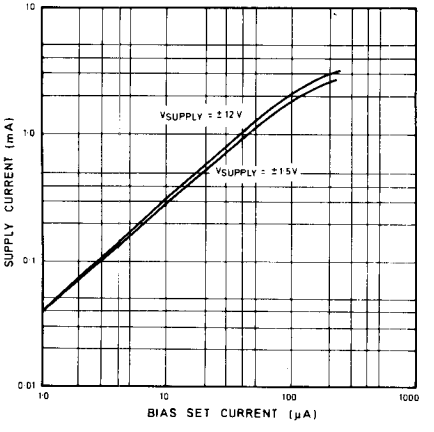

Fig. 3 Supply current (each supply) v. bias set current

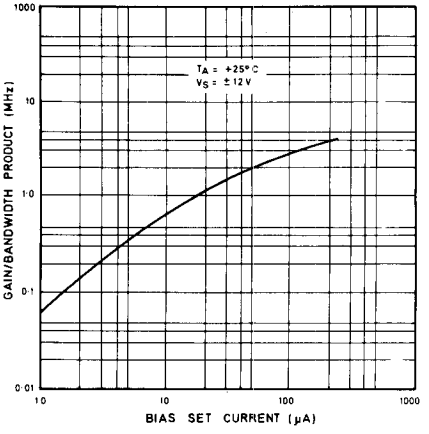

Fig. 4 Gain bandwidth product v. I_{SET}

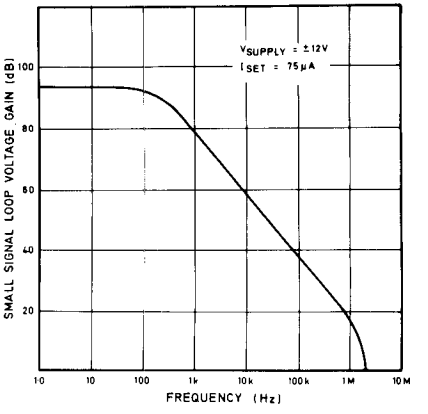

Fig. 5 Typical frequency response

ABSOLUTE MAXIMUM RATINGS

Supply voltages	±15V
Common mode input voltage	Not greater than supplies
Differential input voltage	±25V
Bias set current	10mA
Storage and junction temperature	55°C to +150°C
Power dissipation	800mW at 25°C
	Derate at 7mW/°C above 25°C