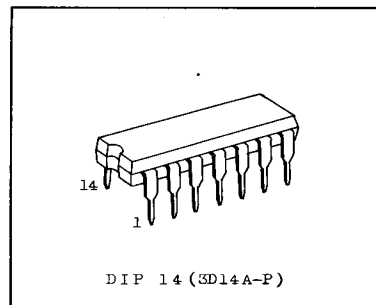


TC40117BP PROGRAMMABLE DUAL 4-BIT TERMINATOR

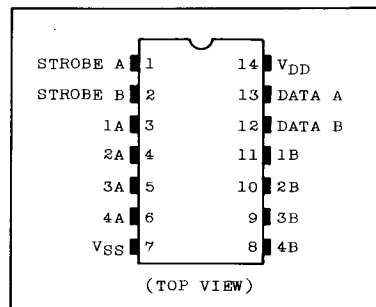
TC40117BP contains independent two 4-bit Programmable Terminators that are capable of terminating a data bus to a high or low state. They can also terminate any open or unused CMOS logic input to the last driven logic state when used with 3-state logic or during a power down condition. The terminator reduces power consumption by eliminating pull up or pull down resistors. When the STROBE input is held low, the terminated input/output latches the last DATA input until the terminated input/output changes state. When STROBE input is held high and DATA input is kept high or low, the terminated input/output stay in a high or low logic state respectively. It also has a wide operating voltage range of 2~18 Volt that allows designers to use it in the battery driving system.

MAXIMUM RATINGS

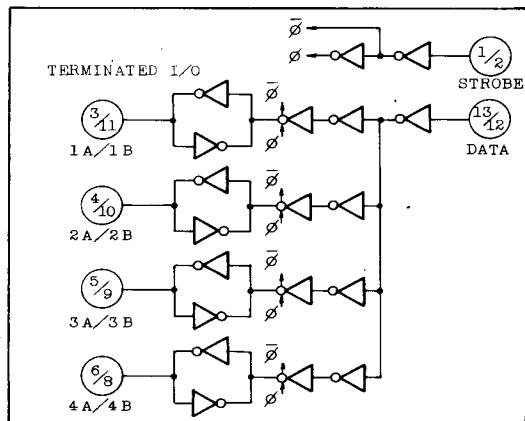
CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	V _{DD}	V _{SS} -0.5 ~ V _{SS} +20	V
Input Voltage	V _{IN}	V _{SS} -0.5 ~ V _{DD} +0.5	V
Output Voltage	V _{OUT}	V _{SS} -0.5 ~ V _{DD} +0.5	V
DC Input Current	I _{IN}	±10	mA
Power Dissipation	P _D	300	mW
Storage Temperature	T _{stg}	-65 ~ 150	°C
Lead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



PIN ASSIGNMENT



LOGIC DIAGRAM



TRUTH TABLE

INPUTS		TERMINATED I/O			
STROBE	DATA	1A(B)	2A(B)	3A(B)	4A(B)
H	L	L*	L*	L*	L*
H	H	H**	H**	H**	H**
L	X	*	*	*	*

H=High Level

L=Low Level

X=Don't Care

*Terminator retains the last data state during strobo if its inputs are high impedance state.

If inputs are not in high impedance state. Then Terminator follows the last driven state ("H" or "L" on its input/output)

.. Equivalent to pull-down resistor

.. Equivalent to pull-up resistor

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	V _{DD}		2	-	18	V
Input Voltage	V _{IN}		0	-	V _{DD}	V
Operating Temperature	T _A		-40	-	85	°C

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

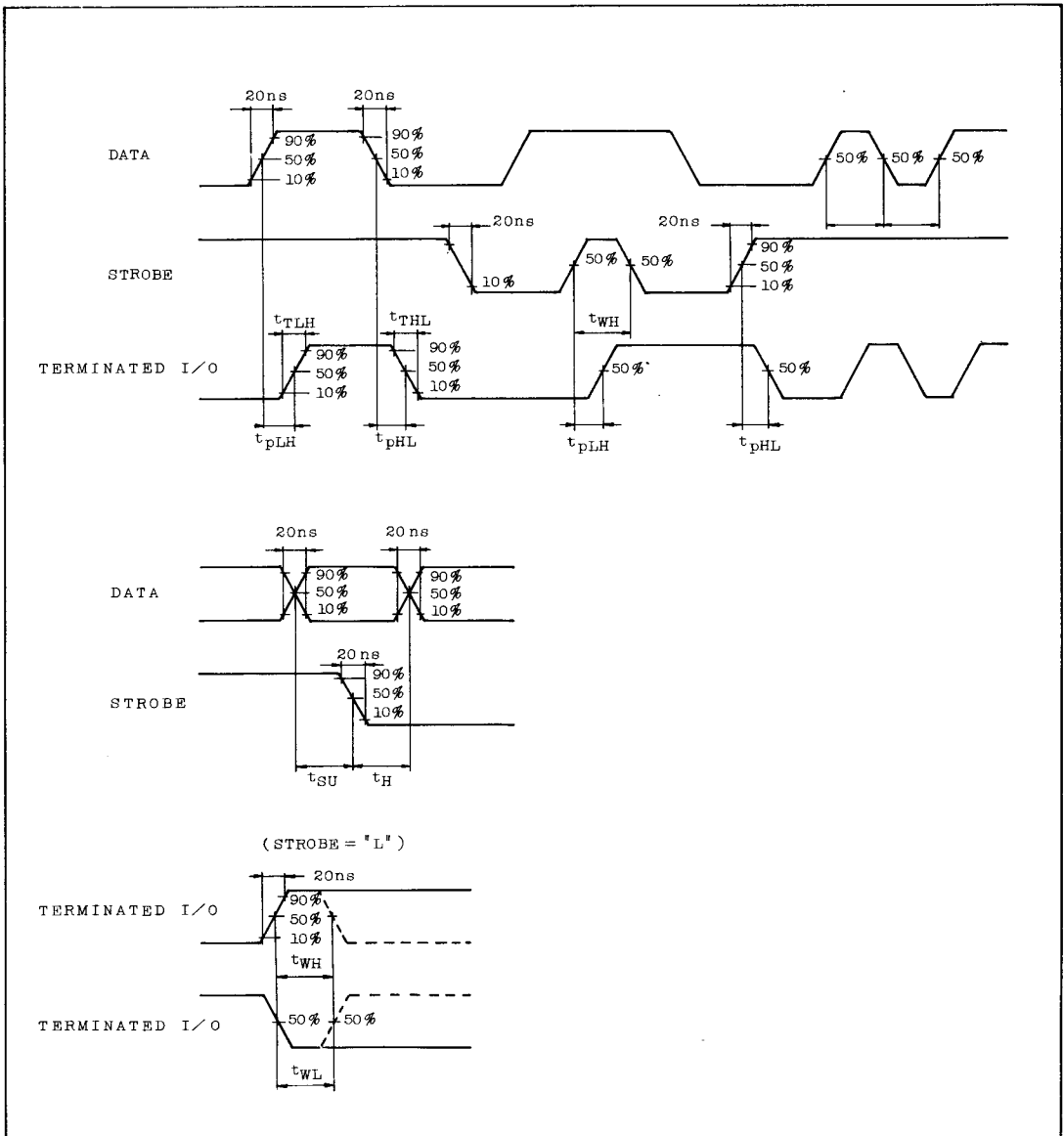
CHARACTERISTIC		SYMBOL	TEST CONDITIONS	V _{DD} (V)	-40°C		25°C			85°C		UNIT
					MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Output Voltage	V _{OH}	I _{OUT} < 1μA V _{IN} =V _{SS} , V _{DD}	5	4.95	-	4.95	5.00	-	4.95	-	V	
			10	9.95	-	9.95	10.00	-	9.95	-		
			15	14.95	-	14.95	15.00	-	14.95	-		
Low-Level Output Voltage	V _{OL}	I _{OUT} < 1μA V _{IN} =V _{SS} , V _{DD}	5	-	0.05	-	0.00	0.05	-	0.05	V	
			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	-12	-	-12	-35	-	-9	-	μA	
		V _{OH} =9.5V	10	-30	-	-30	-70	-	-25	-		
		V _{OH} =13.5V	15	-125	-	-125	-260	-	-102	-		
		V _{IN} =V _{SS} , V _{DD}										
Output Low Current	I _{OL}	V _{OL} =0.4V	5	12	-	12	35	-	9	-	μA	
		V _{OL} =0.5V	10	30	-	30	85	-	25	-		
		V _{OL} =1.5V	15	125	-	125	320	-	102	-		
		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	
		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
	"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	-	0.25	-	0.001	0.25	-	7.5	μA	
			10	-	0.5	-	0.001	0.5	-	15		
			15	-	1.0	-	0.002	1.0	-	30		

* All valid input combinations

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

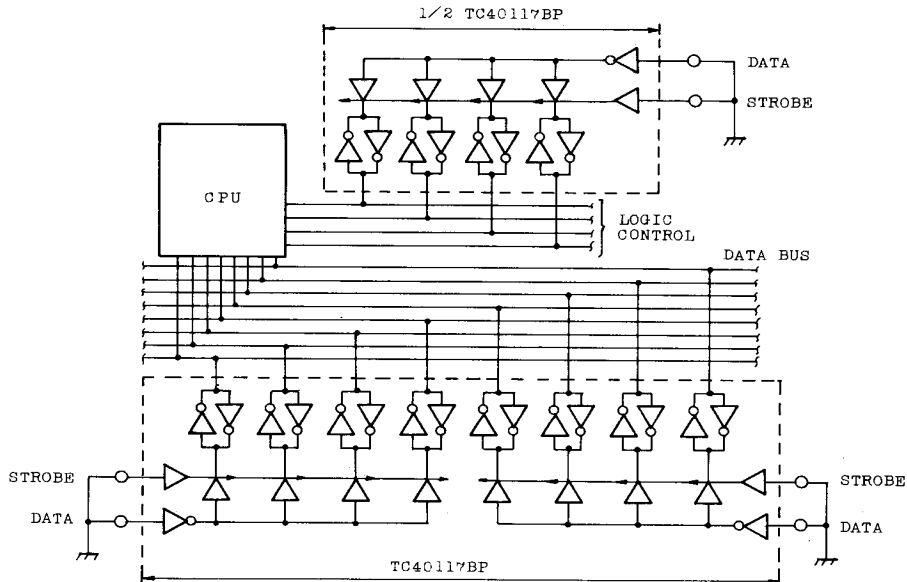
CHARACTERISTIC	SYMBOL	TEST CONDITION	V _{DD} (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	t _{TLH}		5	-	2.1	6.6	μs
			10	-	1.0	3.2	
			15	-	0.8	2.2	
Output Transition Time (High to Low)	t _{THL}		5	-	2.1	6.6	
			10	-	1.0	3.2	
			15	-	0.8	2.2	
Propagation Delay Time (STROBE, DATA-A,B)	t _{PLH}		5	-	0.9	3.0	μs
			10	-	0.45	1.25	
			15	-	0.35	1.0	
Propagation Delay Time (STROBE, DATA-A,B)	t _{PHL}		5	-	1.25	3.4	
			10	-	0.55	1.7	
			15	-	0.35	1.15	
Minimum Pulse Width (STROBE)	t _{WH}		5	-	0.9	3.0	μs
			10	-	0.35	1.2	
			15	-	0.25	0.95	
Minimum Pulse Width (DATA)	t _{WH} t _{WL}		5	-	3.6	7.2	
			10	-	1.8	3.6	
			15	-	1.35	2.7	
Minimum Pulse Width (TERMINATED I/O)	t _{WH} t _{WL}		5	-	30	-	ns
			10	-	45	-	
			15	-	55	-	
Minimum Set-Up Time (DATA-STROBE)	t _{SU}		5	-	930	1860	ns
			10	-	380	760	
			15	-	230	460	
Minimum Hold Time (DATA-STROBE)	t _H		5	-	-6	-	ns
			10	-	-4	-	
			15	-	-3	-	
Input Capacitance	C _{IN}			-	5	7.5	pF

WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS

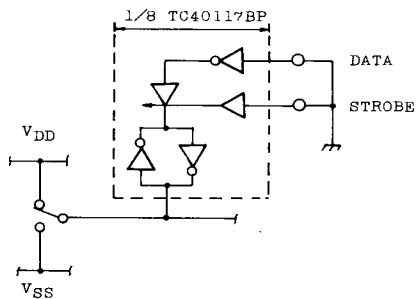


TYPICAL APPLICATIONS

(1) APPLICATION FOR TERMINATING AN 8-BIT DATA BUS LINE OF CPU



(2) APPLICATION FOR ANTI-BOUNCE CIRCUIT



(3) APPLICATION FOR INTERFACE CIRCUIT BETWEEN TTL OUTPUT AND CMOS INPUT

