Features

- Typical propagation delay: 20nS
- Wide power supply range: 2 - 6V
- Low quiescent current: 80μA maximum
- Low input current: 1μA maximum
- Fan out of 10 LS-TTL loads

Description

The PT74HC138 decoder utilizes advanced silicon-gate CMOS technology and is well suited to memory address decoding or data routing applications. The circuit features high noise immunity and low power consumption usually associated with CMOS circuitry, yet has speeds comparable to low power Schottky TTL logic.

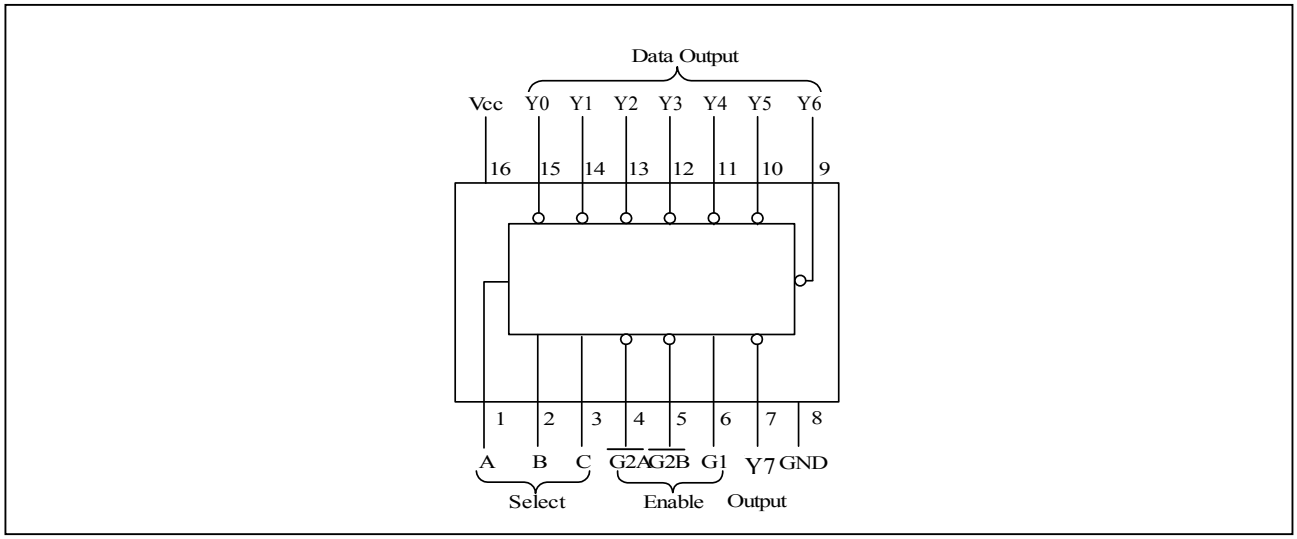
The PT74HC138 has 3 binary select inputs (A, B and C). If the device is enabled, these inputs determine which one of the eight normally HIGH outputs will go LOW. Two active LOW and one active HIGH enables (G1, $\overline{G2A}$ and $\overline{G2B}$) are provided to ease the cascading of decoders.

The decoder's outputs can drive 10 low power Schottky TTL equivalent loads and are functionally pin equivalent to the 74LS138. All inputs are protected from damage due to static discharge by internal diode clamps to V_{CC} and ground.

Ordering Information

Ordering No.	Package
PT74HC138W	SOIC-16
PT74HC138WE	Lead free SOIC-16
PT74HC138P	PDIP-16
PT74HC138PE	Lead free PDIP-16

Pin Information

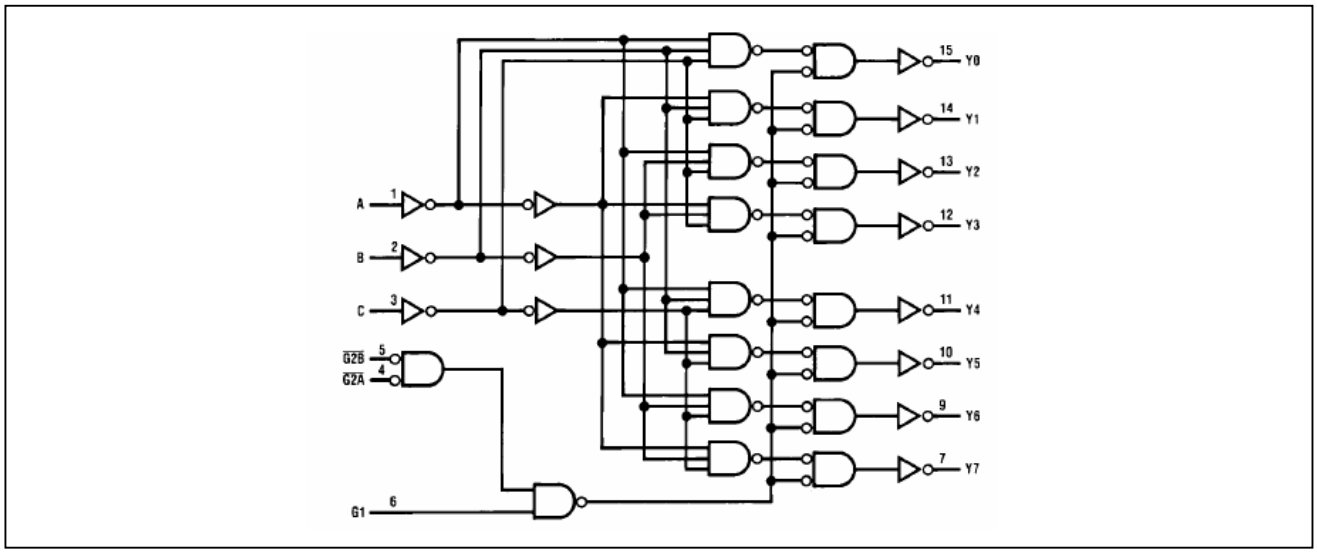


Truth table

Inputs					Outputs							
Enable		Select										
G1	$\overline{G2}$(Note)	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
X	H	X	X	X	H	H	H	H	H	H	H	H
L	X	X	X	X	H	H	H	H	H	H	H	H
H	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	H	H	L	H	H	H	H	H	H
H	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	H	H	H	H	H	L	H	H	H	H
H	L	H	L	L	H	H	H	H	L	H	H	H
H	L	H	L	H	H	H	H	H	H	L	H	H
H	L	H	H	L	H	H	H	H	H	H	L	H
H	L	H	H	H	H	H	H	H	H	H	H	L

H=HIGH Level, L=LOW Level, X=Don't care.
Note: $\overline{G2}$=G2A+G2B

Logic Diagram



Maximum Ratings

Storage Temperature	-65°C to +150°C
Ambient Temperature with Power Applied	-40°C to +85°C
Supply Voltage to Ground Potential (V_{CC} to GND)	-0.5V to 7.0V
DC Input Voltage (V_{IN})	-1.5V to V_{CC}+1.5V
DC Output Voltage (V_{OUT})	-0.5V to V_{CC} +0.5V
Clamp Diode Current (I_{IK}, I_{OK})	±20mA
DC Output Current, per pin (I_{OUT})	±25mA
DC V_{CC} or GND Current, per pin (I_{CC})	±50mA
Power Dissipation (P_D) *	600mW
S. O. Package only	500mV

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

* Power Dissipation temperature derating - plastic *PDIP* package: -12mW/°C from 65°C to 85°C.

Recommended operation conditions

Sym	Description	Test Conditions	Min	Typ	Max	Unit
V_{cc}	Supply voltage	-	2.0	-	6.0	V
V_{IN}, V_{OUT}	DC input or output voltage	-	0.0	-	Vcc	V
T_A	Operating temperature	-	-40	-	85	℃
T_r, T_f	Input rise or fall time	Vcc=2.0V	-	-	1000	nS
		Vcc=4.5V	-	-	500	
		Vcc=6.0V	-	-	400	

DC Electrical Characteristics

Sym	Parameter	Test Conditions	V_{CC}	T_A=25℃	T_A= -40 to 85℃	Unit
				Typ	Guaranteed Limits	
V_{IH}	Minimum High Level Input Voltage	-	2.0V 4.5V 6.0V	-	1.5 3.15 4.2	1.5 3.15 4.2	V
V_{IL}	Maximum LOW Level Input Voltage	-	2.0V 4.5V 6.0V	-	0.5 1.35 1.8	0.5 1.35 1.8	V
V_{OH}	Minimum High Level Output Voltage	V_{IN} =V_{IH} or V_{IL} $\|I_{OUT}\| \le 20$ μA	2.0V 4.5V 6.0V	2.0 4.5 6.0	1.9 4.4 5.9	1.9 4.4 5.9	V
		V_{IN} =V_{IH} or V_{IL} $\|I_{OUT}\| \le 4.0$ mA $\|I_{OUT}\| \le 5.2$ mA	4.5V 6.0V	4.2 5.7	3.98 5.48	3.84 5.34	V
V_{OL}	Maximum LOW Level Output Voltage	V_{IN}=V_{IH} $\|I_{OUT}\| \le 20$ μA	2.0V 4.5V 6.0V	0 0 0	0.1 0.1 0.1	0.1 0.1 0.1	V
		V_{IN} =V_{IH} $\|I_{OUT}\| \le 4.0$ mA $\|I_{OUT}\| \le 5.2$ mA	4.5V 6.0V	0.2 0.2	0.26 0.26	0.33 0.33	V
I_{IN}	Maximum Input Current	V_{IN} =V_{CC} or GND	6.0V	-	±0.1	±0.1	μA
I_{CC}	Maximum Quiescent Supply Current	V_{IN} =V_{CC} or GND I_{OUT} = 0 μA	6.0V	-	8	80	μA

AC Electrical Characteristics

(V_{CC}= 5V, T_A= 25^{0}C, C_L=15pF, t_r=t_f= 6nS, Unless otherwise noted.)

Symbol	Parameter	Conditions	Typ	Guaranteed Limit	Units
t_{PLH}	Maximum Propagation Delay, Binary select to any output	-	18	25	nS
t_{PHL}	Maximum Propagation Delay, Binary select to any output	-	28	35	nS
t_{PLH}, t_{PHL}	Maximum Propagation Delay, G1 to any output	-	18	25	nS
t_{PHL}	Maximum propagation Dealay $\overline{G2A}$ or $\overline{G2B}$ to output	-	23	30	nS
t_{PLH}	Maximum propagation Dealay $\overline{G2A}$ or $\overline{G2B}$ to output	-	18	25	nS

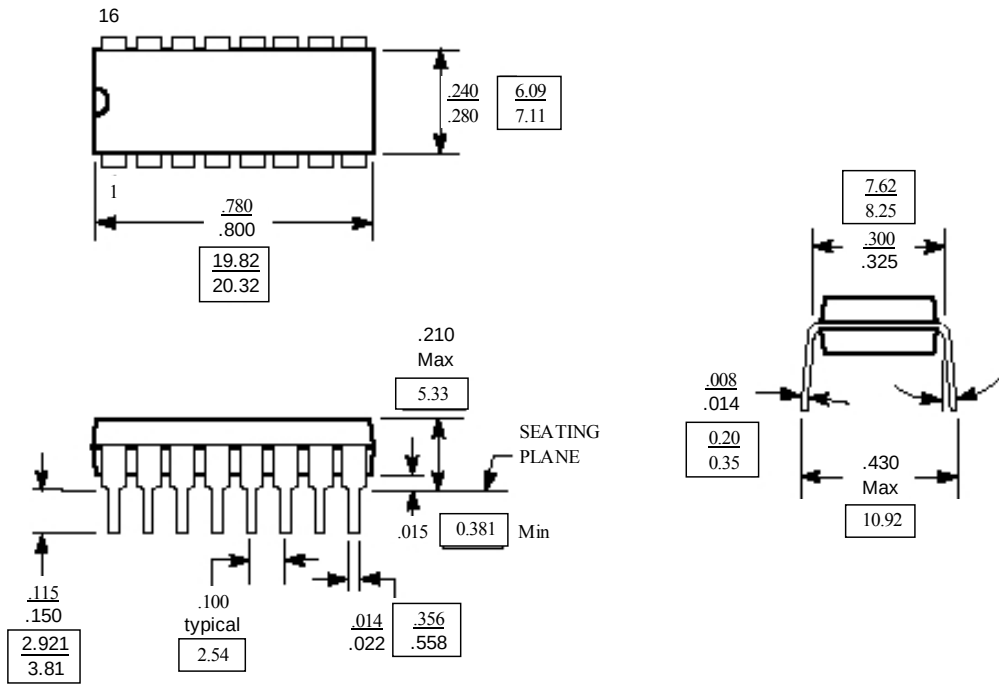
(V_{CC}=2.0V to 6.0V, C_L=50pF, tr=tf=6nS, Unless otherwise noted.)

Sym	Parameter	Conditions	V_{CC}	T_A=25^{0}C		T_A= -40 to 85^{0}C	Units
				Typ	GuaranteedLimits		
t_{PLH}	Maximum propagation Delay Binary Select to any output LOW-to-HIGH	-	2.0V 4.5V 6.0V	75 15 13	150 30 26	189 38 32	nS
t_{PHL}	Maximum Propagation Delay Binary Select to any output HIGH-to-LOW	-	2.0V 4.5V 6.0V	100 20 17	200 40 34	252 50 43	nS
t_{PHL}, t_{PLH}	Maximum Propagation Delay G1 to any output	-	2.0V 4.5V 6.0V	75 15 13	150 30 26	189 38 32	nS
t_{PHL}	Maximum Propagation Delay $\overline{G2A}$ or $\overline{G2B}$ to output	-	2.0V 4.5V 6.0V	82 28 22	175 35 30	221 44 37	nS
t_{PLH}	Maximum Propagation Delay $\overline{G2A}$ or $\overline{G2B}$ to output	-	2.0V 4.5V 6.0V	75 15 13	150 30 26	189 38 32	nS
t_{TLH}, t_{THL}	Output Rise and Fall Time	-	2.0V 4.5V 6.0V	30 8 7	75 15 13	95 19 16	nS
C_{PD}	Power Dissipation Capacitance (**Note**)	-	-	75	-	-	pF
C_{IN}	Maximum Input Capacitance	-	-	3	10	10	pF

Note: C_{PD} determines the no load dynamic power consumption, P_D=$C_{PD}V_{CC}^2f$ + $I_{CC}V_{CC}$, and the no load dynamic current consumption. I_S= $C_{PD}V_{CC}f$ + I_{CC}.

Mechanical Information

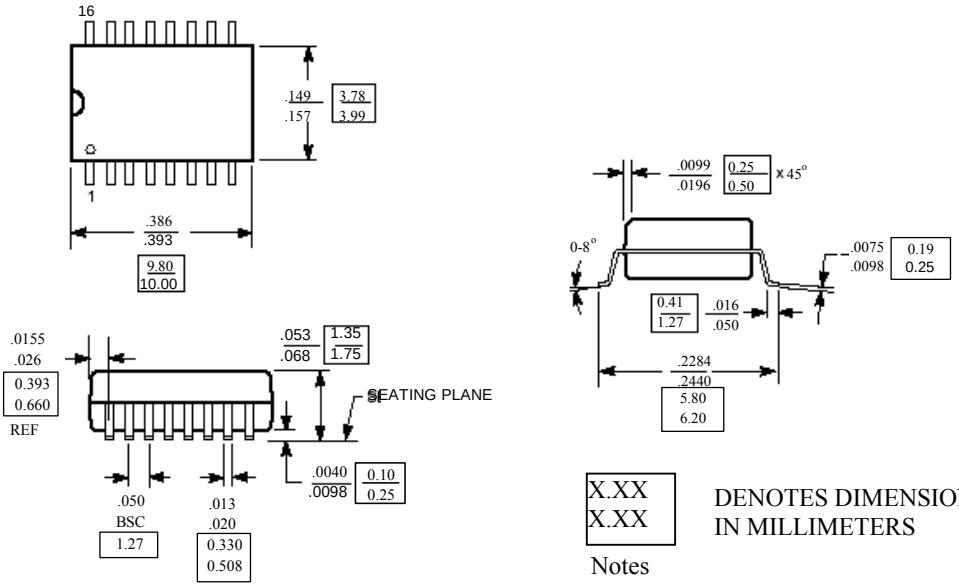
P/PE (PDIP-16)



Note:

1) Controlling dimensions in inches.
2) Ref: JDDEC MS-001 AB

W/WE (SOIC-16)



Notes

1) Controlling dimensions in millimeters.
2) Ref: JDDEC MS-012 AC

Notes

Pericom Technology Inc.

Email: support@pti.com.cn Web Site: www.pti.com.cn, www.pti-ic.com

China: No. 20 Building, 3/F, 481 Guiping Road, Shanghai, 200233, China
Tel: (86)-21-6485 0576 Fax: (86)-21-6485 2181

Asia Pacific: Unit 1517, 15/F, Chevalier Commercial Centre, 8 Wang Hoi Rd, Kowloon Bay, Hongkong
Tel: (852)-2243 3660 Fax: (852)- 2243 3667

U.S.A.: 3545 North First Street, San Jose, California 95134, USA
Tel: (1)-408-435 0800 Fax: (1)-408-435 1100