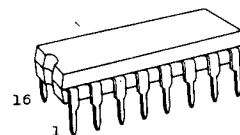


TC4032BP TRIPLE SERIAL ADDER (POSITIVE LOGIC ADDER)
TC4038BP TRIPLE SERIAL ADDER (NEGATIVE LOGIC ADDER)

TC4032BP and TC4038BP are tripple serial adders having common CLOCK input and CARRY RESET input to all the adders.
Each adder has two SERIAL DATA inputs (A_n and B_n; n=1 ~ 3), INVERT input and SUM output. When INVERT input is "L", both TC4032BP and TC4038BP perform positive addition and when it is "H", negative addition is performed.
CARRY of TC4032BP is triggered by rising edge of CLOCK and CARRY of TC4038BP is triggered by falling edge of CLOCK.

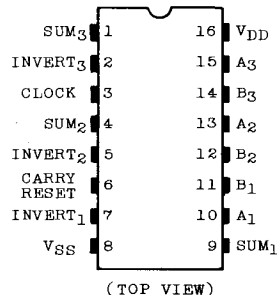


DIP16(3D16A-F)

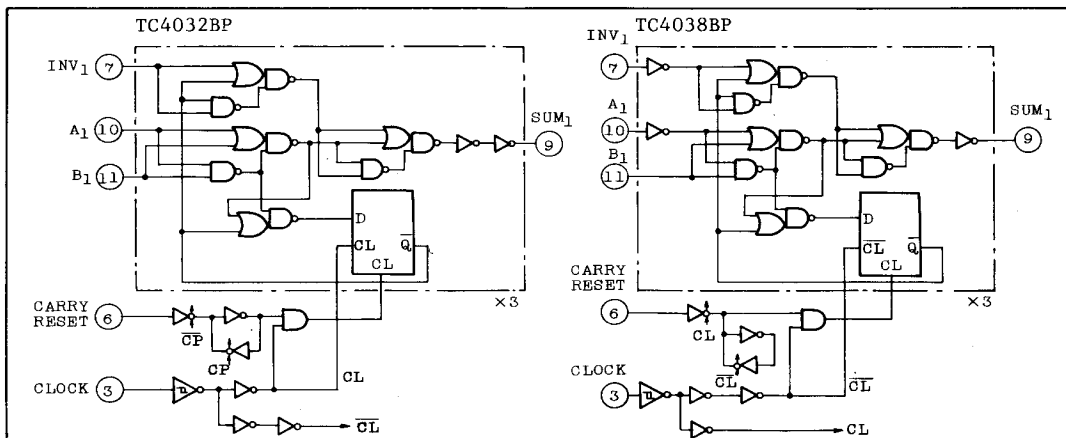
ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V _{DD}	V _{SS} -0.5 ~ V _{SS} +20	V
Input Voltage	V _{IN}	V _{SS} -0.5 ~ V _{DD} +0.5	V
Output Voltage	V _{OUT}	V _{SS} -0.5 ~ V _{DD} +0.5	V
DC Input Current	I _{IN}	±10	mA
Power Dissipation	P _D	300	mW
Operating Temperature Range	T _A	-40 ~ 85	°C
Storage Temperature Range	T _{stg}	-65 ~ 150	°C
Lead Temp./Time	T _{sol}	260°C . 10 sec	

PIN ASSIGNMENT



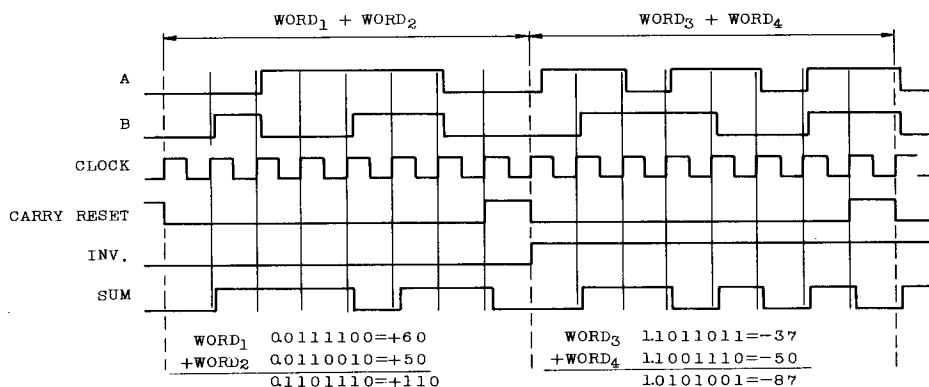
LOGIC DIAGRAM



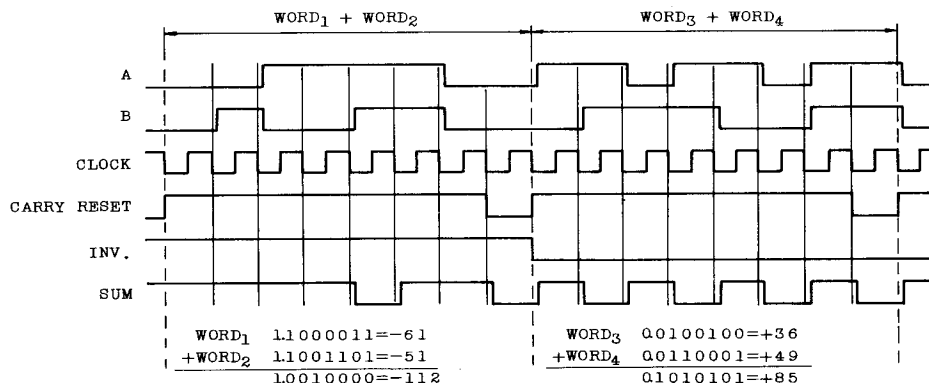
TC4032BP, TC4038BP

TIMING DIAGRAM

TC4032BP



TC4038BP



RECOMMENDED OPERATING CONDITIONS (V_{SS}=0V)

CHARACTERISTIC	SYMBOL		MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V _{DD}		3	-	18	V
Input Voltage	V _{IN}		0	-	V _{DD}	V

STATIC ELECTRICAL CHARACTERISTICS ($V_{SS}=0V$)

CHARACTERISTIC	SYM-BOL	TEST CONDITION	V _{DD} (V)	-40°C		25°C			85°C		UNIT
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Output Voltage	V _{OH}	$ I_{OUT} < 1\mu A$ $V_{IN}=V_{SS}, V_{DD}$	5	4.95	-	4.95	5.00	-	4.95	-	V
			10	9.95	-	9.95	10.00	-	9.95	-	
			15	14.95	-	14.95	15.00	-	14.95	-	
Low-Level Output Voltage	V _{OL}	$ I_{OUT} < 1\mu A$ $V_{IN}=V_{SS}, V_{DD}$	5	-	0.05	-	0.00	0.05	-	0.05	
			10	-	0.05	-	0.00	0.05	-	0.05	
			15	-	0.05	-	0.00	0.05	-	0.05	
Output High Current	I _{OH}	V _{OH} =4.6V	5	-0.61	-	-0.51	-1.0	-	-0.42	-	mA
		V _{OH} =2.5V	5	-2.5	-	-2.1	-4.0	-	-1.7	-	
		V _{OH} =9.5V	10	-1.5	-	-1.3	-2.2	-	-1.1	-	
		V _{OH} =13.5V	15	-4.0	-	-3.4	-9.0	-	-2.8	-	
		V _{IN} =V _{SS} , V _{DD}									
Output Low Current	I _{OL}	V _{OL} =0.4V	5	0.61	-	0.51	1.5	-	0.42	-	
		V _{OL} =0.5V	10	1.5	-	1.3	3.8	-	1.1	-	
		V _{OL} =1.5V	15	4.0	-	3.4	15.0	-	2.8	-	
		V _{IN} =V _{SS} , V _{DD}									
Input High Voltage	V _{IH}	V _{OUT} =0.5V, 4.5V	5	3.5	-	3.5	2.75	-	3.5	-	V
		V _{OUT} =1.0V, 9.0V	10	7.0	-	7.0	5.5	-	7.0	-	
		V _{OUT} =1.5V, 13.5V	15	11.0	-	11.0	8.25	-	11.0	-	
		$ I_{OUT} < 1\mu A$									
Input Low Voltage	V _{IL}	V _{OUT} =0.5V, 4.5V	5	-	1.5	-	2.25	1.5	-	1.5	
		V _{OUT} =1.0V, 9.0V	10	-	3.0	-	4.5	3.0	-	3.0	
		V _{OUT} =1.5V, 13.5V	15	-	4.0	-	6.75	4.0	-	4.0	
		$ I_{OUT} < 1\mu A$									
Input Current	"H" Level	I _{IH} V _{IH} =18V	18	-	0.1	-	10 ⁻⁵	0.1	-	1.0	μA
	"L" Level	I _{IL} V _{IL} =0V	18	-	-0.1	-	-10 ⁻⁵	-0.1	-	-1.0	
Quiescent Device Current	I _{DD}	V _{IN} =V _{SS} , V _{DD} *	5	-	5	-	0.005	5	-	150	μA
			10	-	10	-	0.010	10	-	300	
			15	-	20	-	0.015	20	-	600	

* All valid input combinations.

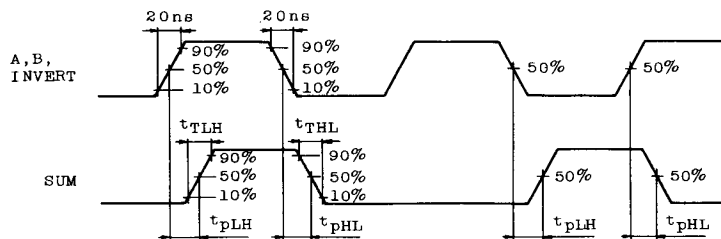
TC4032BP, TC4038BP

DYNAMIC ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, $V_{SS}=0\text{V}$, $C_L=50\text{pF}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{DD} (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t_{TLH}		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Output Transition Time (High to Low)	t_{THL}		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Propagation Delay Time (CLOCK - SUM)	t_{PLH} t_{PHL}		5	-	240	650	ns
			10	-	95	350	
			15	-	70	300	
Propagation Delay Time (A,B,INV - SUM)	t_{PLH} t_{PHL}		5	-	330	660	ns
			10	-	130	260	
			15	-	95	190	
Max. Clock Frequency	f_{CL}		5	2.5	5	-	MHz
			10	5	10	-	
			15	6	12	-	
Max. Clock Input Rise Time	t_{rCL}		5	No Limit			μs
Max. Clock Input Fall Time	t_{fCL}		10				
			15				
Min. Set-up Time (A,B - CLOCK)	t_{SU}		5	-	80	200	ns
			10	-	30	80	
			15	-	20	60	
Input Capacitance	C_{IN}			-	5	7.5	pF

WAVEFORMS FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

WAVEFORM 1.



WAVEFORMS FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS (Continued)

