Dual Differential Comparators

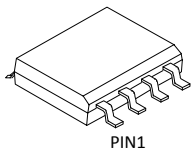
DESCRIPTION

The LM393 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



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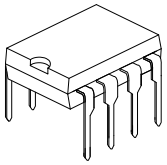

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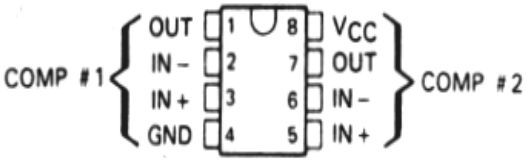
PACKAGE INFORMATION



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, $V_{IC}=V_{ICR}$ min, Vo=1.4V		25°C		2	5	mV
			Full range			9	
I_{IO} Input offset current	Vo=1.4V		25°C		5	50	nA
			Full range			150	
I_{IB} Input bias current	Vo=1.4V		25°C		-25	-250	nA
			Full range			-400	
V_{ICR} Common-mode input voltage range**			25°C	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, $R_L \geq 15k\Omega$ to V_{CC}		25°C	50	200		V/mV
I_{OH} High-level output current	V_{OH}=5V, V_{ID}=1V,		25°C		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°C		150	400	mV
			Full range			700	
I_{OL} Low-level output current	V_{OL}=1.5V, V_{ID}=-1V		25°C	6			mA
I_{CC} Supply current	R_L=∞	V_{CC}=5V	25°C		0.8	1	mA
		V_{CC}=30V	Full range			2.5	

*Full range (MIN to MAX), for the LM393 is -40°C to 125°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°C

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Response time	R_L connected to 5V through 5.1kΩ, 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.

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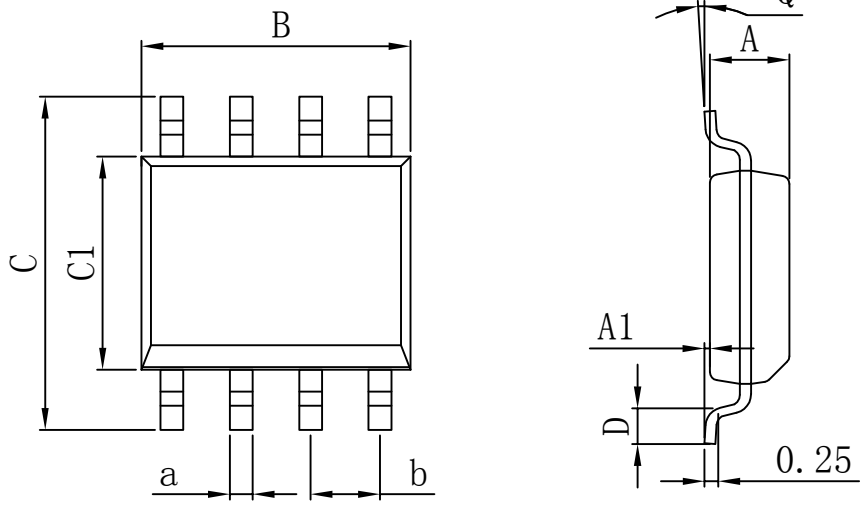

UNIT: mm							
DIM.	MIN	TYP	MAX	DIM.	MIN	TYP	MAX
A	4.520	4.570	4.620	a	0.400	0.420	0.440
A1	0.100	–	0.250	b	1.260	1.270	1.280
B	4.800	4.920	5.100	Q	0°	–	8°
C	5.800	6.100	6.250				
C1	3.800	3.900	4.000				
D	0.400	–	0.950				

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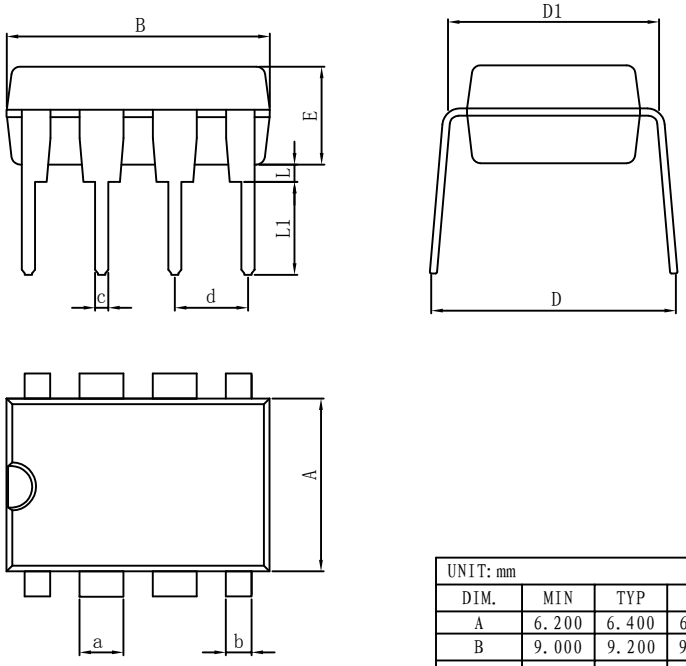

UNIT: mm							
DIM.	MIN	TYP	MAX	DIM.	MIN	TYP	MAX
A	6.200	6.400	6.680	a	1.504	1.524	1.544
B	9.000	9.200	9.500	b	–	0.889	–
D	8.200	8.700	9.200	c	0.437	0.457	0.477
D1	7.42	7.62	7.82	d	2.530	2.540	2.550
E	3.100	3.300	3.550	L	0.500	–	0.700
				L1	3.000	3.200	3.600

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