



Austin Semiconductor, Inc.

OUTPUT VOLTAGE COMPARATOR AS161

High Speed Differential Comparator

AVAILABLE AS MILITARY SPECIFICATIONS

- MIL-STD-883, Paragraph 1.2.2 Compliant

FEATURES

- Independent strobes
- High Speed: 20ns Max
- Tight delay matching on both outputs
- Complementary TTL outputs
- Operates from op amp supplies: $\pm 15V$
- Low speed variation with overdrive variation
- Low input offset voltage
- Versatile supply voltage range

OPTIONS

- Packages

14 Pins Ceramic DIP	C014
14 Pins Ceramic Flatpack	F014
10 Lead Metal Can	T010

MARKINGS

GENERAL DESCRIPTION

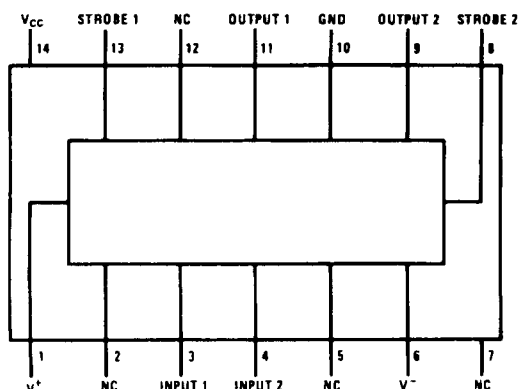
The AS161 is a very high speed differential input, complementary TTL output voltage comparator with improved characteristics over similar devices for which it is a pin-for-pin replacement. The device has been optimized for greater speed performance and lower input offset voltage. Typically delay varies only 3 ns for over-drive variations of 5 mV to 500 mV. It may be operated from op amp supplies ($\pm 15V$).

Complementary outputs having maximum skew are provided. Applications involve high speed analog to digital converters and zero-crossing detectors in disk file systems.

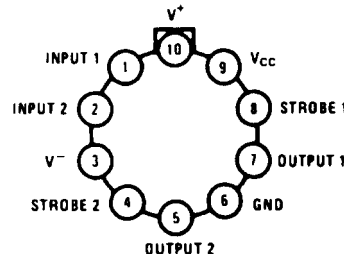
For more products and information
please visit our web site at
www.austinsemiconductor.com

PIN ASSIGNMENT (Top View)

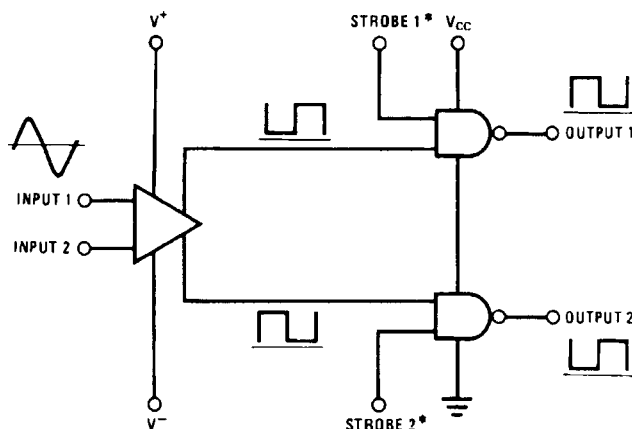
14 Pin Ceramic DIP (C014)
14 Pin Flatpack (F014)



10 Lead Metal Can (T010)



LOGIC DIAGRAM



*Output is low when current is drawn from strobe pin.



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ABSOLUTE MAXIMUM RATINGS*

Supply Voltage, V+	5V to 15V
Supply Voltage, V-	-6V to -15V
Supply Voltage, V _{CC}	4.5V to 5.5V
Output Voltage	+7.0V
Differential Input Voltage	±5V
Input Common Mode Voltage	±6V
Operating Temperature Range	-55°C to 125°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 Sec.)	260°C

*Stresses greater than 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 operation section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

ELECTRICAL CHARACTERISTICS

(V+ = +10V; V_{CC} = +5V, V- = -10V, T_{MIN} ≤ T_A ≤ T_{MAX}, Unless otherwise specified)

PARAMETERS	CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage			1	3	mV
Input Bias Current	T _A = 25°C		5	20	μA
Input Offset Current	T _A = 25°C		2	3	μA
Voltage Gain	T _A = 25°C		3		V/mV
Input Resistance	T _A = 25°C, f = 1kHz		20		kΩ
Logical "1" Output Voltage	V _{CC} = 4.75V, I _{SOURCE} = -0.5mA	2.4	3.3		V
Logical "0" Output Voltage	V _{CC} = 4.75V, I _{SINK} = 6.4mA			0.4	V
Strobe Input "1" Current (Output Enabled)	V _{CC} = 5.25V, I _{STROBE} = 2.4mA			200	μA
Strobe Input "0" Current (Output Disabled)	V _{CC} = 5.25V, I _{STROBE} = 0.4mA			-1.6	mA
Strobe Input "0" Voltage	V _{CC} = 4.75V			0.8	V
Strobe Input "1" Voltage	V _{CC} = 4.75V	2			V
Output Short Circuit Current	V _{CC} = 5.25V, V _{OUT} = 0V	-18		-55	mA
Supply Current I ⁺	V+ = 10V, V- = -10V, V _{CC} = 5.25V, -55°C ≤ T _A ≤ 125°C			4.5	mA
Supply Current I ⁻	V+ = 10V, V- = -10V, V _{CC} = 5.25V, -55°C ≤ T _A ≤ 125°C			10	mA
Supply Current I _{CC}	V+ = 10V, V- = -10V, V _{CC} = 5.25V, -55°C ≤ T _A ≤ 125°C			18	mA
TRANSIENT RESPONSE	V _{IN} = 50mV overdrive ¹				
Propagation Delay Time (t _{pd(0)})	T _A = 25°C		14	20	ns
Propagation Delay Time (t _{pd(1)})	T _A = 25°C		14	20	ns
Delay Between Output A and B	T _A = 25°C		2	5	ns
Strobe Delay Time (t _{pd(0)})	T _A = 25°C		8		ns
Strobe Delay Time (t _{pd(1)})	T _A = 25°C		8		ns

NOTES: 1. Measurements using AC test circuit, Fanout = 1. The devices are faster at low supply voltages.

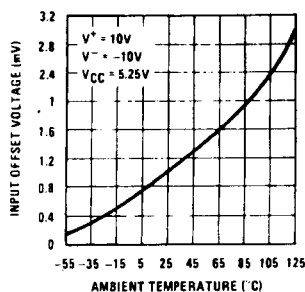


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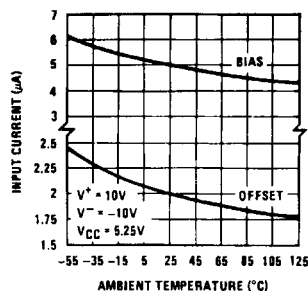
OUTPUT VOLTAGE COMPARATOR AS161

TYPICAL PERFORMANCE CHARACTERISTICS

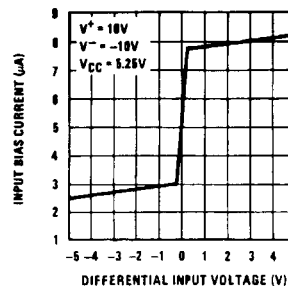
Offset Voltage



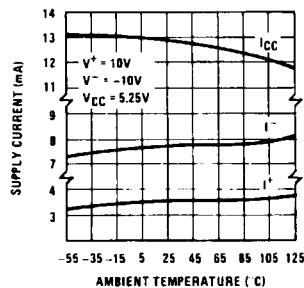
Input Currents vs Ambient Temperature



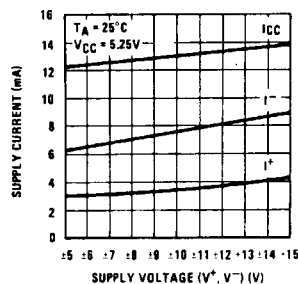
Input Characteristics



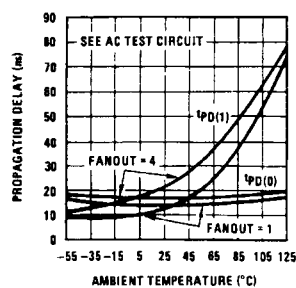
Supply Current vs Ambient Temperature



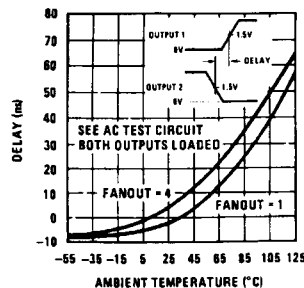
Supply Current vs Supply Voltage



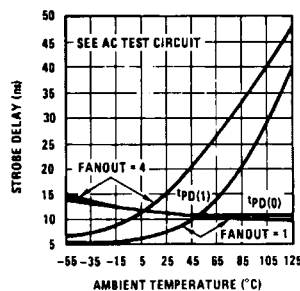
Propagation Delay vs Ambient Temperature



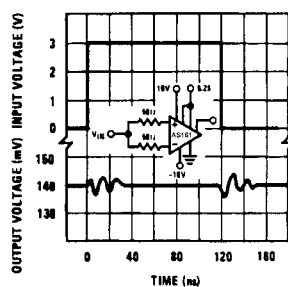
Delay of Output 1 With Respect to Output 2 vs Ambient Temperature



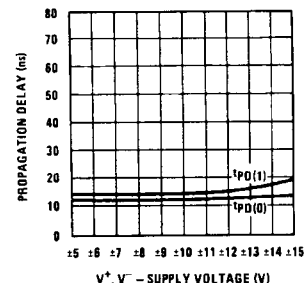
Strobe Delay vs Ambient Temperature



Common-Mode Pulse Response



Propagation Delay vs Supply Voltage





AS161

The diagram shows an AS161 buffer with two inputs, INPUT 1 and INPUT 2, and two outputs, OUTPUT 1 and OUTPUT 2. INPUT 1 is grounded. INPUT 2 is connected to a square wave signal V_{IN} . OUTPUT 1 is an open terminal. OUTPUT 2 is connected to a load consisting of a capacitor C to ground and a series combination of a resistor R and three 1N914 diodes connected to ground. The diodes are connected in series, with their cathodes to the node between R and the first diode, and their anodes to ground. The output of the buffer is labeled OUTPUT.

$V_{IN} = \pm 50mV$	FANOUT = 1	FANOUT = 4
$V^+ = +10V$	R = 2.4k	R = 680 Ω
$V^- = -10V$	C = 15pF	C = 30pF
$V_{CC} = 5.25V$		

DIAGRAM

AS161

The diagram illustrates the internal circuitry of the AS161, a 16-bit parallel-to-serial converter. The circuit is powered by V^+ and V^- rails. It features two main input sections: a differential input stage with transistors Q1 and Q2, and a strobe input stage with transistors Q3 and Q4. The output stage consists of two 8-bit parallel-to-serial converters, each using a chain of transistors (Q5-Q10 and Q11-Q16) and diodes (D1-D4 and D5-D8) to shift the data out. The circuit also includes a feedback loop with transistors Q17 and Q18, and a current source with transistors Q19 and Q20. The output of the first 8-bit converter is the NON-INVERTING OUTPUT1, and the output of the second 8-bit converter is the INVERTING OUTPUT2. The STROBE1 and STROBE2 inputs are used to control the data output. The circuit is designed to operate with a supply voltage of V_{CC} and a ground connection.

R10, R16: 85
R11, R17: 205



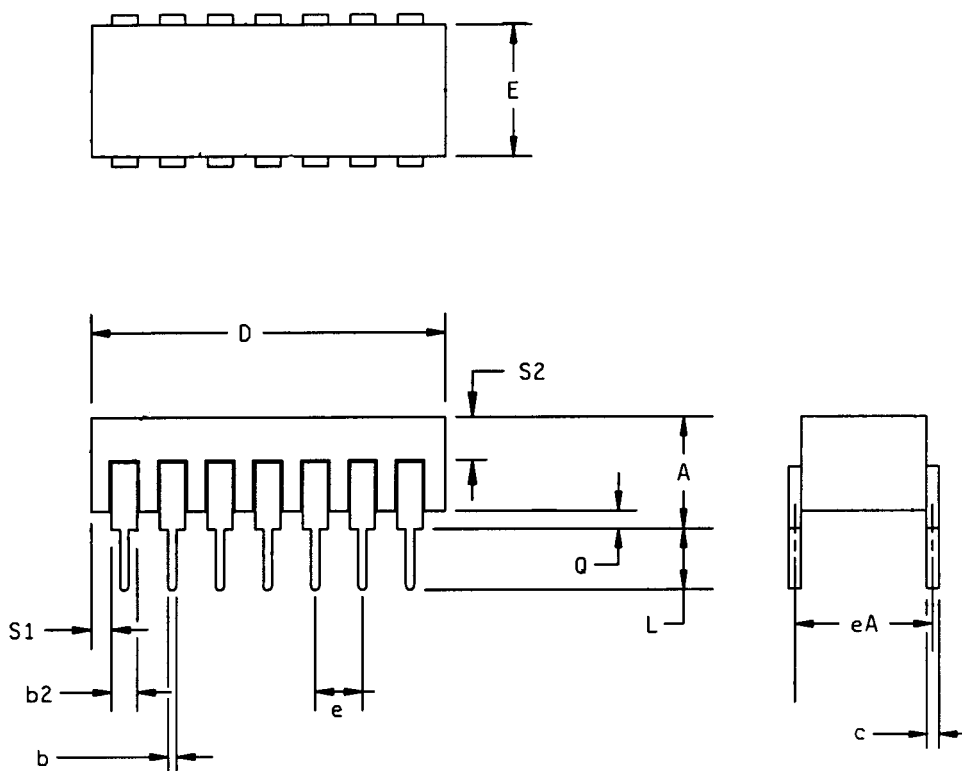
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MECHANICAL DEFINITIONS*

Package Designator C014



SYMBOL	ASI SPECIFICATIONS	
	MIN	MAX
A	---	0.200
b	0.014	0.026
b2	0.045	0.065
c	0.008	0.018
D	---	0.785
E	0.220	0.310
e	0.100 BCS	
eA	0.300 BSC	
L	0.125	0.200
Q	0.015	0.060
S1	0.005	---
S2	0.005	---

*All measurements are in inches.



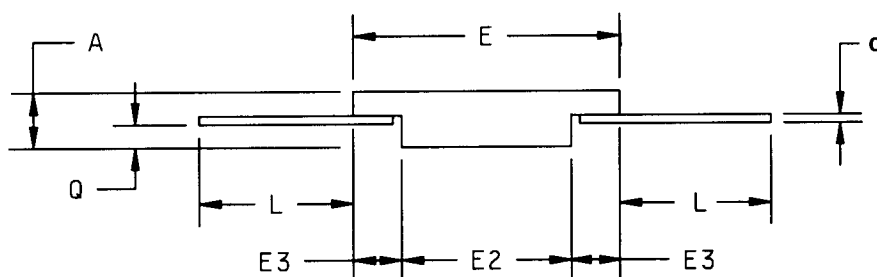
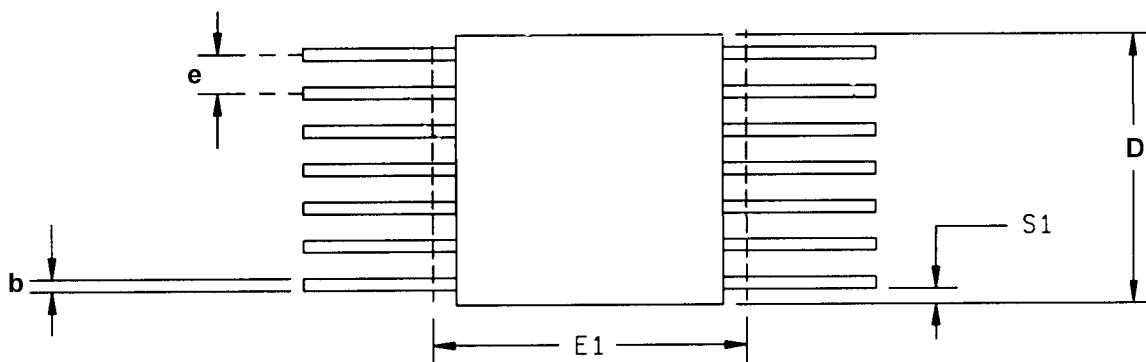
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OUTPUT VOLTAGE COMPARATOR

AS161

MECHANICAL DEFINITIONS*

Package Designator F014



SYMBOL	ASI SPECIFICATIONS	
	MIN	MAX
A	0.045	0.085
b	0.010	0.022
C	0.004	0.009
D	---	0.390
E	0.235	0.260
E1	---	0.280
E2	0.125	---
E3	0.030	---
e	0.050 BSC	
L	0.250	0.370
Q	0.026	0.045
S1	0.005	---

*All measurements are in inches.



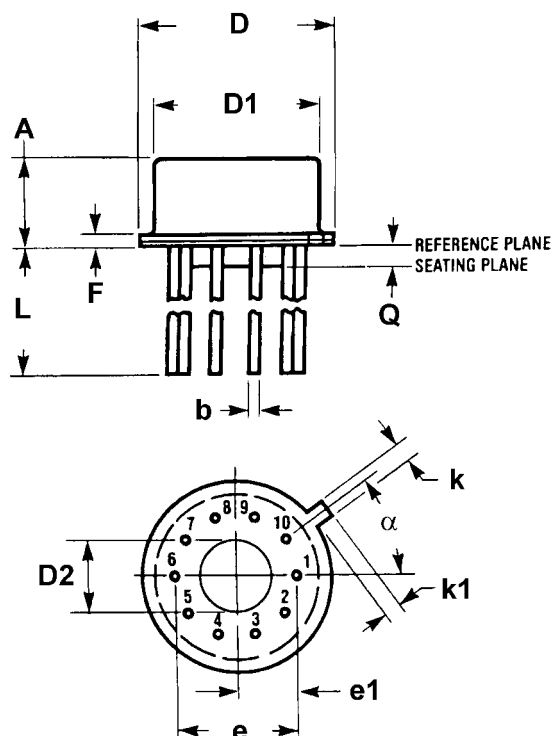
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OUTPUT VOLTAGE COMPARATOR

AS161

MECHANICAL DEFINITIONS*

Package Designator T010



SYMBOL	ASI SPECIFICATIONS	
	MIN	MAX
A	0.165	0.185
b	0.016	0.019
D	0.335	0.375
D1	0.305	0.335
D2	0.110	0.160
e	0.230 BSC	
e1	0.115 BSC	
F	---	0.040
k	0.027	0.034
k1	0.027	0.045
L	0.500	0.750
Q	0.010	0.045
α	36° BSC	

*All measurements are in inches.



ORDERING INFORMATION

EXAMPLE: AS161C014/MIL

Device Number	Package Type	Process
AS161	C014	/*

EXAMPLE: AS161F014/MIL

Device Number	Package Type	Process
AS161	F014	/*

EXAMPLE: AS161T010/MIL

Device Number	Package Type	Process
AS161	T010	/*

*AVAILABLE PROCESSES

IT = Industrial Temperature Range	-40°C to +85°C
XT = Extended Temperature Range	-55°C to +125°C
MIL = /883 equivalent processing compliant to paragraph 1.2.2	-55°C to +125°C