GM393

LOW POWER DUAL DIFFERENTIAL COMPARATOR

Description

The GM393 consists of two independent precision voltage comparators with an offset voltage specification as low as 2.0 mV max for two comparators which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. These comparators also have a unique characteristic. In that, the input common-mode voltage range includes ground, even though operated from a single power supply voltage.

Application areas include limit comparators, simple analog to digital converters; pulse, square wave and time delay generators; wide range VCO; MOS clock timers; multivibrators and high voltage digital logic gates. The GM393 are designed to directly interface with TTL and CMOS. When operated from both plus and minus power supplies, the GM393 will directly interface with MOS logic, where their low power drain is a distinct advantage over standard comparators.

The GM393 is available in DIP-8 and SOP-8 packages.

Features

- **Single- supply Range: ±1.0V to ±18V**
- **Wide supply voltage range: ±2.0V to ±36V**
- **Very low supply current drain (0.4 mA) -**
- **independent of supply voltage**
- **Low input biasing current: 25 nA**
- **Low input offset current: ±5 nA**
- **Maximum offset voltage: ±3 mV**
- **Input common-mode voltage range includes ground**
- **Differential input voltage range equal to the power supply voltage**
- **Low output saturation voltage: 250 mV at 4 mA**
- **Output voltage compatible with TTL, DTL, ECL, MOS and CMOS logic systems**

Application

High precision comparators

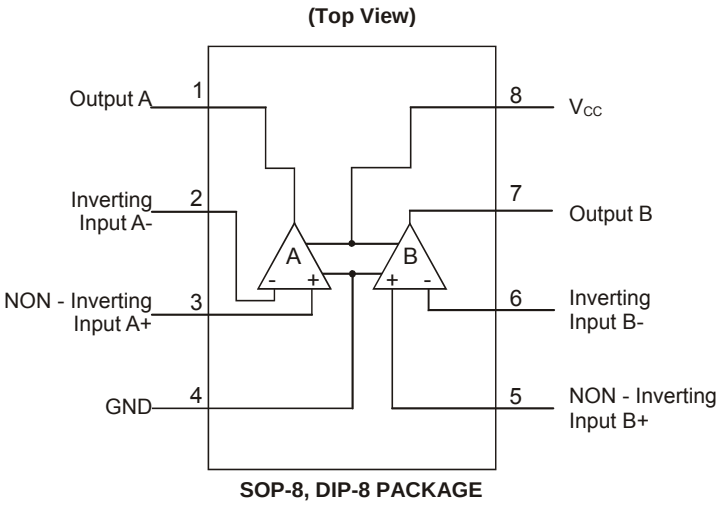
Simple Analog to Digital Converters

Pulse, Square Wave Generators

Wide Range VCO

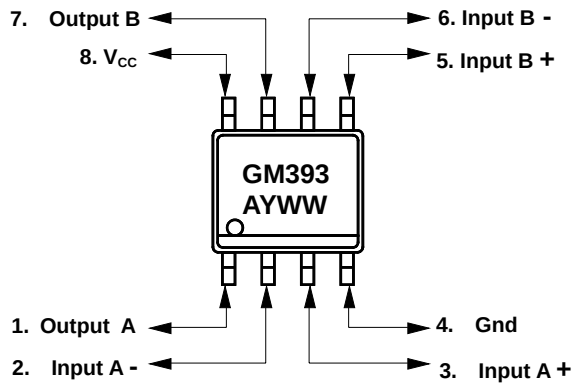
MOS Clock Timer

Connecting Diagram

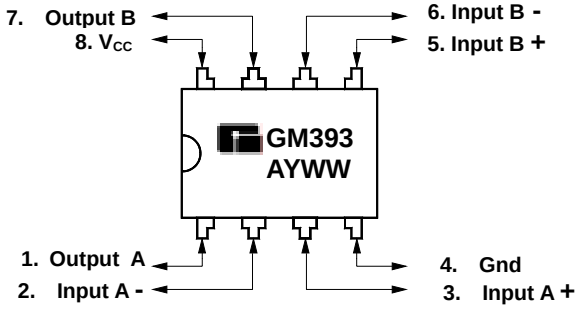


Marking Information and Pin Configurations (Top View)

SO8



DIP8



A: Assembly / Test site code
Y: Year
WW: Week

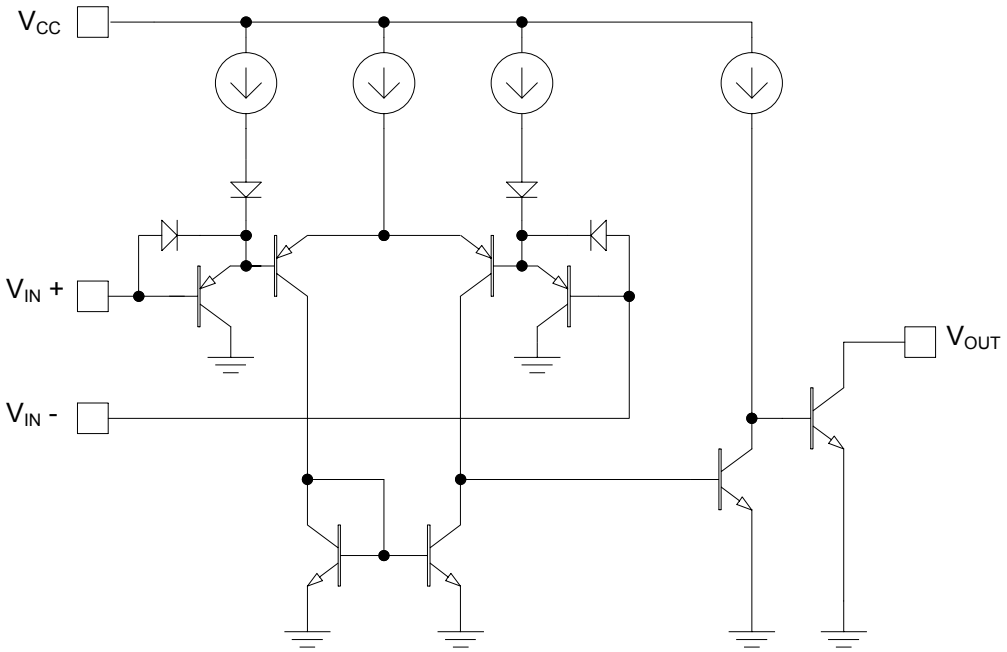
Ordering Information

Ordering Number	Package	Shipping
GM393D8T	DIP-8	60 Units / Tube
GM393S8T	SOP-8	100 Units / Tube
GM393S8R	SOP-8	2,500 Units / Tape & Reel

Absolute Maximum Ratings

PARAMETER		RATINGS	UNITS
Supply Voltage		±18 or 36	V
Input Current		50	mA
Input Voltage		-0.3 to +32	V
Power dissipation	DIP 8	780	mW
	SO 8	510	
Operating Temperature Range		-40 to 125	℃
Storage Temperature		- 65 to 150	℃
Lead Temperature (soldering 10 sec.)		260	℃

Block Diagram



Electrical Characteristics (V_{CC} = 5V, at specified free-air temperature, unless otherwise specified)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Input offset Voltage	V_{IO}	V_{CC} = 5V to Max V_{IC} = V_{ICR} min V_O = 1.4V	T_A = 25℃		±2	±5	mV
			Full Range			9	
Input Offest Current	I_{IO}	V_O = 1.4V	T_A = 25℃		±5	±50	nA
			Full Range			±150	
Input Bias Current	I_{IB}	V_O =1.4V	T_A = 25℃		-20	-250	nA
			Full Range			400	
Common-Mode Input Voltage Range**	V_{ICR}		T_A = 25℃	0 to V_{CC}-1.5V			V
			Full Range	0 to V_{CC}-2.0V			
High-Level output Voltage	V_{OL}	I_{OL} = 4mA, V_{ID} = 1V	T_A = 25℃		150	400	mV
			Full Range			700	
Large-Signal Differential Voltage Amplification	A_{VD}	V_{CC} = 15V, V_O = 1V to 11V R_L = 15K to V_{CC}	T_A = 25℃	50	200		V/mV
High Level Output Current	I_{OH}	V_{OH} = 5V, V_{ID} = 1V	T_A = 25℃		0.1	50	nA
		V_{OH} = 30V, V_{ID} = 1V	Full Range		1		μA
Low Level Output Current	I_{OL}	V_{OH} = 1.5V, V_{ID} = -1V	T_A = 25℃	6			mA
Supply Current	I_{CC}	R_L = ∞, V_{CC} = 5V	T_A = 25℃		0.8	1.0	mA
		R_L = ∞, V_{CC} = 30V	Full Range			2.5	
Response Time (Note 1)		R_L Connected to 5V through 5.1k. C_L = 15pF	100mV input step with 5mV overdrive		1.3		μs
			TTL - level input step		0.3		

All characteristics are measured under open loop conditions with zero common-mode input voltage unless otherwise specified. "MAX" V_{CC} for testing purposes is 30V. Full range is 0°C to 70°C.

** The voltage at either input or common - mode should not be allowed to go negative by more than 0.3V. The upper end of the common - mode voltage range is V_{CC} - 1.5V, but either or both inputs can go to 30V without damage.

Note 1: C_L includes probe and jig capacitance. The response time specified is the interval between the input step function and the instant when the output crosses 1.4V.

Typical Performance Characteristics

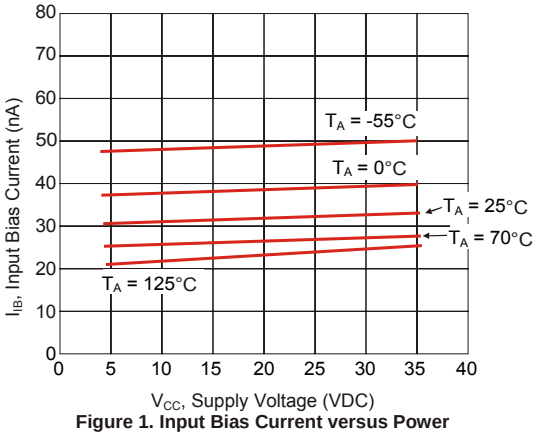


Figure 1. Input Bias Current versus Power Supply Voltage

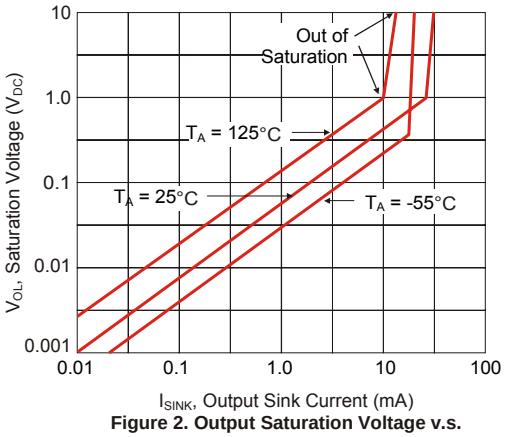


Figure 2. Output Saturation Voltage v.s. Output Sink Current

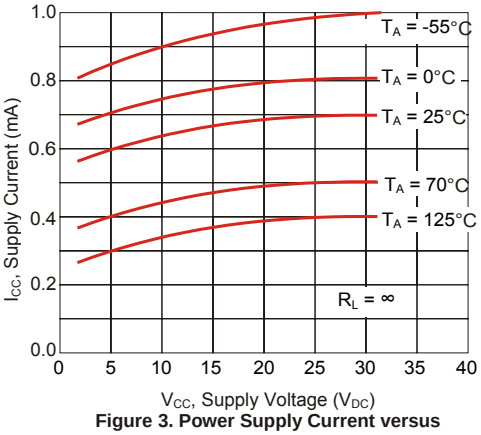
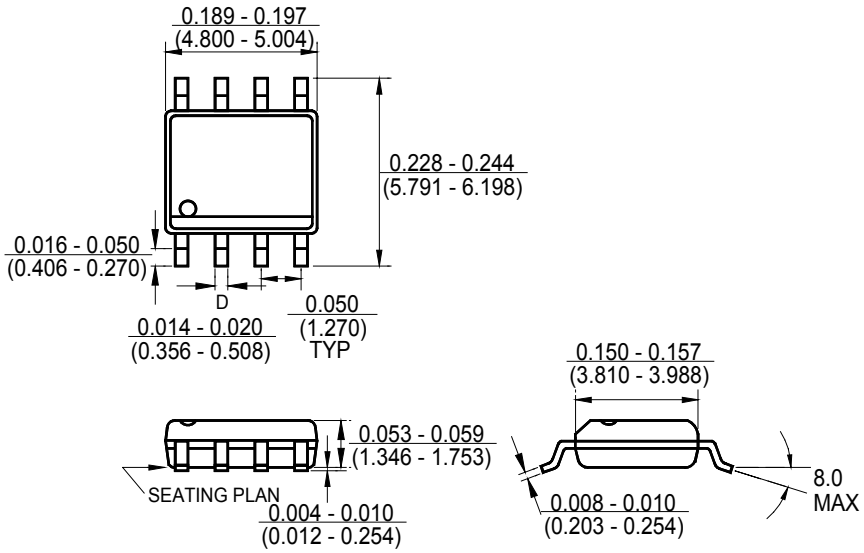
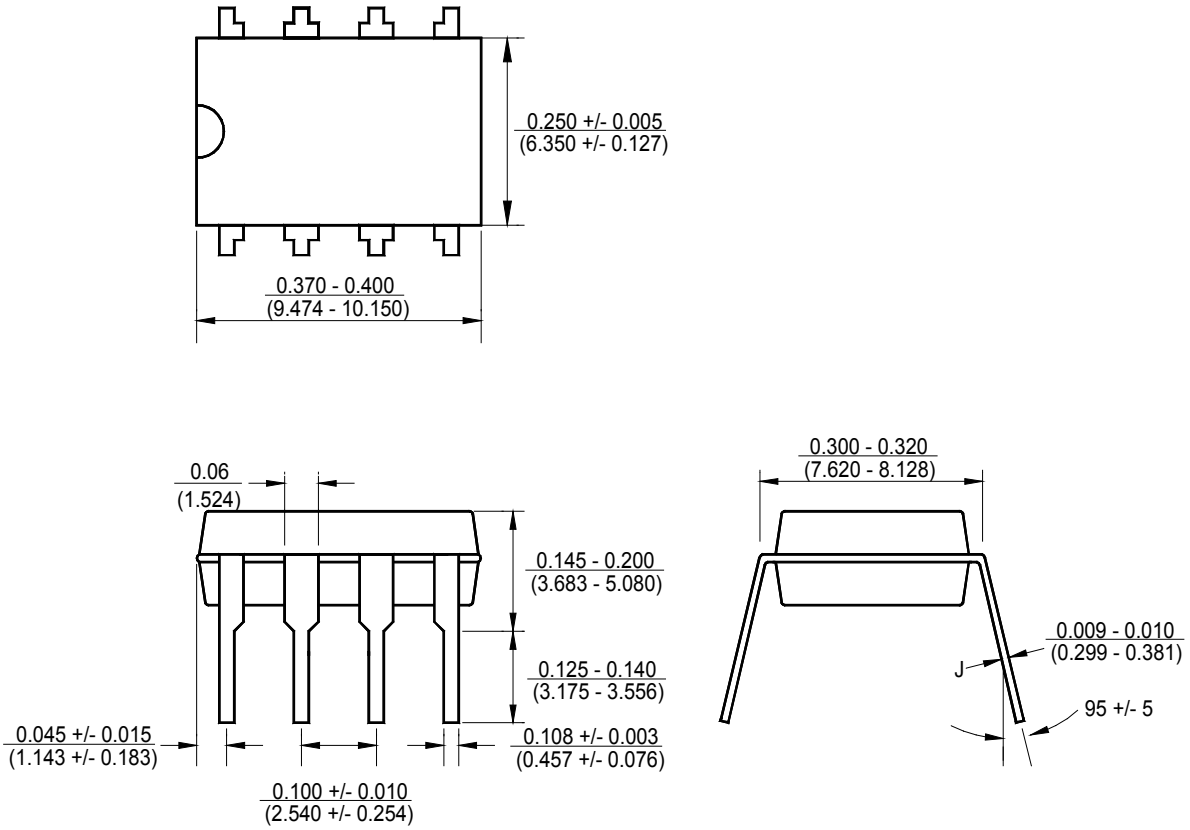


Figure 3. Power Supply Current versus Power Supply Voltage

Package Outline Dimensions – SO 8



Package Outline Dimensions – DIP 8



Ordering Number

GM	393	S8	R
Circuit Type	Circuit Type	Package Type S8: SO 8 D8: DIP 8	Shipping Type R: Taping & Reel T: Tube

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