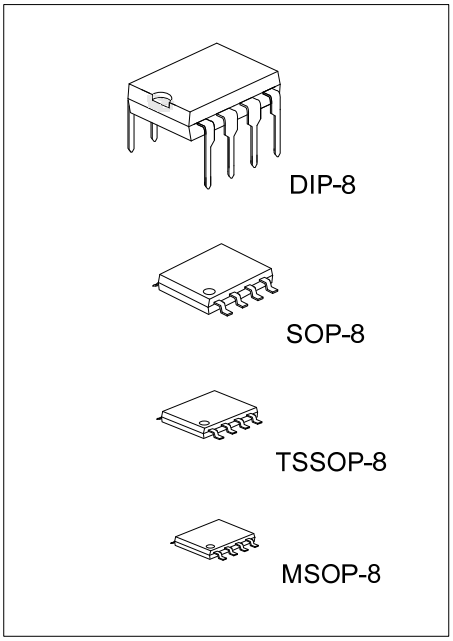
LM393 *LINEAR INTEGRATED CIRCUIT*

DUAL DIFFERENTIAL COMPARATOR



■ DESCRIPTION

The UTC **LM393** consists of two independent voltage comparators, designed specifically to operate from a single power supply over a wide voltage range.

■ FEATURES

* Single or dual supply operation.
* Wide operating supply range
  (V_{CC}=2V ~ 36V or ±1 ~ ±18V)
* Input common-mode voltage includes ground.
* Low supply current drain I_{CC}=0.8mA (Typical).
* Low input bias current I_{BIAS}=25nA (Typical).
* Output compatible with TTL, DTL, and CMOS logic system.

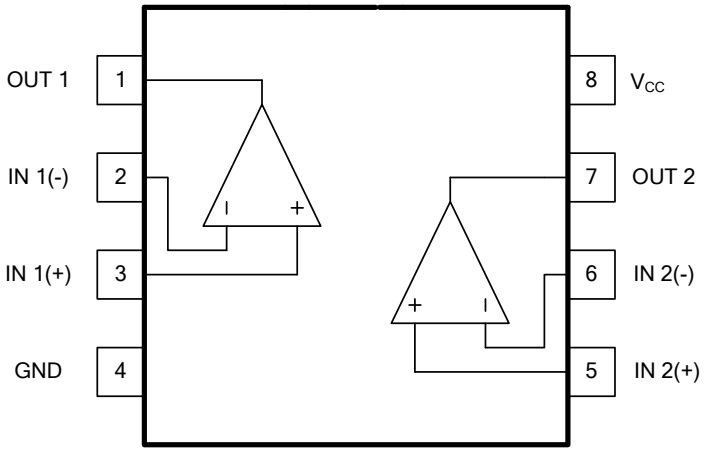
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free Plating	Halogen-Free		
LM393L-D08-T	LM393G-D08-T	DIP-8	Tube
LM393L-S08-R	LM393G-S08-R	SOP-8	Tape Reel
LM393L-P08-R	LM393G-P08-R	TSSOP-8	Tape Reel
LM393L-SM1-R	LM393G-SM1-R	MSOP-8	Tape Reel

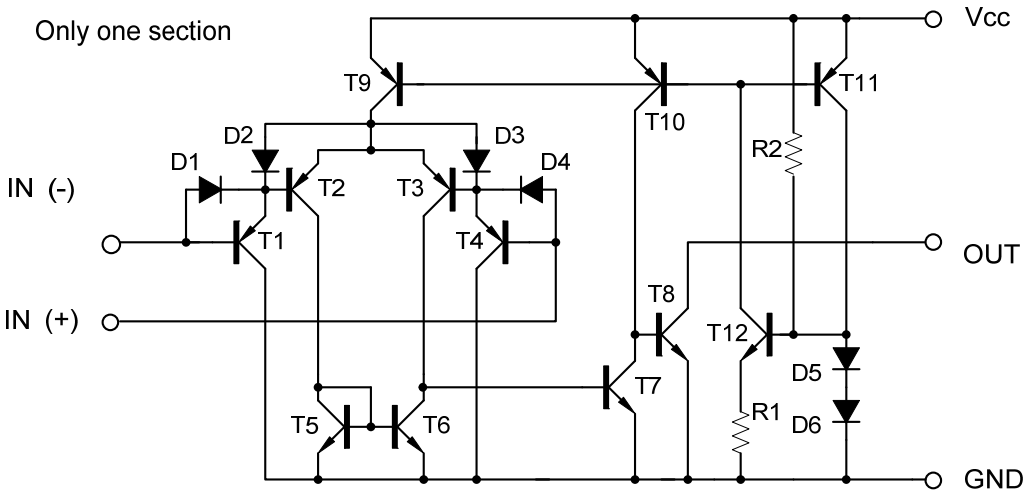
LM393L-D08-T
(1) Packing Type
(2) Package Type
(3) Lead Plating

(1) T: Tube, R: Tape Reel
(2) D08: DIP-8, S08: SOP-8, P08: TSSOP-8, SM1: MSOP-8
(3) L: Lead Free, G: Halogen Free

■ PIN DESCRIPTION



■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	±18 or 36	V
Differential Input Voltage		$V_{I(DIFF)}$	±36	V
Input Voltage		V_{IN}	-0.3 ~ +36	V
Power Dissipation	DIP-8	P_D	600	mW
	SOP-8		420	mW
	TSSOP-8		350	mW
	MSOP-8		300	mW
Operating Temperature Range		T_{OPR}	-20 ~ +85	°C
Storage Temperature Range		T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

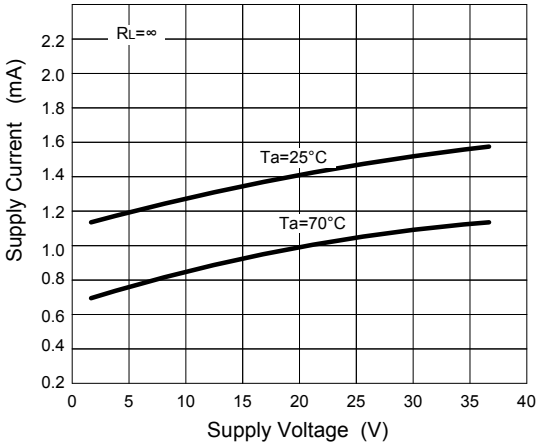
■ ELECTRICAL CHARACTERISTICS

(V_{CC}=5.0V, T_A=25°C, All voltage referenced to GND unless otherwise specified)

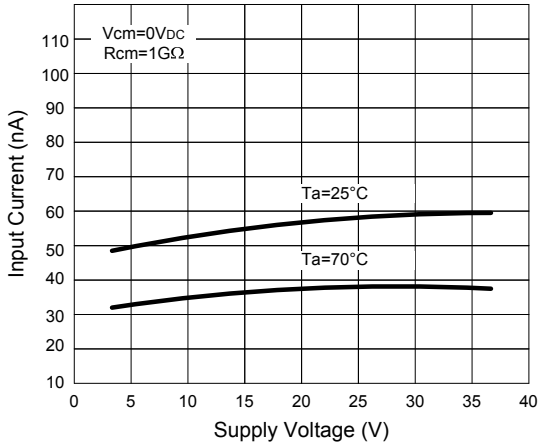
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Input Offset Voltage	$V_{I(OFF)}$	V_{CM}=0V toV_{CC}-1.5V $V_{O(P)}$=1.4V, R_S=0Ω			1.0	5.0	mV
Output Saturation Voltage	V_{SAT}	V_I(-)>1V, V_I(+)=0V, I_{SINK}=4mA			160	400	mV
Input Common Mode Voltage	$V_{I(CM)}$	V_{CC}=30V		0		V_{CC}-1.5	V
Large Signal Voltage Gain	G_V	V_{CC}=15V, R_L≧15KΩ		50	200		V/mV
Power Supply Current	I_{CC}	R_L=∝, V_{CC}=30V			0.8	2.5	mA
		R_L=∝			0.6	1.0	mA
Input Offset Current	$I_{I(OFF)}$				5	50	nA
Input Bias Current	$I_{I(BIAS)}$				65	250	nA
Output Sink Current	$I_{O(SINK)}$	V_I(-)>1V, V_I(+)=0V, Vo(p)<1.5V		6	18		mA
Output Leakage Current	$I_{O(LEAK)}$	V_I(+)=1V, V_I(-)=0	Vo(p)= 5V		0.1		nA
			Vo(p)=30V			1.0	μA
Large Signal Response Time	t_R	V_{IN}=TTL logic wing V_{REF}=1.4V, V_{RL}=5V, R_L=5.1kΩ			350		ns
Response Time	t_R	V_{RL}=5V,R_L=5.1kΩ			1400		ns

■ TYPICAL CHARACTERISTICS

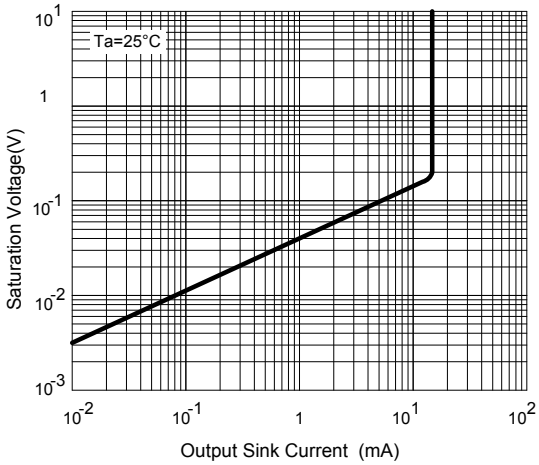
Supply Current



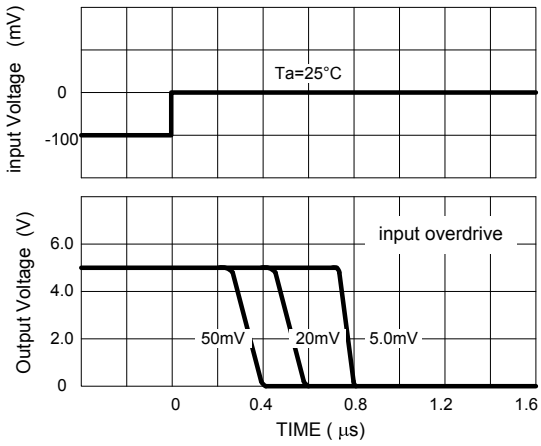
Input Current



Output Saturation Voltage



Reponse Time for Various Input Overdrive
Negative Transition



Reponse Time for Various Input Overdrive
Positive Transition