GAMMA MICROELECTRONICS

GM393

LOW POWER DUAL DIFFERENTIAL COMPARATOR

Description

The GM393 consist 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

Reduced V_{OS} drift over temperature

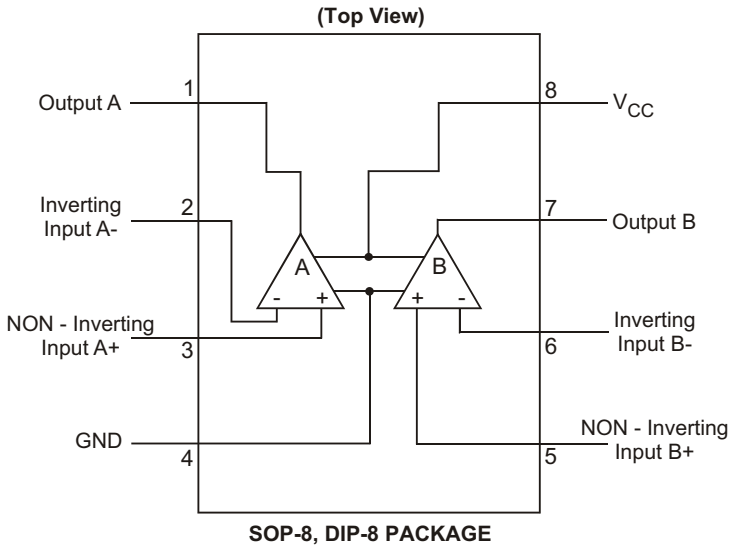
Eliminates need for dual supplies

Allows sensing near GND

Compatible with all forms of logic

Power drain suitable for battery operation

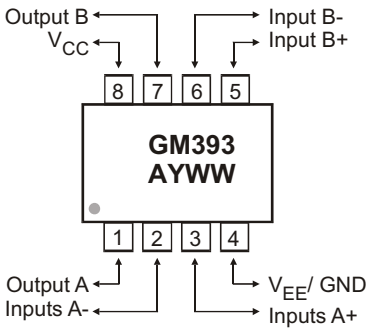
CONNECTION DIAGRAM



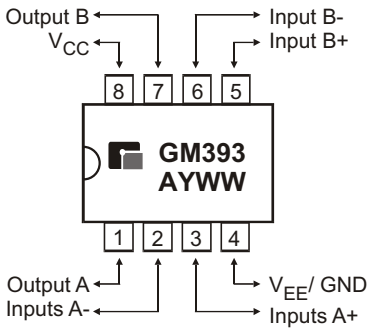
SOP-8, DIP-8 PACKAGE

◆ MARKING INFORMATION & PIN CONFIGURATIONS

SOP-8



DIP - 8



A : Assembly Location
Y : Year
W W : Weekly

◆ ORDERING INFORMATION

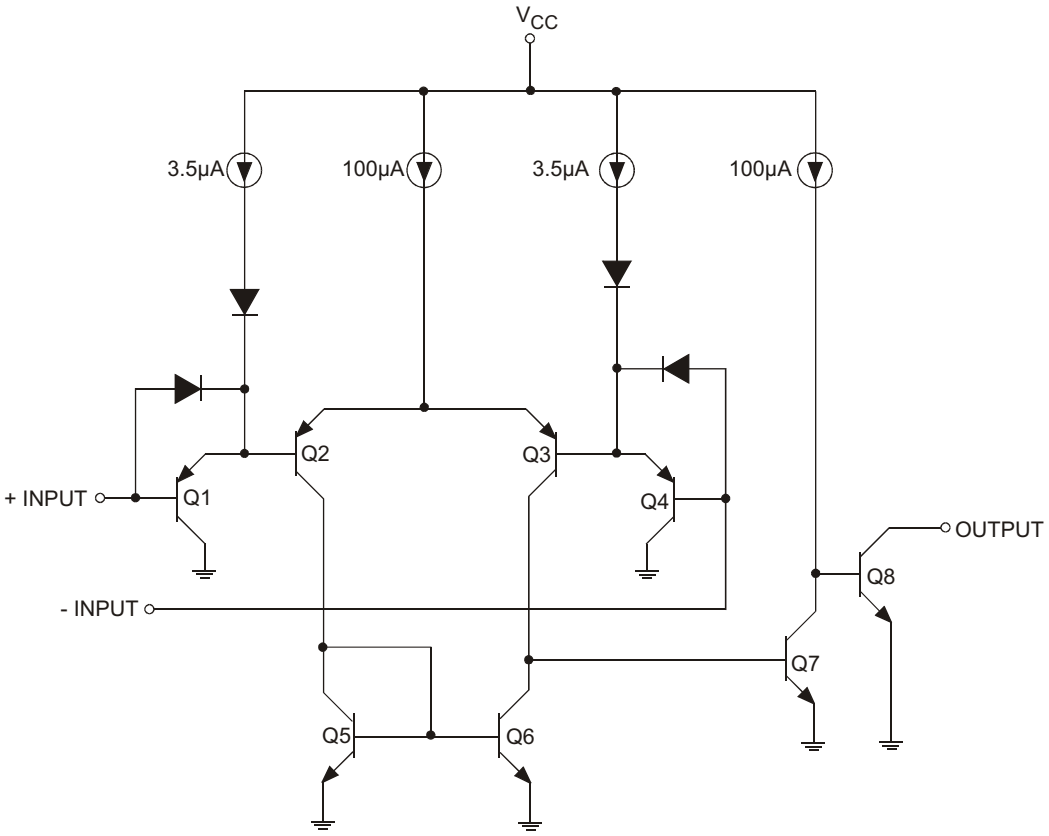
Ordering Number	Package	Shipping
GM393D8T	DIP-8	60 Units / Tube
GM393S8T	SOP-8	100 Units / Tube
GM393S8R	SOP-8	2,500 Units/Tape & Reel

* For detail Ordering Number identification, please see last page.

◆ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Power Dissipation DIP package SOP package	P_D	 780 510	mW
Supply Voltage	V_{CC}	±36, ±18	V
Input Current	I_O	50	mA
Operating Temperature Range	T_J	0 to +70	°C
Lead Temperature (Soldering, 10 sce)	T_{LEAD}	260	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C

◆ SCHEMATIC BLOCK DIAGRAM



◆ ELECTRICAL CHARACTERISTICS

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

CHARACTERISTICS	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{IO}	V_{CC} = 5V to 30V, V_{CC} = V_{ICR}min, V_O = 1.4V	25°C		±2	±5	mV
			Full range			9	
Input Offset Current	I_{IO}	V_O = 1.4V	25°C		±5	±50	nA
			Full range			±150	
Input Bias Current	I_{IB}	V_O = 1.4V	25°C		-25	-250	nA
			Full range			400	
Common - Mode Input Voltage Range **	V_{ICR}		25°C	0 to V_{CC} - 1.5			V
			Full range	0 to V_{CC} - 2			
Low - Level Output Voltage	V_{OL}	I_{OL} = 4mA, V_{ID} = -1V	25°C		150	400	mV
			Full range			700	
Large - Signal Differential Voltage Amplification	A_{VD}	V_{CC} = 15V, V_O = 14V to 11.4V, R_L > 15k to V_{CC}	25°C	50	200		V/ mV
High - Level Output Curretn	I_{OH}	V_{OH} = 5V, V_{ID} = 1V	25°C		0.1	50	nA
		V_{OH} = 30V, V_{ID} = 1V	Full range			1	μA
Low - Level Output Current	I_{OL}	V_{OL} = 1.5V, V_{ID} = -1V	25°C	6			mA
Supply Current	I_{CC}	R_L = ∞, V_{CC} = 5V	25°C		0.8	1.0	mA
		R_L = ∞, V_{CC} = 30V	Full range			2.5	

* All characteristics are measured under open loop conditions with zero common - mode input voltage unless otherwise specified. 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.

◆ SWITCHING CHARACTERISTICS, V_{CC}= 5V, TA=25°C

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Response time	R_L Connected to 5V through 5.1k , C_L= 15pF* (See Note 1)	100 - mV input step with 5 - mV overdrive		1.3		μs
		TTL - level input step		0.3		

* C_L includes probe and jig capacitance.

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

◆ Typical Performance Characteristics

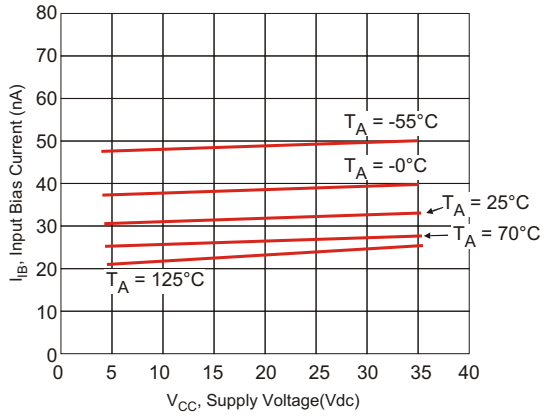


Figure 1. Input Bias Current versus Power Supply Voltage

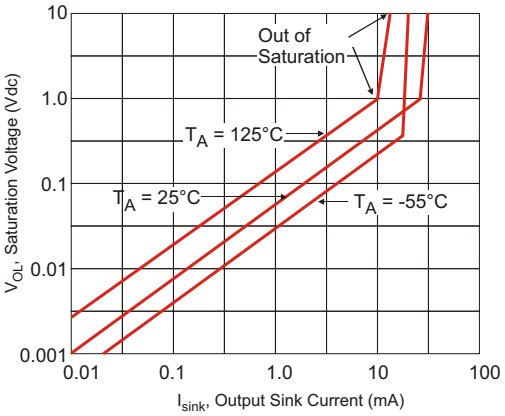


Figure 2. Output Saturation Voltage versus Output Sink Current

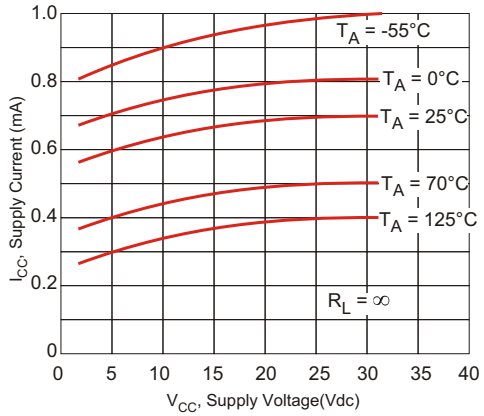
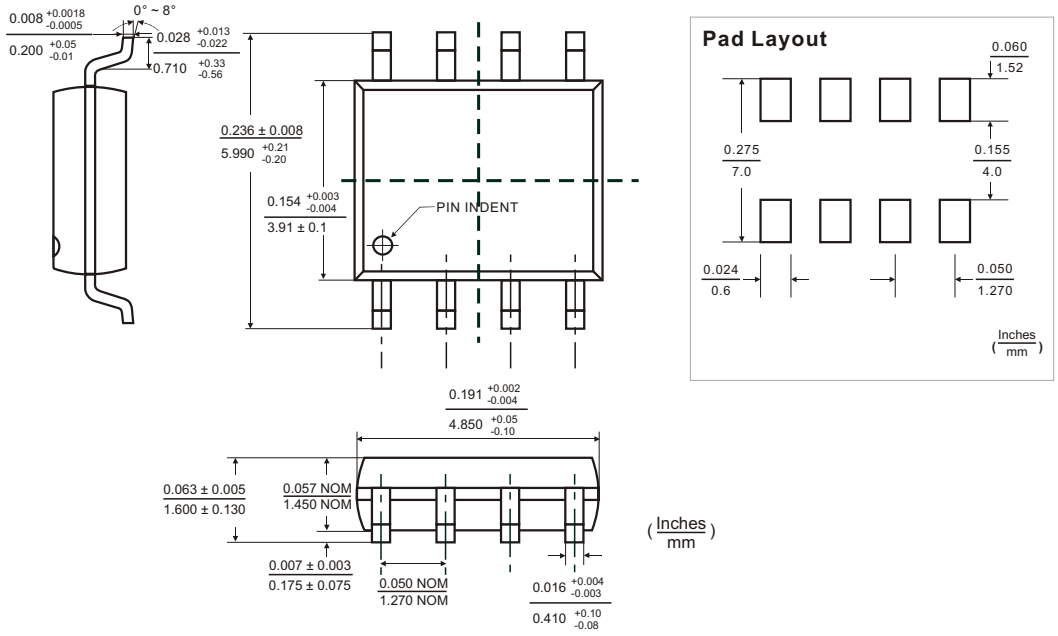
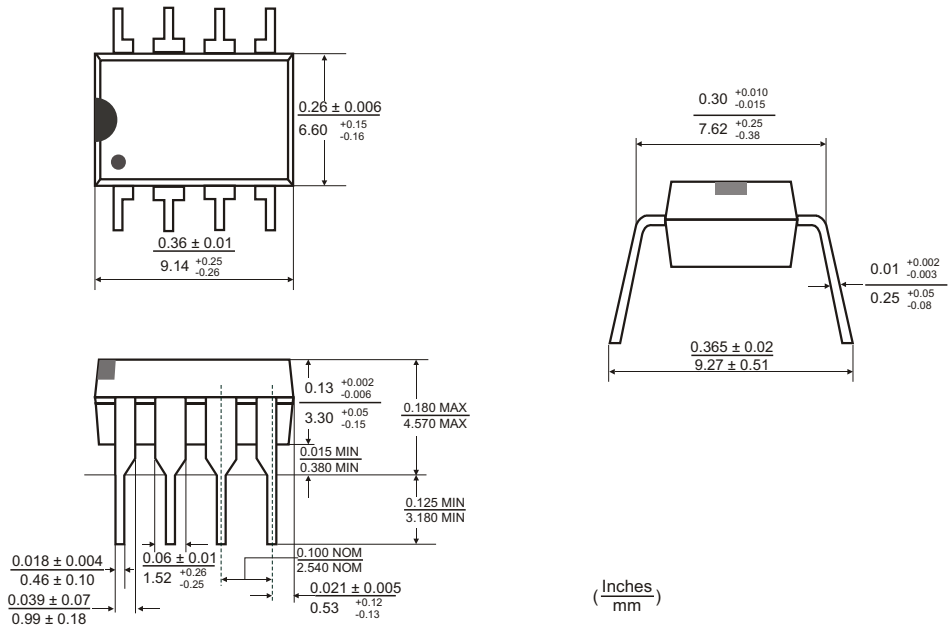


Figure 3. Power Supply Current versus Power Supply Voltage

◆ SOP-8 PACKAGE OUTLINE DIMENSIONS



◆ DIP-8 PACKAGE OUTLINE DIMENSIONS



◆ ORDERING NUMBER