



LM393

LINEAR INTEGRATED CIRCUIT

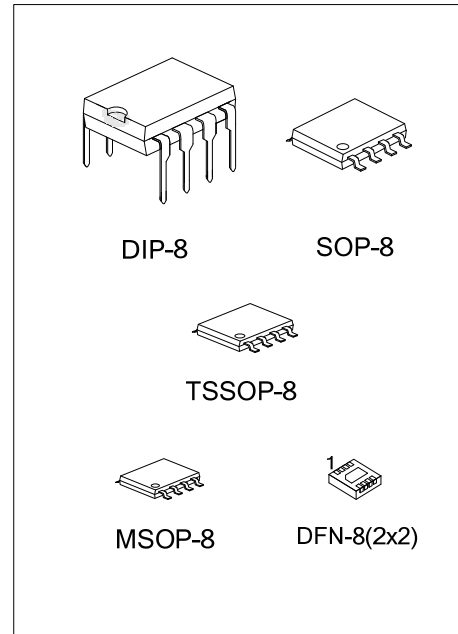
DUAL DIFFERENTIAL COMPARATOR

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 ($V_{CC}=2V \sim 36V$ or $\pm 1 \sim \pm 18V$)
- * 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

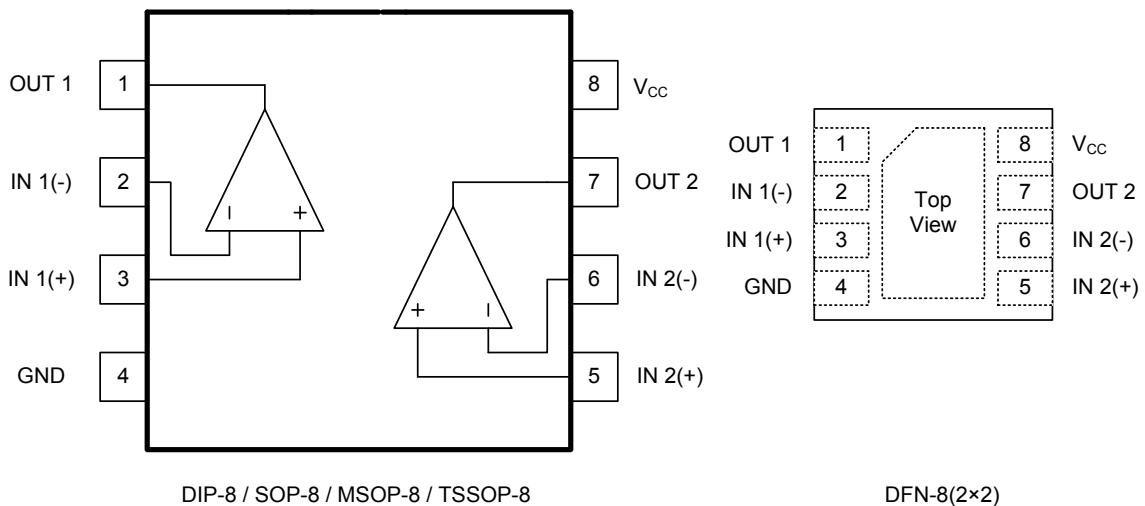
Ordering Number		Package	Packing
Lead Free	Halogen-Free		
LM393L-D08-T	LM393G-D08-T	DIP-8	Tube
-	LM393G-S08-R	SOP-8	Tape Reel
-	LM393G-P08-R	TSSOP-8	Tape Reel
-	LM393G-SM1-R	MSOP-8	Tape Reel
-	LM393G-K08-2020-R	DFN-8(2x2)	Tape Reel

<p>LM393L-D08-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) D08: DIP-8, S08: SOP-8, P08: TSSOP-8, SM1: MSOP-8, K08-2020: DFN-8(2x2) (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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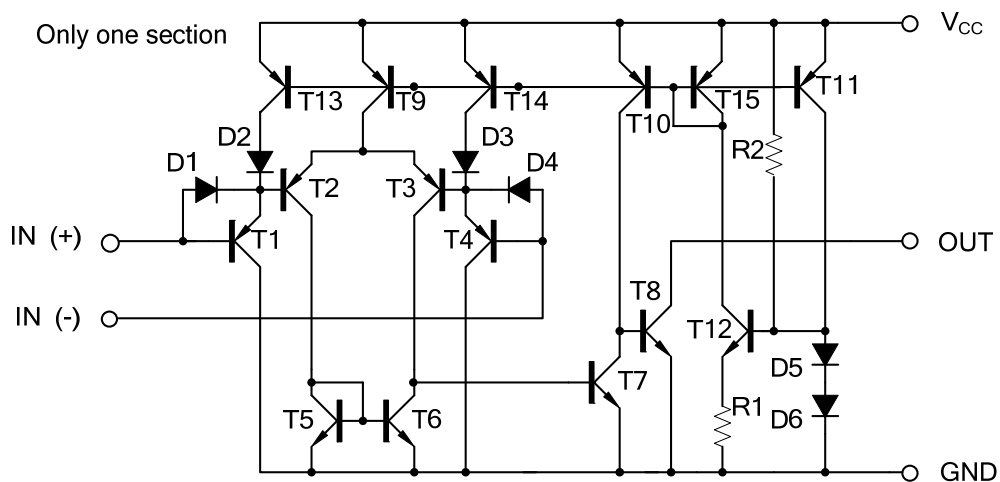
MARKING

DIP-8	SOP-8 / MSOP-8
<p>UTC □□□□ → Date Code LM393 □ L: Lead Free G: Halogen Free □□ → Lot Code</p>	<p>UTC □□□□ → Date Code LM393G □ □□ → Lot Code</p>
TSSOP-8	DFN-8(2x2)
<p>UTC □□□□ → Date Code LM393G □ □□ → Lot Code</p>	<p>M93C □□□□ → Date Code</p>

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
	DFN-8(2x2)		830	mW
Operating Temperature Range		T_{OPR}	-20 ~ +85	°C
Storage Temperature Range		T_{STG}	-65 ~ +150	°C

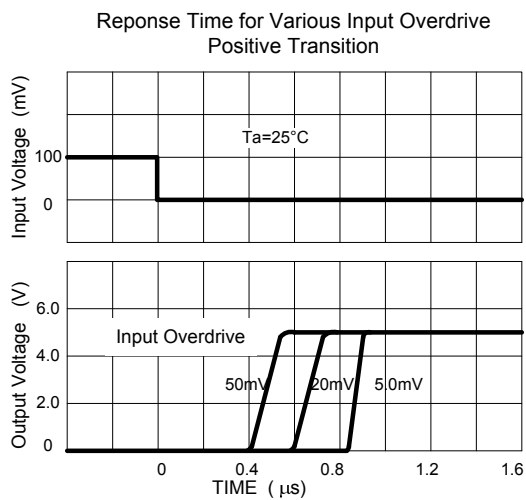
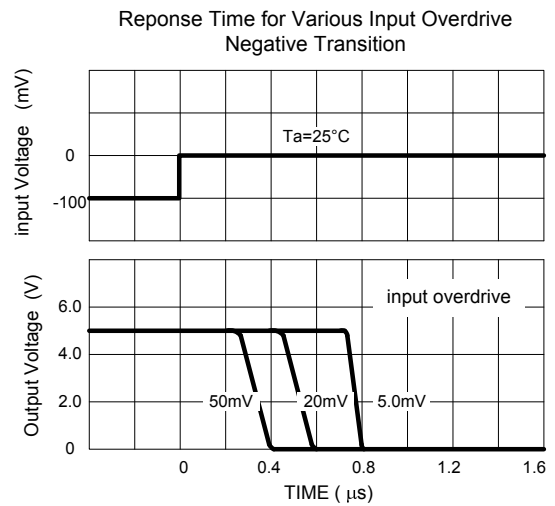
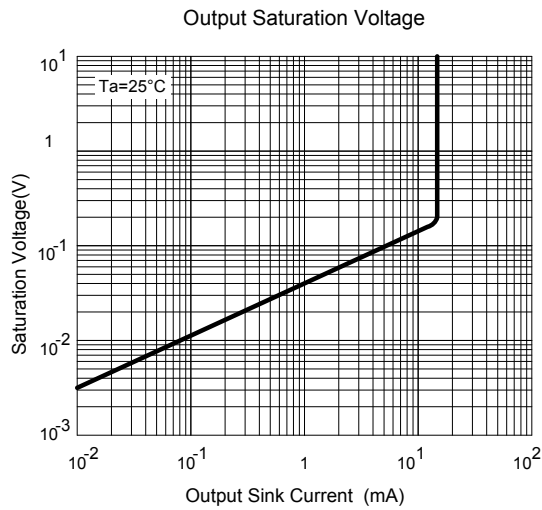
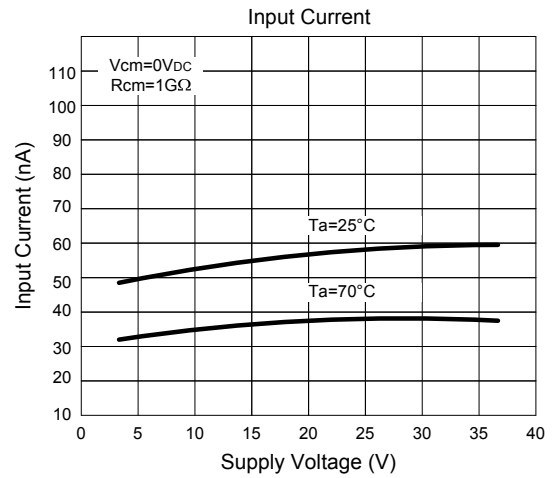
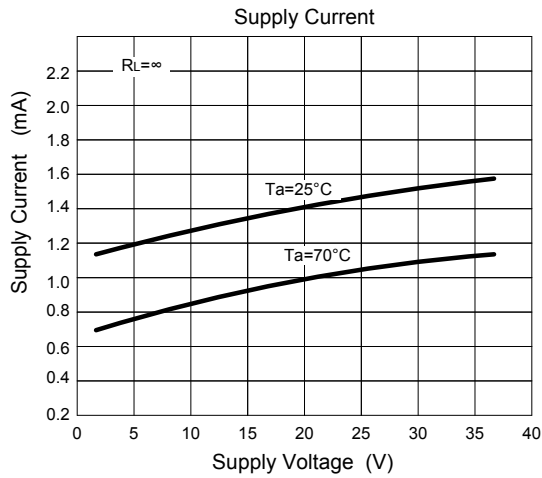
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	$V_{I(OFF)}$	$V_{CM}=0V$ to $V_{CC}-1.5V$ $V_{O(P)}=1.4V$, $R_S=0\Omega$		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	$V_{CC}=15V$, $R_L \geq 15k\Omega$	50	200		V/mV
Power Supply Current	I_{CC}	$R_L=\infty$, $V_{CC}=30V$		0.8	2.5	mA
		$R_L=\infty$		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	$I_{O(SINK)}$	$V_{I(-)}>1V$, $V_{I(+)}=0V$, $V_{O(P)}<1.5V$	6	18		mA
Output Leakage Current	$I_{O(LEAK)}$	$V_{I(+)}=1V$, $V_{I(-)}=0$		0.1		nA
					1.0	μA
Large Signal Response Time	t_R	V_{IN} =TTL logic wing $V_{REF}=1.4V$, $V_{RL}=5V$, $R_L=5.1k\Omega$		350		ns
Response Time	t_R	$V_{RL}=5V$, $R_L=5.1k\Omega$		1400		ns

TYPICAL CHARACTERISTICS



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