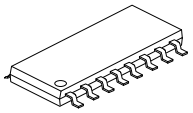
U74HCT138

CMOS IC

3-TO-8 LINE DECODERS / DEMULTIPLEXERS



SOP-16

■ DESCRIPTION

The **U74HCT138** decodes a three−bit Address to 1−of−8 active−low outputs.

This device features three Chip Select inputs, two active−low and one active−high, to facilitate the demultiplexing, cascading and chip−selecting functions.

The demultiplexing function is accomplished by using the Address inputs to select the desired device output. One of the Chip Selects is used as a data input while the other Chip Selects are held in their active states.

■ FEATURES

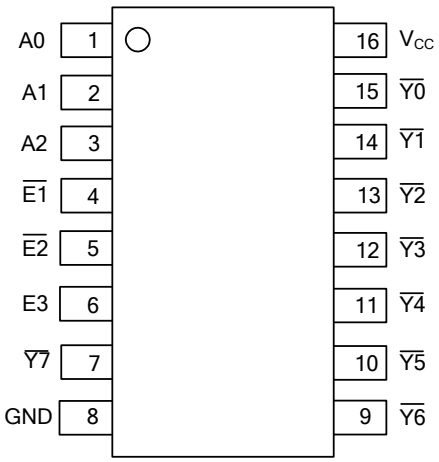
* Operate from 4.5V to 5.5V
* Low Input Current:1.0uA Max
* Low Power Consumption: 8μA Max
* Typical t_{PD}=15ns
* Inputs are TTL voltage compatible

■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HCT138L-S16-R	U74HCT138G-S16-R	SOP-16	Tape Reel
U74HCT138L-S16-T	U74HCT138G-S16-T	SOP-16	Tube

U74HCT138L-S16-R (1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel, T: Tube (2) S16: SOP-16 (3) G: Halogen Free, L: Lead Free

■ PIN CONFIGURATION

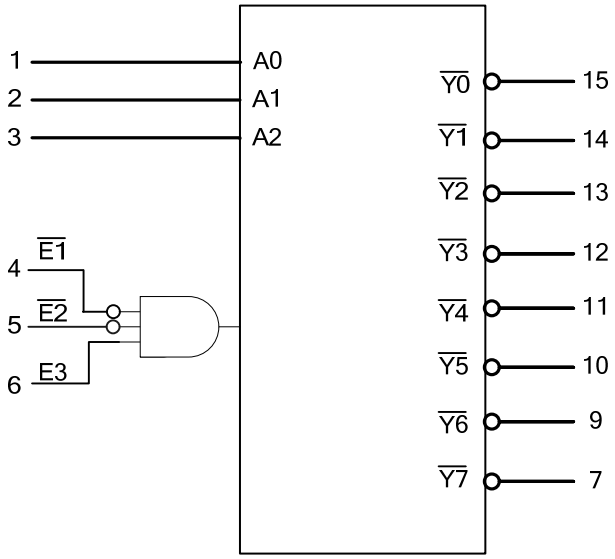


■ FUNCTION TABLE

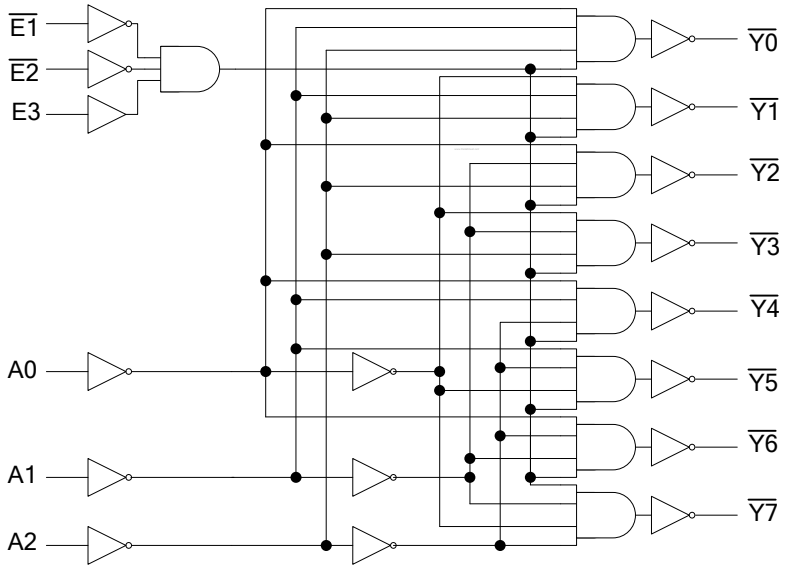
INPUTS						OUTPUTS							
$\overline{E1}$	$\overline{E2}$	E3	A0	A1	A2	$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	$\overline{Y4}$	$\overline{Y5}$	$\overline{Y6}$	$\overline{Y7}$
H	X	X	X	X	X	H	H	H	H	H	H	H	H
X	H	X	X	X	X	H	H	H	H	H	H	H	H
X	X	L	X	X	X	H	H	H	H	H	H	H	H
L	L	H	L	L	L	L	H	H	H	H	H	H	H
L	L	H	H	L	L	H	L	H	H	H	H	H	H
L	L	H	L	H	L	H	H	L	H	H	H	H	H
L	L	H	H	H	L	H	H	H	L	H	H	H	H
L	L	H	L	L	H	H	H	H	H	L	H	H	H
L	L	H	H	L	H	H	H	H	H	H	L	H	H
L	L	H	L	H	H	H	H	H	H	H	H	L	H
L	L	H	H	H	H	H	H	H	H	H	H	H	L

Note:H : High voltage level L : Low voltage level X : Don't care

■ LOGIC SYMBOL



■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ 7.0	V
Input Clamp Current(V_I<0 or V_I>V_{CC})	I_{IK}	±20	mA
Output Clamp Current(V_O<0 or V_O>V_{CC})	I_{OK}	±20	mA
Continuous Output Current(V_O=0 to V_{CC})	I_O	±25	mA
V_{CC} or GND Current	I_{CC}	±50	mA
Storage Temperature	T_{STG}	-65 ~ + 150	℃

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	4.5	5.0	5.5	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Operating Temperature	T_A		-40		+85	℃
Input Rise or Fall Times	t_R, t_F	V_{CC}=4.5V~5.5V			500	ns

■ ELECTRICAL CHARACTERISTICS(T_A=25℃)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level input voltage	V_{IH}	V_{CC}=4.5V~5.5V	2.0			V
Low-Lever output voltage	V_{IL}	V_{CC}=4.5V~5.5V			0.8	V
High-Level Output Voltage	V_{OH}	V_{CC}=4.5V, I_{OH}=-20μA	4.4	4.499		V
		V_{CC}=4.5V, I_{OH}=-4mA	3.98	4.3		V
Low-Level Output Voltage	V_{OL}	V_{CC}=4.5V, I_{OL}=20μA		0.001	0.1	V
		V_{CC}=4.5V, I_{OL}=4mA		0.17	0.26	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=5.5V, V_{IN}= V_{CC} or GND		±0.1	±100	nA
Quiescent Supply Current	I_{CC}	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			8	μA
Additional Quiescent Supply Current	$\triangle I_{CC}$	One input at 0.5V or 2.4V,other inputs at 0 or Vcc		1.4	2.4	mA
Input Capacitance	C_I	V_{CC}=4.5V~5.5V		3	10	pF

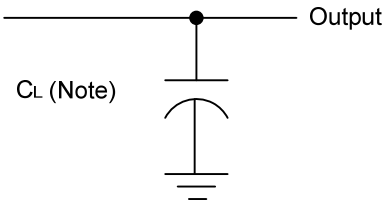
■ SWITCHING CHARACTERISTICS(T_A=25℃,see TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (An) to output($\overline{Yn}$)	t_{PLH}/t_{PHL}	V_{CC} =4.5V, C_L=50pF		23	36	ns
		V_{CC} =5.5V, C_L=50pF		17	32	ns
Propagation delay from input ($\overline{En}$) to output($\overline{Yn}$)	t_{PLH}/t_{PHL}	V_{CC} =4.5V, C_L=50pF		22	33	ns
		V_{CC} =5.5V, C_L=50pF		18	30	ns
Output Transition Time	t_{TLH}/t_{THL}	V_{CC} =4.5V, C_L=50pF		12	15	ns
		V_{CC} =5.5V, C_L=50pF		11	14	ns

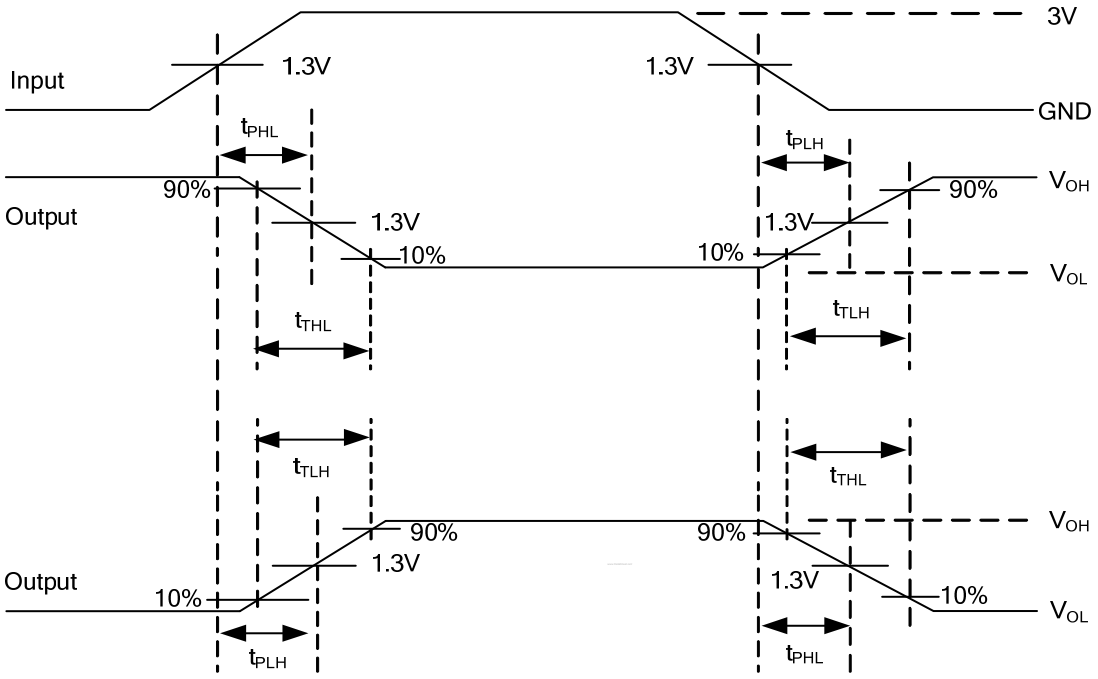
■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load		85		pF

■ TEST CIRCUIT AND WAVEFORMS



Test Circuit



Propagation Delay and Output Tansition Times

Note: C_L includes probe and jig capacitance.
All input pulses are supplied by generators having the following characteristics: Zo = 50Ω, t_R =6ns, t_F =6ns.