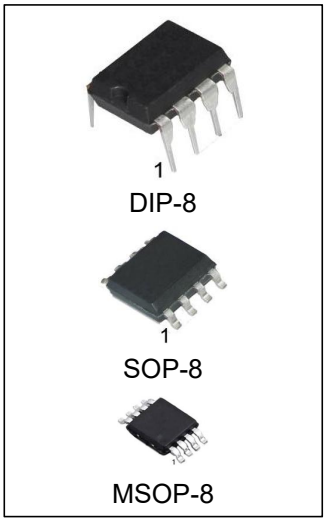
Dual Differential Comparators

DESCRIPTION

The LM393A 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.



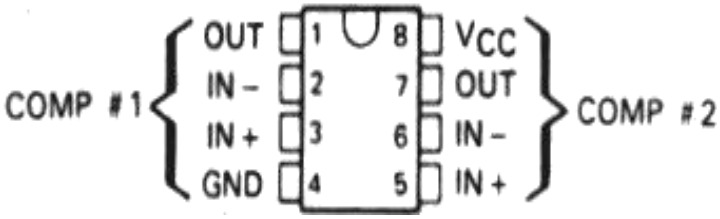
FEATURES

- 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

ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
LM393AN	DIP-8	LM393A	TUBE	2000 pcs/box
LM393AM/TR	SOP-8	LM393A	REEL	2500 pcs/reel
LM393AMM/TR	MSOP-8	LM393A	REEL	3000 pcs/reel

PACKAGE INFORMATION



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	Vcc=5V to 30, VIC=VICRmin, Vo=1.4V		25℃		2	5	mV
			Full range			9	
I_{IO} Input offset current	Vo=1.4V		25℃		5	50	nA
			Full range			150	
I_{IB} Input bias current	Vo=1.4V		25℃		-25	-250	nA
			Full range			-400	
V_{ICR} Common-mode inputvoltage range**			25℃	0 to Vcc-1.5			V
			Full range	0 to Vcc-2			
A_{VD} Large-signal differential voltage amplification	Vcc=15V, Vo=1.4V to 11.4V, R_L≧15kΩ tO V_{CC}		25℃	50	200		V/mV
I_{OH} High-level output current	V_{OH}=5V, V_{ID}=1V,		25℃		0.1	50	nA
	V_{OH}=30V, V_{ID}=1V		Full range			1	μA
V_{OL} Low-level output voltage	I_{OL}=4mA, V_{ID}=-1V		25℃		150	400	mV
			Full range			700	
I_{OL} Low-level output current	V_{OL}=1.5V, V_{ID}=-1V		25℃	6			mA
I_{CC} Supply current	R_L=∞	VCC=5V	25℃		0.8	1	mA
		VCC=30V	Full range			2.5	

*Full range (MIN to MAX), for the LM393A is -40℃to 85℃. 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 VCC-1.5V, but either or both inputs can go to 30V without damage.

SWITCHING CHARACTERISTICS, VCC=5V, TA=25°C

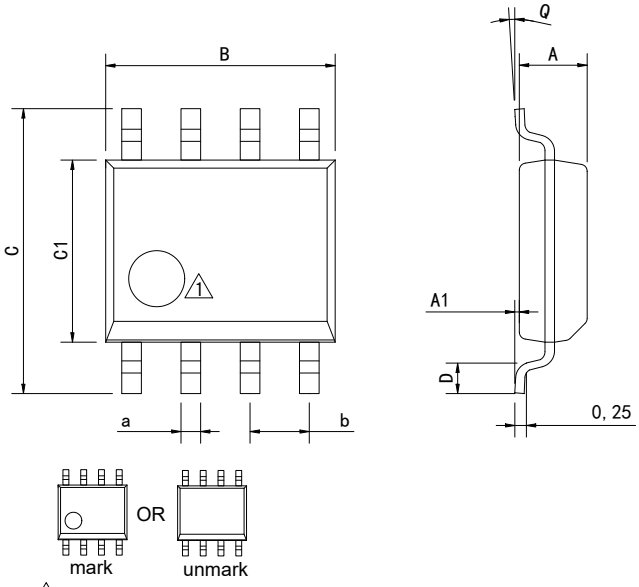
PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Response time	R_L connected to 5V through 5.1k , C_L=15pF* (See Note 1)	MVinput step with 5-mV overdrive		1.3		μs
		TTL-level input step		0.3		

*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.

PHYSICAL DIMENSIONS

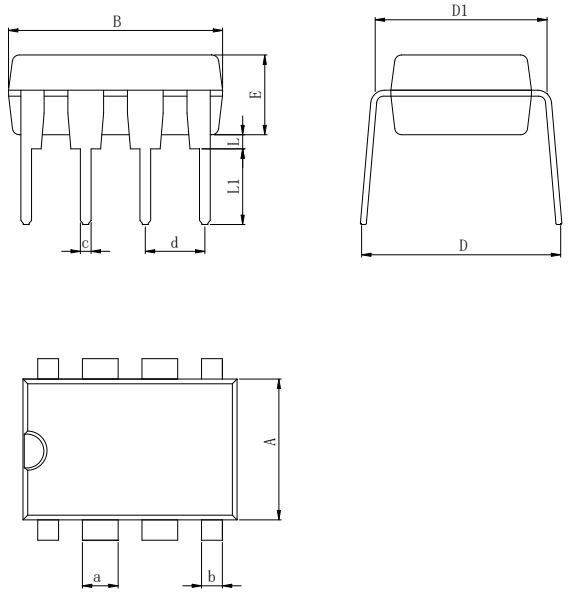
SOP-8



1 Package top mark may be in lower left corner or unmark

Dimensions In Millimeters(SOP-8)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	4.90	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	5.10	6.20	4.00	0.80	8°	0.45	

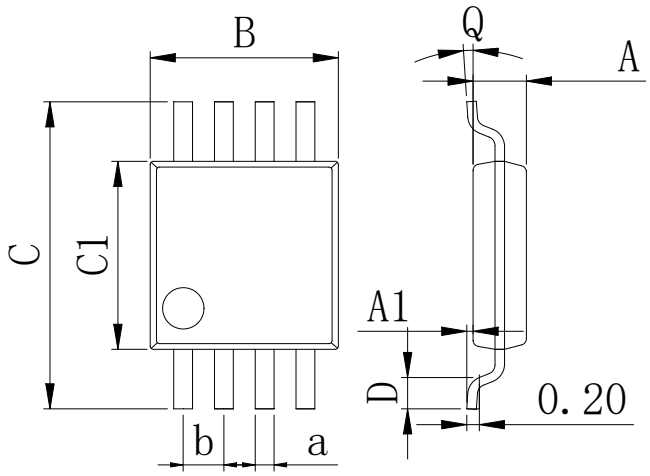
DIP-8



Dimensions In Millimeters(DIP-8)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	9.00	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	9.50	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

PHYSICAL DIMENSIONS

MSOP-8



Dimensions In Millimeters(MSOP-8)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.80	0.05	2.90	4.75	2.90	0.35	0°	0.25	0.65 BSC
Max:	0.90	0.20	3.10	5.05	3.10	0.75	8°	0.35	

REVISION HISTORY

REVISION NUMBER	DATE	REVISION	PAGE
V1.0	2018-6	New	1-6
V1.1	2023-8	Update encapsulation type、Updated DIP-8 dimension	1、3
V1.2	2025-12	Update important statements、Update sop-8 Dimension drawing	3、6

IMPORTANT STATEMENT:

Huaguan Semiconductor reserves the right to change products and services offered without prior notice. Customers should obtain the latest relevant information before placing orders and verify that such information is current and complete. Huaguan Semiconductor assumes no responsibility or liability for altered documents.

Customers are responsible for complying with safety standards and implementing safety measures when using Huaguan Semiconductor products in system design and end-product manufacturing. You assume full responsibility for: selecting the appropriate Huaguan Semiconductor products for your application; designing, validating, and testing your application; and ensuring that your application complies with applicable standards and all other safety, security, or other requirements. This is to prevent potential risks that may lead to personal injury or property damage.

Huaguan Semiconductor products are not approved for use in life support, military, aerospace, or other high-risk applications. Huaguan products are neither intended nor warranted for use in such systems or equipment. Any failure or malfunction may lead to personal injury or severe property damage. Such applications are deemed "Unsafe Use." Unsafe Use includes, but is not limited to: surgical and medical equipment, nuclear energy control equipment, aircraft or spacecraft instruments, control or operation of vehicle power, braking, or safety systems, traffic signal instruments, all types of safety devices, and any other applications intended to support or sustain life. Huaguan Semiconductor shall not be liable for consequences resulting from Unsafe Use in these fields. Users must independently evaluate and assume all risks. Any issues, liabilities, or losses arising from the use of products beyond their approved applications shall be solely borne by the user. Users may not claim any compensation from Huaguan Semiconductor based on these terms. If any third party claims against Huaguan Semiconductor due to such Unsafe Use, the user shall compensate Huaguan Semiconductor for all resulting damages and liabilities.

Huaguan Semiconductor provides technical and reliability data (including datasheets), design resources (including reference designs), application or other design advice, web tools, safety information, and other resources for its semiconductor products. However, no guarantee is made that these resources are free from defects, and no express or implied warranties are provided. The use of testing and other quality control techniques is limited to Huaguan Semiconductor's quality assurance scope. Not all parameters of each device are tested.

Huaguan Semiconductor's documentation authorizes you to use these resources only for developing applications related to the products described herein. You are not granted rights to any other intellectual property of Huaguan Semiconductor or any third party. Any other reproduction or display of these resources is strictly prohibited. You shall fully indemnify Huaguan Semiconductor and its agents against any claims, damages, costs, losses, and liabilities arising from your use of these resources. Huaguan Semiconductor shall not be held responsible.