TYPES SN5482, SN7482
2-BIT BINARY FULL ADDERS

BULLETIN NO. DL-S 7211836, DECEMBER 1972

For applications in:

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

logic

FUNCTION TABLE

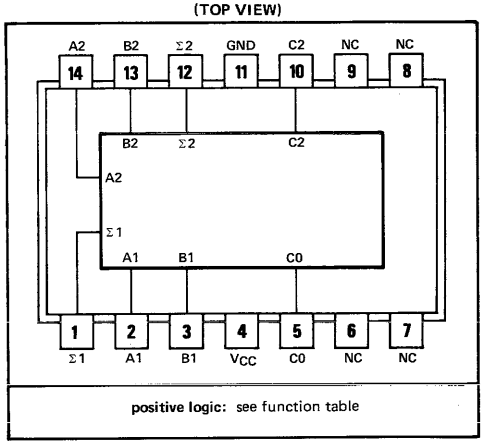
INPUTS				OUTPUTS					
				WHEN C0 = L			WHEN C0 = H		
A1	B1	A2	B2	Σ1	Σ2	C2	Σ1	Σ2	C2
L	L	L	L	L	L	L	H	L	L
H	L	L	L	H	L	L	L	H	L
L	H	L	L	H	L	L	L	H	L
H	H	L	L	L	H	L	H	H	L
L	L	H	L	L	H	L	H	H	L
H	L	H	L	H	H	L	L	L	H
L	H	H	L	H	H	L	L	L	H
H	H	H	L	L	L	H	H	L	H
L	L	L	H	L	H	L	H	H	L
H	L	L	H	H	H	L	L	L	H
L	H	L	H	H	H	L	L	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

description

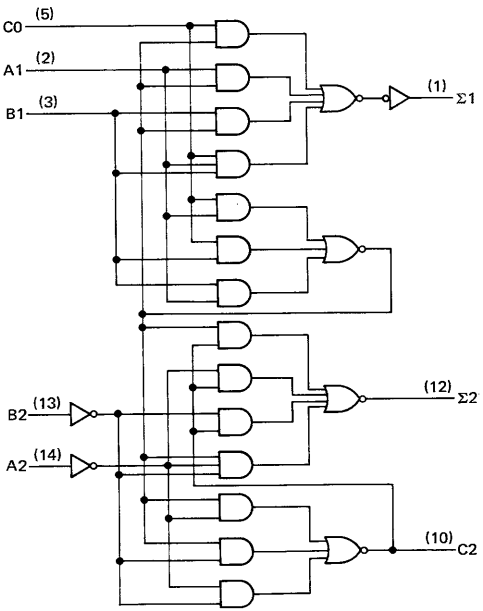
These full adders perform the addition of two 2-bit binary numbers. The sum (Σ) outputs are provided for each bit and the resultant carry (C2) is obtained from the second bit. Designed for medium-to-high-speed, multiple-bit, parallel-add/serial-carry applications, these circuits utilize high-speed, high-fan-out transistor-transistor logic (TTL) and are 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.

SN5482 . . . J OR W PACKAGE
SN7482 . . . J OR N PACKAGE
(TOP VIEW)



NC—No internal connection

functional block diagram



7

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage (see Note 2) . . . . . 5.5 V
Operating free-air temperature range: SN5482 Circuits . . . . . −55°C to 125°C
SN7482 Circuits . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTES: 1. Voltage values are with respect to network ground terminal.
2. Input signals must be zero or positive with respect to network ground terminal.

recommended operating conditions

		SN5482			SN7482			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}		4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}	Σ1 or Σ2			−400			−400	μA
	C2			−200			−200	
Low-level output current, I_{OL}	Σ1 or Σ2			16			16	mA
	C2			8			8	
Operating free-air temperature, T_A		−55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER			TEST CONDITIONS†		SN5482			SN7482			UNIT
					MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IH}	High-level input voltage				2			2			V
V_{IL}	Low-level input voltage						0.8			0.8	V
V_{OH}	High-level output voltage	Σ1 or Σ2	V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = 0.4 V	I_{OH} = −400 μA	2.4	3.4		2.4	3.4		V
		C2		I_{OH} = −200 μA							
V_{OL}	Low-level output voltage	Σ1 or Σ2	V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = 0.4 V	I_{OL} = 16 mA		0.2	0.4		0.2	0.4	V
		C2		I_{OL} = 8 mA							
I_I	Input current at maximum input voltage		V_{CC} = MAX, V_I = 5.5 V				1			1	mA
I_{IH}	High-level input current	A1, B1, or C0	V_{CC} = MAX, V_I = 2.4 V				160			160	μA
		A2 or B2					40			40	
I_{IL}	Low-level input current	A1, B1, or C0	V_{CC} = MAX, V_I = 0.4 V				−6.4			−6.4	mA
		A2 or B2					−1.6			−1.6	
I_{OS}	Short-circuit output current§	Σ1 or Σ2	V_{CC} = MAX		−20		−55	−18		−55	mA
		C2			−20		−70	−18		−70	
I_{CC}	Supply current		V_{CC} = MAX, See Note 3			35	50		35	58	mA

†For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
‡All typical values are at V_{CC} = 5 V, T_A = 25°C.
§Not more than one output should be shorted at a time.
NOTE 3: I_{CC} is measured with outputs open, B1 and B2 grounded, and 4.5 V applied to A1, A2, and C0.

7

TEXAS INSTRUMENTS
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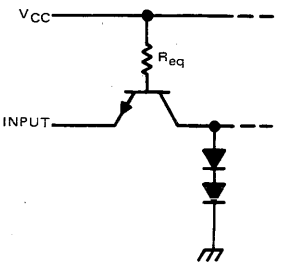
switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 4)

PARAMETER¶	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	C0	Σ1	C_L = 15 pF, R_L = 400 Ω			34	ns
t_{PHL}						40	
t_{PLH}	B2	Σ2				40	ns
t_{PHL}						35	
t_{PLH}	C0	Σ2				38	ns
t_{PHL}						42	
t_{PLH}	C0	C2	C_L = 15 pF, R_L = 780 Ω		12	19	ns
t_{PHL}					17	27	

¶ t_{PLH} ≡ propagation delay time, low-to-high-level output
t_{PHL} ≡ propagation delay time, high-to-low-level output
NOTE 4: Load circuit and voltage waveforms are shown on page 3-10.

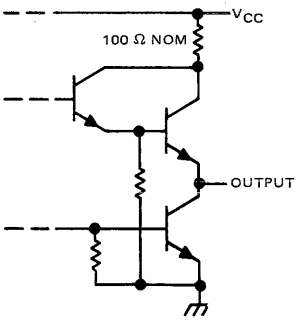
schematics of inputs and outputs

EQUIVALENT OF ALL INPUTS

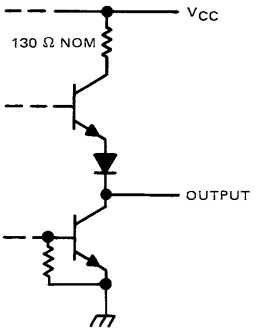


A1, B1, C0: R_{eq} = 1 kΩ NOM
A2, B2: R_{eq} = 4 kΩ NOM

C2 OUTPUT



Σ1 AND Σ2 OUTPUTS



7