

Features

- Guaranteed 1.8V and 5.5V performance
- Low Supply Current
- Low supply current 50 μ A/comparator Typ
- Open-Drain Output for Maximum Flexibility
- RoHS and Halogen free compliance
- package: ST353

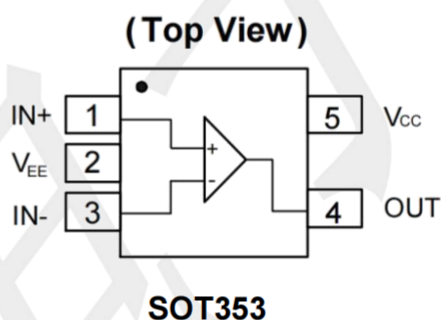
Applications

- 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.

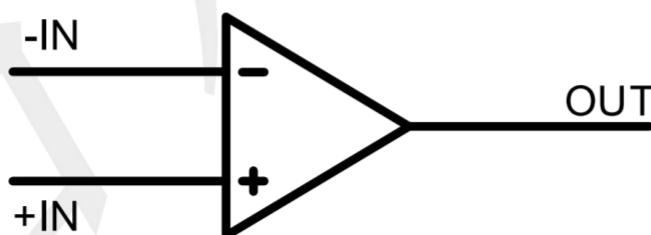
Pinout (top view)



Pin Configurations

| Pin Number | Pin Name | Pin Function |
|------------|----------|-----------------------------------|
| 1 | IN+ | Channel Non-inverting Input |
| 2 | VEE | Chip Supply Voltage(Negative)/GND |
| 3 | IN- | Channel Inverting Input |
| 4 | OUT | Channel Output |
| 5 | VCC | Chip Supply Voltage(Positive) |

SIMPLIFIED SCHEMATIC



Simplified Schematic

Absolute Maximum Ratings

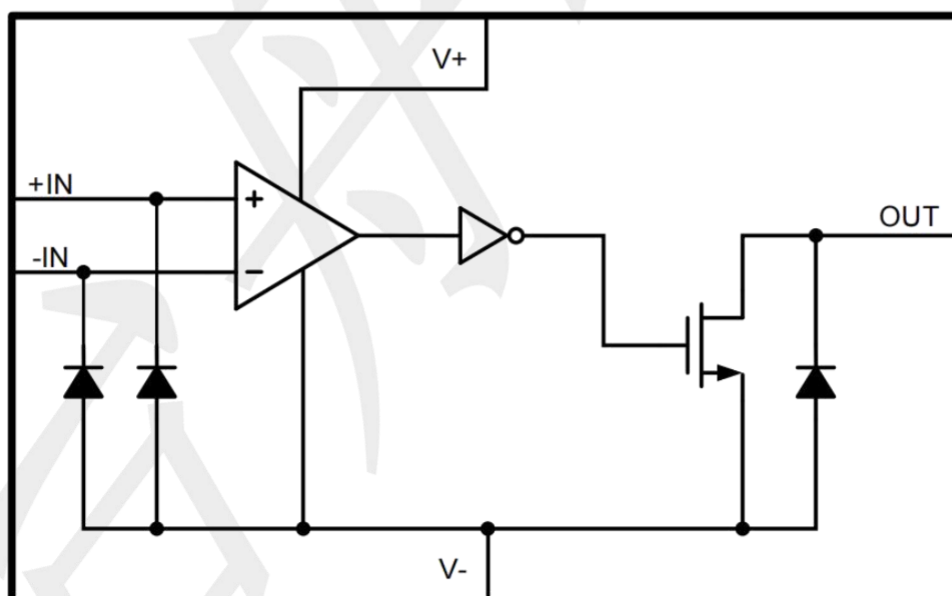
| | | MIN | MAX | UNIT |
|-----|--|--------------|--------------|------|
| VID | Supply, $V_s = (V+) - (V-)$ | -- | 7 | V |
| | Input pin (IN+, IN-) ⁽²⁾ | $(V-) - 0.3$ | $(V+) + 0.3$ | V |
| | Signal output pin ⁽³⁾ | $(V-) - 0.3$ | $(V+) + 0.3$ | V |
| | Signal Input pin (IN+, IN-) ⁽²⁾ | -10 | 10 | mA |
| | Signal output pin ⁽³⁾ | -55 | 55 | mA |
| | Operating Range | -55 | +125 | °C |
| | Storage | -65 | +150 | °C |
| | Junction | -- | +150 | °C |
| 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 $\pm 55\text{mA}$ 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 $T_A = 25^\circ\text{C}$, $V_{CM} = V_S/2$, 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 | Vos | | -4 | ±0.8 | 4 | mV |
| Input Offset Voltage Tempco | $\Delta V_{os}/\Delta T$ | | -- | 0.8 | -- | μV/°C |
| Input Bias Current | IB | | -- | 2 | -- | PA |
| Input Offset Current | Ios | | -- | 1 | -- | PA |
| Common-Mode Voltage Range | VCM | VS = 5.5V | (V-)-0.1 | -- | 4.5 | V |
| OUTPUT | | | | | | |
| Saturation Voltage | SV | Io≤4mA | -- | 70 | -- | mV |
| Output Pull-up Voltage Range | | | -- | -- | 5.6 | V |
| Output Current(sinking) | | Vo≤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:

- 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.
- 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

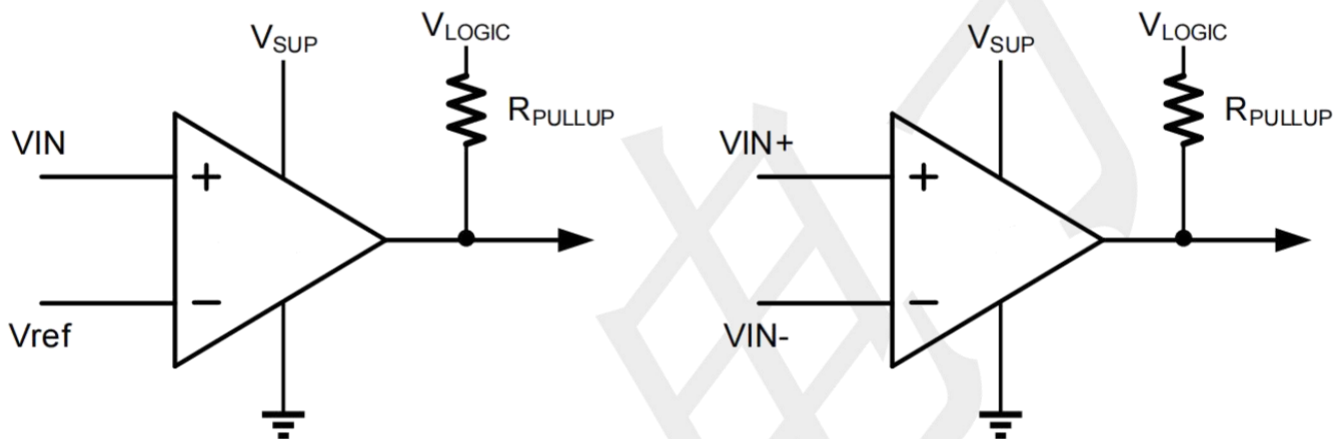


Figure 10. Typical Application Schematic

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.

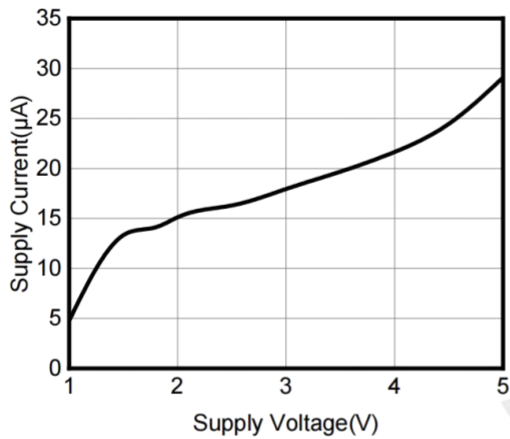
Layout

Layout Guidelines

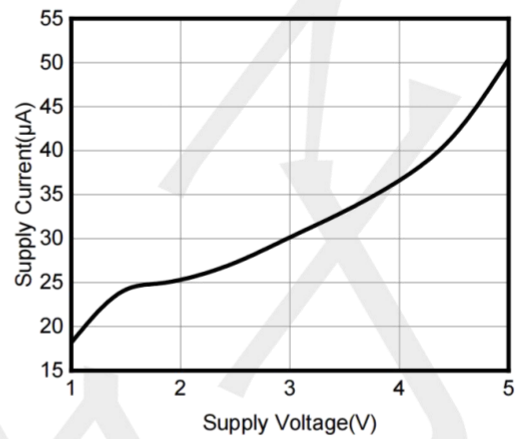
For accurate comparator applications without hysteresis it is important maintain a stable power supply with minimized noise and glitches, which can affect the high-level input common mode voltage range. In order to achieve this, it is best to add a bypass capacitor between the supply voltage and ground. 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

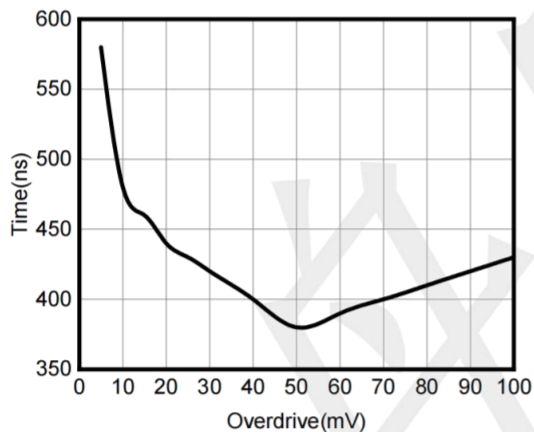
(At $T_A = 25^\circ\text{C}$, $V_S = +5\text{V}$, $V_{CM} = V_S/2$, unless otherwise noted.)



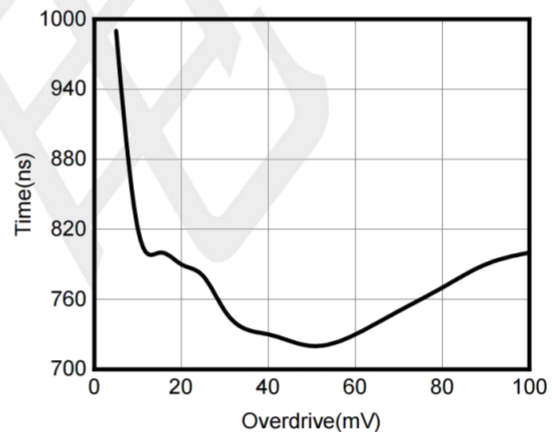
Supply Current vs Supply Voltage
Output High



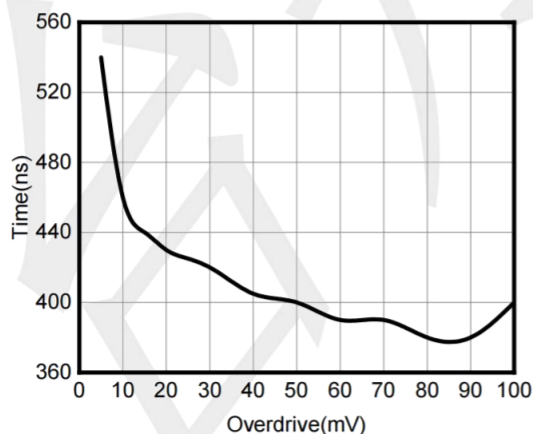
Supply Current vs Supply Voltage
Output Low



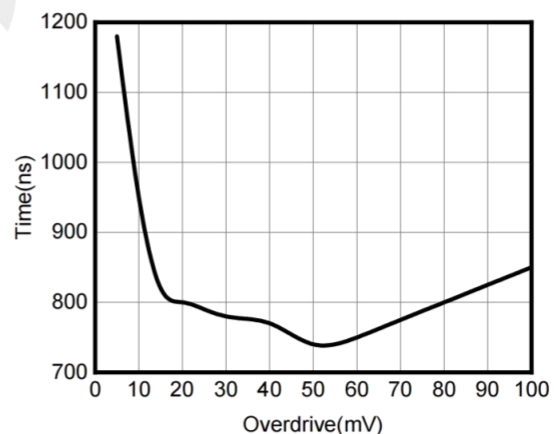
Response Time vs Input Overdrives
Negative Transition ($V_{CC}=1.8\text{V}$)



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



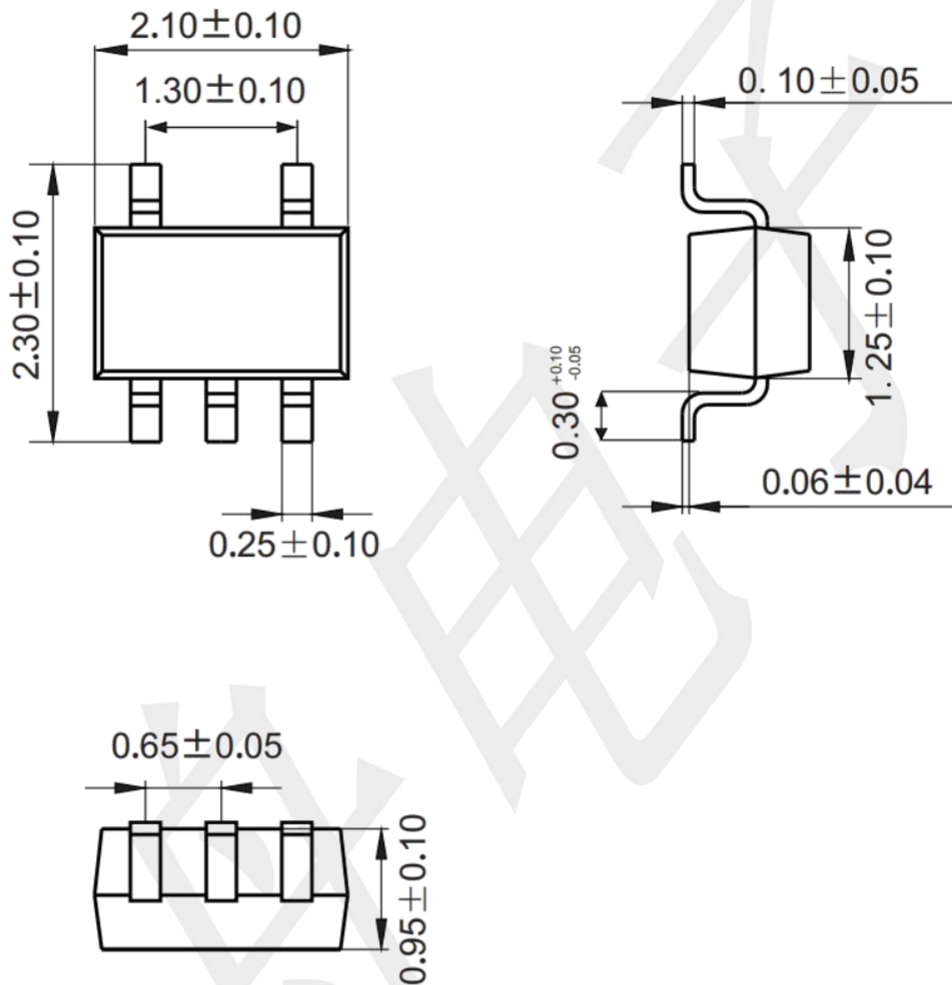
Response Time vs Input Overdrives
Negative Transition ($V_{CC}=5\text{V}$)



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

Package information (Unit: mm)

SOT353 (Unit: mm)



Mounting Pad Layout (Unit: mm)

