

Philips Components

Document No.	853-0661
ECN No.	99799
Date of Issue	June 14, 1990
Status	Product Specification
ECL Products	

10132 Multiplexer/Latch

Dual 2-Input Multiplexer with Clocked D-Type Latches and Common Reset

FEATURES

- Typical propagation delay: 3.0ns
- Typical supply current ($-I_{EE}$): 44mA

DESCRIPTION

The 10132 is a Dual 2-Input Multiplexer with Clocked D-type Latches and a Common Reset. The Latch can be clocked by the common Clock (CP) when the Clock Enable input (CE) is Low or by the Clock Enable input when the common Clock is held in the Low-State. The outputs are latched by the positive transition of the Clock. Any change at the data input will be registered at the output only if the Clock is Low.

Data inputs are selected by a common data Select (S). All unused inputs must be tied Low to V_{IL} or V_{EE} .

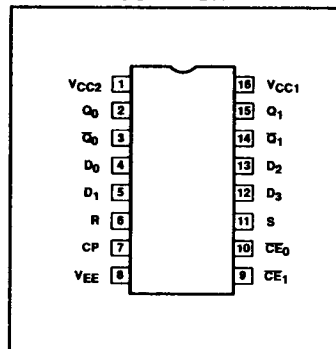
ORDERING INFORMATION

DESCRIPTION	ORDER CODE
16-Pin Plastic DIP	10132N
16-Pin Ceramic DIP	10132F

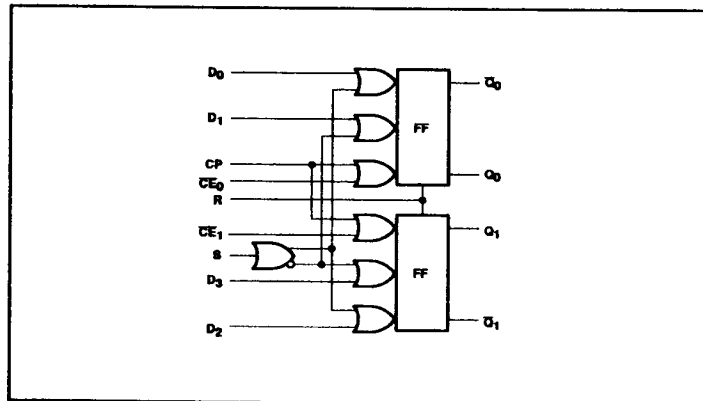
PIN DESCRIPTION

PINS	DESCRIPTION
$D_0 - D_3$	Data Inputs
CP	Clock Input
$\overline{CE}_0, \overline{CE}_1$	Clock Enable Inputs
S	Data Select Input
R	Reset Input
$Q_0, Q_1, \overline{Q}_0, \overline{Q}_1$	Data Outputs

PIN CONFIGURATION



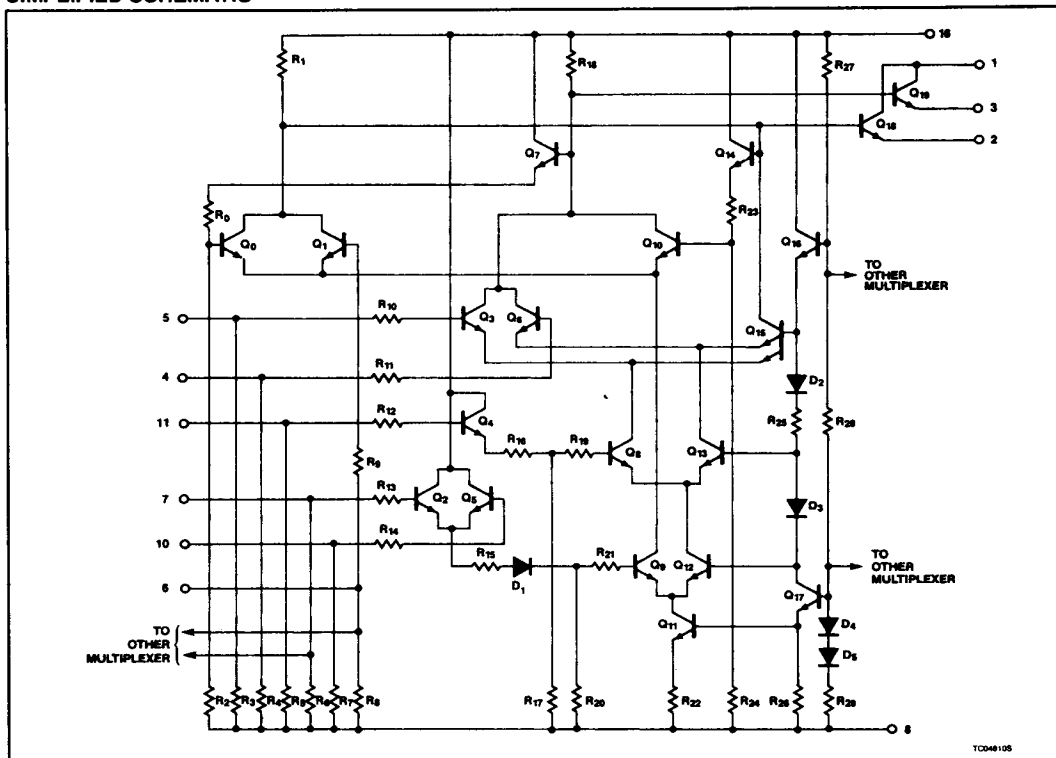
LOGIC DIAGRAM



Multiplexer/Latch

10132

SIMPLIFIED SCHEMATIC



TC048105

FUNCTION TABLE

INPUTS				OUTPUT
R	S	CP*	CE*	Q_{n+1}
L	L	L	L	D_0
L	L	L	H	Q_n
L	L	H	L	Q_n
L	L	H	H	Q_n
L	H	L	L	D_1
L	H	H	L	Q_n
L	H	H	H	Q_n
H	X	X	H	L
H	X	H	X	L
H	X	L	L	Q_n

* Conditions for CP and CE may be interchanged as indicated in the function table.

H = High Voltage Level

L = Low Voltage Level

X = Don't Care

Multiplexer/Latch**10132****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	°C
		Plastic Package	+150	°C

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	$T_A = -30^\circ\text{C}$			-890	mV
		$T_A = +25^\circ\text{C}$			-810	mV
		$T_A = +85^\circ\text{C}$			-700	mV
V_{HT}	High level input threshold voltage	$T_A = -30^\circ\text{C}$	-1205			mV
		$T_A = +25^\circ\text{C}$	-1105			mV
		$T_A = +85^\circ\text{C}$	-1035			mV
V_{ILT}	Low level input threshold voltage	$T_A = -30^\circ\text{C}$			-1500	mV
		$T_A = +25^\circ\text{C}$			-1475	mV
		$T_A = +85^\circ\text{C}$			-1440	mV
V_{IL}	Low level input voltage	$T_A = -30^\circ\text{C}$	-1890			mV
		$T_A = +25^\circ\text{C}$	-1850			mV
		$T_A = +85^\circ\text{C}$	-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.

Multiplexer/Latch

10132

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 50 Ω 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	$T_A = -30^\circ\text{C}$	For Q_n outputs, apply V_{IHMAX} to D_0 input with	-1060		-890	mV
		$T_A = +25^\circ\text{C}$	V_{ILMIN} applied to all other inputs. For $\overline{Q}_n$	-960		-810	mV
		$T_A = +85^\circ\text{C}$	outputs, apply V_{ILMIN} to all inputs.	-890		-700	mV
V_{OHT}	High level output threshold voltage	$T_A = -30^\circ\text{C}$	For Q_n outputs, apply V_{IHT} to D_0 input with	-1080			mV
		$T_A = +25^\circ\text{C}$	V_{ILMIN} applied to all other inputs. For $\overline{Q}_n$	-980			mV
		$T_A = +85^\circ\text{C}$	outputs, apply V_{ILT} to D_0 input with	-910			mV
V_{OLT}	Low level output threshold voltage	$T_A = -30^\circ\text{C}$	For Q_n outputs, apply V_{ILT} to D_0 input with			-1655	mV
		$T_A = +25^\circ\text{C}$	V_{ILMIN} applied to all other inputs. For $\overline{Q}_n$			-1630	mV
		$T_A = +85^\circ\text{C}$	outputs, apply V_{IHT} to D_0 input with			-1595	mV
V_{OL}	Low level output voltage	$T_A = -30^\circ\text{C}$	For Q_n outputs, apply V_{ILMIN} to all inputs. For	-1890		-1675	mV
		$T_A = +25^\circ\text{C}$	$\overline{Q}_n$ outputs, apply V_{IHMAX} to D_0 input with	-1850		-1650	mV
		$T_A = +85^\circ\text{C}$	V_{ILMIN} applied to all other inputs.	-1825		-1615	mV
I_{IH}	High level input current	D_n inputs	$T_A = -30^\circ\text{C}$			460	μA
			$T_A = +25^\circ\text{C}$			290	μA
			$T_A = +85^\circ\text{C}$			290	μA
		R input	$T_A = -30^\circ\text{C}$			620	μA
			$T_A = +25^\circ\text{C}$			390	μA
			$T_A = +85^\circ\text{C}$			390	μA
		CP input	$T_A = -30^\circ\text{C}$			460	μA
			$T_A = +25^\circ\text{C}$			290	μA
			$T_A = +85^\circ\text{C}$			290	μA
		S, $\overline{CE}_n$ inputs	$T_A = -30^\circ\text{C}$			425	μA
			$T_A = +25^\circ\text{C}$			265	μA
			$T_A = +85^\circ\text{C}$			265	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	$T_A = -30^\circ\text{C}$				60	mA
		$T_A = +25^\circ\text{C}$			44	55	mA
		$T_A = +85^\circ\text{C}$				60	mA

Multiplexer/Latch

10132

DC ELECTRICAL CHARACTERISTICS (Continued)

SYMBOL	PARAMETER	TEST CONDITIONS ²	LIMITS			UNIT
			MIN.	TYP.	MAX.	
$\frac{\Delta V_{OH}}{\Delta V_{EE}}$	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.

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

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 , $\overline{Q}_n$	Waveform 1, 2	1.00 1.00	3.60 3.60	1.00 1.00	3.00 3.00	3.30 3.30	1.00 1.00	3.70 3.70	ns ns
t_{PLH} t_{PHL}	Propagation delay R to Q_n , $\overline{Q}_n$		1.00 1.00	4.00 4.00	1.00 1.00		3.80 3.80	1.00 1.00	4.20 4.20	ns ns
t_{PLH} t_{PHL}	Propagation delay CP to Q_n , $\overline{Q}_n$		1.00 1.00	6.00 6.00	1.00 1.00		5.70 5.70	1.00 1.00	6.30 6.30	ns ns
t_{PLH} t_{PHL}	Propagation delay S to Q_n , $\overline{Q}_n$		1.00 1.00	4.80 4.80	1.00 1.00		4.60 4.60	1.00 1.00	5.00 5.00	ns ns
t_s	Setup time D_n to CP		2.50		2.50			2.50		ns
t_h	Hold time D_n to CP		1.50		1.50			1.50		ns
t_s	Setup time S to CP		3.50		3.50			3.50		ns
t_h	Hold time S to CP		1.00		1.00			1.00		ns
t_{TLH} t_{THL}	Transition time 20% to 80%, 80% to 20%		1.50 1.50	3.70 3.70	1.50 1.50		3.50 3.50	1.50 1.50	3.80 3.80	ns ns

NOTE:

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

Multiplexer/Latch

10132

AC WAVEFORMS

