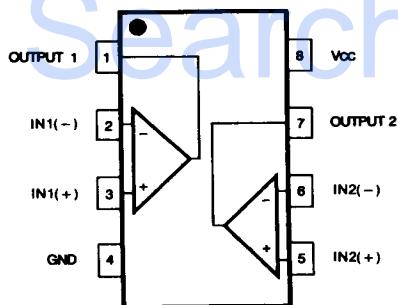
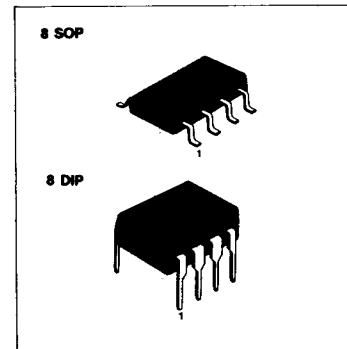
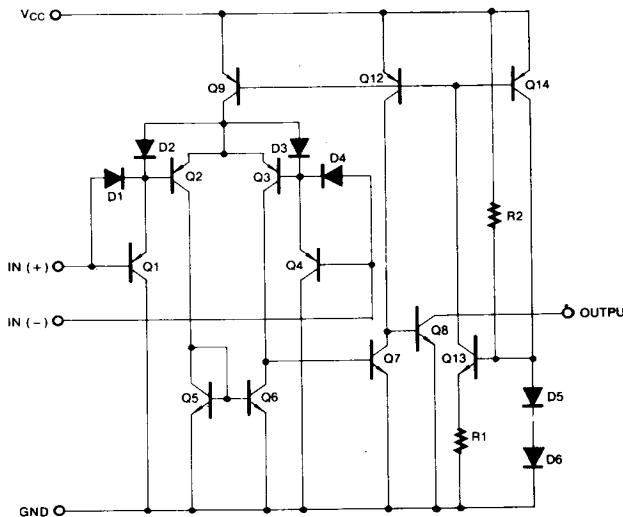


DUAL DIFFERENTIAL COMPARATOR

The LM393 consists of two independent voltage comparator is designed to operate from a single power supply over a wide voltage range.

FEATURES

- Low input offset current: $\pm 5\text{mA}$ (TYP)
- Low offset voltage: $\pm 1\text{mV}$ (TYP)
- Compatible with all forms of logic level
- Allow comparison of voltages near ground level

BLOCK DIAGRAM**SCHEMATIC DIAGRAM**

2

ORDERING INFORMATION

Device	Package	Operating Temperature
LM393N	8 DIP	$0 \sim +70^\circ\text{C}$
LM393D	8 SOP	

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Power Supply Voltage	V_S	± 20 or 40	V
Differential Input Voltage	V_{ID}	40	V
Input Voltage	V_I	-0.3 to +40	V
Output Short Circuit to GND		Continuous	
Power Dissipation	P_D	570	mW
Operating Temperature	T_{op}	0 - +70	
Shortage Temperature	T_{stg}	-65 - +150	°C

ELECTRICAL CHARACTERISTICS ($V_{CC} = 5V$, $T_a = 25^\circ C$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	$V_{ICM} = 0V$ to $V_{CC} - 1.5V$ $V_O = 1.4V$, $R_S = 0$ $0 \leq T_a \leq +70^\circ C$	0.5	5	9.0	mV
Input Offset Current	I_{IO}	$0 \leq T_a \leq +70^\circ C$	2.0	50	150	nA
Input Bias Current	I_B	$0 \leq T_a \leq +70^\circ C$	80	250	400	nA
Input Common Mode Voltage Range	V_{ICR}	$0 \leq T_a \leq +70^\circ C$	0	3.5	3.0	V
Supply Current	I_{CC}	$R_L = \infty$ $R_L = \infty$, $V_{CC} = 30V$	0.7	1	2.5	mA
Voltage Gain	A_V	$V_{CC} = 15V$, $R_L \geq 15K\Omega$ (for large, V_O swing)	50	500		V/mV
Large Signal Response Time	t_{RES1}	$V_{IN} = TTL$ logic Swing $V_{ref} = 1.4V$, $V_{RL} = 5V$, $R_L = 5.1K\Omega$		350		nS
Response Time	t_{RES2}	$V_{RL} = 5V$, $R_L = 5.1K\Omega$		1.4		μS
Output Sink Current	I_{sink}	$V_{IN^-} \geq 1V$, $V_{IN^+} = 0V$, $V_O \leq 1.5V$	6	20		mA
Output Saturation Voltage	V_{sat}	$V_{IN^-} \geq 1V$, $V_{IN^+} = 0V$ $I_{sink} = 4mA$ $0 \leq T_a \leq +70^\circ C$	150	400	700	mV
Output Leakage Current	I_{leak}	$V_{IN^-} = 0$, V_{IN^+} $V_O = 5V$ $V_O = 30V$		0.1		nA
					1.0	μA

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 SUPPLY CURRENT

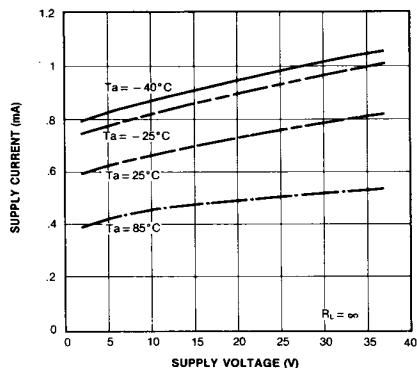


Fig. 3 OUTPUT SATURATION VOLTAGE

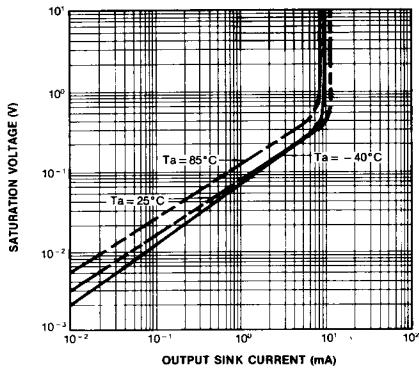


Fig. 5 RESPONSE TIME FOR VARIOUS INPUT OVERDRIVE-POSITIVE TRANSITION

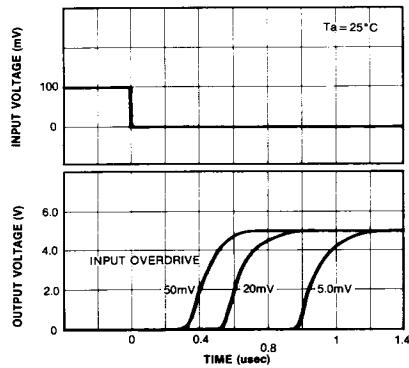


Fig. 2 INPUT CURRENT

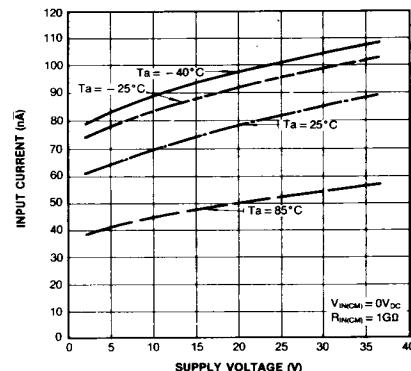


Fig. 4 RESPONSE TIME FOR VARIOUS INPUT OVERDRIVE-NEGATIVE TRANSITION

