

## Dual Differential Comparators

### DESCRIPTION

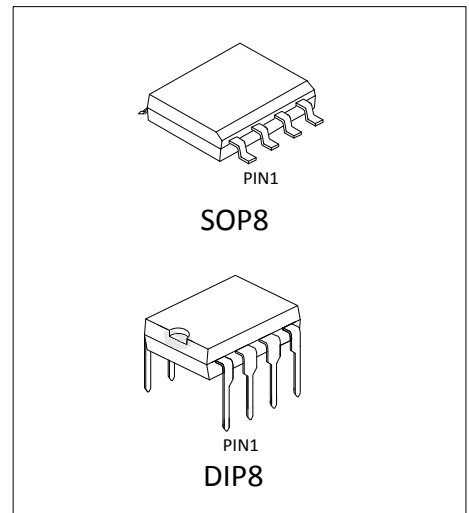
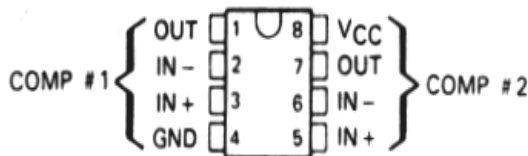
The LM293 consists of two independent voltage comparators. These were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. The outputs can be connected to other open-collector outputs to achieve wired-AND relationships.

### FEATURES

Wide supply voltage range

- Low supply current drain independent of the supply voltage.
- Low input biasing current
- Low input offset current
- Low input offset voltage
- Input common-mode voltage range includes GND
- Differential input voltage range equal to the power supply voltage
- Low output saturation voltage
- Output voltage compatible with TTL, MOS and CMOS logic

### PACKAGE INFORMATION



### ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM293N	DIP8	LM293	TUBE	2000/box
LM293M/TR	SOP8	LM293	REEL	2500/reel

**ELECTRICAL CHARACTERISTICS**

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

PARAMETER	TEST CONDITIONS*		MIN	TYP	MAX	UNIT
$V_{IO}$ Input offset voltage	$V_{CC}=5V$ to $30V$ , $V_{IC}=V_{ICR\ min}$ , $V_O=1.4V$	$25^{\circ}C$		2	5	mV
		Full range			9	
$I_{IO}$ Input offset current	$V_O=1.4V$	$25^{\circ}C$		5	50	nA
		Full range			150	
$I_{IB}$ Input bias current	$V_O=1.4V$	$25^{\circ}C$		-25	-250	nA
		Full range			-400	
$V_{ICR}$ Common-mode input voltage range**		$25^{\circ}C$	0 to $V_{CC}-1.5$			V
		Full range	0 to $V_{CC}-2$			
$A_{VD}$ Large-signal differential voltage amplification	$V_{CC}=15V$ , $V_O=1.4V$ to $11.4V$ , $R_L \geq 15k\Omega$ to $V_{CC}$	$25^{\circ}C$	50	200		V/mV
$I_{OH}$ High-level output current	$V_{OH}=5V$ , $V_{ID}=1V$ ,	$25^{\circ}C$		0.1	50	nA
	$V_{OH}=30V$ , $V_{ID}=1V$	Full range			1	$\mu A$
$V_{OL}$ Low-level output voltage	$I_{OL}=4mA$ , $V_{ID}=-1V$	$25^{\circ}C$		150	400	mV
		Full range			700	
$I_{OL}$ Low-level output current	$V_{OL}=1.5V$ , $V_{ID}=-1V$	$25^{\circ}C$	6			mA
$I_{CC}$ Supply current	$R_L=\infty$	$V_{CC}=5V$	$25^{\circ}C$	0.8	1	mA
		$V_{CC}=30V$	Full range		2.5	

\*Full range (MIN to MAX), for the LM293 is  $-40^{\circ}C$  to  $85^{\circ}C$ . All characteristics are measured with zero common-mode input voltage unless otherwise specified.

\*\*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,  $V_{CC}=5V$ ,  $T_A=25^{\circ}C$**

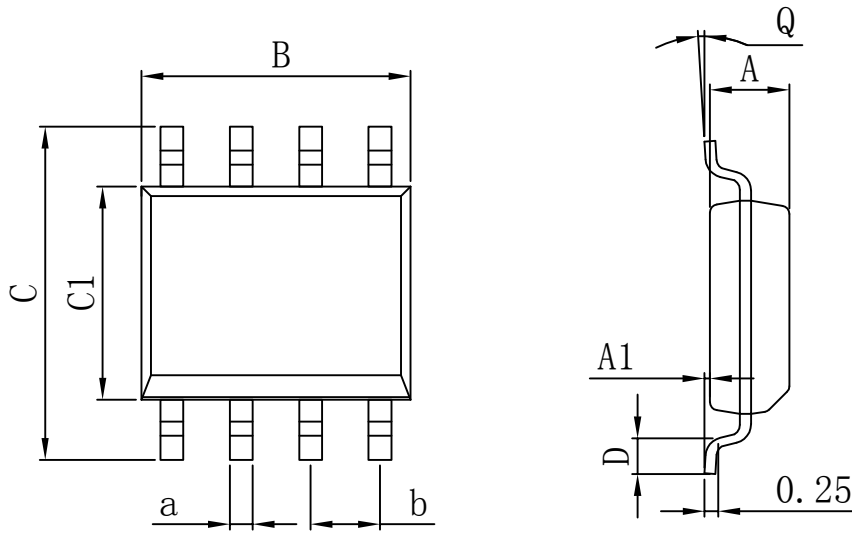
PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Response time	$R_L$ connected to 5V through 5.1k $\Omega$ , $C_L=15pF$ * (See Note 1)	100-mV input step with 5-mV overdrive		1.3		$\mu s$
		TTL-level input step		0.3		

\* $C_L$  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.

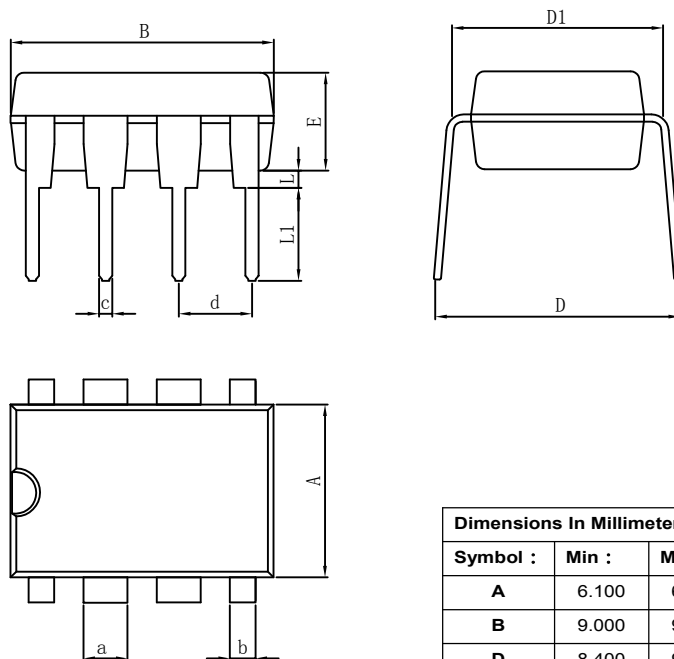
PACKAGE

SOP8



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	1.225	1.570	D	0.400	0.950
A1	0.100	0.250	Q	0°	8°
B	4.800	5.100	a	0.420 TYP	
C	5.800	6.250	b	1.270 TYP	
C1	3.800	4.000			

DIP8



Dimensions In Millimeters					
Symbol :	Min :	Max :	Symbol :	Min :	Max :
A	6.100	6.680	L1	3.000	3.600
B	9.000	9.500	a	1.524 TYP	
D	8.400	9.000	b	0.889 TYP	
D1	7.420	7.820	c	0.457 TYP	
E	3.100	3.550	d	2.540 TYP	
L	0.500	0.700			

## Important statement:

Huaguan Semiconductor Co,Ltd. reserves the right to change the products and services provided without notice. Customers should obtain the latest relevant information before ordering, and verify the timeliness and accuracy of this information.

Customers are responsible for complying with safety standards and taking safety measures when using our products for system design and machine manufacturing to avoid potential risks that may result in personal injury or property damage.

Our products are not licensed for applications in life support, military, aerospace, etc., so we do not bear the consequences of the application of these products in these fields.

Huaguan Semiconductor Co,Ltd. the performance of the semiconductor products produced by the company can reach the performance indicators that can be applied at the time of sales. the use of testing and other quality control technologies is limited to the quality assurance scope of Huaguan semiconductor. Not all parameters of each device need to be tested. The above documents are for reference only, and all are subject to the physical parameters.

Our documentation is only permitted to be copied without any tampering with the content, so we do not accept any responsibility or liability for the altered documents.

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Analog Comparators](#) category:*

*Click to view products by [HGSEMI](#) manufacturer:*

Other Similar products are found below :

[SC2903VDR2G](#) [LM2901SNG](#) [LM339SNG](#) [NTE911](#) [LM339EDR2G](#) [NTE922](#) [NCX2200GMAZ](#) [LM2903F-E2](#) [MCP6544-EP](#) [MCP6541UT-I/LT](#) [MCP6542T-E/MS](#) [BA2903FVM-TR](#) [TS882IQ2T](#) [LM2901EDR2G](#) [LM2903SNG](#) [5962-8765901CA](#) [TS391SN2T1G](#) [JM38510/11201BDA](#) [LM111JG](#) [LM139ADT](#) [LM239APT](#) [TLV1704AIPW](#) [BA8391G-TR](#) [MAX9144EUD+](#) [MAX9095AUD+](#) [MIC842NYMT-T5](#) [BU7252FVM-TR](#) [NCS2200AMUT1G](#) [MAX975EUA+T](#) [MAX9034AUD+](#) [M38510/10304BGA](#) [MIC842HYMT-TR](#) [TS3021HIYLT](#) [AZV331KSTR-G1](#) [LM2901QS14-13](#) [LT1720IDD#PBF](#) [TLV7011DPWR](#) [TC75S58F,LF](#) [LT1394IS8#PBF](#) [S-89431ACMC-HBVT2U](#) [LM2903AQTH-13](#) [TLC3704MD](#) [TC75S59F,LF](#) [TC75W58FU,LF](#) [S-89431BCPH-H4DTFU](#) [TL331SN4T3G](#) [TLV7021DPWR](#) [TC75W56FU,LF](#) [LM2903QS-13](#) [TL331VSN4T3G](#)