



DESCRIPTION — The SN54LS/74LS385 is a general-purpose adder/subtractor which is useful as a companion part to the SN54LS/74LS384 two's-complement multiplier. The LS385 contains four independent adder/subtractor elements with common clock and clear.

Each of four independent sum (Σ) outputs reflects the respective A and B input and is controlled by the S/\bar{A} pin.

When low, the clear input asynchronously resets the sum flip-flop low and the carry flip-flop either high in the subtract mode or low in the add mode. The clock is positive-edge triggered and controls the sum and carry flip-flops.

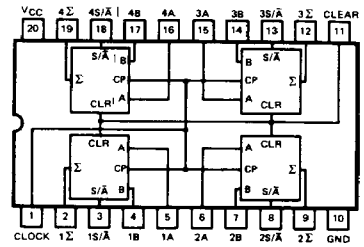
- FOUR SYNCHRONOUS ELEMENTS IN A SINGLE 20-PIN PACKAGE
- INDEPENDENT TWO'S-COMPLEMENT ADDITION/SUBTRACTION
- BUFFERED CLOCK AND DIRECT CLEAR INPUTS

SN54LS385 SN74LS385

QUADRUPLE SERIAL ADDERS/SUBTRACTORS

LOW POWER SCHOTTKY

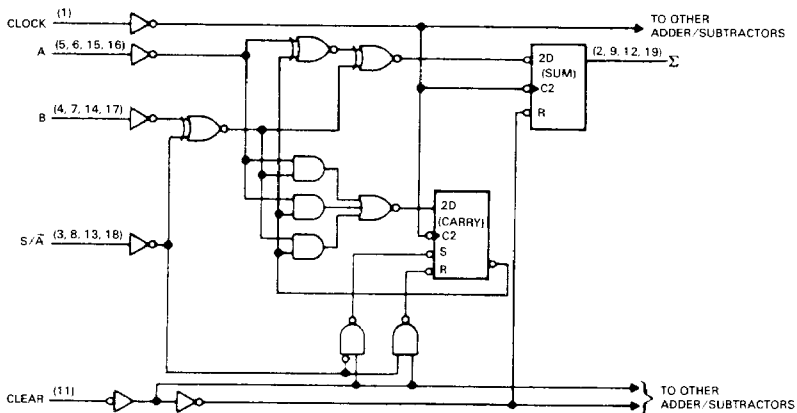
CONNECTION DIAGRAM DIP (TOP VIEW)



J Suffix — Case 732-03 (Ceramic)
N Suffix — Case 738-01 (Plastic)

5

BLOCK DIAGRAM



FUNCTION TABLE

SELECTED FUNCTION	INPUTS				INTERNAL CARRY D INPUT		OUTPUT	
	CLEAR	S/ \bar{A}	A	B	CLOCK	BEFORE \uparrow	AFTER \uparrow	AFTER \uparrow
Clear	L	L	X	X	X	L	L	L
	L	H	X	X	X	H	H	L
Add	H	L	L	L	\uparrow	L	L	L
	H	L	L	L	\uparrow	H	L	H
	H	L	L	H	\uparrow	L	L	H
	H	L	L	H	\uparrow	H	H	L
	H	L	H	L	\uparrow	L	L	H
	H	L	H	L	\uparrow	H	H	L
	H	L	H	H	\uparrow	L	H	L
Subtract	H	H	L	L	\uparrow	L	L	H
	H	H	L	L	\uparrow	H	H	L
	H	H	L	H	\uparrow	L	L	L
	H	H	L	H	\uparrow	H	L	H
	H	H	H	L	\uparrow	L	H	L
	H	H	H	L	\uparrow	H	H	H
	H	H	H	H	\uparrow	L	L	H

H = high level, L = low level, X = irrelevant,
 \uparrow = transition from low to high level at the clock input

GUARANTEED OPERATING RANGES

SYMBOL	PARAMETER		MIN	TYP	MAX	UNIT
V _{CC}	Supply Voltage	54	4.5	5.0	5.5	V
		74	4.75	5.0	5.25	
T _A	Operating Ambient Temperature Range	54	-55	25	125	°C
		74	0	25	70	
I _{OH}	Output Current — High	54,74			-0.4	mA
I _{OL}	Output Current — Low	54			4.0	mA
		74			8.0	

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER	LIMITS			UNITS	TEST CONDITIONS	
		MIN	TYP	MAX			
V _{IH}	Input HIGH Voltage	2.0			V	Guaranteed Input HIGH Voltage for All Inputs	
V _{IL}	Input LOW Voltage	54		0.7	V	Guaranteed Input LOW Voltage for All Inputs	
		74		0.8			
V _{IK}	Input Clamp Diode Voltage		-0.65	-1.5	V	V _{CC} = MIN, I _{IN} = -18 mA	
V _{OH}	Output HIGH Voltage	54	2.5	3.5	V	V _{CC} = MIN, I _{OH} = MAX, V _{IN} = V _{IH} or V _{IL} per Truth Table	
		74	2.7	3.5	V		
V _{OL}	Output LOW Voltage	54,74		0.25	0.4	I _{OL} = 4.0 mA I _{OL} = 8.0 mA	V _{CC} = V _{CC} MIN, V _{IN} = V _{IL} or V _{IH} per Truth Table
		74		0.35	0.5		
I _{IH}	Input HIGH Current			20	μA	V _{CC} = MAX, V _{IN} = 2.7 V	
I _{IL}	Input LOW Current			0.1	mA	V _{CC} = MAX, V _{IN} = 7.0 V	
I _{OS}	Short Circuit Current	-20		-100	mA	V _{CC} = MAX, V _{IN} = 0.4 V	
I _{CC}	Power Supply Current			75	mA	V _{CC} = MAX	

AC CHARACTERISTICS: T_A = 25°C, V_{CC} = 5.0 V

SYMBOL	PARAMETER	LIMITS			UNITS	TEST CONDITIONS
		MIN	TYP	MAX		
f _{MAX}	Maximum Clock Frequency	30	40		MHz	V _{CC} = 5.0 V C _L = 15 pF
t _{PLH}	Propagation Delay, Clock to Σ		14	22	ns	
t _{PHL}	Propagation Delay, Clear to Σ		18	27	ns	
t _{PHL}	Propagation Delay, Clear to Σ		18	30	ns	

AC SETUP REQUIREMENTS: T_A = 25°C, V_{CC} = 5.0 V

SYMBOL	PARAMETER	LIMITS			UNITS	TEST CONDITIONS
		MIN	TYP	MAX		
t _W	Clock Pulse Width	16			ns	V _{CC} = 5.0 V
t _s	Setup Time	10			ns	
t _h	Hold Time	0			ns	