

## Programmable Operational Amplifier

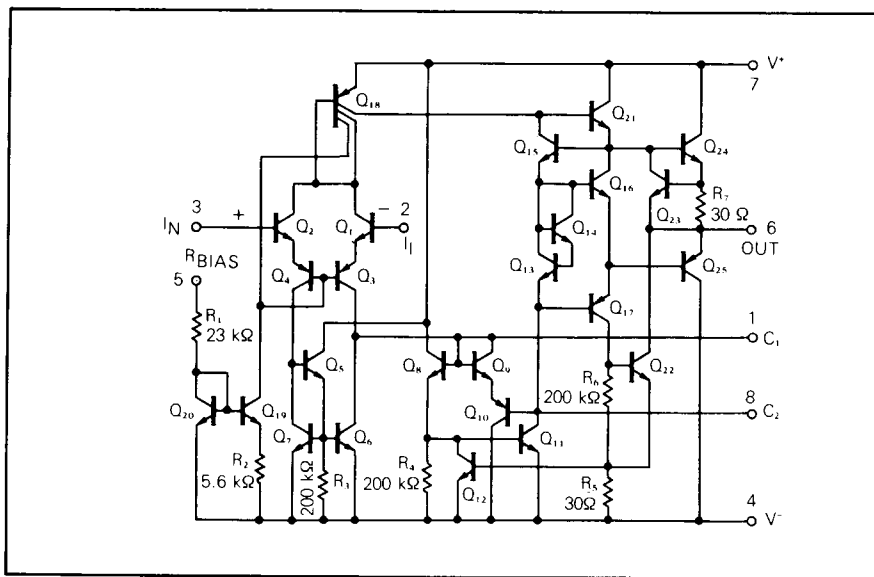
### GENERAL DESCRIPTION

μPC253 is a high performance programmable operational amplifier designed for many low power applications like handy DMM. The quiescent current can be set by a single external resistor and this feature enables micro-watt power consumption or analog gate applications.

### FEATURES

- Micropower
- ±3 V to ±18 V Operation
- Low Input Bias Current
- High Gain ( $V^{\pm} = \pm 3 \text{ V}$ ,  $A_v = 300,000$ )
- Short Circuit Protection
- No Latch Up
- Programmable

### EQUIVALENT CIRCUIT



### ORDERING INFORMATION

μPC253A



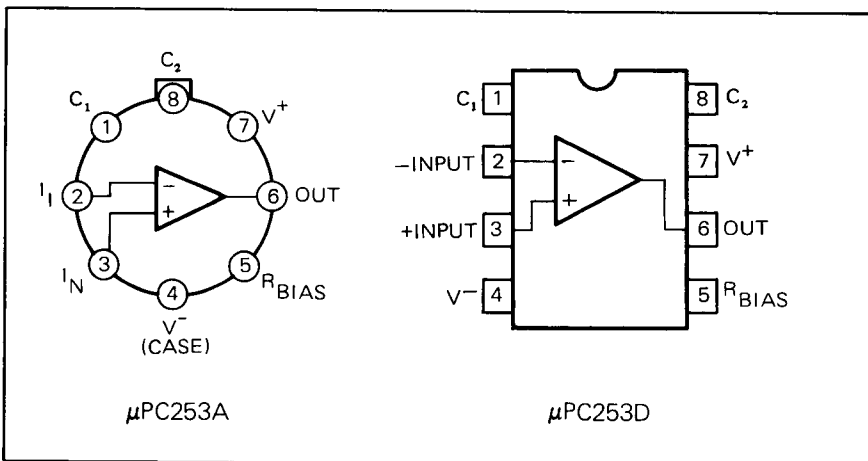
8 pin Metal Can Package

μPC253D



8 pin Ceramic DIP  
(Dual In-Line Package)

### CONNECTION DIAGRAM (Top View)



**ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)**

PARAMETER		μPC253	UNIT
Voltage between V <sup>+</sup> and V <sup>-</sup>		36	V
Power Dissipation *	A or D Package	500	mW
Differential Input Voltage		±30	V
Input Voltage (Note 1)		±15	V
Operating Temperature Range	A or D Package	-20 to +80	°C
Storage Temperature Range	A Package	-65 to +175	°C
	D Package	-55 to +150	

Note 1: For supply voltage less than ±15 V, the absolute maximum input voltage is equal to the supply voltage.

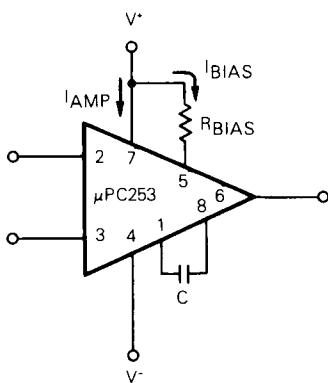
\* See thermal information in chapter 11.

**ELECTRICAL CHARACTERISTICS (Ta = 25°C, V<sup>±</sup> = ±3 V to ±15 V, R<sub>bias</sub> = 1 MΩ to V<sup>+</sup>)**

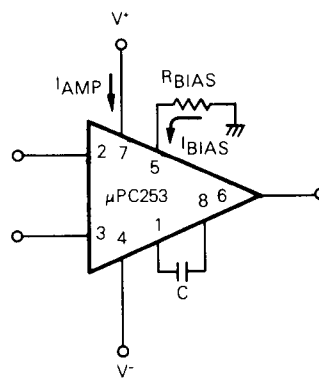
CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Input Offset Voltage		1.0	5.0	mV	R <sub>s</sub> ≤ 20 kΩ
Average Input Offset Voltage Drift		3		μV/°C	R <sub>s</sub> ≤ 20 kΩ
Input Offset Current		4	50	nA	
Input Bias Current		20	100	nA	
Input Impedance	1	6		MΩ	
Large Signal Voltage Gain	90	110		dB	
Amplifier Current		40	80	μA	
Output Voltage Swing	±10	±13.5		V	V <sup>±</sup> = ±15V, R <sub>L</sub> ≥ 2 kΩ
Output Voltage Swing		±1.5		V	V <sup>±</sup> = ±3 V, R <sub>L</sub> ≥ 2 kΩ
Common Mode Rejection Ratio	80	100		dB	
Supply Voltage Rejection Ratio		10	100	μV/V	

Supply Current = Amplifier Current (I<sub>AMP</sub>) + Bias (I<sub>BIAS</sub>) Current

Typical Connection

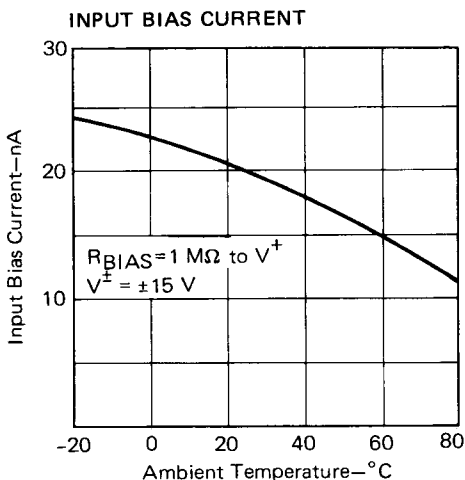
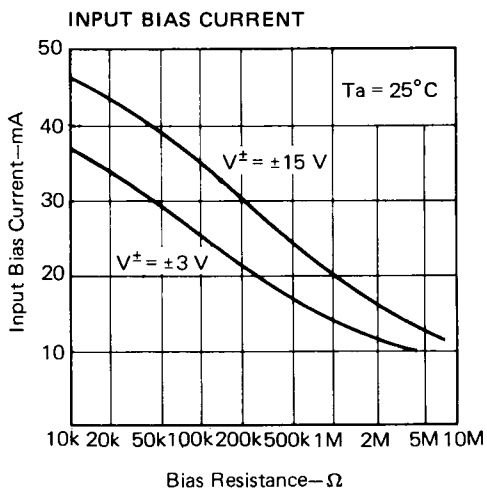
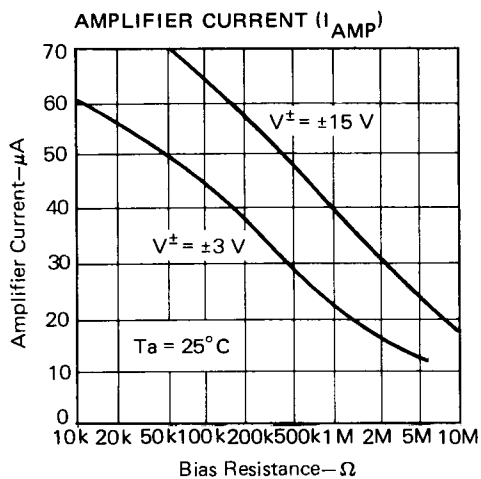
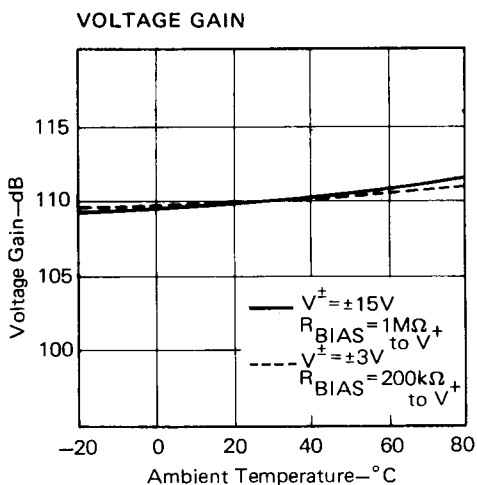
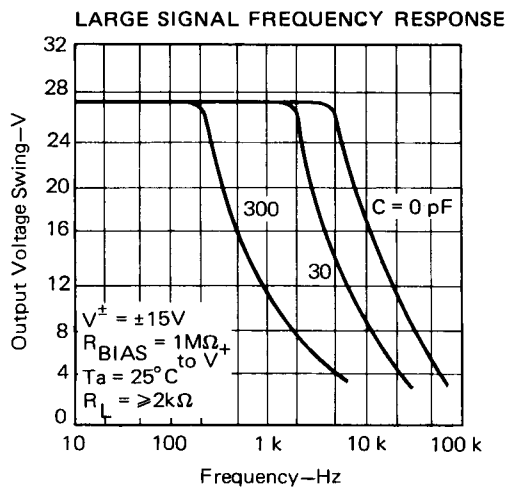
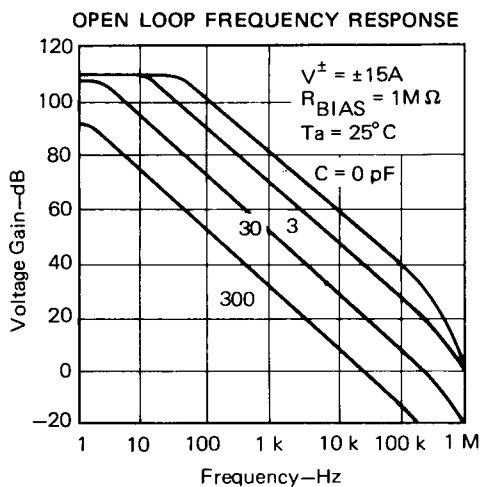


$$I_{BIAS} = \frac{|V^+ - V^-|}{R_{BIAS} + 23k\Omega}$$

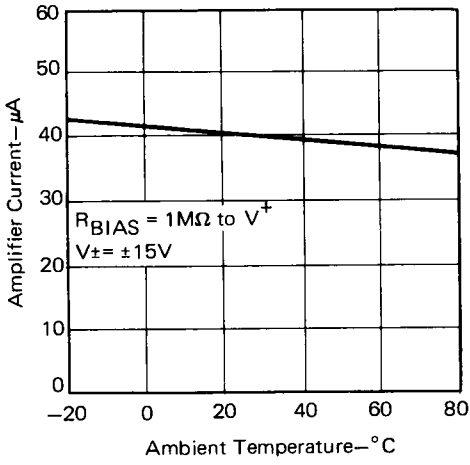


$$I_{BIAS} = \frac{|V^-|}{R_{BIAS} + 23k\Omega}$$

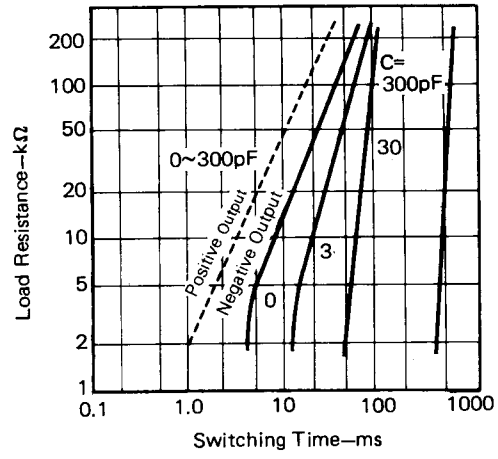
TYPICAL PERFORMANCE CHARACTERISTICS



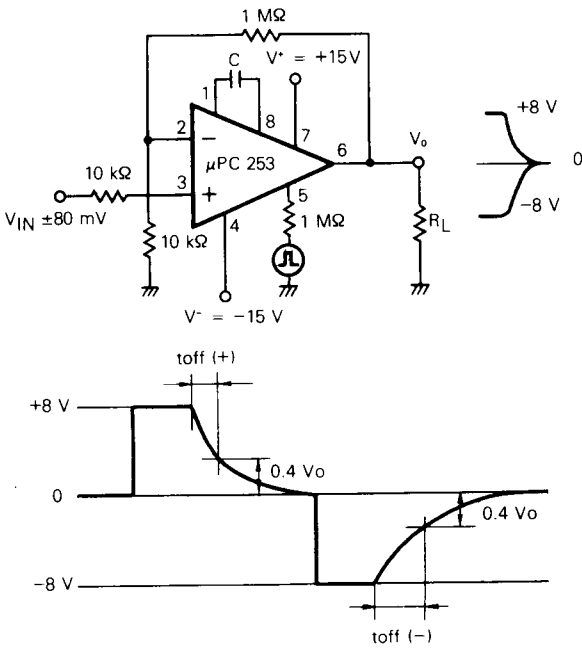
**AMPLIFIER CURRENT ( $I_{AMP}$ )**



**SWITCHING TIME**



**SWITCHING TIME MEASUREMENT CIRCUIT (toff)**



*Handwritten notes:*  
 200 to 1000 pF  
 Jawohl!

