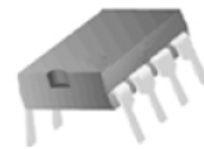


Voltage Comparator

General Description

- The TCI LM393 consist of two independent voltage comparator, designed specifically to operate from a single power supply over a wide voltage range.
- The LM393 is available in standard DIP-8, SOP-8 and TSSOP-8 packages.



DIP-8



SOP-8



TSSOP-8



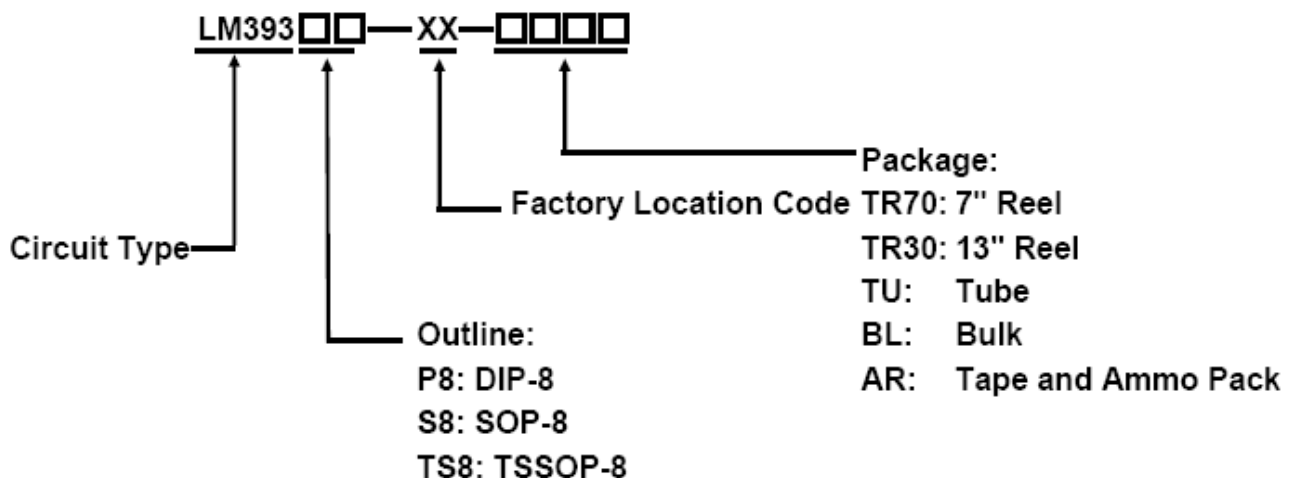
Features

- 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
- RoHS Compliance

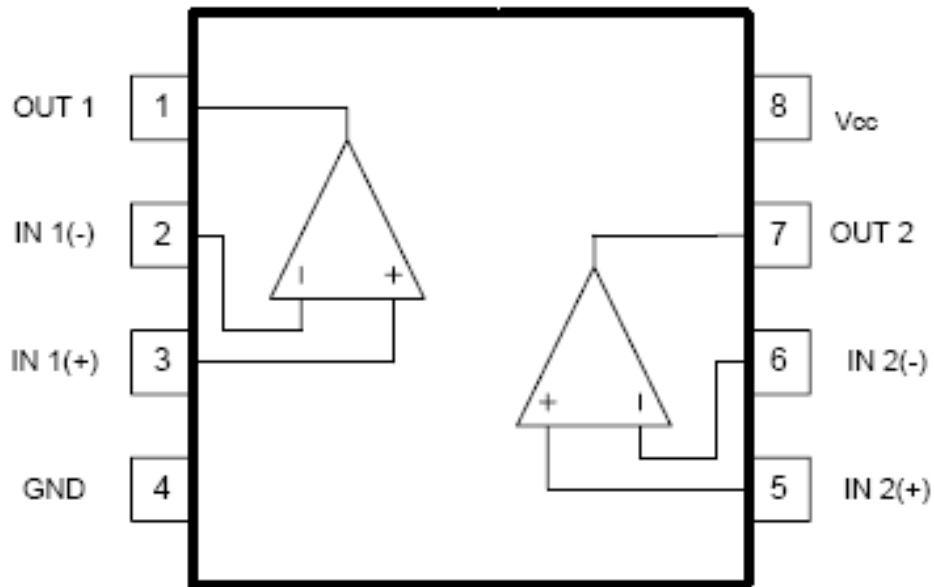
Applications

- Battery Charger
- Cordless Telephone
- Switching Power Supply
- PC Motherboard
- Communication Equipment

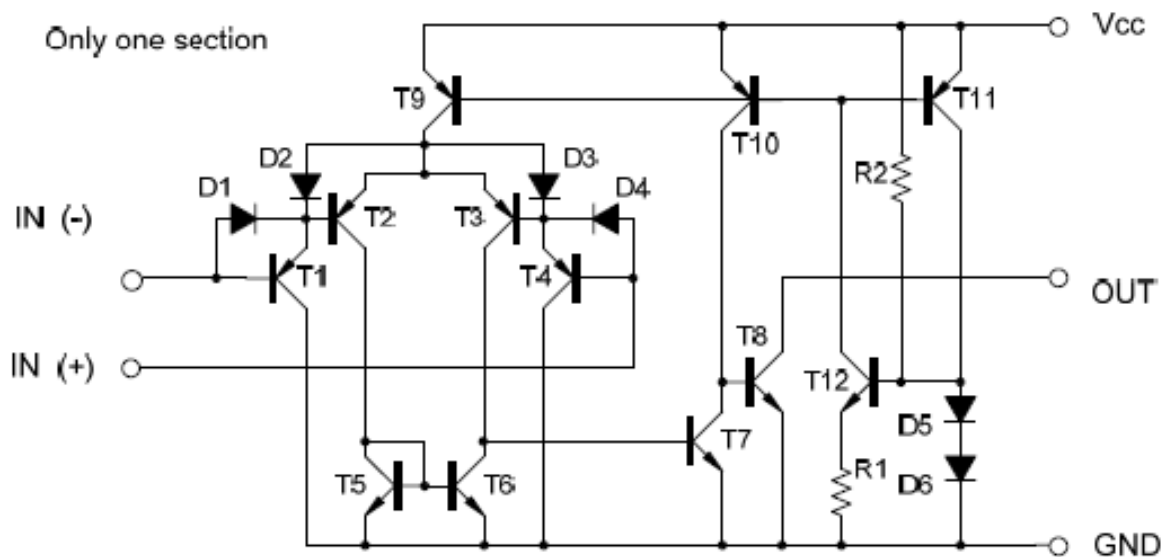
Ordering Information



Pin Configuration



Block Diagram



Voltage Comparator

LM393

Absolute Maximum Ratings

Symbol	Description	LM393	Unit
V _{CC}	Supply Voltage	± 18 or 36	V
V _{I(DIFF)}	Differential Input Voltage	36	V
V _{IN}	Input Voltage	-0.3 ~ 36	V
P _D	Power Dissipation	TSSOP-8	mW
		SOP-8	
		DIP-8	
T _J	Operating Junction Temperature	150	° C
T _{OPR}	Operating Temperature Range	-40 ~ 85	° C
T _{STG}	Storage Temperature Range	-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)

Symbol	Description	LM393			Unit	Conditions
		Min.	Typ.	Max.		
V _{I(OFF)}	Input Offset Voltage	-	1.0	5.0	mV	V _{CM} =0V to V _{CC} -1.5V V _{O(P)} =1.4V, R _S =0Ω
V _{SAT}	Output Saturation Voltage	-	160	400	mV	V _{I(-)} >1V, V _{I(+)} =0V, I _{SINK} =4mA
V _{I(CM)}	Input Common Mode Voltage	0	-	V _{CC} -1.5	V	V _{CC} =30V
G _v	Large Signal Voltage Gain	50	200	-	V/mV	V _{CC} =15V, R _L ≥15KΩ
I _{CC}	Power Supply Current	-	0.8	2.5	mA	R _L =∞, V _{CC} =30V
		-	0.6	1.0		R _L =∞
I _{I(OFF)}	Input Offset Current	-	5	50	nA	-
I _{I(BIAS)}	Input Bias Current	-	65	250	nA	-
I _{O(SINK)}	Output Sink Current	6	18	-	mA	V _{I(-)} >1V, V _{I(+)} =0V, V _{O(P)} <1.5V
I _{O(LEAK)}	Output Leakage Current	-	0.1	-	nA	V _{I(+)} =1V, V _{I(-)} =0V, V _{O(P)} =5V
		-	-	1.0	μA	V _{I(+)} =1V, V _{I(-)} =0V, V _{O(P)} =30V
t _R	Large Signal Response Time	-	350	-	ns	V _{IN} =TTL logic wing, V _{REF} =1.4V, V _{RL} =5V, R _L =5.1KΩ
t _R	Response Time	-	1400	-	ns	V _{RL} =5V, R _L =5.1KΩ

Typical Characteristics Curves

Fig.1- Supply Current

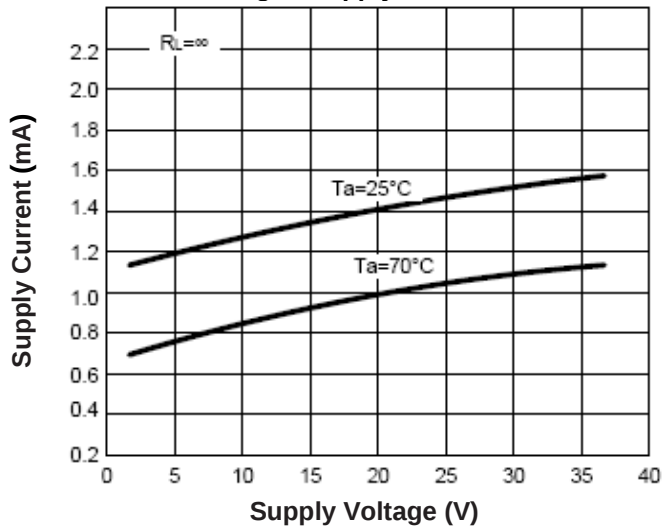


Fig.2- Input Current

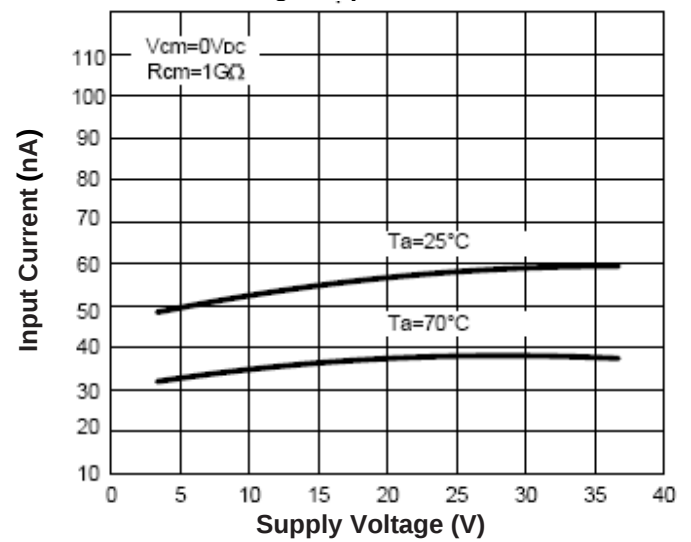


Fig.3- Output Saturation Voltage

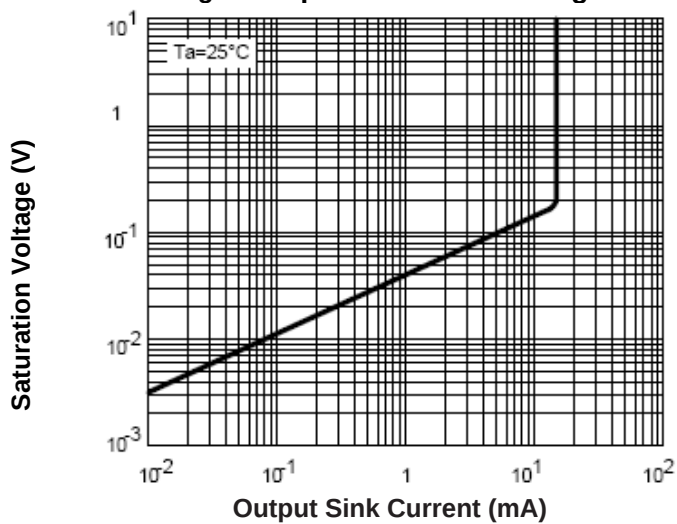
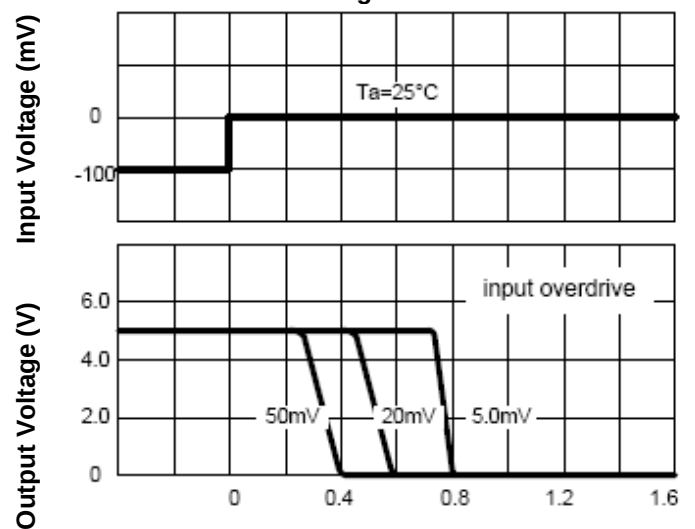


Fig.4- Response Time for Various Input Overdrive Negative Transition



Typical Characteristics Curves (Continued)

Fig.5- Response Time for Various Input Overdrive Positive Transition

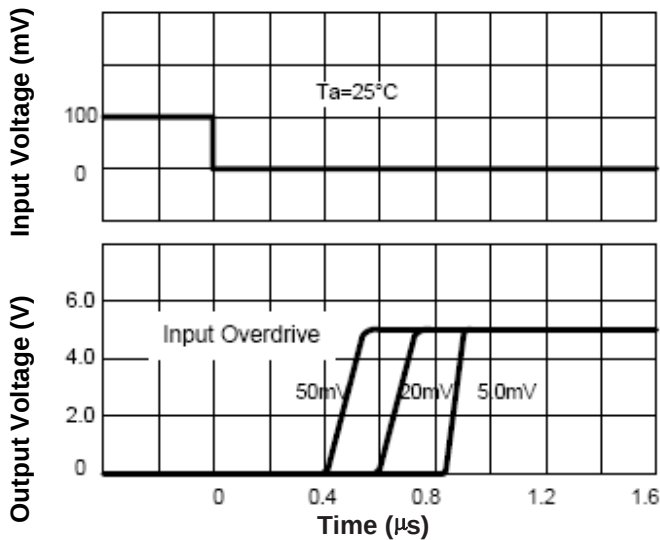


Fig.6- Voltage Follower Pulse Response

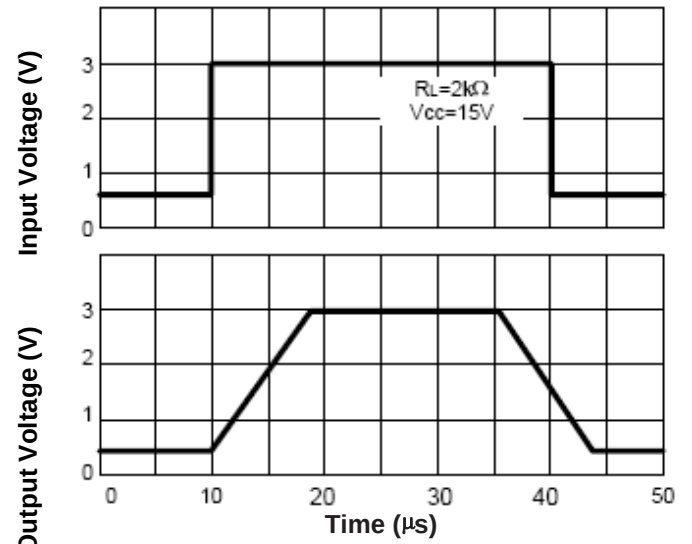


Fig.7- Voltage Follower Pulse Response (small signal)

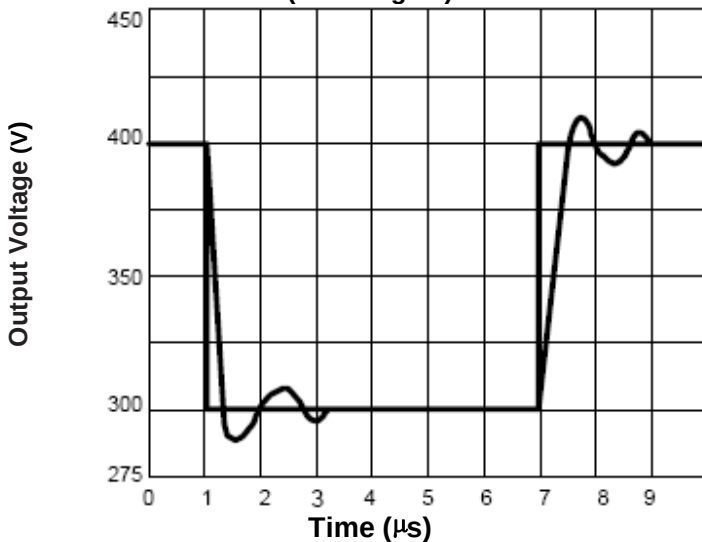
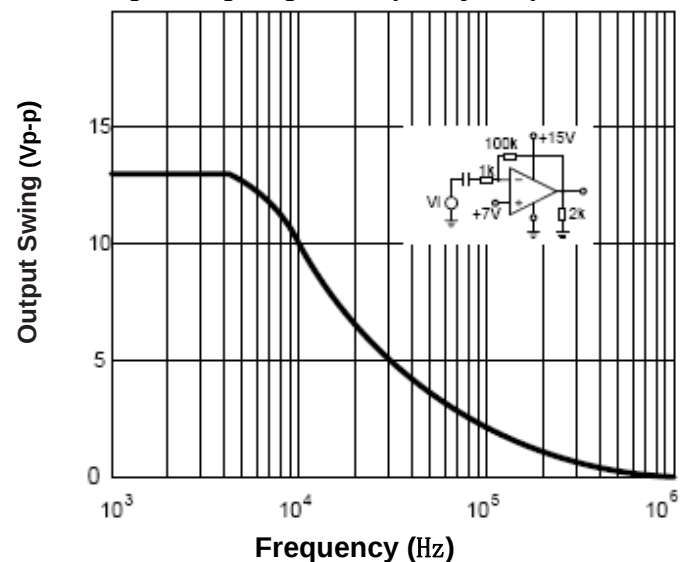


Fig.8- Large Signal Frequency Response



Typical Characteristics Curves (Continued)

Fig.9- Output Characteristics Current Sourcing

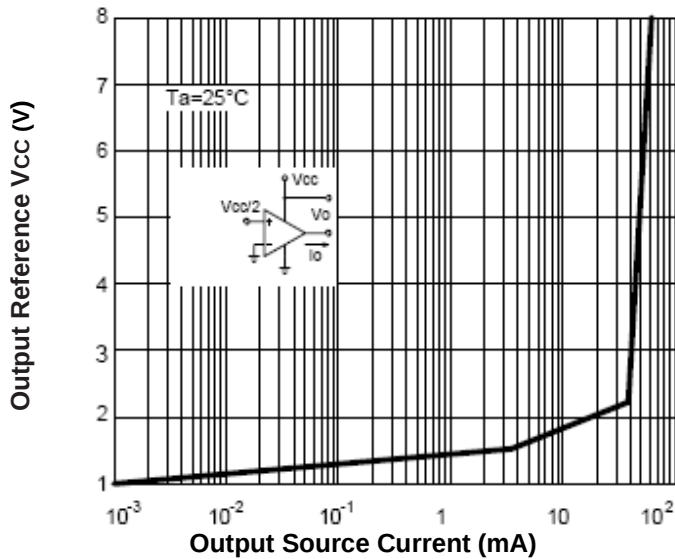


Fig.10- Output Characteristics Current Sinking

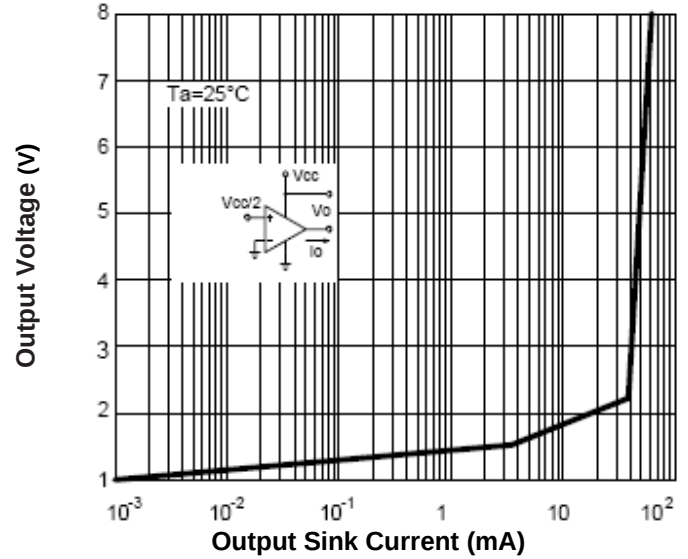
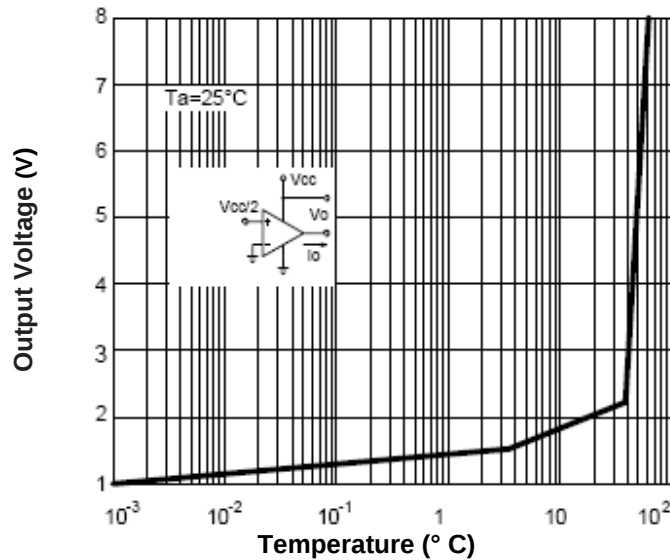


Fig.11- Current Limiting



Typical Applications

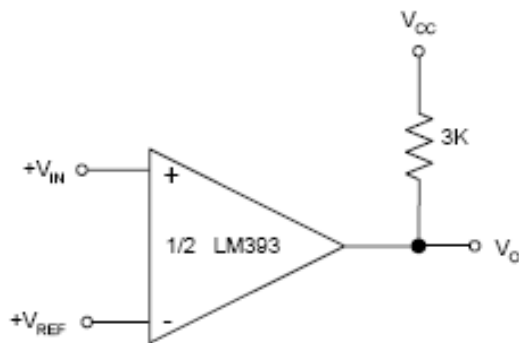


Fig.12-Basic Comparator

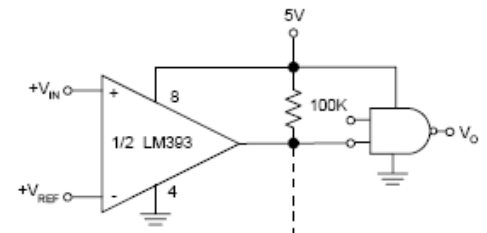


Fig.13-Driving CMOS

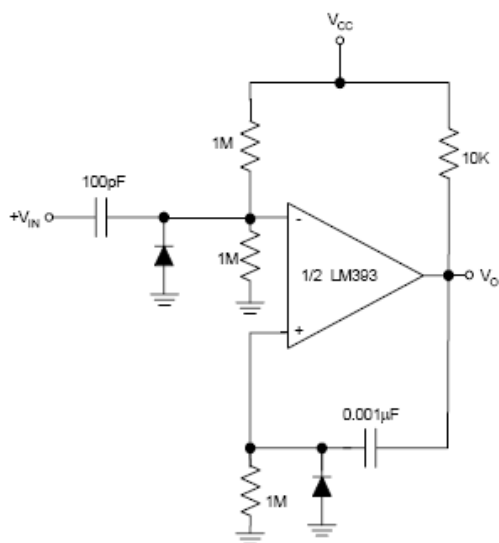


Fig.14-One Shot Multivibrator

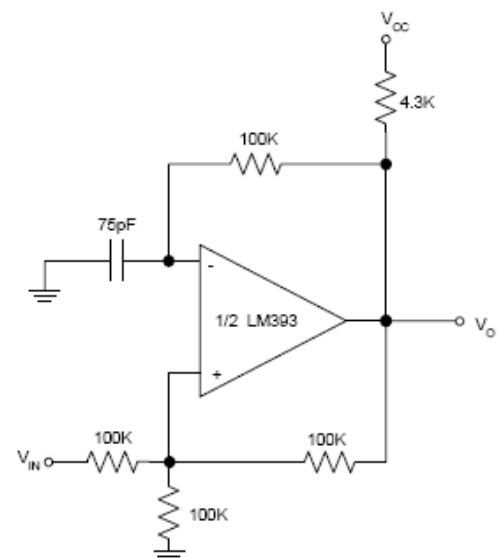
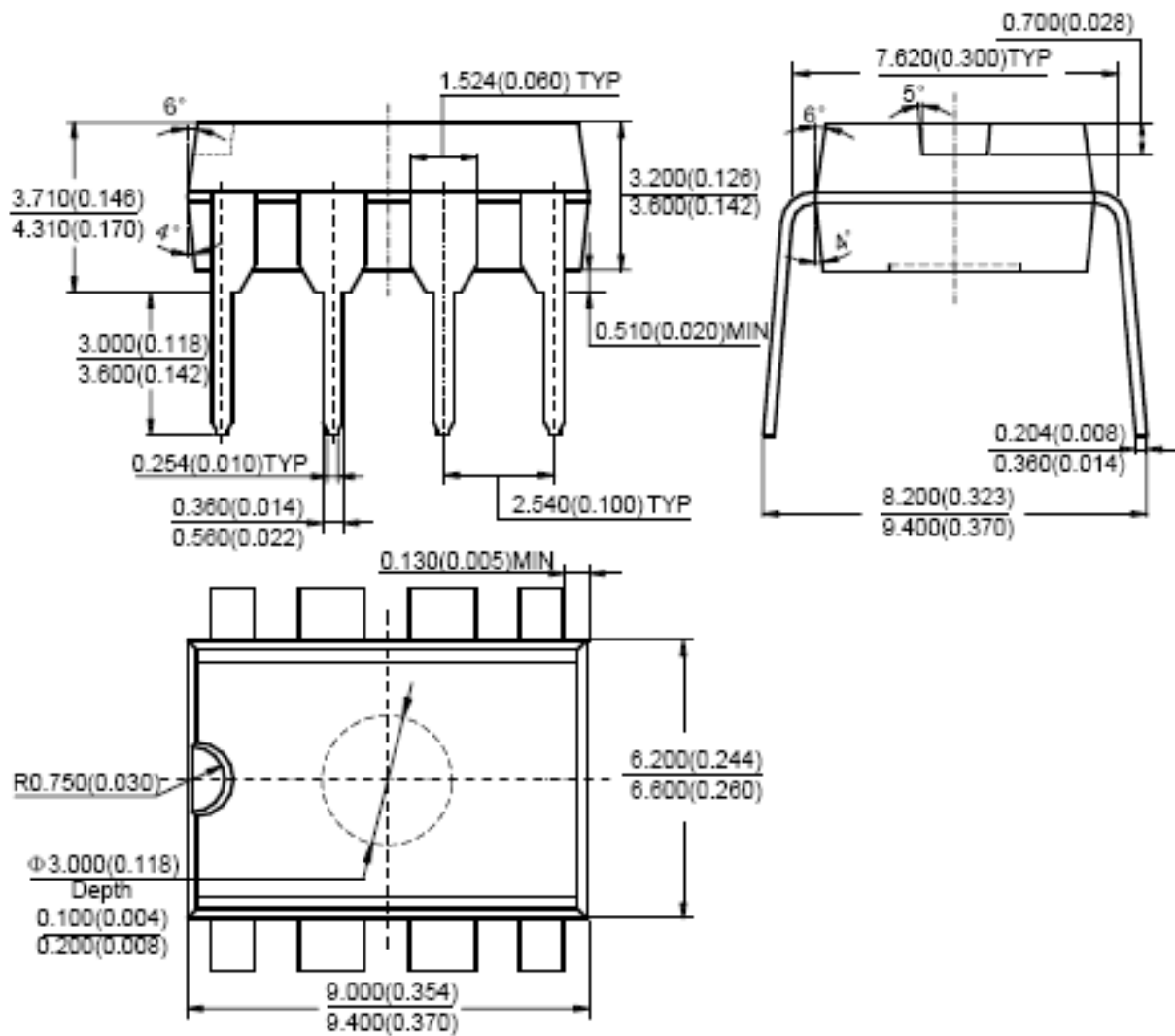
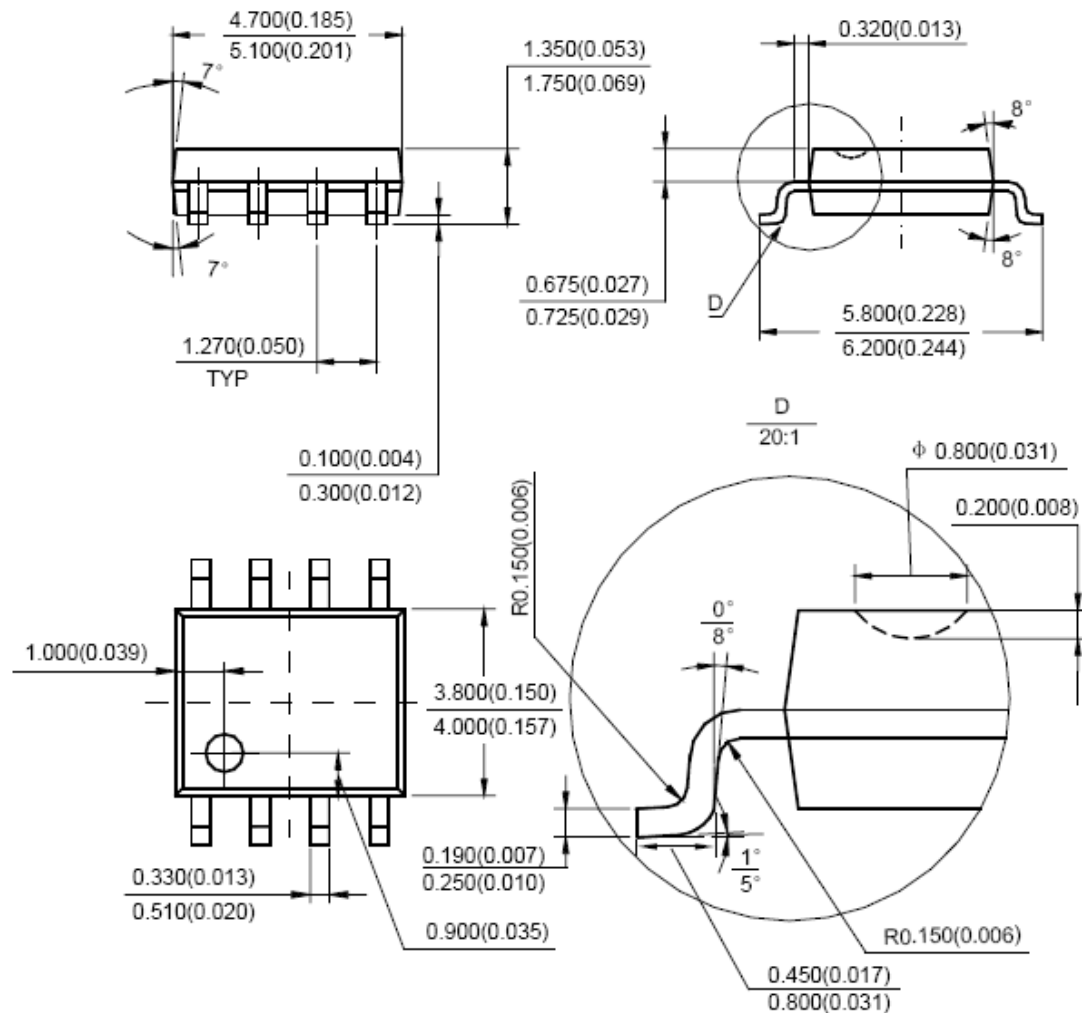


Fig.15-Squarewave Oscillator

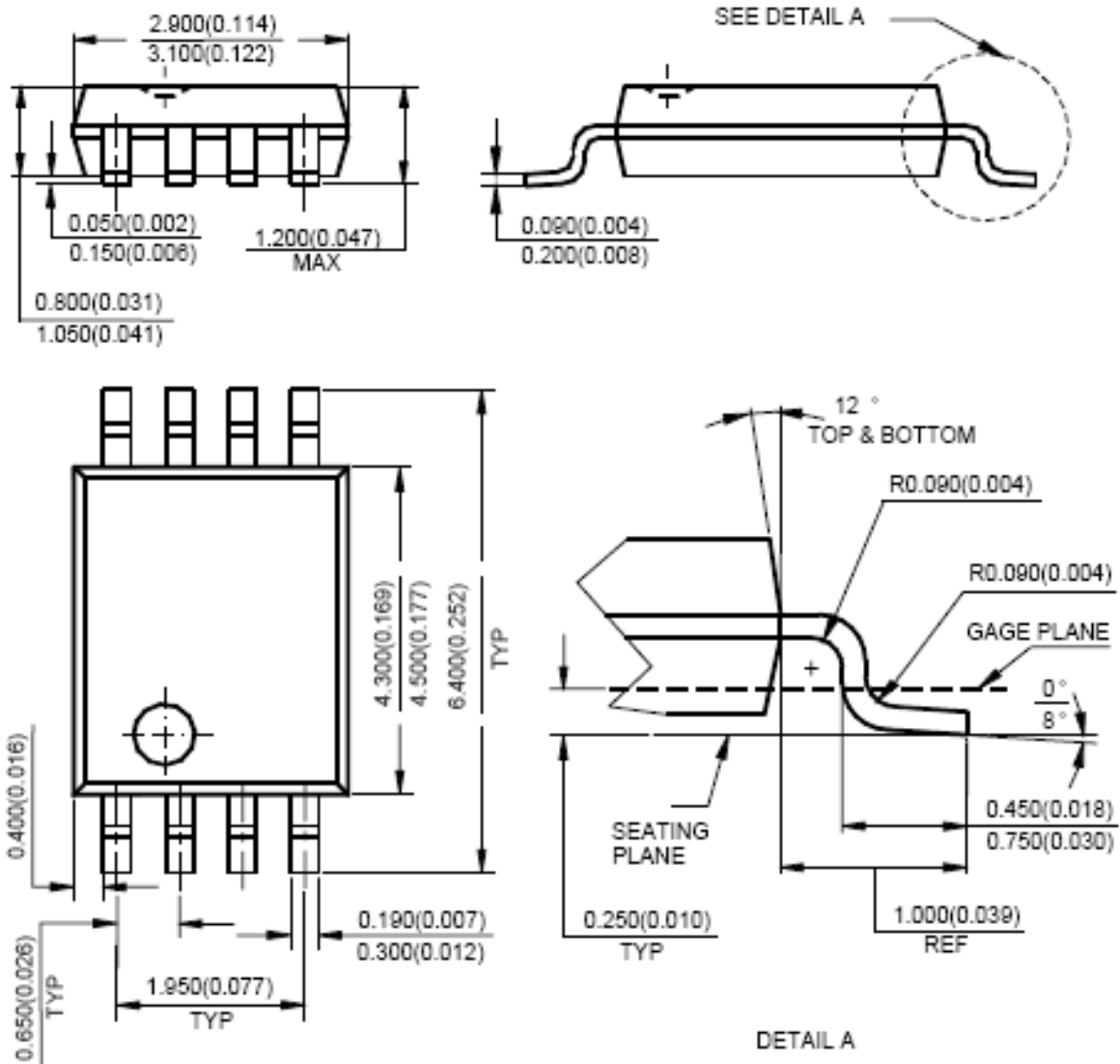
Dimensions in mm (inches)



DIP-8



SOP-8



TSSOP-8

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