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NTE7482 Integrated Circuit TTL, 2-Bit Binary Full Adder

Description:

The NTE7482 is a 2-bit binary full adder in a 14-Lead DIP type package that performs the addition of two 2-bit binary numbers. The sum (Σ) outputs are provided for each bit and the resultant carry (C2) is obtained from the second bit. Designed for medium-to-high-speed, multiple-bit, parallel-add/serial-carry applications, this circuit utilizes high-speed, high-fan-out transistor-transistor logic (TTL) and is compatible with both DTL and TTL logic families. The implementation of a single-inversion, high-speed, Darlington-connected serial-carry circuit within each bit minimizes the necessity for extensive "look-ahead" and carry-cascading circuits.

Applications:

- Digital Computer Systems
- Data-Handling Systems
- Control Systems

Absolute Maximum Ratings: ($T_A = 0^\circ$ to $+70^\circ\text{C}$ unless otherwise specified)

Supply Voltage (Note 1), V_{CC}	7V
Input Voltage (Note 2), V_{IN}	5.5V
Operating Ambient Temperature Range, T_A	0° to $+70^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+150^\circ\text{C}$

Note 1. Voltage values are with respect to network GND terminal.

Note 2. Input signals must be zero or positive with respect to network ground terminal.

Recommended Operating Conditions:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_{CC}		4.75	5.0	5.25	V
High-Level Output Current $\Sigma 1$ or $\Sigma 2$	I_{OH}		-	-	-400	μA
			C2	-	-	-200
Low-Level Output Current $\Sigma 1$ or $\Sigma 2$	I_{OL}		-	-	16	mA
			C2	-	-	8
Operating Ambient Temperature	T_A		0	-	70	$^\circ\text{C}$

Electrical Characteristics: (Note 3, Note 4)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
High-Level Input Voltage	V_{IH}			2	-	-	V
Low-Level Input Voltage	V_{IL}			-	-	0.8	V
High-Level Output Voltage $\Sigma 1$ or $\Sigma 2$	V_{OH}	$V_{CC} = \text{MIN},$ $V_{IH} = 2\text{V},$ $V_{IL} = 0.4\text{V}$	$I_{OH} = -400\mu\text{A}$	2.4	3.5	-	V
C2			$I_{OH} = -200\mu\text{A}$	2.4	3.5	-	V
Low-Level Output Voltage $\Sigma 1$ or $\Sigma 2$	V_{OL}	$V_{CC} = \text{MIN},$ $V_{IH} = 2\text{V},$ $V_{IL} = 0.4\text{V}$	$I_{OL} = 16\text{mA}$	-	0.2	0.4	V
C2			$I_{OL} = 8\text{mA}$	-	0.2	0.4	V
Input Current	I_I	$V_{CC} = \text{Max}, V_I = 5.5\text{V}$		-	-	1	mA
High-Level Input Current A1, B1, or C0	I_{IH}	$V_{CC} = \text{Max}, V_I = 2.4\text{V}$		-	-	160	μA
A2 or B2				-	-	40	μA
Low-Level Input Current A1, B1, or C0	I_{IL}	$V_{CC} = \text{Max}, V_I = 0.4\text{V}$		-	-	-6.4	mA
A2 or B2				-	-	-1.6	mA
Short Circuit Output Current $\Sigma 1$ or $\Sigma 2$	I_{OS}	$V_{CC} = \text{Max}, \text{Note 5}$		-18	-	-55	mA
C2				-18	-	-70	mA
Supply Current	I_{CC}	$V_{CC} = \text{Max}, \text{Note 6}$		-	35	58	mA

Note 3. For conditions shown as Min and Max, use the appropriate value specified under recommended operating conditions.

Note 4. All typical values are at $V_{CC} = 5\text{V}, T_A = +25^\circ\text{C}$.

Note 5. Not more than one output should be shorted at a time.

Note 6. I_{CC} is measured with outputs open, B1 and B2 grounded, and 4.5V applied to A1, A2, and C0.

Switching Characteristics: ($V_{CC} = 5\text{V}, T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	From(Input)	To(Output)	Test Conditions	Min	Typ	Max	Unit
Propagation Delay Time	t_{PLH}	C0	$\Sigma 1$	$R_L = 400\Omega,$ $C_L = 15\text{pF}$	-	-	34	ns
	t_{PHL}				-	-	40	ns
Propagation Delay Time	t_{PLH}	B2	$\Sigma 2$		-	-	40	ns
	t_{PHL}				-	-	35	ns
Propagation Delay Time	t_{PLH}	C0	$\Sigma 2$		-	-	38	ns
	t_{PHL}				-	-	42	ns
Propagation Delay Time	t_{PLH}	C0	C2	$R_L = 780\Omega,$ $C_L = 15\text{p}$	-	12	19	ns
	t_{PHL}				-	17	27	ns

Function Table:

Inputs				Outputs					
				When C0 = L			When C0 = H		
A1	B1	A2	B2	$\Sigma 1$	$\Sigma 2$	C2	$\Sigma 1$	$\Sigma 2$	C2
L	L	L	L	L	L	L	H	L	L
H	L	L	L	H	L	L	L	H	L
L	H	L	L	H	L	L	L	H	L
H	H	L	L	L	H	L	H	H	L
L	L	H	L	L	H	L	H	H	L
H	L	H	L	H	H	L	L	L	H
L	H	H	L	H	H	L	L	L	H
H	H	H	L	L	L	H	H	L	H
L	L	L	H	L	H	L	H	H	L
H	L	L	H	H	H	L	L	L	H
L	H	L	H	H	H	L	L	L	H
H	H	L	H	L	L	H	H	L	H
L	L	H	H	L	L	H	H	L	H
H	L	H	H	H	L	H	L	H	H
L	H	H	H	H	L	H	L	H	H
H	H	H	H	L	H	H	H	H	H

H = High level, L = Low level

Pin Connection Diagram



