



## LM339

## LINEAR INTEGRATED CIRCUIT

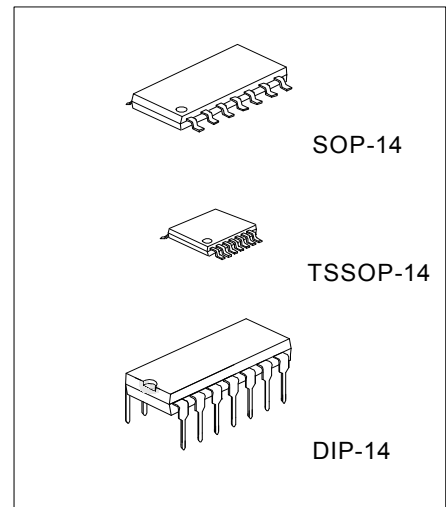
### QUAD DIFFERENTIAL COMPARATOR

#### DESCRIPTION

The UTC **LM339** consists of four independent voltage comparators, designed specifically to operate from a single power supply over a wide voltage range.

#### FEATURES

- \*Signal or dual supply operation.
- \*Wide operating supply range ( $V_{CC}=2V\sim 36V$ ).
- \*Input common-mode voltage includes ground.
- \*Low supply current drain  $I_F=0.8mA$  (Typical).
- \*Open collector outputs for wired and connection.
- \*Low input bias current  $I_{BIAS}=25nA$  (Typical).
- \*Low output saturation voltage.
- \*Output compatible with TTL, DTL, and CMOS logic system.



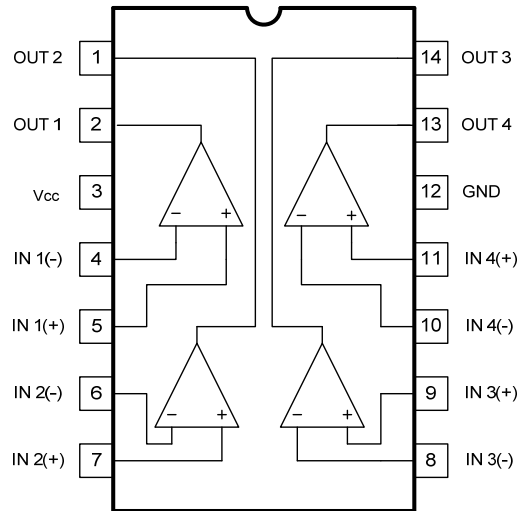
Lead-free: LM339L  
Halogen-free: LM339G

#### ORDERING INFORMATION

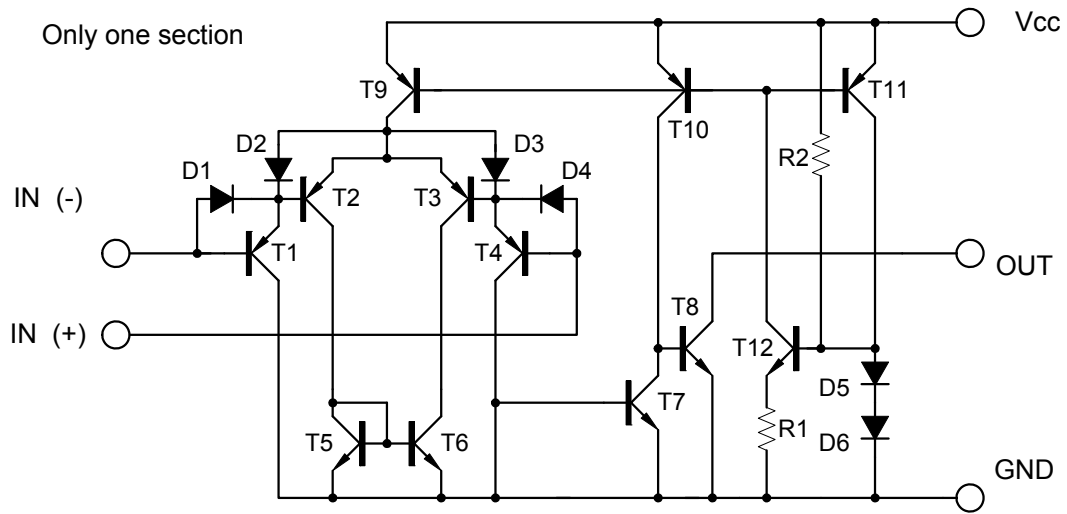
Ordering Number			Package	Packing
Normal	Lead Free Plating	Halogen-Free		
LM339-S14-R	LM339L-S14-R	LM339G-S14-R	SOP-14	Tape Reel
LM339-P14-R	LM339L-P14-R	LM339G-P14-R	TSSOP-14	Tape Reel
LM339-D14-T	LM339L-D14-T	LM339G-D14-T	DIP-14	Tube

<p>LM339L-S14-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube (2) S14: SOP-14, P14: TSSOP-14, D14: DIP-14 (3) G: Halogen Free, L: Lead Free Plating, Blank: Pb/Sn</p>
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## ■ PIN CONFIGURATION



■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	+ - 18 or 36	V
Differential input Voltage	V <sub>I(DIFF)</sub>	36	V
Input Voltage	V <sub>IN</sub>	-0.3~36	V
Power Dissipation	DIP-14	760	mW
	SOP-14	560	mW
	TSSOP-14	440	mW
Junction Temperature	T <sub>J</sub>	125	°C
Operating Temperature	T <sub>OPR</sub>	-20 ~ +85	°C
Storage Temperature	T <sub>STG</sub>	-40 ~ 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<sub>CC</sub>=5.0V, Ta=25°C, All voltage referenced to GND unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
Input Offset Voltage	V <sub>I(OFF)</sub>	V <sub>CM</sub> =0 ~ V <sub>CC</sub> -1.5 V <sub>OUT(p)</sub> =1.4V, R <sub>S</sub> =0		+1.5	+5.0	mV
Input Offset Current	I <sub>I(OFF)</sub>			+2.3	+50	nA
Input Bias Current	I <sub>BIAS</sub>			57	250	nA
Input Common-Mode Voltage Range	V <sub>IN(R)</sub>		0		V <sub>CC</sub> -1.5	V
Supply Current	I <sub>CC</sub>	R <sub>L</sub> =∞		1.1	2.0	mA
Large Signal Voltage Gain	G <sub>V</sub>	V <sub>CC</sub> =15V, R <sub>L</sub> >15kΩ	50	200		V/mV
Large Signal Response Time	t <sub>res</sub>	V <sub>IN</sub> =TTL logic wing V <sub>REF</sub> =1.4V, V <sub>RL</sub> =5V, R <sub>L</sub> =5.1kΩ		350		ns
Response Time	t <sub>res</sub>	V <sub>RL</sub> =5V, R <sub>L</sub> =5.1kΩ		1400		ns
Output Sink Current	I <sub>SINK</sub>	V <sub>IN</sub> (-)>1V, V <sub>IN</sub> (+)=0V, V <sub>OUT(p)</sub> <1.5V	6	18		mA
Output Saturation Voltage	V <sub>SAT</sub>	V <sub>IN</sub> (-)>1V, V <sub>IN</sub> (+)=0V, I <sub>SINK</sub> =4mA		140	400	mV
Output Leakage Current	I <sub>LEAK</sub>	V <sub>IN</sub> (+)=1V, V <sub>IN</sub> (-)=0 V <sub>OUT(p)</sub> = 5V V <sub>OUT</sub> (p)=30V		0.1	1.0	nA μA
Differential Input Voltage	V <sub>IN(DIFF)</sub>				36	V

## TYPICAL CHARACTERISTICS

Fig.1 Supply Current

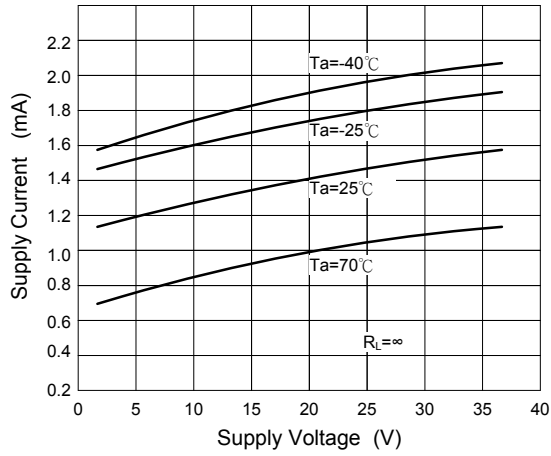


Fig.2 Input Current

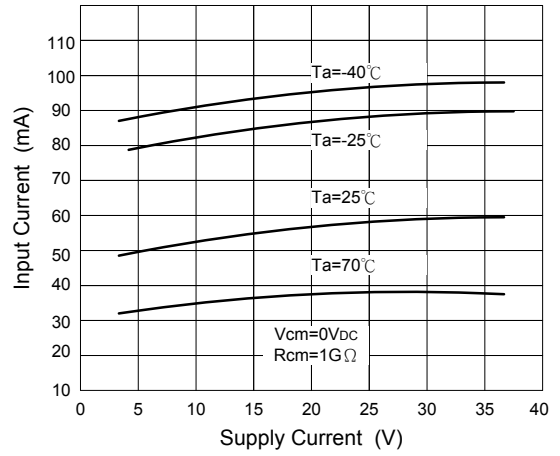


Fig.3 Output Saturation Voltage

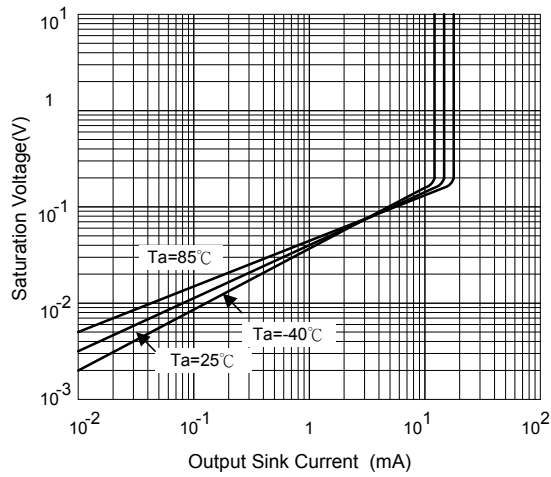


Fig.4 Reponse Time For Various Input Overdrive Negative Transition

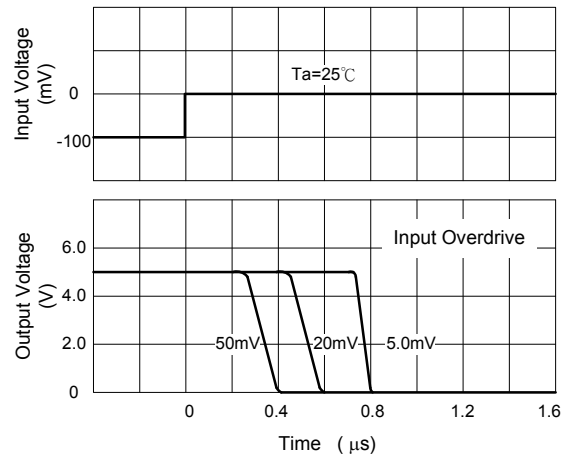
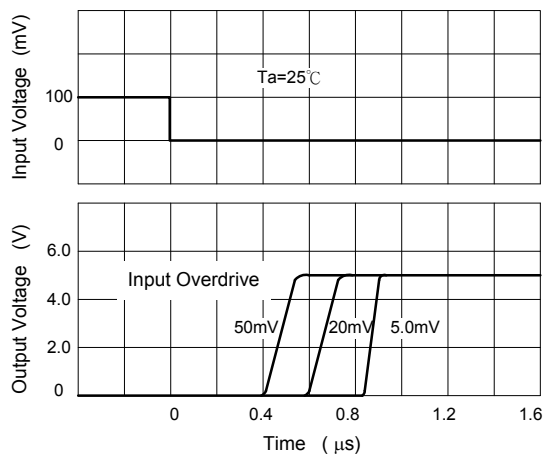


Fig.5 Reponse Time For Various Input Overdrive Positive Transition



## ■ TYPICAL CHARACTERISTICS(cont.)

Fig.6

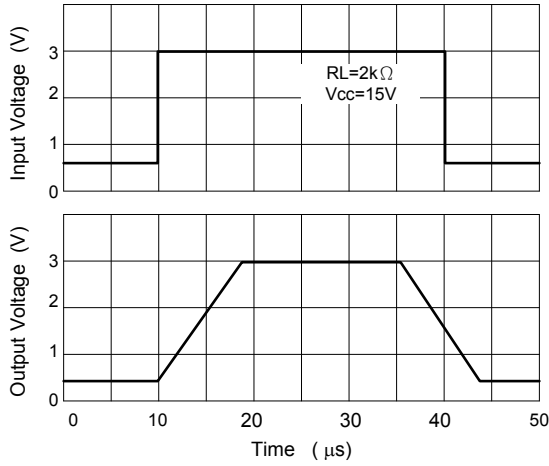


Fig.7 Voltage Follower Pulse Response (Small Signal)

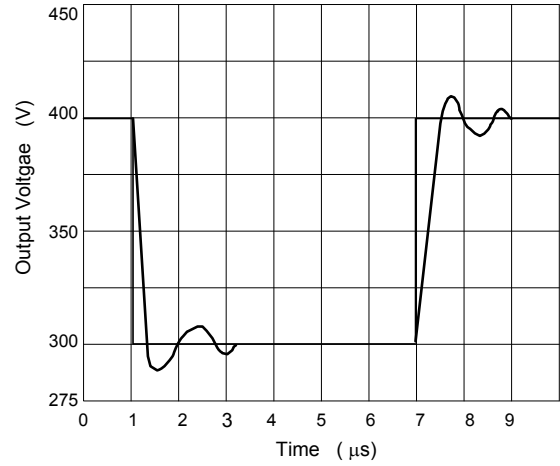


Fig.8 Large Signal Frequency Response

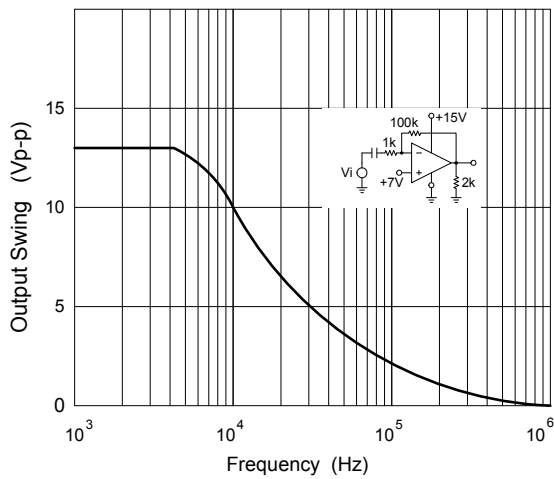


Fig.9 Output Characteristics Current Sourcing

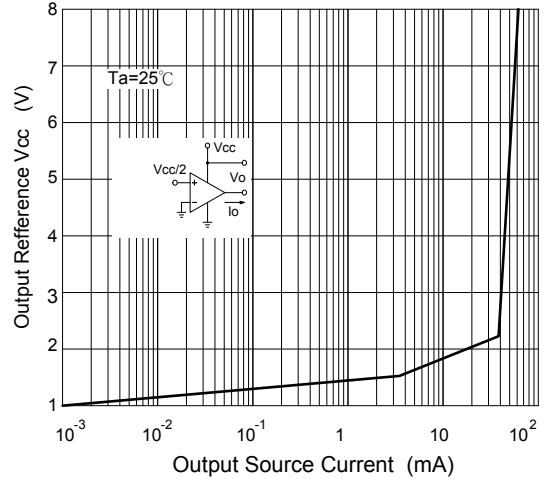


Fig.10 Output Characteristics Current Sinking

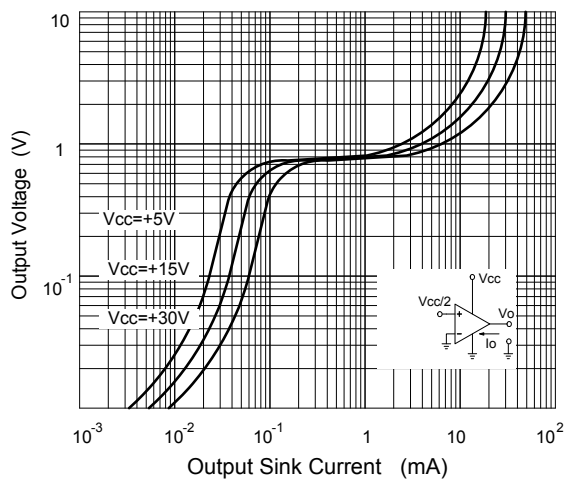
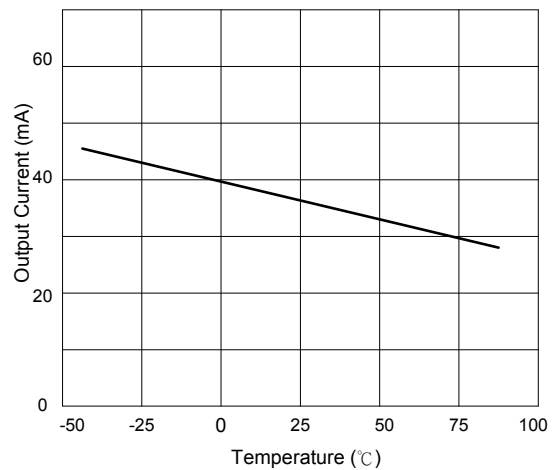


Fig.11 Current Limiting



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