TPV339LS14

General-Purpose Low-Voltage Open-Drain Output Comparator

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Features

- Guaranteed 1.8V and 5.5V performance
- Low Supply Current
- Low supply current 50μA/comparator Typ
- Open-Drain Output for Maximum Flexibility
- RoHS and Halogen free compliance
- package: SOP14

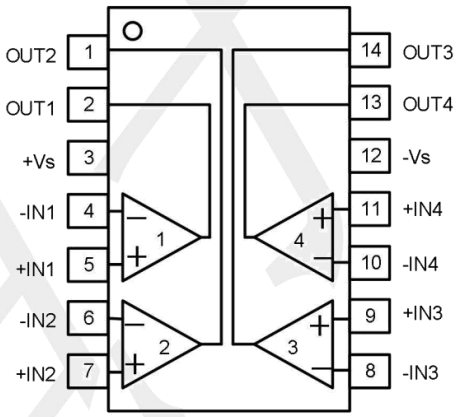
Applications

- Alarm and Monitoring Circuits
- Hysteresis Comparators
- Oscillators
- Window Comparators
- Industrial Equipment
- Test and Measurement

General Description

The most cost-effective solutions for applications where low voltage operation, low power and space saving are the primary specifications in circuit design for portable consumer products.

Pinout (top view)



SOP14

Pin Configurations

Pin Number	Pin Name	Pin Function
1	OUT2	Channel 2 Output
2	OUT1	Channel 1 Output
3	+VS	Chip Supply Voltage(Positive)
4	- IN1	Channel 1 Inverting Input
5	+IN1	Channel 1 Non-inverting Input
6	- IN2	Channel 2 Inverting Input
7	+IN2	Channel 2 Non-inverting Input
8	- IN3	Channel 3 Inverting Input
9	+IN3	Channel 3 Non-inverting Input
10	- IN4	Channel 4 Inverting Input
11	+IN4	Channel 4 Non-inverting Input
12	-VS	Chip Supply Voltage(Negative)/GND
13	OUT4	Channel 4 Output
14	OUT3	Channel 3 Output

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Absolute Maximum Ratings

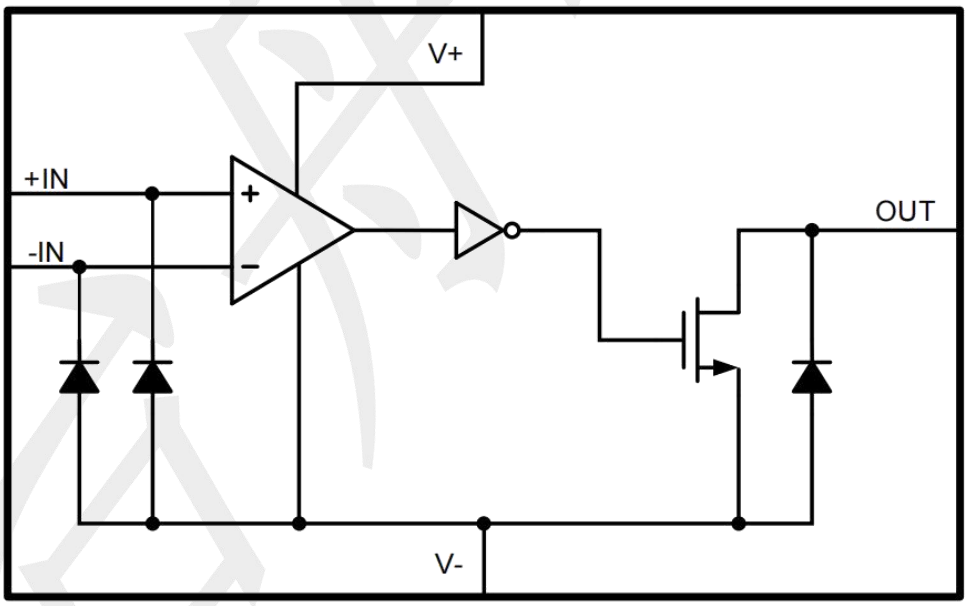
		MIN	MAX	UNIT
VID	Supply, V_S=(V+) - (V-)	--	7	**V**
	Input pin (IN+, IN-) (2)	(V-) - 0.3	(V+) + 0.3	**V**
	Signal output pin (3)	(V-) - 0.3	(V+) + 0.3	**V**
	Signal Input pin (IN+, IN-) (2)	-10	10	**mA**
	Signal output pin (3)	-55	55	**mA**
	Operating Range	-55	+125	℃
	Storage	-65	+150	℃
	Junction	--	+150	℃
HBM	ESD Susceptibility	±2000		**V**
MM		±1000		**V**

(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

(2) Output terminals are diode-clamped to the power-supply rails. Output signals that can swing more than 0.5V beyond the supply rails should be current-limited to ±55mA or less.

(3) Short-circuit from output to V_{CC} can cause excessive heating and eventual destruction.

BLOCK DIAGRAM



Functional Block Diagram

Electrical Characteristics (VS = 5.0V)

(At T_A = 25°C, V_{CM} = V_S/2, unless otherwise noted.)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
POWER SUPPLY						
Operating Voltage Range	VCC		1.8	--	5.5	**V**
Quiescent Current/per channel	IQ	(Output High)	--	29	--	**uA**
		(Output Low)	--	50	--	**uA**
Power Supply Rejection Ratio	PSRR	VS = 1.8V to 5.5V, VCM = VS/2	--	70	--	**dB**
INPUT						
Input Offset Voltage	V_{OS}		-4	±0.8	4	**mV**
Input Offset Voltage Tempco	$\Delta V_{OS}/\Delta T$		--	0.8	--	**μV/°C**
Input Bias Current	I_B		--	2	--	**PA**
Input Offset Current	I_{OS}		--	1	--	**PA**
Common-Mode Voltage Range	V_{CM}	VS = 5.5V	(V-)-0.1	--	4.5	**V**
OUTPUT						
Saturation Voltage	SV	I_O≤4mA	--	70	--	**dB**
Output Pull-up Voltage Range			--	--	5.6	**V**
Output Current(sinking)		V_O≤1.5V	--	50	--	**mA**
SWITCHING						
Propagation Delay (High to Low)	TdHL	RPU=5.1KΩ,Overdrive =10mV	--	460	--	**ns**
		RPU=5.1KΩ,Overdrive =100mV	--	400	--	**ns**
Propagation Delay (Low to High)	TdLH	RPU=5.1KΩ,Overdrive =10mV	--	950	--	**ns**
		RPU=5.1KΩ,Overdrive =100mV	--	850	--	**ns**
Fall Time	Tf	RPU=5.1KΩ, Overdrive =100mV	--	36	--	**ns**

Notes:

1. Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration. The typical values are not tested and are not guaranteed on shipped production material.
2. All limits are guaranteed by testing or statistical analysis.

APPLICATION and IMPLEMENTATION

Application Information

will typically be used to compare a single signal to a reference or two signals against each other. Many users take advantage of the open drain output (logic high with pull-up) to drive the comparison logic output to a logic voltage level to an MCU or logic device.

Typical Application

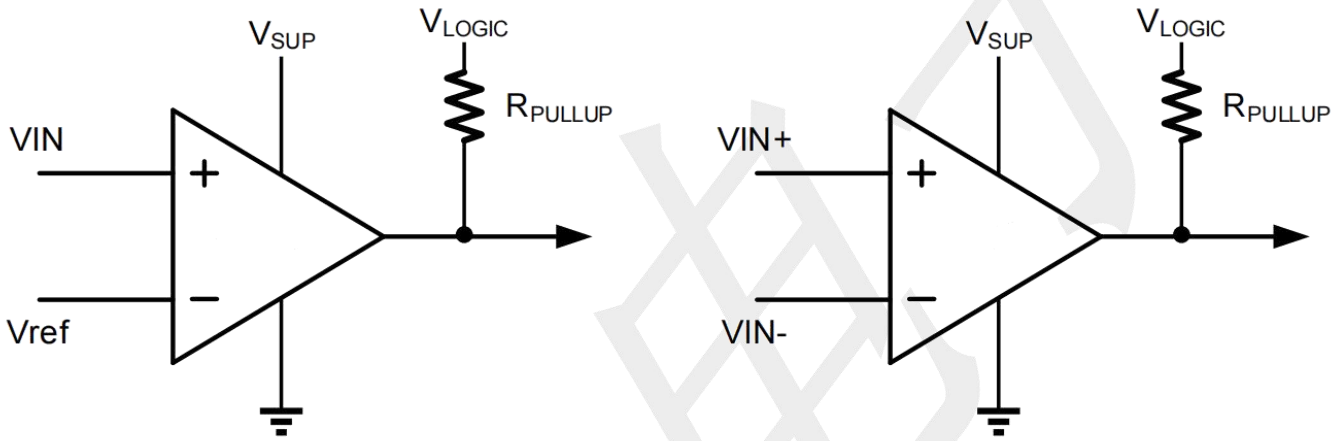


Figure 10. Typical Application Schematic

Power Supply Recommendations

For fast response and comparison applications with noisy or AC inputs, it is recommended to use a bypass capacitor on the supply pin to reject any variation on the supply voltage. This variation causes temporary fluctuations in the comparator's input common mode range and create an inaccurate comparison.

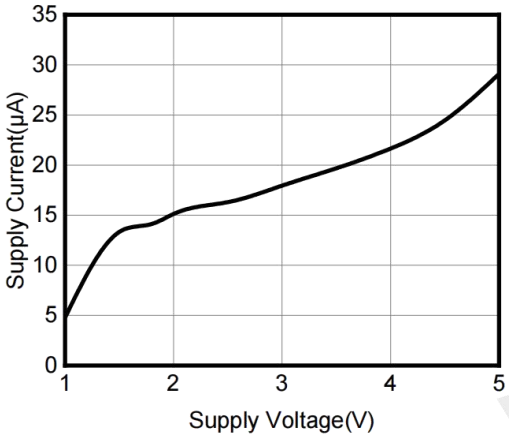
Layout

Layout Guidelines

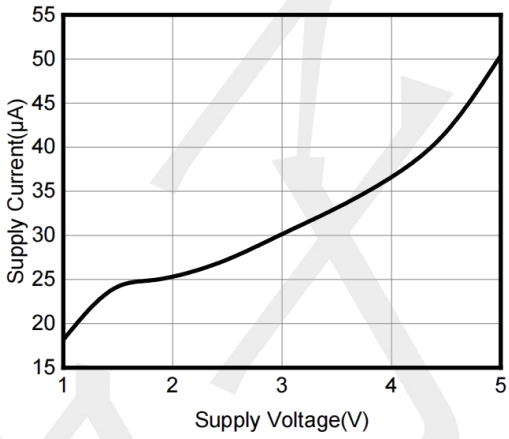
For accurate comparator applications without hysteresis it is important maintain a stable power supply with minimized noise and glitches, which can affect the high-level input common mode voltage range. In order to achieve this, it is best to add a bypass capacitor between the supply voltage and ground. This should be implemented on the positive power supply and negative supply (if available). If a negative supply is not being used, do not put a capacitor between the IC's GND pin and system ground.

Typical Performance Characteristics

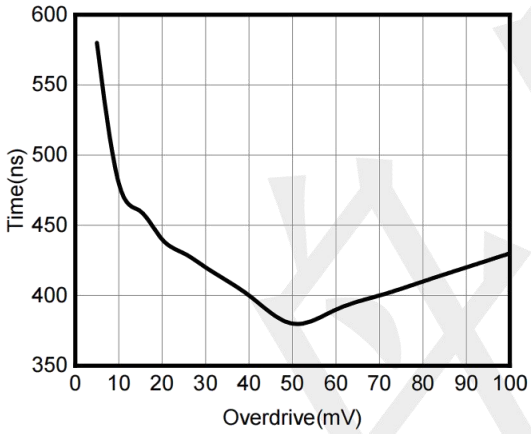
（At TA = 25°C, VS = +5V, VCM = VS/2, unless otherwise noted.）



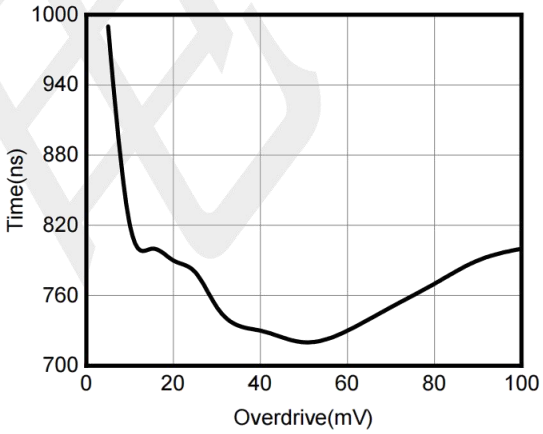
Supply Current vs Supply Voltage
Output High



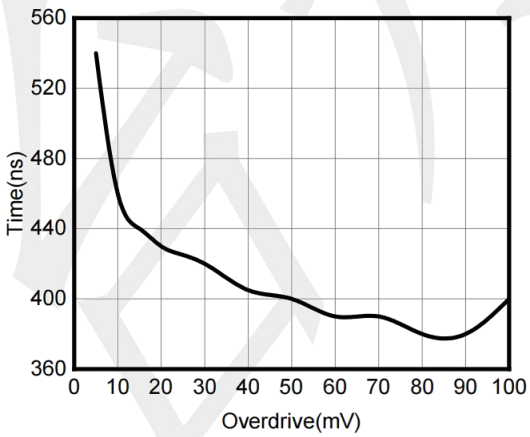
Supply Current vs Supply Voltage
Output Low



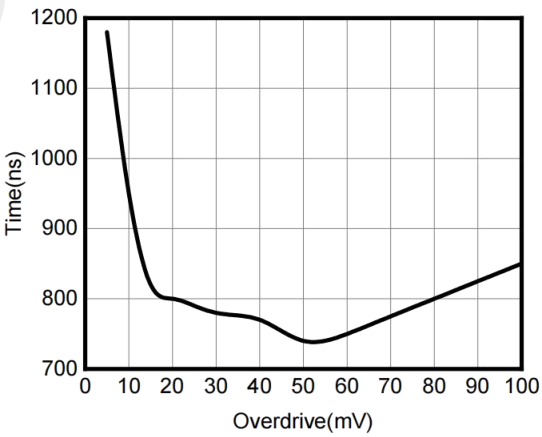
Response Time vs Input Overdrives
Negative Transition(V_{CC}=1.8V)



Response Time vs Input Overdrives
Positive Transition(V_{CC}=1.8V)



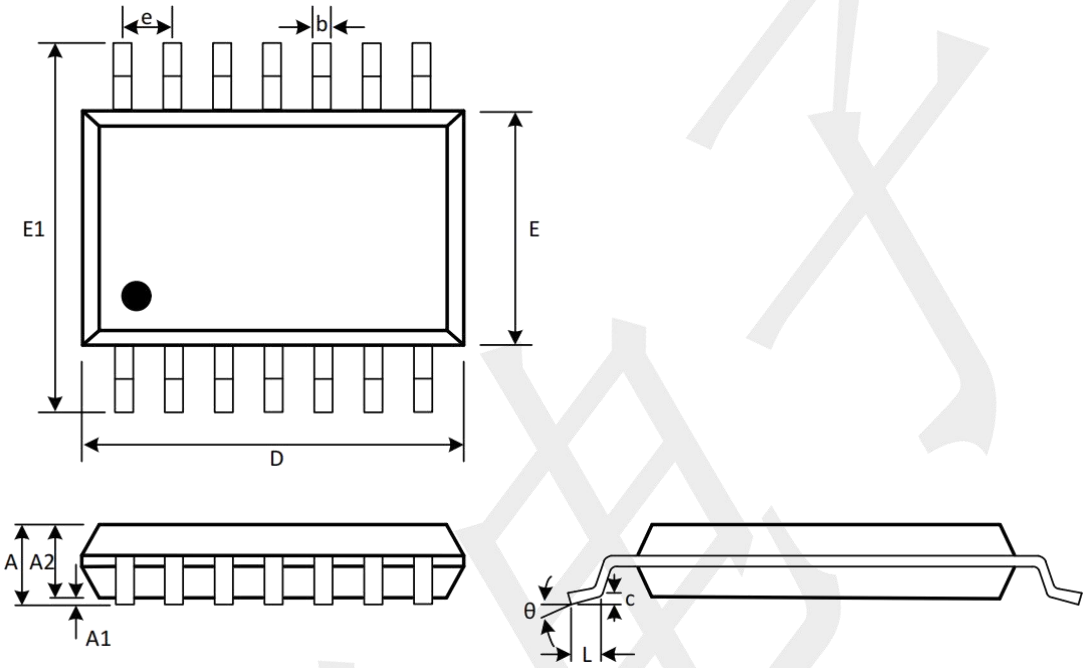
Response Time vs Input Overdrives
Negative Transition(V_{CC}=5V)



Response Time vs Input Overdrives
Positive Transition(V_{CC}=5V)

Package informantion (mm)

SOP14



Symbol	Min	Max
A	1.350	1.750
A1	0.100	0.250
A2	1.350	1.550
b	0.310	0.510
c	0.100	0.250
D	8.450	8.850
e	1.270(BSC)	
E1	5.800	6.200
E	3.800	4.000
L	0.400	1.270
θ	0°	8°