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10174

Multiplexer

Dual 4-to-1 Multiplexer (with Output Enable)

FEATURES

- Typical propagation delay: 3.5ns
- Typical supply current ($-I_{EE}$): 58mA

DESCRIPTION

The 10174 is a Dual 4-to-1 Multiplexer with output enable input. The 10174 performs two 4-input multiplexer functions. The output of each multiplexer reflects one of the 4 data inputs determined by the states on the two select inputs. An enable input is provided for easy bit expansion by wire-ORing several multiplexers. Each output will go Low with the enable input in the High state. All unused inputs can be left open due to integrated pull-down resistors which avoid the need for a supply voltage.

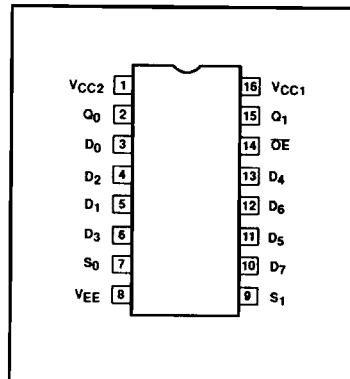
ORDERING INFORMATION

DESCRIPTION	ORDER CODE
16–Pin Plastic DIP	10174N
16–Pin Ceramic DIP	10174F

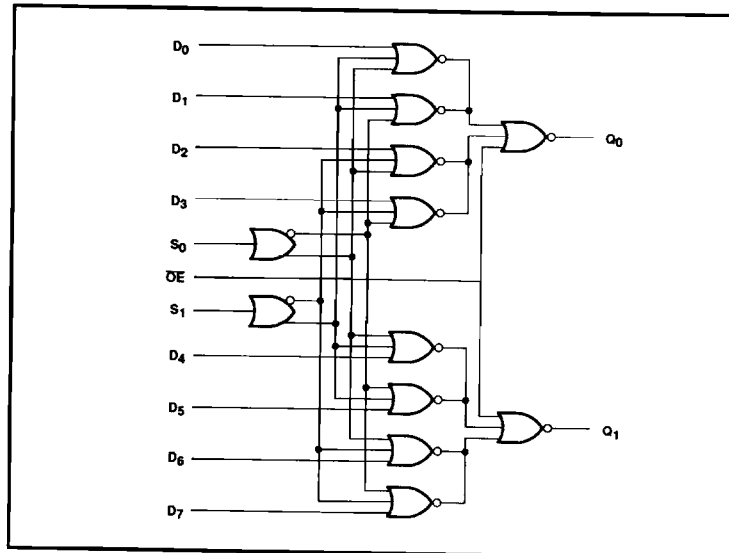
PIN DESCRIPTION

PINS	DESCRIPTION
$D_0 - D_7$	Data Inputs
S_0, S_1	Select Inputs
$\overline{OE}$	Output Enable Input
Q_0, Q_1	Data Outputs

PIN CONFIGURATION



LOGIC DIAGRAM



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FUNCTION TABLE

INPUTS			OUTPUTS	
S ₀	S ₁	OE	Q ₀	Q ₁
L	L	L	D ₀	D ₄
H	L	L	D ₁	D ₅
L	H	L	D ₂	D ₆
H	H	L	D ₃	D ₇
X	X	H	L	L

H = High Voltage Level

L = Low Voltage Level

X = Don't Care

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	LIMITS	UNIT
V _{EE}	Supply voltage	−8.0	V
V _{IN}	Input voltage (V _{IN} should never be more negative than V _{EE})	0 to V _{EE}	V
I _O	Output source current (continuous)	−50	mA
T _S	Storage temperature range	−55 to +150	°C
T _J	Maximum junction temperature	Ceramic Package	+165
		Plastic Package	+150

NOTE:

Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted, these limits are specified over the operating ambient temperature range.

DC OPERATING CONDITIONS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			MIN.	NOM.	MAX.	
V _{CC1} , V _{CC2}	Circuit ground		0	0	0	V
V _{EE}	Supply voltage (negative)			−5.2		V
V _{IH}	High level input voltage	T _A = −30°C			−890	mV
		T _A = +25°C			−810	mV
		T _A = +85°C			−700	mV
V _{IHT}	High level input threshold voltage	T _A = −30°C	−1205			mV
		T _A = +25°C	−1105			mV
		T _A = +85°C	−1035			mV
V _{ILT}	Low level input threshold voltage	T _A = −30°C			−1500	mV
		T _A = +25°C			−1475	mV
		T _A = +85°C			−1440	mV
V _{IL}	Low level input voltage	T _A = −30°C	−1890			mV
		T _A = +25°C	−1850			mV
		T _A = +85°C	−1825			mV
T _A	Operating ambient temperature range		−30	+25	+85	°C

NOTE:

When operating at other than the specified V_{EE} voltage (−5.2V), the DC and AC Electrical Characteristics will vary slightly from specified values.

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DC ELECTRICAL CHARACTERISTICS $V_{CC1} = V_{CC2} = \text{ground}$, $V_{EE} = -5.2V \pm 0.010V$, $T_A = -30^\circ\text{C}$ to $+85^\circ\text{C}$ output loading 50Ω to $-2.0V \pm 0.010V$ unless otherwise specified^{1,3}

SYMBOL	PARAMETER		TEST CONDITIONS ²		LIMITS			UNIT	
					MIN.	TYP.	MAX.		
V _{OH}	High level output voltage		T _A = -30°C	Apply V _{IHMAX} to D ₀ and D ₄ inputs, with V _{ILMIN} applied to all other inputs.	-1060		-890	mV	
			T _A = +25°C		-960		-810	mV	
			T _A = +85°C		-890		-700	mV	
V _{OHT}	High level output threshold voltage		T _A = -30°C	Apply V _{IHT} to D ₀ input, with V _{ILMIN} applied to all other inputs. Measure Q ₀ . Apply V _{IHT} to D ₄ input, with V _{ILMIN} applied to all other inputs.	-1080			mV	
			T _A = +25°C		-980			mV	
			T _A = +85°C		-910			mV	
V _{OLT}	Low level output threshold voltage		T _A = -30°C	Apply V _{IHT} to $\overline{\text{OE}}$ input with V _{ILMIN} applied to all other inputs.			-1655	mV	
			T _A = +25°C				-1630	mV	
			T _A = +85°C				-1595	mV	
V _{OL}	Low level output voltage		T _A = -30°C	Apply V _{IHMAX} to $\overline{\text{OE}}$ input with V _{ILMIN} applied to all other inputs.	-1890		-1675	mV	
			T _A = +25°C		-1850		-1650	mV	
			T _A = +85°C		-1825		-1615	mV	
I _{IH}	High level input current	Other inputs	T _A = -30°C	Apply V _{IHMAX} to each input under test, one at a time, with V _{ILMIN} applied to all other inputs.			350	μA	
			T _A = +25°C				220	μA	
			T _A = +85°C				220	μA	
		$\overline{\text{OE}}$ input	T _A = -30°C	Apply V _{IHMAX} to $\overline{\text{OE}}$ input with V _{ILMIN} applied to all other inputs.			525	μA	
			T _A = +25°C				310	μA	
			T _A = +85°C				330	μA	
I _{IL}	Low level input current		T _A = -30°C	Apply V _{ILMIN} to each input under test, one at a time, with V _{IHMAX} applied to all other inputs.	0.5			μA	
			T _A = +25°C		0.5			μA	
			T _A = +85°C		0.3			μA	
-I _{EE}	V _{EE} supply current		T _A = -30°C				80	mA	
			T _A = +25°C			58	73	mA	
			T _A = +85°C				80	mA	
$\frac{\Delta V_{\text{OH}}}{\Delta V_{\text{EE}}}$	High level output voltage compensation		T _A = +25°C				0.016		V/V
$\frac{\Delta V_{\text{OL}}}{\Delta V_{\text{EE}}}$	Low level output voltage compensation						0.250		V/V
$\frac{\Delta V_{\text{BB}}}{\Delta V_{\text{EE}}}$	Reference bias voltage compensation						0.148		V/V

NOTES:

1. The specified limits represent the worst case values for the parameter. Since these worst case values normally occur at the supply voltage and temperature extremes, additional noise immunity can be achieved by decreasing the allowable operating condition ranges.
2. Conditions for testing shown in the tables are not necessarily worst case. For worst case testing guidelines, refer to DC Testing, Chapter 1, Section 3.
3. The specified limits shown in the DC Electrical Characteristics table can be met only after thermal equilibrium has been established. Thermal equilibrium is established by applying power for at least 2 minutes, while maintaining transverse airflow of 2.5 meters/sec (500 linear feet/min) over the device, mounted either in a test socket or on a printed circuit board. Test voltage values are given in the DC Operating Conditions table.

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AC ELECTRICAL CHARACTERISTICS $V_{CC1} = V_{CC2} = \text{ground}$, $V_{EE} = -5.2V \pm 0.010V$

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS								UNIT
			$T_A = -30^{\circ}\text{C}$		$T_A = +25^{\circ}\text{C}$			$T_A = +85^{\circ}\text{C}$			
			MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
t_{PLH} t_{PHL}	Propagation delay D_n to Q_n	Waveform 1	1.40 1.40	4.80 4.80	1.50 1.50	3.50 3.50	4.50 4.50	1.40 1.40	4.80 4.80	ns ns	
t_{PLH} t_{PHL}	Propagation delay S_n to Q_n		1.90 1.90	6.40 6.40	2.00 2.00	5.00 5.00	6.00 6.00	2.10 2.10	6.40 6.40	ns ns	
t_{PLH} t_{PHL}	Propagation delay E to Q_n		1.00 1.00	3.10 3.10	1.00 1.00	2.00 2.00	2.90 2.90	0.90 0.90	3.20 3.20	ns ns	
t_{TLH} t_{THL}	Transition time 20% to 80%, 80% to 20%		1.00 1.00	3.40 3.40	1.10 1.10	2.00 2.00	3.30 3.30	1.10 1.10	3.60 3.60	ns ns	

NOTE:

For AC test setup information, see AC Testing, Chapter 2, Section 3.

AC WAVEFORMS

