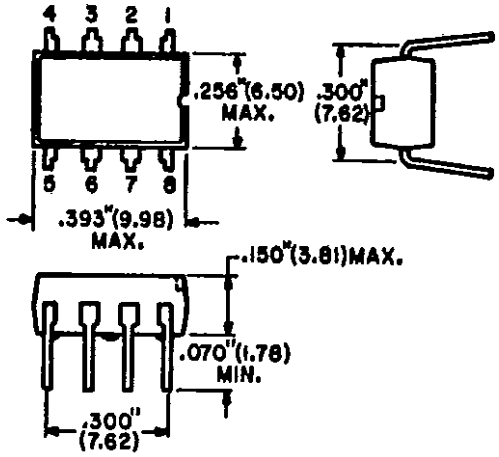
ECG® Semiconductors

ECG996

Operational Transconductance Amplifier

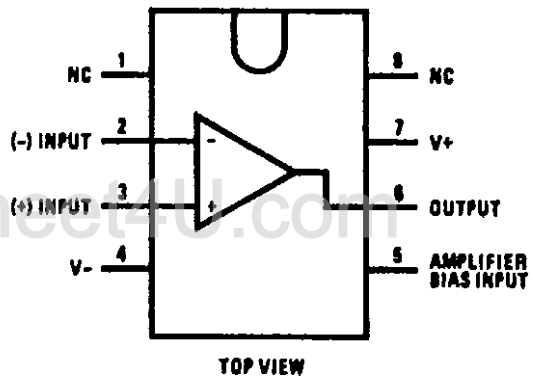


Features

- Slew rate (unity gain compensated): 50V/μs
- Fully adjustable gain: 0 to gm R_L limit
- Extended gm linearity: 3 decades
- Flexible supply voltage range: ±2V to ±18V
- Adjustable power consumption

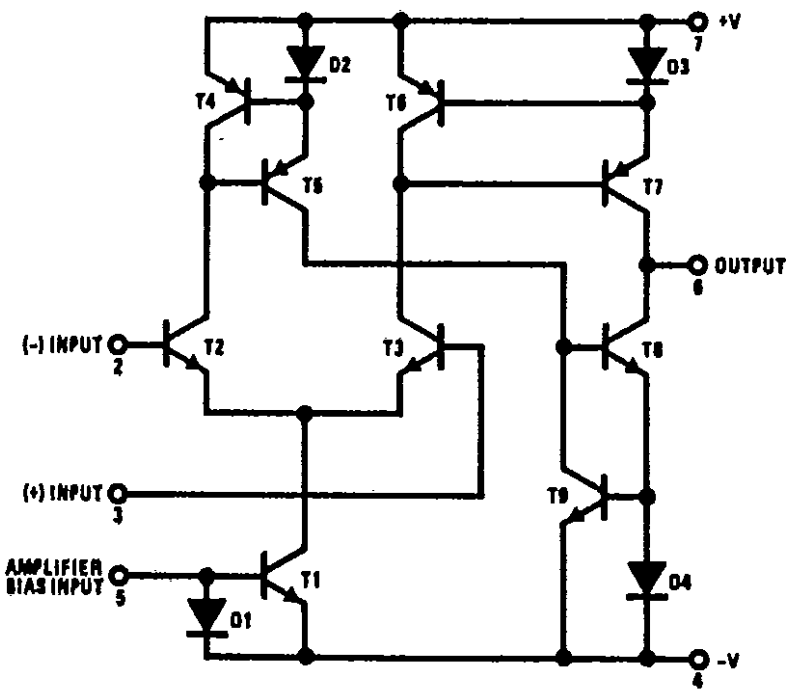
The ECG996 is a programmable transconductance block intended to fulfill a wide variety of variable gain applications. It has differential inputs and high impedance push-pull outputs. The device has high input impedance and its transconductance (gm) is directly proportional to the amplifier bias current (I_{ABC}).

High slew rate together with programmable gain make the ECG996 an ideal choice for variable gain applications such as sample and hold, multiplexing, filtering, and multiplying.



TOP VIEW

Schematic Diagram



Absolute Maximum Ratings

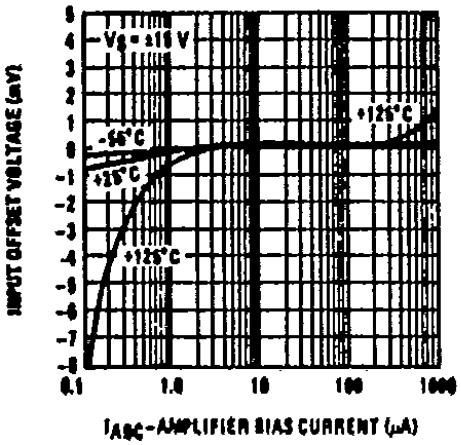
Supply Voltage ..... ±18V
Power Dissipation 250mW
Differential Input Voltage ..... ±5V
Amplifier Bias Current (I_{ABC}) 2mA
DC Input Voltage ..... $+V_S$ to $-V_S$
Output Short Circuit Duration ..... Indefinite
Operating Temperature Range ..... 0°C to +70°C
Storage Temperature Range ..... −65°C to +150°C
Lead Temperature (Soldering, 10 seconds) ..... 300°C

Electrical Characteristics ($V_S = \pm 15V$ and $T_A = 25°C$, amplifier bias current (I_{ABC}) = 500μA unless otherwise specified.)

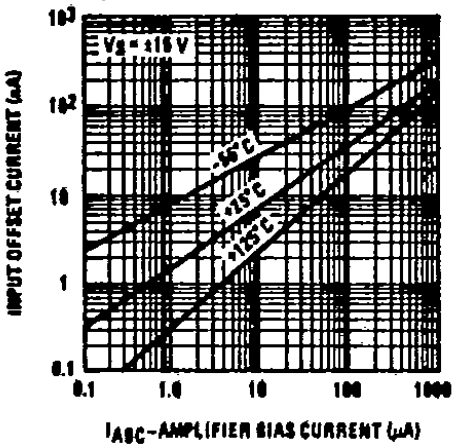
Characteristic	Conditions	Min	Typ	Max	Units
Input Offset Voltage		--	0.4	5	mV
Range	Over Specified Temperature	--	--	6	mV
	$I_{ABC} = 5\mu A$	--	0.3	--	mV
Input Offset Voltage Change	$5\mu A \leq I_{ABC} \leq 500\mu A$	--	0.1	--	mV
Input Offset Current		--	0.1	0.6	μA
Input Bias Current		--	0.4	5	μA
	Over Specified Temperature Range	--	1	7	μA
Forward Transconductance (gm)		6700	9600	13000	μmho
	Over Specified Temperature	5400	--	--	μmho
Peak Output Current	$R_L = 0$, $I_{ABC} = 5\mu A$	--	5	--	μA
	$R_L = 0$	350	500	650	μA
	$R_L = 0$ Over Specified Temperature Range	300	--	--	μA
Peak Output Voltage Positive	$R_L = \infty$, $5\mu A \leq I_{ABC} \leq 500\mu A$	+12	+14.2	--	V
Negative	$R_L = \infty$, $5\mu A \leq I_{ABC} \leq 500\mu A$	−12	−14.4	--	V
Amplifier Supply Current		--	1.1	--	mA
Input Offset Voltage Sensitivity					
Positive	$\Delta_{OFFSET}/\Delta V+$	--	20	150	μV/V
Negative	$\Delta V_{OFFSET}/\Delta V-$	--	20	150	μV/V
Common Mode Rejection Ratio		80	110	--	dB
Common Mode Range		±12	±14	--	V
Input Resistance		10	26	--	kΩ
Magnitude of Leakage Current	$I_{ABC} = 0$	--	0.2	100	nA
Differential Input Current	$I_{ABC} = 0$, Input = ±4V	--	0.02	100	nA
Open Loop Bandwidth		--	2	--	MHz
Slew Rate	Unity Gain Compensated	--	50	--	V/μs

Typical Performance Characteristics

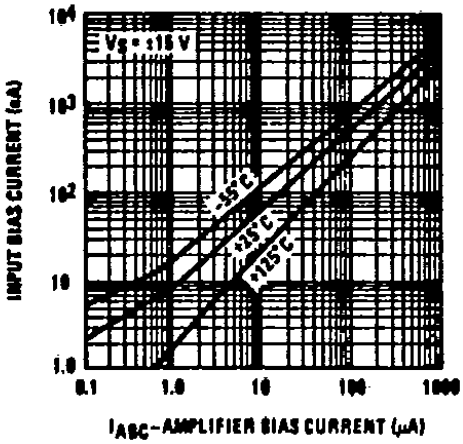
Input Offset Voltage



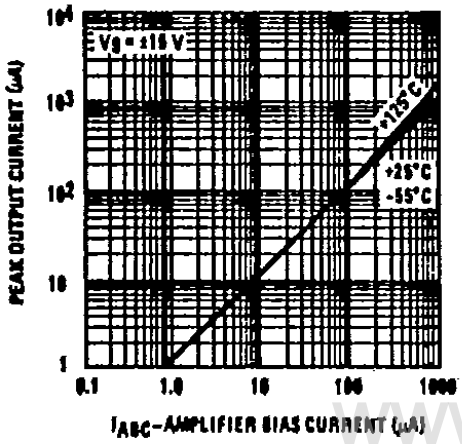
Input Offset Current



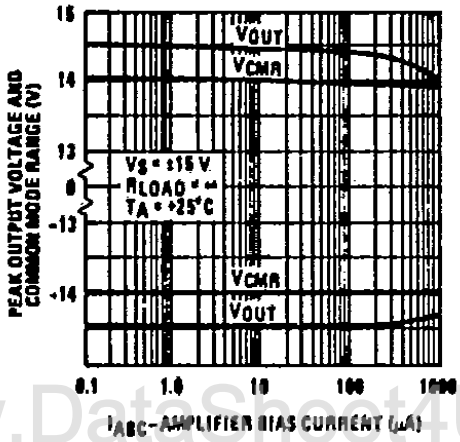
Input Bias Current



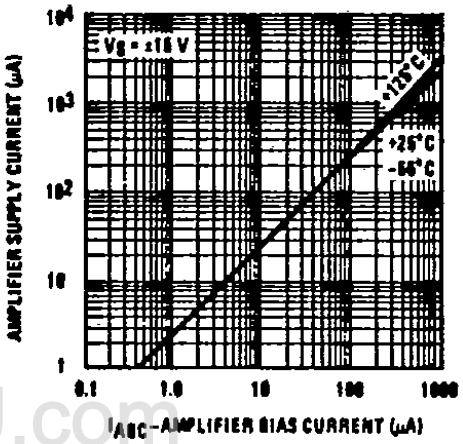
Peak Output Current



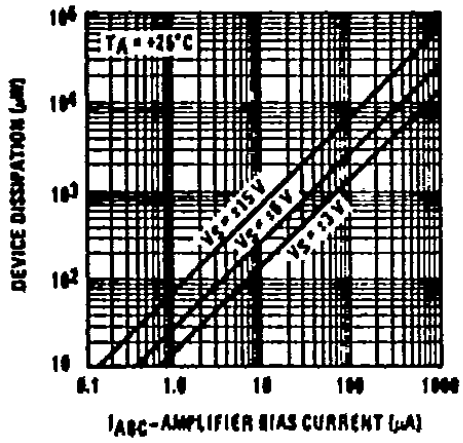
Peak Output Voltage and Common Mode Range



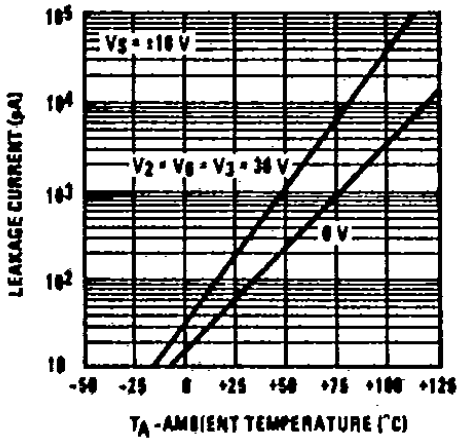
Amplifier Supply Current



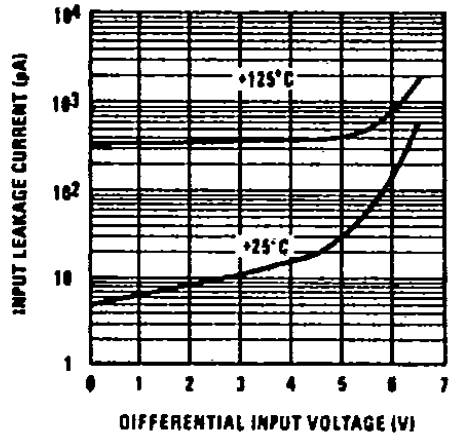
Total Power Dissipation



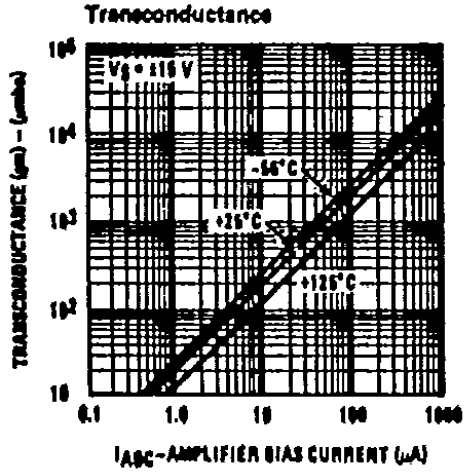
Leakage Current



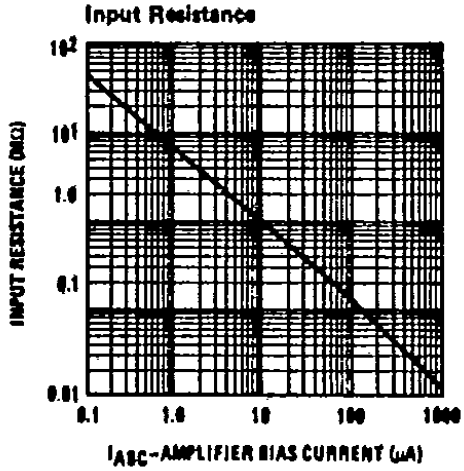
Input Leakage



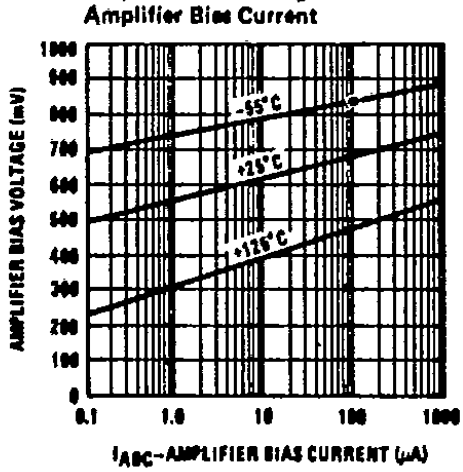
Transconductance



Input Resistance

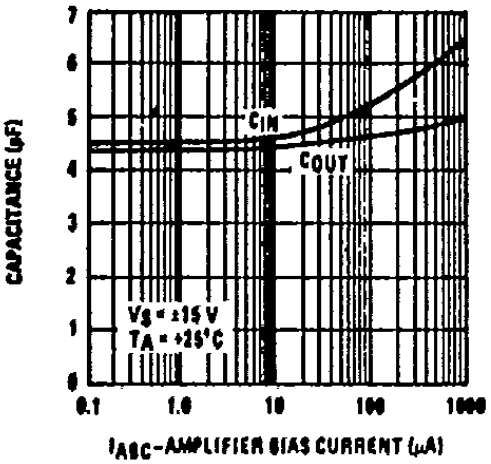


Amplifier Bias Voltage vs Amplifier Bias Current

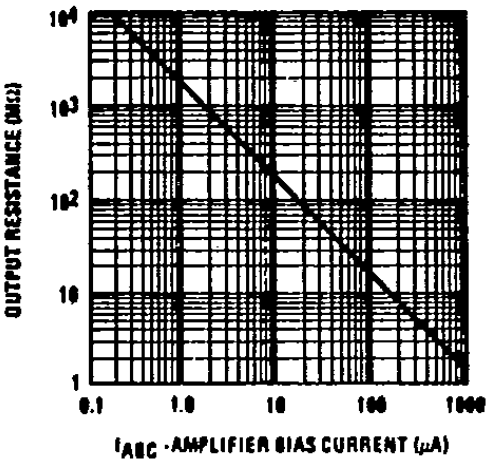


typical performance characteristics (con't)

Input and Output Capacitance

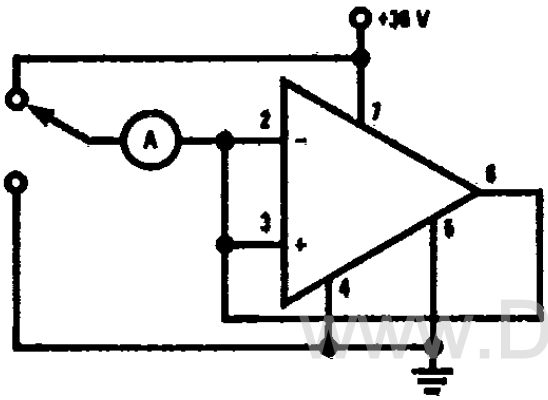


Output Resistance

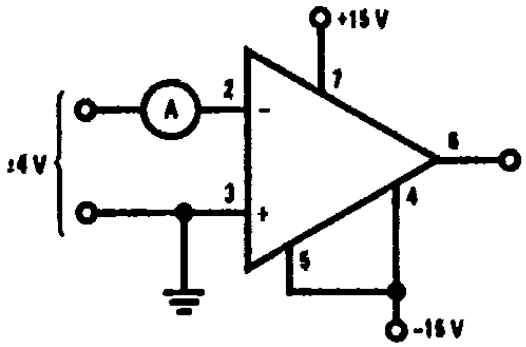


Applications

Leakage Current Test Circuit



Differential Input Current Test Circuit



Unity Gain Follower