Single Comparator with 400mV Reference and Dual Polarity Outputs

Preliminary Technical Data

ADCMP361

FEATURES

Low Quiescent Current: 6.5µA Typ
Supply Range: 1.7V to 5.5V
400mV Reference ±0.8% Accuracy Over Temperature
Input Range Includes Ground
Internal Hysteresis: 6.5mV Typ
Low Input Bias Current: ±10nA Max
40mA Typical Output Sink Current
Supports Wired-AND Connections
Both inverting and noninverting outputs
Small SOT-23 Package

APPLICATIONS

Battery-Powered System Monitoring
Threshold Detectors
Relay Driving
Optoisolator Driving
Industrial Control Systems
Handheld Instruments

GENERAL DESCRIPTION

The ADCMP361 is a single low power, low voltage comparator with a 400mV reference in the 5-lead SOT-23 package. Operating within a supply range of 1.7V to 5.5V, the device only draw 6.5µA typical, making it ideal for low voltage system monitoring and portable applications. Hysteresis is included in the comparators to insure stable output operation. The comparator has only one input available externally, the other input is connected internally to the reference. The comparator has both an inverting and a noninverting output. The output stage sinking capability guaranteed greater than 5mA over temperature.

Available in commercial, industrial and automotive temperature ranges.

FUNCTIONAL BLOCK DIAGRAM

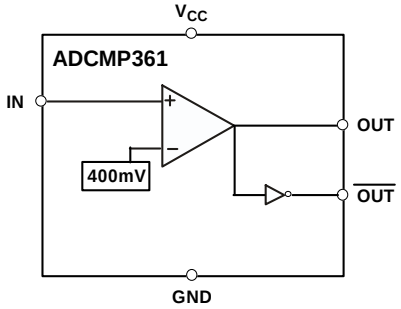


Figure 1.

Rev. PrB
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REVISION HISTORY

SPECIFICATIONS

Table 1.

V_{CC} = 1.7V to 5.5V, -40°C ≤ T_A ≤ 125°C , unless otherwise noted.

Parameter	Min	Typ	Max	Unit	Test Conditions/Comments
Reference Voltage	396.8	400	403.2	mV	Vs = 1.7V, Note1
	396.8	400	403.2	mV	Vs = 5V, Note1
Reference Voltage Accuracy		±0.8	±1.0	%	Vs = 1.7V, Note1
		±0.8	±1.0	%	Vs = 5V, Note1
Input Bias Current		0.01	10	nA	Vs = 1.7V, Vin = Vs
		4	10	nA	Vs = 1.7V, Vin = 0.1V
Output Low Voltage		60	200	mV	Vs = 1.7V, Iout = 3mA, Note2
		70	200	mV	Vs = 5V, Iout = 5mA, Note2
Output Leakage Current		0.01	1	µA	Vs=1.7V, Vout = Vs, Note3
		0.01	1	µA	Vs=1.7V, Vout = 5.5V, Note3
High-to-Low Propagation Delay		29		µs	Vs = 5V, Vol = 400mV, Note2,4
Low-to-High Propagation Delay		18		µs	Vs = 5V, Voh = 0.9 X Vs, Note2,4
Output Rise time		2.2		µs	Vs = 5V, Vo = (0.1 to 0.9) X Vs, Note2,4
Output Fall time		0.22		µs	Vs = 5V, Vo = (0.1 to 0.9) X Vs, Note2,4
Supply Current		6.5	10	µA	Vs = 1.7V
		6.5	10	µA	Vs = 5.5V

Note1: R_L=100K, V_O=2V Swing
Note2: 10mV input overdrive
Note3: Vin = 40mV overdrive
Note4: R_L=10K
Note5: No load

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise noted.

Table 5.

Parameter	Rating
V_S	−0.3V to +6V
INx	−0.3V to +6V
OUTx	−0.3V to +6V
Operating Temperature Range	−40°C to +125°C
Storage Temperature Range	−65°C to +150°C
θ_{JA} Thermal Impedance, SC70	146°C/W
Lead Temperature	
Soldering (10 sec)	300°C
Vapor Phase (60 sec)	215°C
Infrared (15 sec)	220°C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



PIN CONFIGURATION AND FUNCTION DESCRIPTIONS

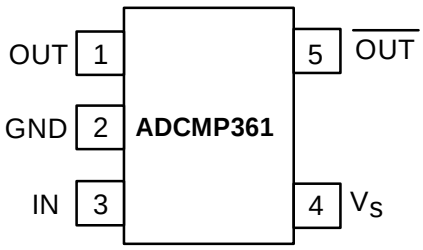


Figure 2. Pin Configuration

Table 6. Pin Function Descriptions

Pin No.	Mnemonic	Description
1	OUT	Noninverting Open Drain Output. Capable of sinking up to 40mA of current.
2	GND	Ground.
3	IN	Monitors Analog Input Voltage on comparator. The other input of the comparator is connected to a 400mV reference.
4	Vs	Power Supply. Operates from 1.7V to 5.5V.
5	OUTB	Inverting Open Drain Output. Capable of sinking up to 40mA of current.

TYPICAL PERFORMANCE CHARACTERISTICS

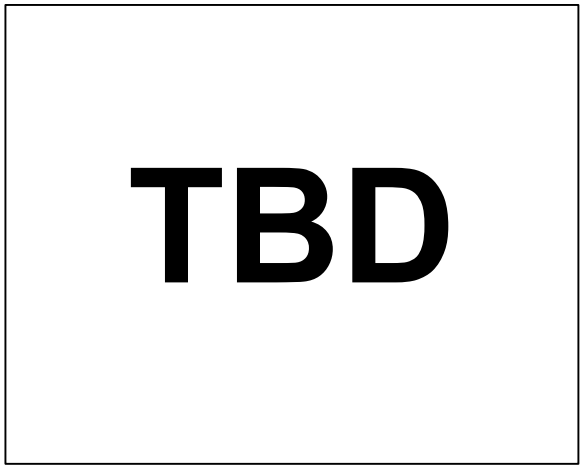


Figure 3. Distribution of Rising Input Threshold Voltage

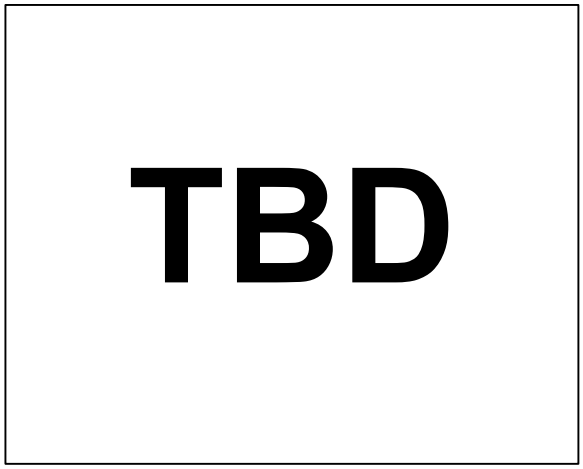


Figure 6. Distribution of Falling Input Threshold Voltage

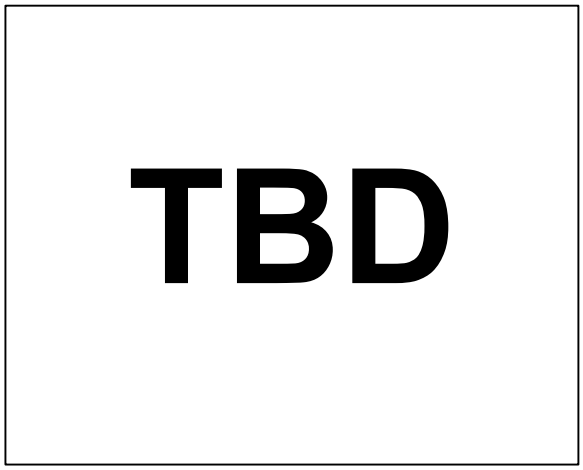


Figure 4. Distribution of Hysteresis

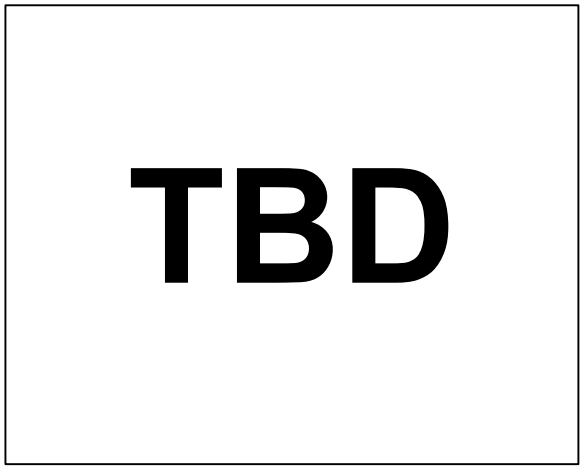


Figure 7. Rising Input Threshold Voltage vs Temperature

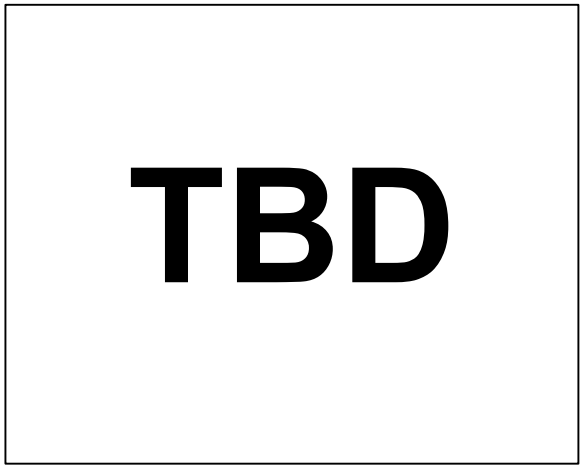


Figure 5.Rising Input Threshold Voltage vs Temperature

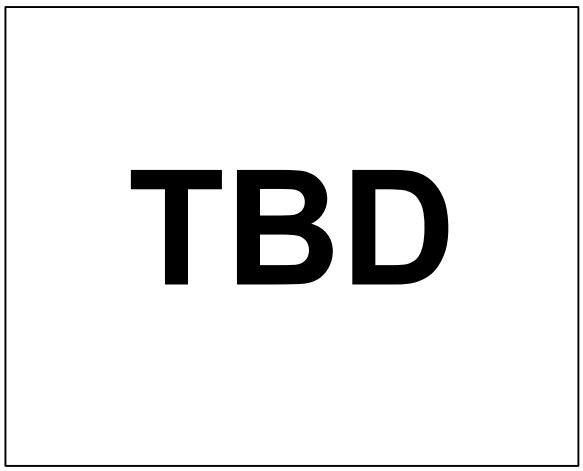


Figure 8.Rising Input Threshold Voltage vs Supply Voltage

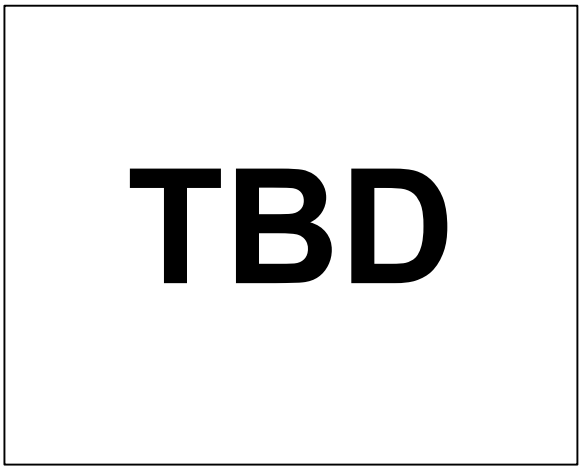


Figure 9. Hysteresis vs Temperature

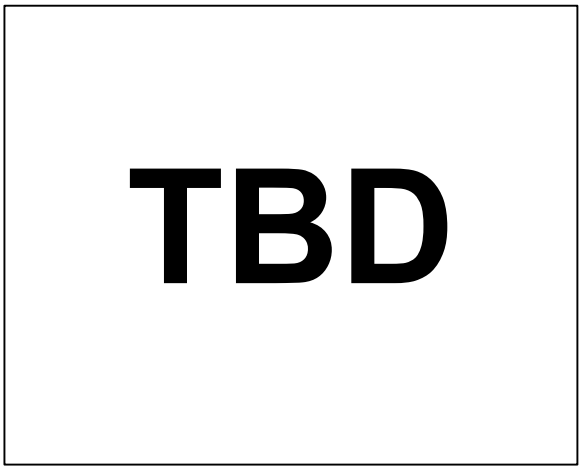


Figure 12. Hysteresis vs Temperature

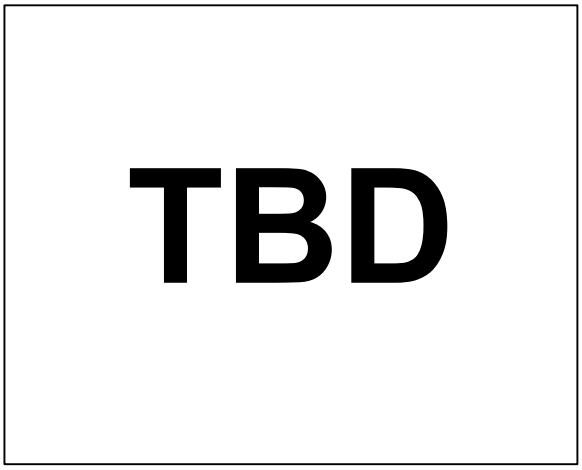


Figure 10. Hysteresis vs Supply Voltage

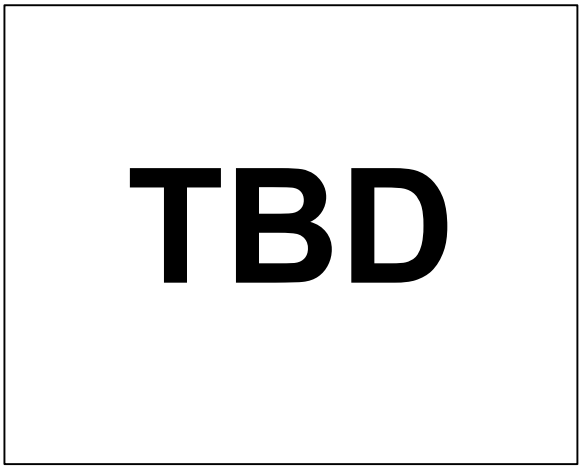


Figure 13. Minimum Supply Voltage

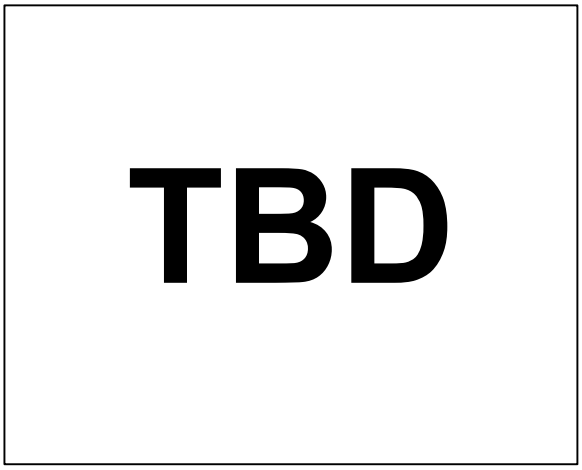


Figure 11. Quiescent Supply Current vs Supply Voltage

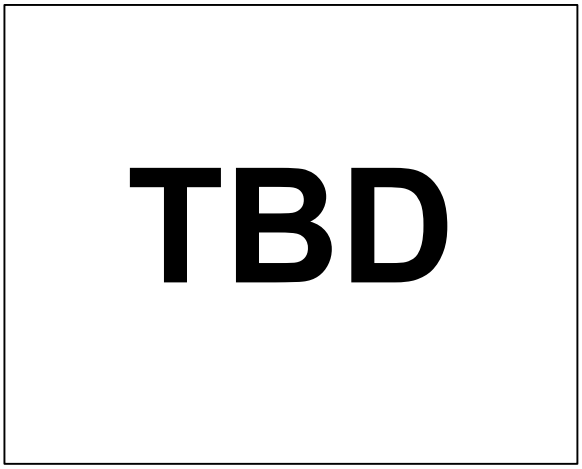


Figure 14. Startup Supply Current

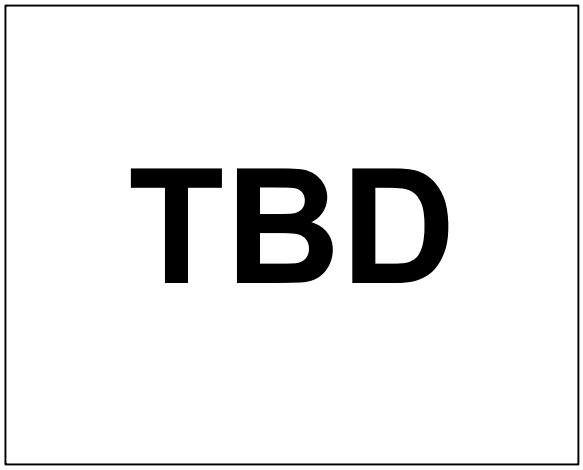


Figure 15. Supply Current vs Output Sink Current

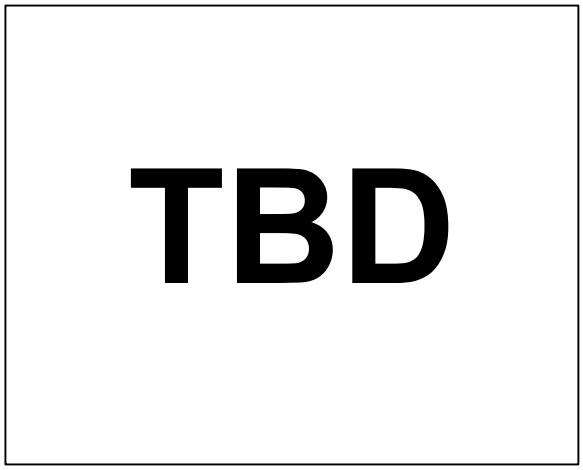


Figure 18. Below Ground Input Bias Current

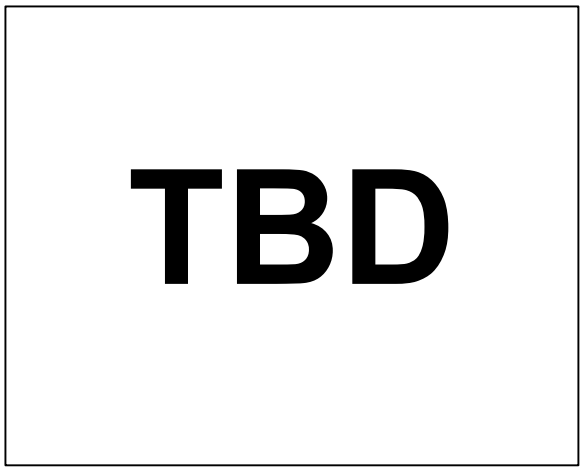


Figure 16 Supply Current vs Output Sink Current

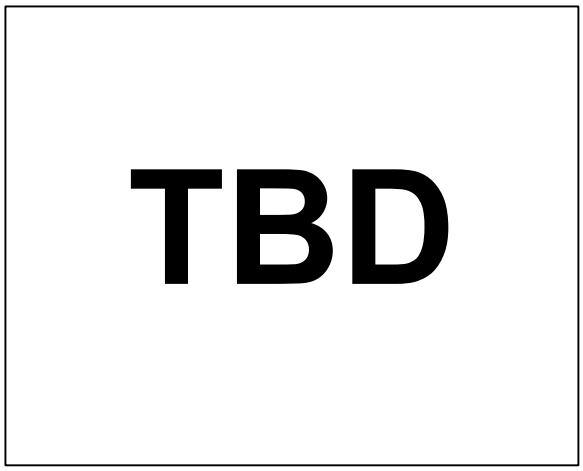


Figure 19. Low Level Input Bias Current

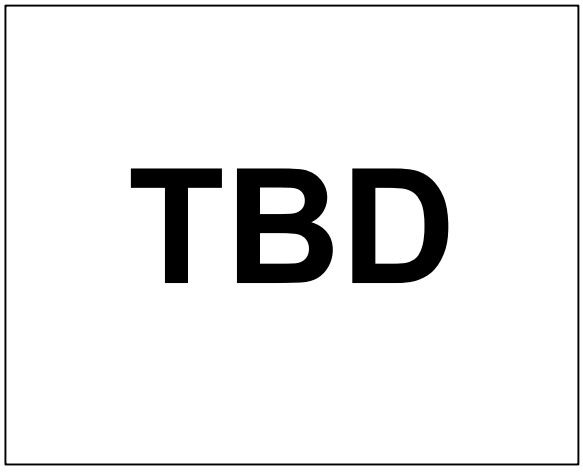


Figure 17. Supply Current vs Output Sink Current

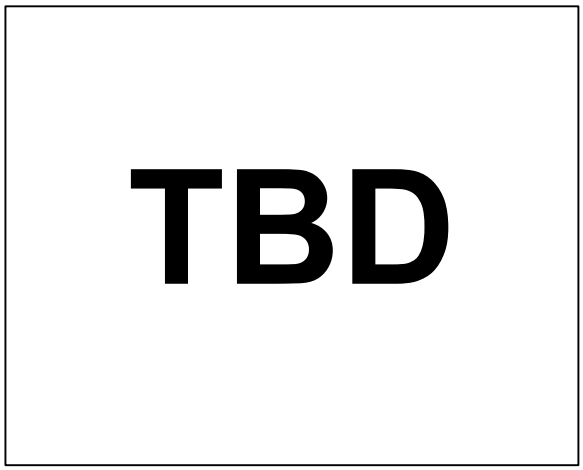


Figure 20 High Level Input Bias Current

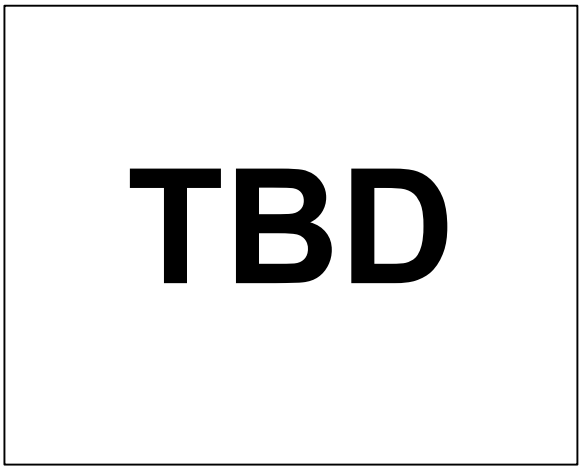


Figure 21. Output Saturation Voltage vs Output Sink Current

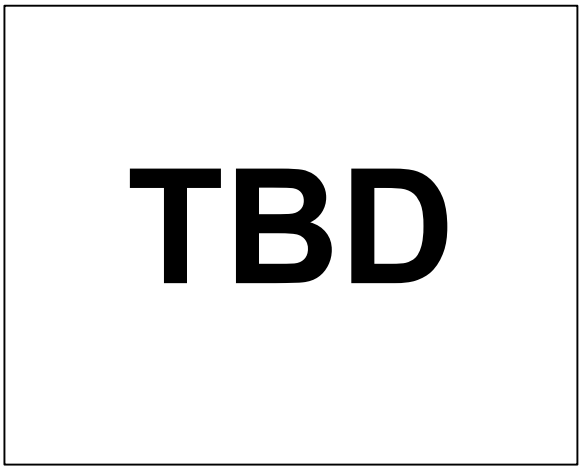


Figure 24. Output Short Circuit Current

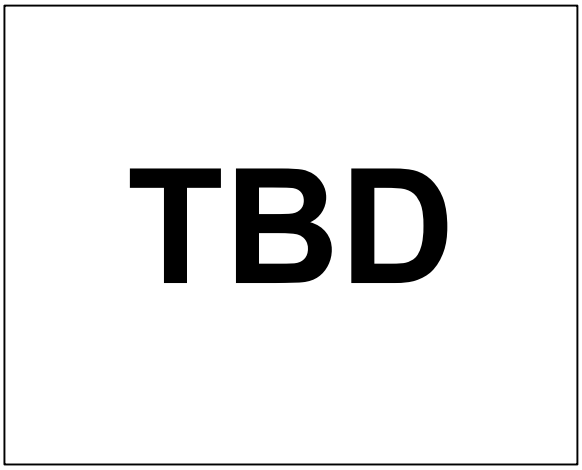


Figure 22 Output Saturation Voltage vs Output Sink Current

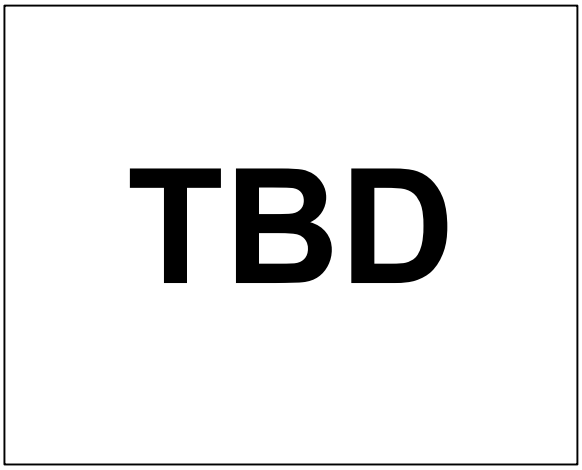


Figure 25. Output Short Circuit Current

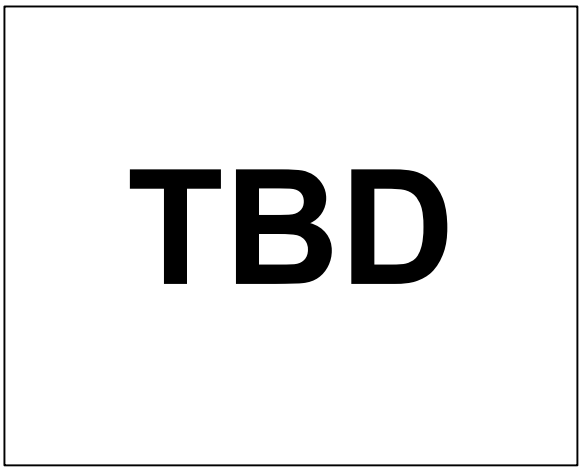


Figure 23. Output Saturation Voltage vs Output Sink Current

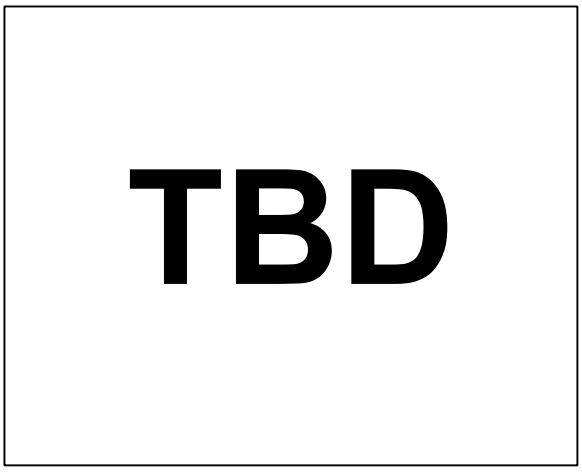


Figure 26. Output Leakage current

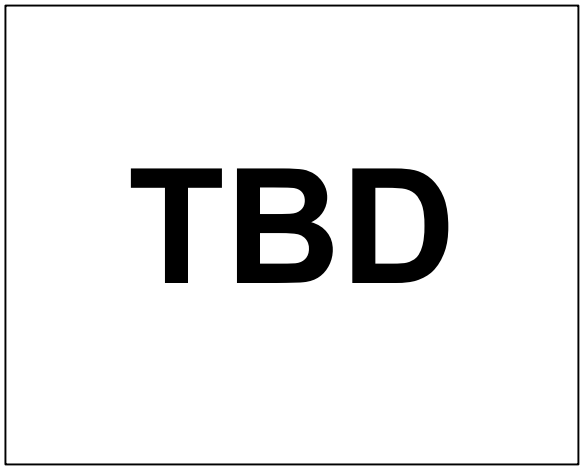


Figure 27. Propagation Delay vs Input Overdrive

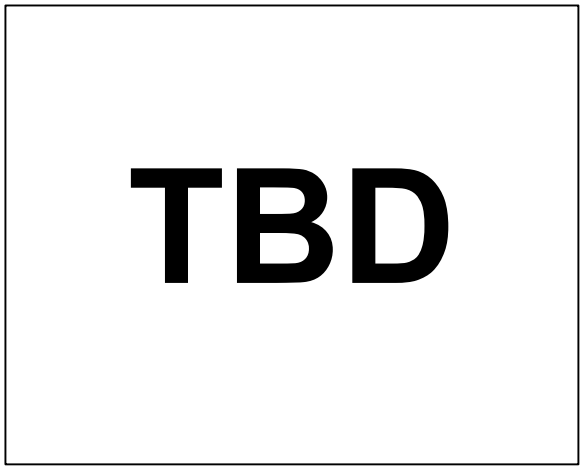


Figure 28.Non Inverting and Inverting comparators Propagation Delay

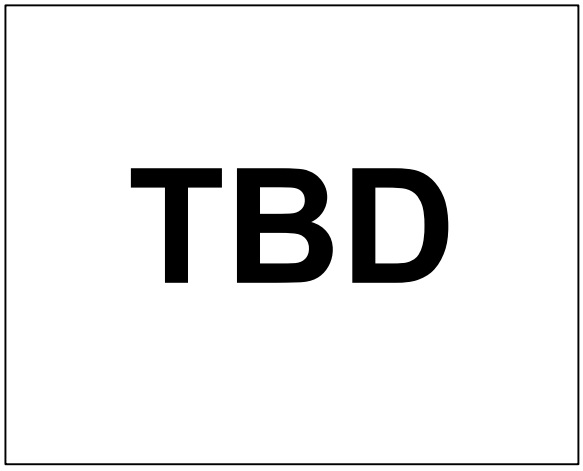


Figure 29. Rise and Fall Times vs Output Pullup Resistor

APPLICATIONS INFORMATION

The ADCMP361 is a low power comparator with a build in 400mV reference that operates from 1.7V to 5.5V. The comparators are approx 0.8% accurate with a built in hysteresis of approx 6.5mV. The outputs are open drain capable of sinking 40mA.

COMPARATORS AND INTERNAL REFERENCE

The comparators has one input available externally and the other input is connected internally to the 400mV reference. The rising input threshold voltage of the comparators is designed to be equal to that of the reference (i.e.≈400mV).

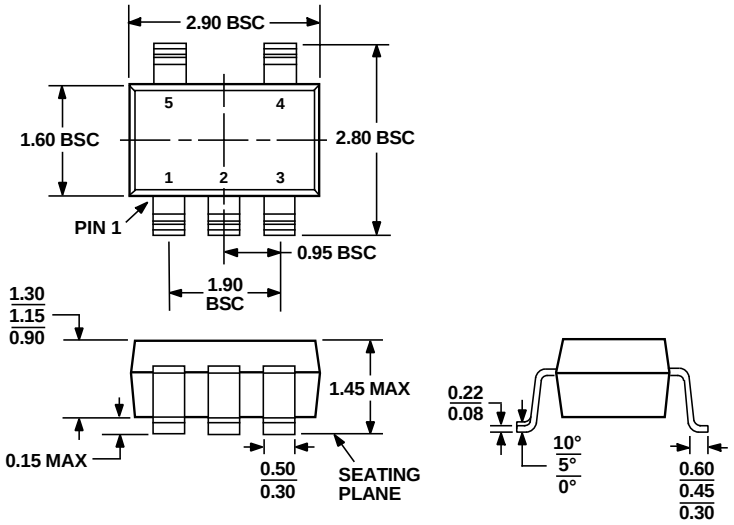
ADDING HYSTERESIS

To prevent oscillations at the output caused by noise or slowly moving signals passing the switching threshold, each comparator has built-in hysteresis of approximately 6.5mV. Positive feedback can be used to adjust hysteresis.

OUTPUTS

The ADCMP361 has both inverting and noninverting outputs available to provide a more flexible solution in applications where the user may need to utilize the comparator in either inverting or noninverting modes.

OUTLINE DIMENSIONS



COMPLIANT TO JEDEC STANDARDS MO-178-AA

Figure 30. 5-Lead SOT-23 Package (RJ-5)—Dimensions shown in millimeters

ORDERING GUIDE

Model	Temperature Range	Package Description	Branding	Package Outline
ADCMP361ARJ	–40°C to +125°C	SOT-23, 5 lead		RJ-5

NOTES

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