



Advanced
Linear
Devices

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Dup

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ALD2301

CMOS DUAL COMPARATOR

GENERAL DESCRIPTION

The ALD 2301 is a monolithic device with dual high performance voltage comparators built with advanced silicon gate CMOS technology. It features very high typical input impedance of $10^{12}\Omega$; low input bias current of 10pA; fast response time of 300 ns; very low power dissipation of 55 μ A per comparator; and single (+5V) or dual ($\pm$ 5V) power supply operation.

The input voltage range includes ground, making this comparator ideal for low level signal detection with high source impedance. The outputs are open-drain configuration, allowing maximum application flexibility, such as wired OR connection.

The ALD 2301 is ideal for a great variety of voltage comparator applications, especially low level signal detection circuits requiring low standby power, yet retaining high output current capability as needed.

FEATURES

- Fanout of 45 LS TTL loads
- Low supply current of 110 μ A typical
- Functional equivalent to LM193 industry standard comparators
- Extremely low input bias currents -- 10 pA typical
- Virtually eliminates source impedance effects
- Low operating supply voltage of 3V to 12V
- Single (+5V) and dual supply ($\pm$ 5V) operation
- High speed for both large signal and low level signals -- 300 ns typical for TTL inputs
- CMOS, NMOS and TTL compatible
- Wired OR open drain outputs
- High output sinking current -- 60 mA typical
- Low supply current spikes

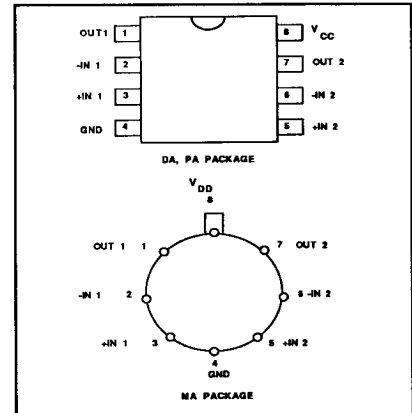
ORDERING INFORMATION

	Operating Temperature Range		
	-55°C to +125°C	-55°C to +125°C	0°C to +70°C
+25°C V _{OS} (mV)	8-Pin TO-99 Package	8-Pin CERDIP Package	8-Pin Plastic Dip Package
2.0	ALD 2301A MA	ALD 2301A DA	ALD 2301A PA
5.0	ALD 2301B MA	ALD 2301B DA	ALD 2301B PA
10.0	ALD 2301 MA	ALD 2301 DA	ALD 2301 PA
20.0	ALD 2301C MA	ALD 2301C DA	ALD 2301C PA

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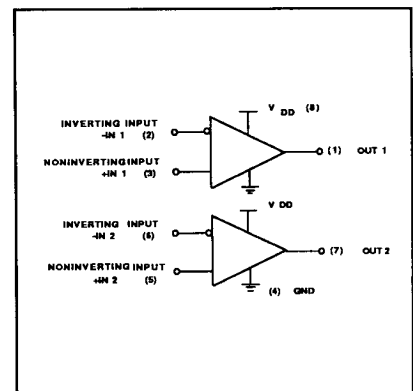
PIN CONFIGURATION



APPLICATIONS

- High source impedance voltage comparison circuits
- Dual limit window comparator
- Power supply voltage monitor
- Photodetector sensor circuit
- Relay or LED driver
- Oscillators
- Battery operated instruments
- Remote signal detection

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Supply voltage, V_{DD}	12V
Differential input voltage range	-0.3V to V_{DD}
Power dissipation	600 mW
Operating temperature range	2301 XPA 0°C to +70°C
	2301 XDA -55°C to +125°C
	2301 XMA -55°C to +125°C
Storage temperature range	-65°C to +150°C
Lead temperature, 10 seconds	+300°C

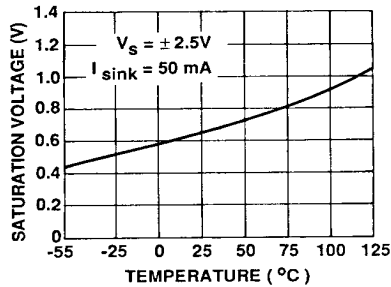
DC AND OPERATING ELECTRICAL CHARACTERISTICS

 $T_A = 25^\circ\text{C}$ $V_{DD} = +5\text{V}$ unless otherwise specified

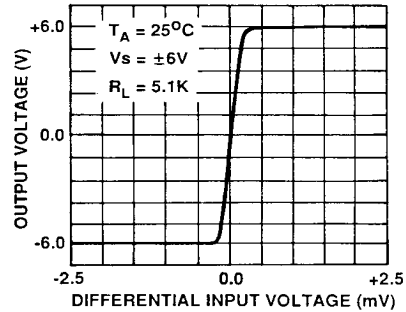
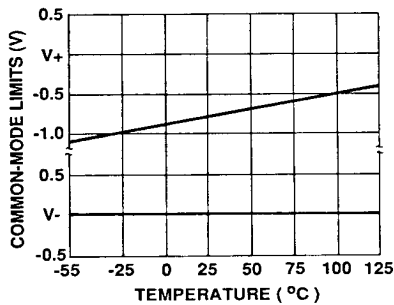
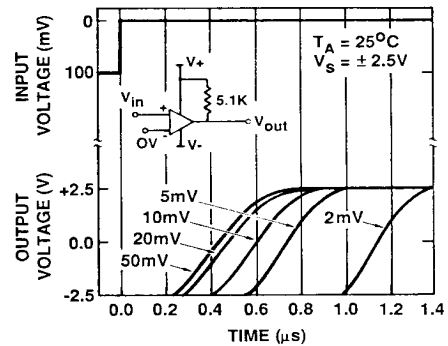
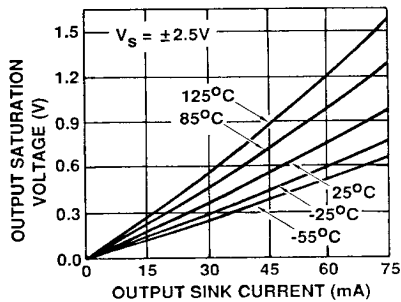
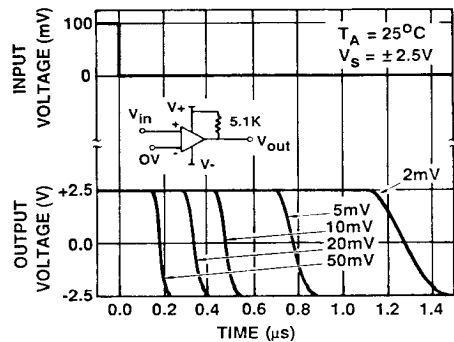
Parameter	Symbol	2301			2301A			2301B			2301C			Unit	Test Conditions
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
Voltage Supply	V_{DD}	3		12	3		12	3		12	3		12	V	
Supply Current	I_{DD}		110	180		110	180		110	180		110	180	μA	$R_{LOAD} = \infty$
Voltage Gain	A_{VD}	50	150		50	150		50	150		50	150		V/mV	$R_{LOAD} \geq 15\text{K}\Omega$
Input Offset Voltage	V_{OS}			10			2			5			20	mV	$R_{LOAD} = 1.5\text{K}\Omega$
Input Offset Current ¹	I_{OS}		10	200		10	200		10	200		10	400	pA	
Input Bias Current ¹	I_{IB}		10	200		10	200		10	200		10	400	pA	
Common Mode Input Voltage Range ²	V_{ICR}	-0.3		$V_{DD}-1.5$	-0.3		$V_{DD}-1.5$	-0.3		$V_{DD}-1.5$	-0.3		$V_{DD}-1.5$	V	
Low Level Output Voltage	V_{OL}		0.15	0.4		0.15	0.4		0.15	0.4		0.15	0.4	V	$I_{SINK} = 12\text{mA}$ $V_{INPUT} = 1\text{V}$ Differential
Low Level Output Current	I_{OL}	24	60		24	60		24	60		24	60		mA	$V_{OL} = 1.0\text{V}$
High Level Leakage Current	I_{OH}		.01			.01			.01			.01		nA	
Response Time ²	T_{RP}		650			650			650			650		ns	$R_L = 5.1\text{K}\Omega$ $C_L = 15\text{pF}$ 100mV Input Step/5mV Overdrive
			300			300			300			300		ns	$R_L = 5.1\text{K}\Omega$ $C_L = 15\text{pF}$ TTL - Level Input Step

Notes : ¹ Consists of junction leakage currents.
² Sample tested parameters.

TYPICAL PERFORMANCE CHARACTERISTICS

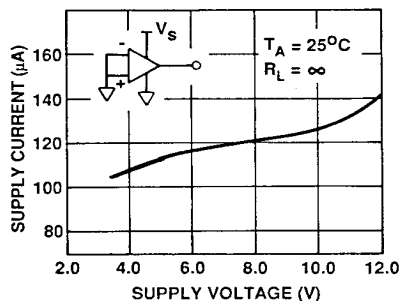
SATURATION VOLTAGE vs.
TEMPERATURE

TRANSFER FUNCTION

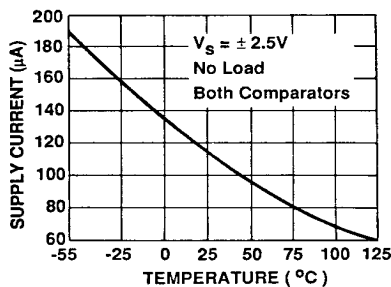
COMMON MODE VOLTAGE REFERRED TO
SUPPLY VOLTAGERESPONSE TIME FOR VARIOUS INPUT
OVERDRIVESSATURATION VOLTAGE vs. SINK
CURRENTRESPONSE TIME FOR VARIOUS INPUT
OVERDRIVES

TYPICAL PERFORMANCE CHARACTERISTICS

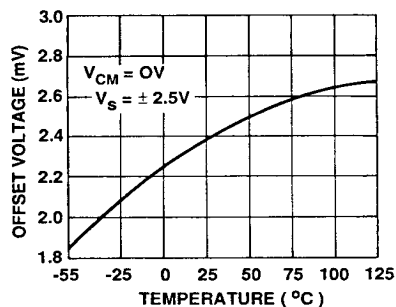
TOTAL SUPPLY CURRENT vs. TOTAL SUPPLY VOLTAGE



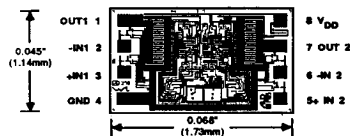
SUPPLY CURRENT vs. TEMPERATURE



INPUT OFFSET VOLTAGE vs. TEMPERATURE

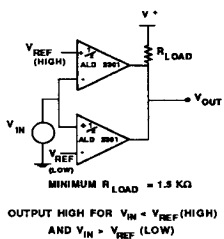


CHIP TOPOGRAPHY

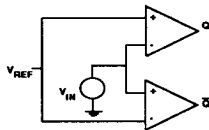


TYPICAL APPLICATIONS

DUAL LIMIT WINDOW COMPARATOR



VOLTAGE COMPARATOR WITH COMPLEMENTARY OUTPUTS



DUAL LIMIT PHOTO DETECTOR MONITOR

