

Philips Components

Document No.	853-0675
ECN No.	99799
Date of Issue	June 14, 1990
Status	Product Specification
ECL Products	

10171 Decoder

Dual 1-of-4 Decoder with One Common and Two Individual Inputs (Active-LOW Outputs)

FEATURES

- Typical propagation delay: 4.0ns
- Typical supply current ($-I_{EE}$): 65mA

DESCRIPTION

The 10171 is a Dual 1-of-4 Decoder with common address inputs, one common (E) and two individual enable (E_0 , E_1) inputs.

The common enable (E), when High, forces all outputs High. All unused inputs can be left open due to integrated pull-down resistors which avoid the need for a supply voltage.

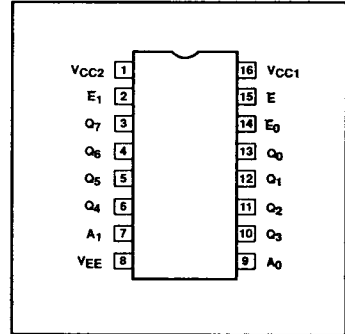
ORDERING INFORMATION

DESCRIPTION	ORDER CODE
16-Pin Plastic DIP	10171N
16-Pin Ceramic DIP	10171F

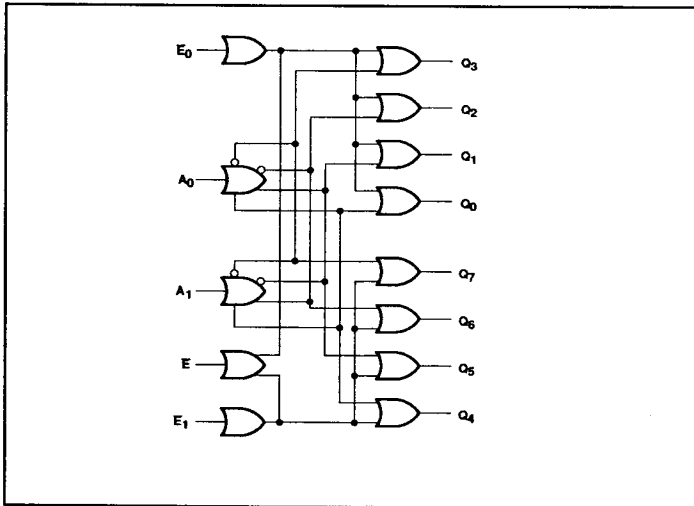
PIN DESCRIPTION

PINS	DESCRIPTION
A_0 , A_1	Address Inputs
E, E_0 , E_1	Enable Inputs
$Q_0 - Q_7$	Data Outputs

PIN CONFIGURATION



LOGIC DIAGRAM



Decoder

10171

FUNCTION TABLE

ENABLE INPUTS			INPUTS		OUTPUTS							
E	E ₀	E ₁	A ₀	A ₁	Q ₄	Q ₅	Q ₆	Q ₇	Q ₀	Q ₁	Q ₂	Q ₃
L	L	L	L	L	L	H	H	H	L	H	H	H
L	L	L	L	H	L	H	H	H	L	H	L	H
L	L	L	L	H	H	L	H	H	L	H	L	H
L	L	L	L	L	H	H	H	H	L	H	H	L
L	L	L	L	L	L	H	H	H	L	H	H	H
L	H	L	L	L	L	H	H	H	H	H	H	H
H	X	X	X	X	H	H	H	H	H	H	H	H

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.

Decoder

10171

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	$T_A = -30^\circ\text{C}$	Apply V_{IHMAX} to E input	-1060		-890	mV
		$T_A = +25^\circ\text{C}$	with V_{ILMIN} applied to	-960		-810	mV
		$T_A = +85^\circ\text{C}$	all other inputs.	-890		-700	mV
V_{OHT}	High level output threshold voltage	$T_A = -30^\circ\text{C}$	Apply V_{IHT} to E input	-1080			mV
		$T_A = +25^\circ\text{C}$	with V_{ILMIN} applied to	-980			mV
		$T_A = +85^\circ\text{C}$	all other inputs.	-910			mV
V_{OLT}	Low level output threshold voltage	$T_A = -30^\circ\text{C}$	For Q_0 and Q_4 outputs, apply V_{ILT} to E			-1655	mV
		$T_A = +25^\circ\text{C}$	input with V_{ILMIN} applied to all other inputs. Apply functional pattern to A_0 and A_1 for			-1630	mV
		$T_A = +85^\circ\text{C}$	other output combinations.			-1595	mV
V_{OL}	Low level output voltage	$T_A = -30^\circ\text{C}$	For Q_0 and Q_4 outputs, apply V_{ILMIN} to	-1890	-1675		mV
		$T_A = +25^\circ\text{C}$	all inputs. Apply functional pattern to A_0	-1850	-1650		mV
		$T_A = +85^\circ\text{C}$	and A_1 for other output combinations.	-1825	-1615		mV
I_{IH}	High level input current	$T_A = -30^\circ\text{C}$	Apply V_{IHMAX} to each input under			350	μA
		$T_A = +25^\circ\text{C}$	test, one at a time, with V_{ILMIN}			220	μA
		$T_A = +85^\circ\text{C}$	applied to all other inputs.			220	μA
I_{IL}	Low level input current	$T_A = -30^\circ\text{C}$	Apply V_{ILMIN} to each input under	0.5			μA
		$T_A = +25^\circ\text{C}$	test, one at a time, with V_{IHMAX}	0.5			μA
		$T_A = +85^\circ\text{C}$	applied to all other inputs.	0.3			μA
$-I_{EE}$	V_{EE} supply current	$T_A = -30^\circ\text{C}$	Apply V_{IHMAX} to inputs.			85	mA
		$T_A = +25^\circ\text{C}$			65	77	mA
		$T_A = +85^\circ\text{C}$				85	mA
$\frac{\Delta V_{OH}}{\Delta V_{EE}}$	High level output voltage compensation	$T_A = +25^\circ\text{C}$			0.016		V/V
$\frac{\Delta V_{OL}}{\Delta V_{EE}}$	Low level output voltage compensation				0.250		V/V
$\frac{\Delta V_{BB}}{\Delta V_{EE}}$	Reference bias voltage compensation				0.148		V/V

NOTES:

- 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.
- 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.
- 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.

Decoder

10171

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 A_0, A_1 to Q_n	Waveform 1	1.50	6.20	1.50	4.00	6.00	1.50	6.40	ns
t_{PLH} t_{PHL}	Propagation delay E, \bar{E}_0, \bar{E}_1 to Q_n		1.50	6.20	1.50	4.00	6.00	1.50	6.40	ns
t_{TLH} t_{THL}	Transition time 20% to 80%, 80% to 20%		1.00	3.30	1.10	2.00	3.30	1.10	3.40	ns

NOTE:

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

AC WAVEFORMS

