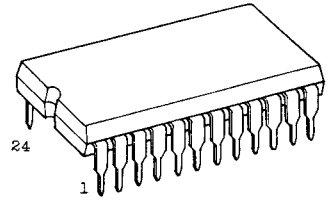
TC4514BP, TC4515BP

C²MOS DIGITAL INTEGRATED CIRCUIT
SILICON MONOLITHIC

TC4514BP 4-BIT LATCH/4-TO-16 LINE DECODER (Output Active High Option)
TC4515BP 4-BIT LATCH/4-TO-16 LINE DECODER (Output Active Low Option)

TC4514BP and TC4515BP are decoders which convert 4 bit binary input signal to hexadecimal output signal and these have the decode inhibit input and the latch function.
TC4514BP gives "H" level only to the selected output among 16 outputs and TC4515BP gives "L" only to the selected output. When INHIBIT input is "H", the selected output does not exist making all the outputs "L" for TC4514BP and all the outputs "H" for TC4515BP. When STROBE input is "H", the output corresponding to DATA 1 through DATA 4 are selected and latched by the transition of STROBE from "H" to "L".

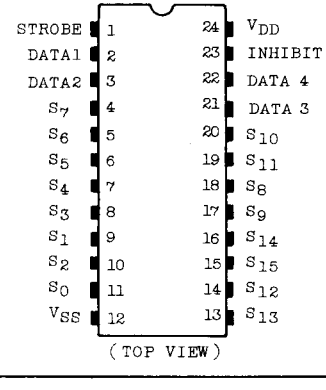


DIP 24 (6D24A-P)

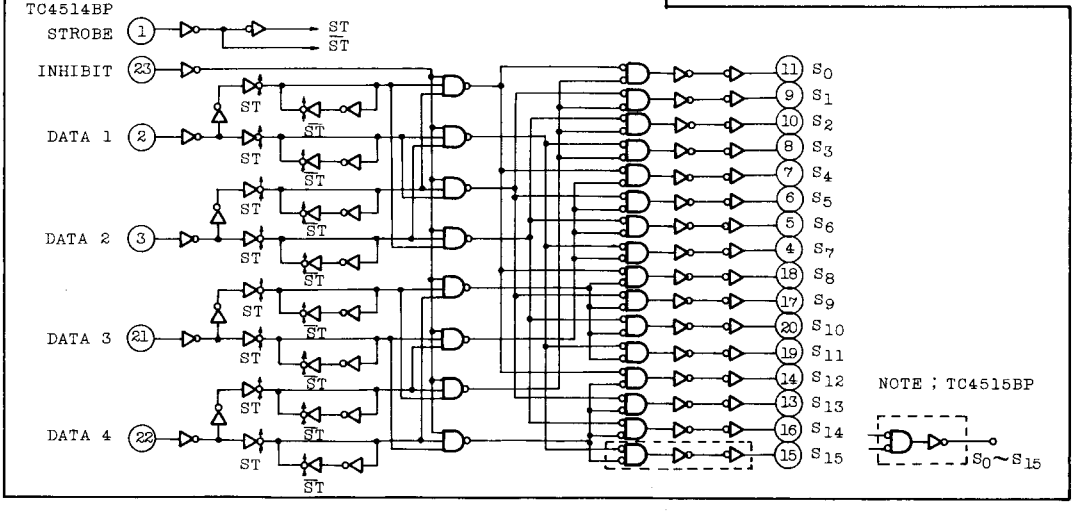
ABSOLUTE MAXIMUM RATINGS

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 · 10sec	

PIN ASSIGNMENT



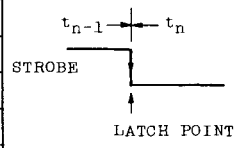
LOGIC DIAGRAM



TRUTH TABLE

INHIBIT	DATA INPUT				SELECTED OUTPUT TC4514BP - "H" TC4515BP - "L"
	$DATA_1$	$DATA_2$	$DATA_3$	$DATA_4$	
L	L	L	L	L	S_0
L	H	L	L	L	S_1
L	L	H	L	L	S_2
L	H	H	L	L	S_3
L	L	L	H	L	S_4
L	H	L	H	L	S_5
L	L	H	H	L	S_6
L	H	H	H	L	S_7
L	L	L	L	H	S_8
L	H	L	L	H	S_9
L	L	H	L	H	S_{10}
L	H	H	L	H	S_{11}
L	L	L	H	H	S_{12}
L	H	L	H	H	S_{13}
L	L	H	H	H	S_{14}
L	H	H	H	H	S_{15}
H	*	*	*	*	TC4514BP-ALL OUTPUTS "L" TC4515BP-ALL OUTPUTS "H"

- STROBE="H" ; See Truth table
- STROBE="L" ; Outputs hold the data when STROBE goes "LOW"



- * Don't care

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	SYMBOL	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	

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

CHARACTERISTIC	SYM-BOL	TEST CONDITION	V_{DD} (V)	-40°C MIN.	-40°C MAX.	25°C MIN.	25°C TYP.	25°C MAX.	85°C MIN.	85°C MAX.	UNIT
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	-	1.13	-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	-	
		$\|I_{OUT}\|$ <1μA									
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	
		$\|I_{OUT}\|$ <1μA									
Input Current "H" Level	I_{IH}	V_{IH}=18V	18	-	0.1	-	10^{-5}	0.1	-	1.0	μA
Input Current "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.

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta=25°C, V_{SS}=0V, C_L=50pF)

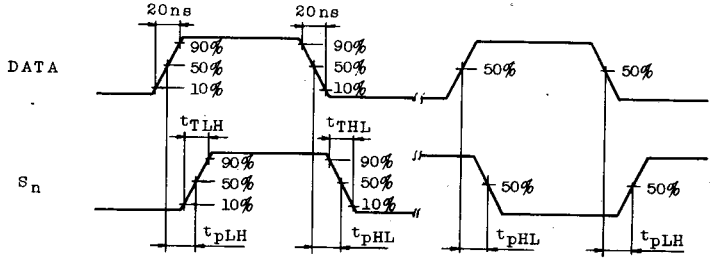
CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{DD}(V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t_{TLH}		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	

DYNAMIC ELECTRICAL CHARACTERISTICS (Ta=25°C, V_{SS}=0V, C_L=50pF)

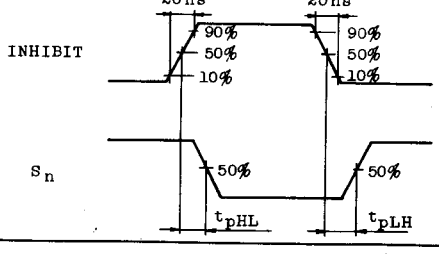
CHARACTERISTIC	SYMBOL	TEST CONDITION	V_{DD} (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (High to Low)	t_{THL}		5	-	80	200	ns
			10	-	50	100	
			15	-	40	80	
Propagation Delay Time (STROBE, DATA - Sn)	t_{pLH} t_{pHL}		5	-	260	970	ns
			10	-	110	370	
			15	-	80	270	
Propagation Delay Time (INHIBIT - Sn)	t_{pLH} t_{pHL}		5	-	150	500	
			10	-	65	220	
			15	-	50	170	
Min. Pulse Width (STROBE)	t_{WH}		5	-	40	250	ns
			10	-	20	100	
			15	-	15	75	
Min. Hold Time (DATA - STROBE)	t_{SU}		5	-	20	150	ns
			10	-	10	70	
			15	-	5	40	
Input Capacitance	C_{IN}			-	5	7.5	pF

WAVEFORMS FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

WAVEFORM 1



WAVEFORM 2



WAVEFORMS FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

WAVEFORM 3