FAIRCHILD SEMICONDUCTOR™

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74ACT563
Octal Latch with 3-STATE Outputs

General Description

The ACT563 is a high-speed octal latch with buffered common Latch Enable (LE) and buffered common Output Enable ($\overline{OE}$) inputs.

The ACT563 device is functionally identical to the ACT573, but with inverted outputs.

Features

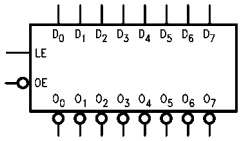
- I_{CC} and I_{OZ} reduced by 50%
- Inputs and outputs on opposite sides of package allow easy interface with microprocessors
- Useful as input or output port for microprocessors
- Functionally identical to ACT573 but with inverted outputs
- Outputs source/sink 24 mA
- ACT563 has TTL-compatible inputs

Ordering Code:

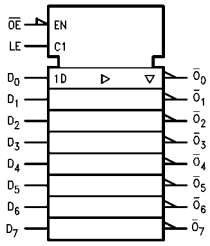
Order Number	Package Number	Package Description
74ACT563SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide Body

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.

Logic Symbols

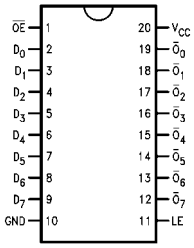


IEEE/IEC



Connection Diagram

Pin Assignment for SOIC



Pin Descriptions

Pin Names	Description
D_0–D_7	Data Inputs
LE	Latch Enable Input
$\overline{OE}$	3-STATE Output Enable Input
$\overline{O}_0$–$\overline{O}_7$	3-STATE Latch Outputs

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Functional Description

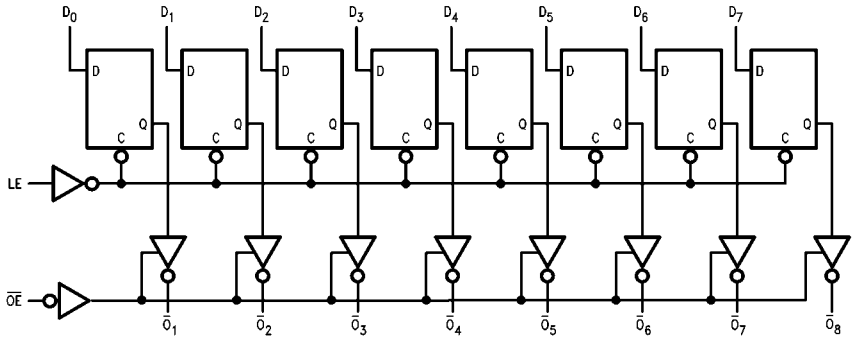
The ACT563 contains eight D-type latches with 3-STATE complementary outputs. When the Latch Enable (LE) input is HIGH, data on the D_n inputs enters the latches. In this condition the latches are transparent, i.e., a latch output will change state each time its D input changes. When LE is LOW the latches store the information that was present on the D inputs at setup time preceding the HIGH-to-LOW transition of LE. The 3-STATE buffers are controlled by the Output Enable ($\overline{OE}$) input. When $\overline{OE}$ is LOW, the buffers are in the bi-state mode. When $\overline{OE}$ is HIGH the buffers are in the high impedance mode but that does not interfere with entering new data into the latches.

Function Table

Inputs			Internal	Outputs	Function
$\overline{OE}$	LE	D	Q	O	
H	X	X	X	Z	High-Z
H	H	L	H	Z	High-Z
H	H	H	L	Z	High-Z
H	L	X	NC	Z	Latched
L	H	L	H	H	Transparent
L	H	H	L	L	Transparent
L	L	X	NC	NC	Latched

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance
NC = No Change

Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

Absolute Maximum Ratings(Note 1)

Supply Voltage (V_{CC})	−0.5V to +7.0V
DC Input Diode Current (I_{IK})	
V_I = −0.5V	−20 mA
V_I = V_{CC} + 0.5V	+20 mA
DC Input Voltage (V_I)	−0.5V to V_{CC} + 0.5V
DC Output Diode Current (I_{OK})	
V_O = −0.5V	−20 mA
V_O = V_{CC} + 0.5V	+20 mA
DC Output Voltage (V_O)	−0.5V to V_{CC} + 0.5V
DC Output Source	
or Sink Current (I_O)	±50 mA
DC V_{CC} or Ground Current	
per Output Pin (I_{CC} or I_{GND})	±50 mA
Storage Temperature (T_{STG})	−65°C to +150°C
Junction Temperature (T_J)	
(PDIP)	140°C

Recommended Operating Conditions

Supply Voltage (V_{CC})	4.5V to 5.5V
Input Voltage (V_I)	0V to V_{CC}
Output Voltage (V_O)	0V to V_{CC}
Operating Temperature (T_A)	−40°C to +85°C
Minimum Input Edge Rate (ΔV/Δt)	
V_{IN} from 0.8V to 2.0V	
V_{CC} @ 4.5V, 5.5V	125 mV/ns

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Fairchild does not recommend operation of FACT™ circuits outside databook specifications.

DC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	T_A = +25°C Typ	T_A = −40°C to +85°C Guaranteed Limits		Units	Conditions
V_{IH}	Minimum HIGH Level Input Voltage	4.5	1.5	2.0	2.0	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
		5.5	1.5	2.0	2.0		
V_{IL}	Maximum LOW Level Input Voltage	4.5	1.5	0.8	0.8	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
		5.5	1.5	0.8	0.8		
V_{OH}	Minimum HIGH Level Output Voltage	4.5	4.49	4.4	4.4	V	I_{OUT} = −50 μA
		5.5	5.49	5.4	5.4		
							V_{IN} = V_{IL} or V_{IH}
		4.5		3.86	3.76	V	I_{OH} = −24 mA
		5.5		4.86	4.76		I_{OH} = −24 mA (Note 2)
V_{OL}	Maximum LOW Level Output Voltage	4.5	0.001	0.1	0.1	V	I_{OUT} = 50 μA
		5.5	0.001	0.1	0.1		
							V_{IN} = V_{IL} or V_{IH}
		4.5		0.36	0.44	V	I_{OL} = 24 mA
		5.5		0.36	0.44		I_{OL} = 24 mA (Note 2)
I_{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V_I = V_{CC}, GND
I_{OZ}	Maximum 3-STATE Current	5.5		±0.25	±2.5	μA	V_I = V_{IL}, V_{IH} V_O = V_{CC}, GND
I_{CCT}	Maximum I_{CC}/Input	5.5	0.6		1.5	mA	V_I = V_{CC} − 2.1V
I_{OLD}	Minimum Dynamic Output Current (Note 3)	5.5			75	mA	V_{OLD} = 1.65V Max
I_{OHD}		5.5			−75	mA	V_{OHD} = 3.85V Min
I_{CC}	Maximum Quiescent Supply Current	5.5		4.0	40.0	μA	V_{IN} = V_{CC} or GND

Note 2: All outputs loaded; thresholds on input associated with output under test.

Note 3: Maximum test duration 2.0 ms, one output loaded at a time.

AC Electrical Characteristics

Symbol	Parameter	V_{CC} (V) (Note 4)	$T_A = +25°C$, $C_L = 50$ pF			$T_A = -40°C$ to $+85°C$, $C_L = 50$ pF		Units
			Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay D_n to $\overline{O}_n$	5.0	3.0	7.0	11.5	2.5	12.5	ns
t_{PHL}	Propagation Delay D_n to $\overline{O}_n$	5.0	3.0	6.0	10.0	2.5	11.0	ns
t_{PLH}	Propagation Delay LE to $\overline{O}_n$	5.0	3.0	6.5	10.5	2.5	11.5	ns
t_{PHL}	Propagation Delay LE to $\overline{O}_n$	5.0	2.5	5.5	9.5	2.0	10.5	ns
t_{PZH}	Output Enable Time	5.0	2.5	5.5	9.0	2.0	10.0	ns
t_{PZL}	Output Enable Time	5.0	2.0	5.5	8.5	2.0	9.5	ns
t_{PHZ}	Output Disable Time	5.0	3.5	6.5	10.5	2.5	11.5	ns
t_{PLZ}	Output Disable Time	5.0	2.0	4.5	8.0	1.0	8.5	ns

Note 4: Voltage Range 5.0 is 5.0V ±0.5V

AC Operating Requirements

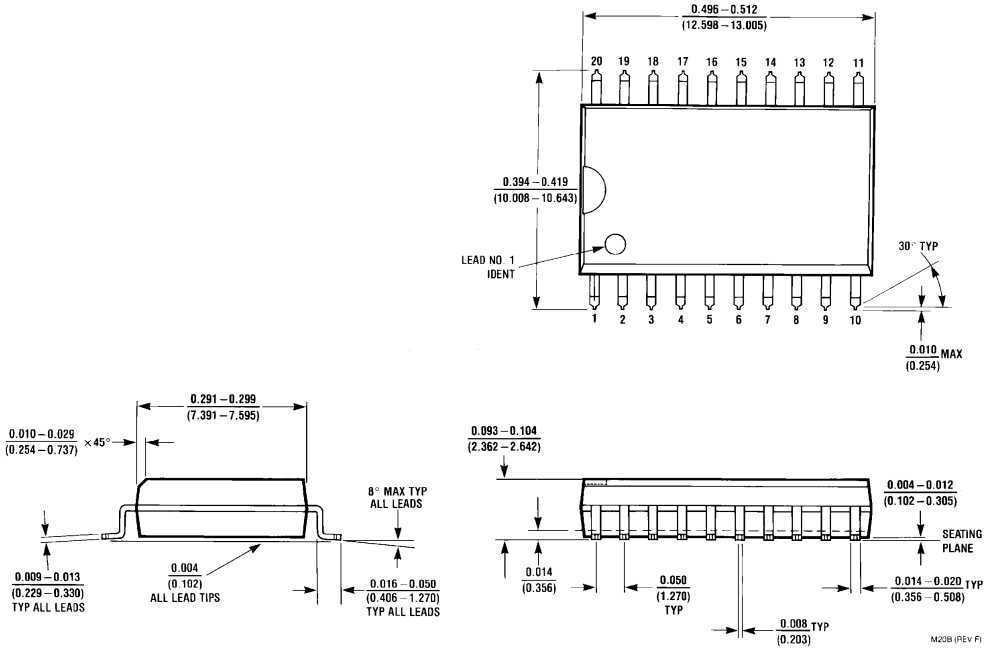
Symbol	Parameter	V_{CC} (V) (Note 5)	$T_A = +25°C$, $C_L = 50$ pF		$T_A = -40°C$ to $+85°C$, $C_L = 50$ pF	Units
			Typ	Guaranteed Minimum		
t_s	Setup Time, HIGH or LOW D_n to LE	5.0	1.5	4.0	4.5	ns
t_h	Hold Time, HIGH or LOW D_n to LE	5.0	−2.0	0	0	ns
t_w	LE Pulse Width, HIGH	5.0	2.0	3.0	3.0	ns

Note 5: Voltage Range 5.0 is 5.0V ±0.5V

Capacitance

Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	V_{CC} = OPEN
C_{PD}	Power Dissipation Capacitance	50.0	pF	V_{CC} = 5.0V

Physical Dimensions inches (millimeters) unless otherwise noted



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