National Semiconductor

F100123
Hex Bus Driver

General Description

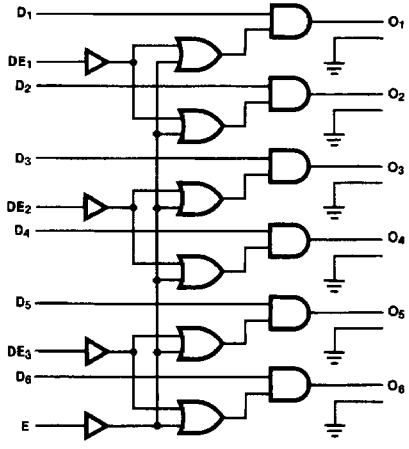
The F100123 is a monolithic device containing six bus drivers capable of driving terminated lines with terminations as low as 25Ω. To reduce crosstalk, each output has its respective ground connection. Transition times were designed to be longer than on other F100K devices. The driver itself performs the positive logic AND of a data input (D_1–D_6) and the OR of two select inputs (E and either DE_1, DE_2 or DE_3).

Enabling of data is possible in multiples of two, i.e., 2, 4 or all 6 paths. All inputs have 50 kΩ pull-down resistors.

The output voltage LOW level is designed to be more negative than normal ECL outputs (cut off state). This allows an emitter-follower output transistor to turn off when the termination supply is −2.0V and thus present a high impedance to the data bus.

Ordering Code: See Section 8

Logic Symbol



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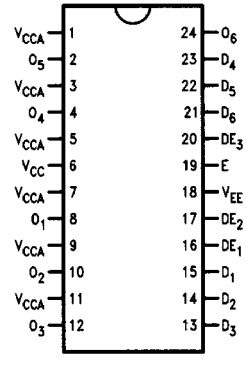
Pin Names	Description
D_1–D_6	Data Inputs
DE_1–DE_3	Dual Enable Inputs
E	Common Enable Input
O_1–O_6	Data Outputs

Connection Diagrams

24-Pin DIP



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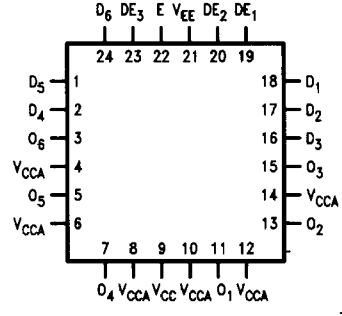
24-Pin Quad Cerpak



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Absolute Maximum Ratings

Above which the useful life may be impaired (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature	−65°C to +150°C
Maximum Junction Temperature (T_J)	+150°C
Case Temperature under Bias (T_C)	0°C to +85°C
V_{EE} Pin Potential to Ground Pin	−7.0V to +0.5V
Input Voltage (DC)	V_{EE} to +0.5V
Output Current (DC Output HIGH)	−50 mA
Operating Range (Note 2)	−5.7V to −4.2V

DC Electrical Characteristics

V_{EE} = −4.5V, V_{CC} = V_{CCA} = GND, T_C = 0°C to +85°C (Note 3)

Symbol	Parameter	Min	Typ	Max	Units	Conditions (Note 4)	
V_{OH}	Output HIGH Voltage	−1025	−955	−880	mV	V_{IN} = $V_{IH\ (Max)}$ or $V_{IL\ (Min)}$	Loading with 25Ω to −2.0V
V_{OHC}	Output HIGH Voltage	−1035			mV	V_{IN} = $V_{IH\ (Min)}$ or $V_{IL\ (Min)}$	Loading with 25Ω to −2.0V
V_{OL}	Output LOW Voltage Cut-Off State			−2200	mV	V_{IN} = $V_{IH\ (Min)}$ or $V_{IL\ (Max)}$	Loading with 25Ω to −2.3V
V_{IH}	Input HIGH Voltage	−1165		−880	mV	Guaranteed HIGH Signal for All Inputs	
V_{IL}	Input LOW Voltage	−1810		−1475	mV	Guaranteed LOW Signal for All Inputs	
I_{IL}	Input LOW Current	0.50			μA	V_{IN} = $V_{IL\ (Min)}$	

DC Electrical Characteristics

V_{EE} = −4.2V, V_{CC} = V_{CCA} = GND, T_C = 0°C to +85°C (Note 3)

Symbol	Parameter	Min	Typ	Max	Units	Conditions (Note 4)	
V_{OH}	Output HIGH Voltage	−1035		−870	mV	V_{IN} = $V_{IH\ (Max)}$ or $V_{IL\ (Min)}$	Loading with 25Ω to −2.0V
V_{OHC}	Output HIGH Voltage	−1045			mV	V_{IN} = $V_{IH\ (Min)}$ or $V_{IL\ (Max)}$	Loading with 25Ω to −2.0V
V_{OL}	Output LOW Voltage Cut-Off State			−2200	mV	V_{IN} = $V_{IH\ (Min)}$ or $V_{IL\ (Max)}$	Loading with 25Ω to −2.3V
V_{IH}	Input HIGH Voltage	−1150		−870	mV	Guaranteed HIGH Signal for All Inputs	
V_{IL}	Input LOW Voltage	−1810		−1475	mV	Guaranteed LOW Signal for All Inputs	
I_{IL}	Input LOW Current	0.50			μA	V_{IN} = $V_{IL\ (Min)}$	

Note 1: Absolute maximum ratings are those values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Parametric values specified at −4.2V to −4.8V.

Note 3: The specified limits represent the "worst case" value for the parameter. Since these "worst case" values normally occur at the temperature extremes, additional noise immunity and guard banding can be achieved by decreasing the allowable system operating ranges.

Note 4: Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

DC Electrical Characteristics

V_{EE} = −4.8V, V_{CC} = V_{CCA} = GND, T_C = 0°C to +85°C (Note 3)

Symbol	Parameter	Min	Typ	Max	Units	Conditions (Note 4)	
V_{OH}	Output HIGH Voltage	−1035		−870	mV	V_{IN} = $V_{IH\ (Max)}$ or $V_{IL\ (Min)}$	Loading with 25Ω to −2.0V
V_{OHC}	Output HIGH Voltage	−1045			mV	V_{IN} = $V_{IH\ (Min)}$ or $V_{IL\ (Max)}$	Loading with 25Ω to −2.0V
V_{OL}	Output LOW Voltage Cut-Off State			−2200	mV	V_{IN} = $V_{IH\ (Min)}$ or $V_{IL\ (Max)}$	Loading with 25Ω to −2.3V
V_{IH}	Input HIGH Voltage	−1165		−880	mV	Guaranteed HIGH Signal for All Inputs	
V_{IL}	Input LOW Voltage	−1830		−1490	mV	Guaranteed LOW Signal for All Inputs	
I_{IL}	Input LOW Current	0.50			μA	V_{IN} = $V_{IL\ (Min)}$	

DC Electrical Characteristics

V_{EE} = −4.2V to −4.8V unless otherwise specified, V_{CC} = V_{CCA} = GND, T_C = 0°C to +85°C

Symbol	Parameter	Min	Typ	Max	Units	Conditions
I_{IH}	Input HIGH Current Common Enable Data and Dual Enable			 330 260	μA	V_{IN} = $V_{IH\ (Max)}$
I_{EE}	Power Supply Current	−235	−170	−113	mA	Inputs Open

Ceramic Dual-In-Line Package AC Electrical Characteristics

V_{EE} = −4.2V to −4.8V, 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	2.00 1.00	4.30 2.40	1.95 1.00	4.30 2.40	2.00 1.10	4.60 2.60	ns	*Figures 1* and *2*
t_{PLH} t_{PHL}	Propagation Delay Dual Enable to Output	2.30 1.40	4.70 3.00	2.00 1.40	4.70 3.00	2.30 1.40	5.10 3.40	ns	
t_{PLH} t_{PHL}	Propagation Delay Common Enable to Output	2.60 1.50	5.40 3.20	2.50 1.50	5.30 3.30	2.80 1.50	5.80 3.60	ns	
t_{TLH} t_{THL}	Transition Time 20% to 80%, 80% to 20%	0.70 0.45	2.10 1.40	0.70 0.45	1.80 1.30	0.70 0.45	2.20 1.40	ns	

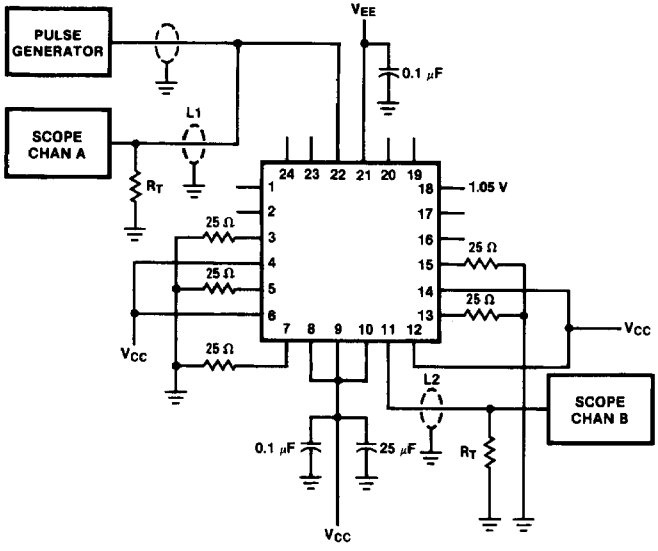
Cerpak AC Electrical Characteristics

V_{EE} = −4.2V to −4.8V, 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	2.00 1.00	4.10 2.20	1.95 1.00	4.10 2.20	2.00 1.10	4.40 2.40	ns	*Figures 1* and *2*
t_{PLH} t_{PHL}	Propagation Delay Dual Enable to Output	2.30 1.40	4.50 2.80	2.00 1.40	4.50 2.80	2.30 1.40	4.90 3.20	ns	
t_{PLH} t_{PHL}	Propagation Delay Common Enable to Output	2.60 1.50	5.20 3.00	2.50 1.50	5.10 3.10	2.80 1.50	5.60 3.40	ns	
t_{TLH} t_{THL}	Transition Time 20% to 80%, 80% to 20%	0.70 0.45	2.00 1.30	0.70 0.45	1.70 1.20	0.70 0.45	2.10 1.30	ns	

Note 3: The specified limits represent the "worst case" value for the parameter. Since these "worst case" values normally occur at the temperature extremes, additional noise immunity and guard banding can be achieved by decreasing the allowable system operating ranges.

Note 4: Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.



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 50Ω to GND

C_L = Fixture and stray capacitance ≤ 3 pF

Pin numbers shown are for flatpak; for DIP see logic symbol

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FIGURE 1. AC Test Circuit

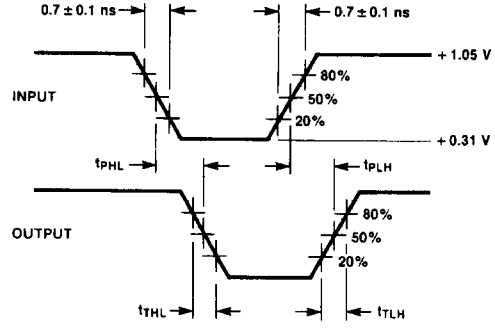

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FIGURE 2. Propagation Delay and Transition Times

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