FAIRCHILD SEMICONDUCTOR™

May 1991
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100319
Low Power Hex Line Driver with Cut-Off

General Description

The 100319 is a Hex Line Driver with output cut-off capability. The 100319 has single ended ECL inputs and differential ECL outputs, designed to drive a differential, doubly terminated 50Ω transmission line (25Ω equivalent impedance) in an ECL backplane. A LOW on the Output Enable (OE) will set both the true and complementary outputs, to a high impedance or cut-off state. The cut-off state is designed to be more negative than a normal ECL LOW state.

Features

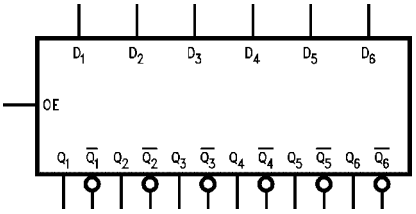
- Differential outputs
- Output cut-off capability
- Drives a 25Ω ECL load
- 2000V ESD protection
- Voltage compensated range = –4.2V to –5.7V
- Available to industrial grade temperature range

Ordering Code:

Order Number	Package Number	Package Description
100319QC	V28A	28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square
100319QI	V28A	28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square Industrial Temperature Range (–40°C to +85°C)

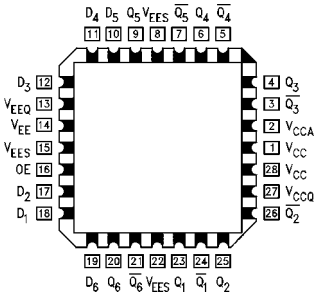
Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbol



Connection Diagram

28-Pin PLCC



Pin Descriptions

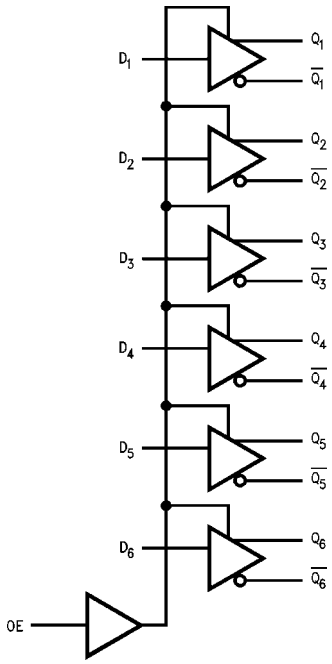
Pin Names	Description
D_n	Data Inputs
Q_n	Data Outputs
$\overline{Q}_n$	Complementary Data Outputs
OE	Output Enable

Truth Table

Inputs		Outputs	
D_n	OE	Q_n	$\overline{Q}_n$
L	H	L	H
H	H	H	L
X	L	Cut-Off	Cut-Off

H = HIGH Voltage Level
L = LOW Voltage Level
X = Don't Care
Cut-off = Lower-than-LOW State

Logic Diagram



Absolute Maximum Ratings(Note 1)

Storage Temperature (T_{STG})	−65°C to +150°C
Maximum Junction Temperature (T_J)	+150°C
Pin Potential to Ground Pin (V_{EE})	−7.0V to +0.5V
Input Voltage (DC)	V_{EE} to +0.5V
Output Current (DC Output HIGH)	−100 mA
ESD (Note 2)	≥2000V

Recommended Operating Conditions

Case Temperature (T_C)	
Commercial	0°C to +85°C
Industrial	−40°C to +85°C
Supply Voltage (V_{EE})	−5.7V to −4.2V

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum rating. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Note 2: ESD testing conforms to MIL-STD-883, Method 3015.

Commercial Version

DC Electrical Characteristics (Note 3)

V_{EE} = −4.2V to −5.7V, V_{CC} = V_{CCA} = GND, T_C = 0°C to +85°C

Symbol	Parameter	Min	Typ	Max	Units	Conditions	
V_{OH}	Output HIGH Voltage	−1025	−955	−870	mV	V_{IN} = $V_{IH(Max)}$	Loading with
V_{OL}	Output LOW Voltage	−1830	−1705	−1620	mV	or $V_{IL(Min)}$	25Ω to −2.0V
V_{OHC}	Output HIGH Voltage	−1035			mV	V_{IN} = $V_{IH(Min)}$	Loading with
V_{OLC}	Output LOW Voltage			−1610	mV	or $V_{IL(Max)}$	25Ω to −2.0V
V_{OLZ}	Cut-Off LOW Voltage			−1950	mV	V_{IN} = $V_{IH(Min)}$ or $V_{IL(Max)}$	OE = LOW
V_{IH}	Input HIGH Voltage	−1110		−870	mV	Guaranteed HIGH Signal for All Inputs	
V_{IL}	Input LOW Voltage	−1830		−1530	mV	Guaranteed LOW Signal for All Inputs	
I_{IL}	Input LOW Current			100	μA	V_{IN} = $V_{IL(Min)}$	
I_{IH}	Input HIGH Current			360	μA	V_{IN} = $V_{IH(Max)}$	
I_{EE}	Power Supply Current, Normal	−119		−30	mA		
I_{EEZ}	Power Supply Current, Cut-Off	−219		−75	mA	Inputs Open, OE = LOW	

Note 3: The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

AC Electrical Characteristics

V_{EE} = −4.2V to −5.7V, V_{CC} = V_{CCA} = GND

Symbol	Parameter	T_C = 0°C		T_C = +25°C		T_C = +85°C		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay Data to Output	0.65	2.10	0.65	2.10	0.65	2.10	ns	Figures 1, 2
t_{PZH}	Propagation Delay	1.8	4.1	1.8	4.1	1.8	4.1	ns	
t_{PHZ}	OE to Output	1.2	2.9	1.2	2.9	1.2	2.9		
t_{TLH} t_{THL}	Transition Time 20% to 80%, 80% to 20%	0.45	1.30	0.45	1.30	0.45	1.30	ns	

Industrial Version

DC Electrical Characteristics (Note 4)

V_{EE} = −4.2V to −5.7V, V_{CC} = V_{CCA} = GND

Symbol	Parameter	T_C = −40°C		T_C = 0°C to +85°C		Units	Conditions	
		Min	Max	Min	Max			
V_{OH}	Output HIGH Voltage	−1085	−870	−1025	−870	mV	V_{IN} = $V_{IH(Max)}$	Loading with
V_{OL}	Output LOW Voltage	−1830	−1575	−1830	−1620	mV	or $V_{IL(Min)}$	25Ω to −2.0V
V_{OHC}	Output HIGH Voltage	−1095		−1035		mV	V_{IN} = $V_{IH(Min)}$	Loading with
V_{OLC}	Output LOW Voltage		−1565		−1610	mV	or $V_{IL(Max)}$	25Ω to −2.0V
V_{IH}	Input HIGH Voltage	−1115	−870	−1110	−870	mV	Guaranteed HIGH Signal for All Inputs	
V_{OLZ}	Cut-Off LOW Voltage		−1900		−1950	mV	V_{IN} = $V_{IH(Min)}$ or $V_{IL(Max)}$	OE = LOW
V_{IL}	Input LOW Voltage	−1830	−1535	−1830	−1530	mV	Guaranteed LOW Signal for All Inputs	
I_{IL}	Input LOW Current		130		100	µA	V_{IN} = $V_{IL(Min)}$	
I_{IH}	Input HIGH Current		360		360	µA	V_{IN} = $V_{IH(Max)}$	
I_{EE}	Power Supply Current, Normal	−119	−30	−119	−30	mA		
I_{EEZ}	Power Supply Current, Cut-Off	−219	−75	−219	−75	mA	Inputs Open OE = LOW	

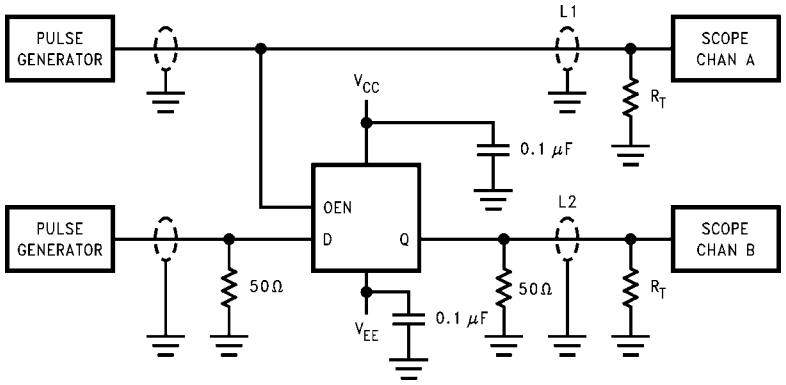
Note 4: The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

AC Electrical Characteristics

V_{EE} = −4.2V to −5.7V, V_{CC} = V_{CCA} = GND

Symbol	Parameter	T_C = −40°C		T_C = +25°C		T_C = +85°C		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay Data to Output	0.65	2.10	0.65	2.10	0.65	2.10	ns	Figures 1Figure 2
t_{PZH}	Propagation Delay	1.8	4.1	1.8	4.1	1.8	4.1	ns	
t_{PHZ}	OE to Output	1.2	2.9	1.2	2.9	1.2	2.9		
t_{TLH} t_{THL}	Transition Time 20% to 80%, 80% to 20%	0.45	1.30	0.45	1.30	0.45	1.30	ns	

Test Circuitry



Notes:

V_{CC}, V_{CCA} = +2V, V_{EE} = −2.5V

L1 and L2 = equal length 50Ω impedance lines

R_T = 50Ω terminator internal to scope

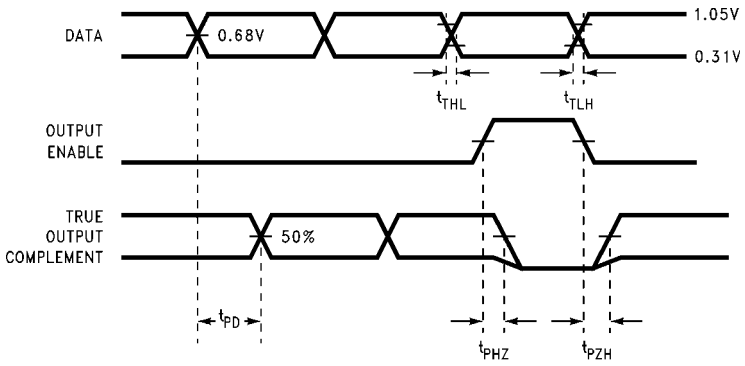
Decoupling 0.1 μF from GND to V_{CC} and V_{EE}

All unused outputs are loaded with 25Ω to GND

C_L = Fixture and stray capacitance ≤ 3 pF

FIGURE 1. AC Test Circuit

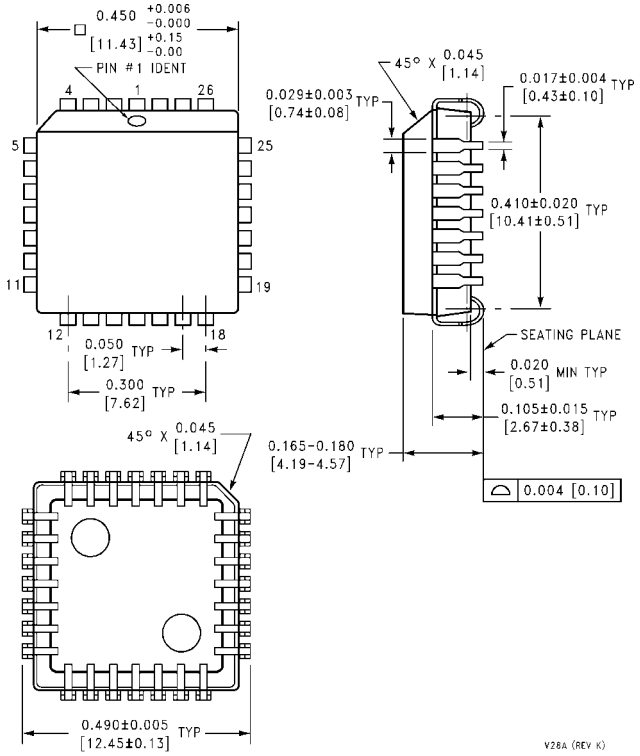
Switching Waveforms



Note: The output AC measurement point for cut-off propagation delay testing = the 50% voltage point between active V_{OL} and V_{OH}.

FIGURE 2. Propagation Delay, Cut-Off and Transition Times

Physical Dimensions inches (millimeters) unless otherwise noted



28-Lead Plastic Lead Chip Carrier (PLCC), JEDEC MO-047, 0.450 Square
Package Number V28A

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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