



U74HC148

CMOS IC

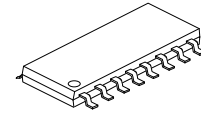
8-LINE TO 3-LINE PRIORITY ENCODERS

DESCRIPTION

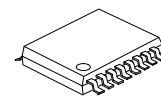
The UTC **U74HC148** devices encode eight data lines to 3-line binary (octal). It feature priority decoding of the inputs to ensure that only the highest-order data line is encoded. (enable input EI and enable output EO) have been provided to allow octal expansion without the need for external circuitry. Data inputs and outputs are active at the low logic level.

FEATURES

- * Wide supply voltage range from 2.0V to 6.0V
- * Low static power consumption; $I_{CC}=8\mu A$ (Max.)
- * Encode Eight Data Lines to 3-Line Binary (Octal)
- * High Noise Immunity



SOP-16



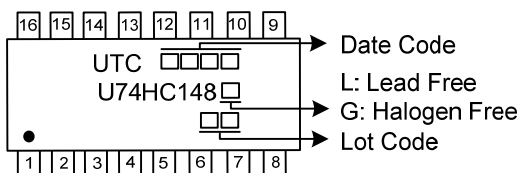
TSSOP-16

ORDERING INFORMATION

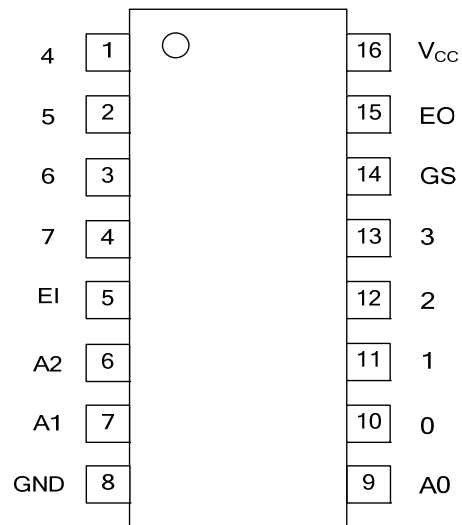
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC148L-S16-R	U74HC148G-S16-R	SOP-16	Tape Reel
U74HC148L-P16-R	U74HC148G-P16-R	TSSOP-16	Tape Reel

U74HC148G-S16-R	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S16: SOP-16, P16: TSSOP-16 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



■ PIN CONFIGURATION

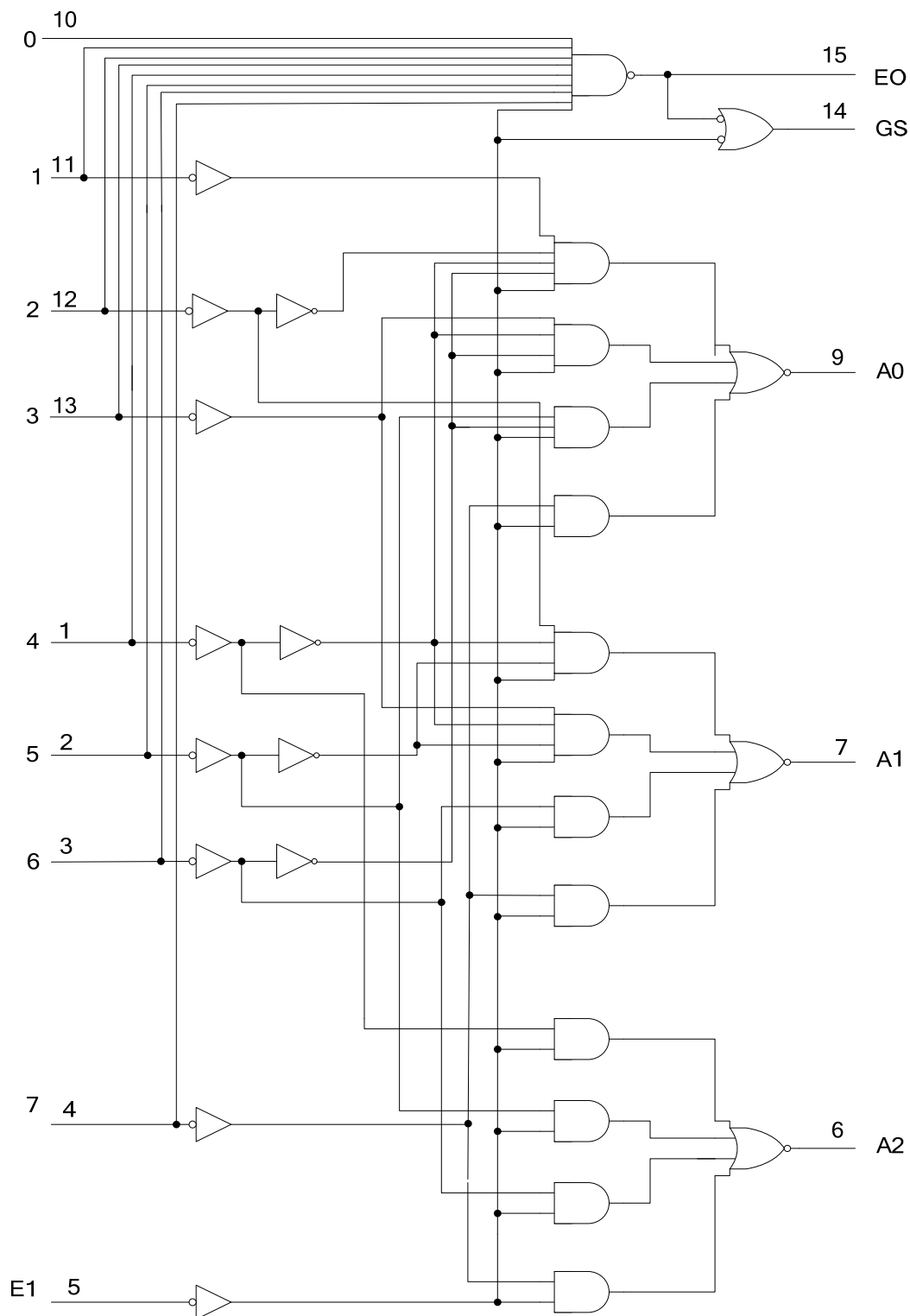


■ FUNCTION TABLE

INPUTS									OUTPUTS				
EI	0	1	2	3	4	5	6	7	A2	A1	A0	GS	EO
H	X	X	X	X	X	X	X	X	H	H	H	H	H
L	H	H	H	H	H	H	H	H	H	H	H	H	L
L	X	X	X	X	X	X	X	L	L	L	L	L	H
L	X	X	X	X	X	X	L	H	L	L	H	L	H
L	X	X	X	X	X	L	H	H	L	H	L	L	H
L	X	X	X	X	L	H	H	H	L	H	H	L	H
L	X	X	X	L	H	H	H	H	H	L	L	L	H
L	X	X	L	H	H	H	H	H	H	L	H	L	H
L	X	L	H	H	H	H	H	H	H	H	L	L	H
L	L	H	H	H	H	H	H	H	H	H	H	L	H

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

■ LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +7.0	V
Input Voltage	V_{IN}		-0.5 ~ $V_{CC}+0.5$	V
Output Voltage	V_{OUT}	Active Mode	-0.5 ~ $V_{CC}+0.5$	V
Continuous V_{CC} or GND Current	I_{CC}		±50	mA
Continuous Output Current	I_{OUT}	$V_{OUT}=0V \sim V_{CC}$	±25	mA
Input Clamp Current (Note 2)	I_{IK}	$V_{IN}<0V$ or $V_{IN}>V_{CC}$	±20	mA
Output Clamp Current (Note 2)	I_{OK}	$V_{OUT}>V_{CC}$ or $V_{OUT}<0V$	±20	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	°C

Notes: 1. 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.

2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2.0	5.0	6.0	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Operating Temperature	T_A		-40		+125	°C
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=2.0V$			1000	ns
		$V_{CC}=4.5V$			500	ns
		$V_{CC}=6.0V$			400	ns

■ ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^\circ\text{C}$			$T_A=-40\sim+125^\circ\text{C}$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-level Input Voltage	V_{IH}	$V_{CC}=2.0V$	1.5			1.5			V
		$V_{CC}=4.5V$	3.15			3.15			V
		$V_{CC}=6.0V$	4.2			4.2			V
Low-level Input Voltage	V_{IL}	$V_{CC}=2.0V$			0.5			0.5	V
		$V_{CC}=4.5V$			1.35			1.35	V
		$V_{CC}=6.0V$			1.8			1.8	V
High-Level Output Voltage	V_{OH}	$V_{CC}=2.0V$	1.9	1.998		1.9			V
		$V_{CC}=4.5V$	4.4	4.498		4.4			V
		$V_{CC}=6.0V$	5.9	5.998		5.9			V
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-20\mu A$	3.98			3.8			V
		$V_{CC}=6.0V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OH}=-5.2mA$	5.48			5.3			V
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=4mA$			0.26			0.3	V
Low-Level Output Voltage	V_{OL}	$V_{CC}=2.0V$		0.002	0.1			0.1	V
		$V_{CC}=4.5V$		0.001	0.1			0.1	V
		$V_{CC}=6.0V$		0.001	0.1			0.1	V
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=20\mu A$							V
		$V_{CC}=4.5V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=4mA$			0.26			0.3	V
		$V_{CC}=6.0V, V_{IN}=V_{IH}$ or $V_{IL}, I_{OL}=5.2mA$			0.26			0.3	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or GND			±0.1			±10	μA
Quiescent Supply Current	I_{CC}	$V_{CC}=6.0V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0A$			8			160	μA

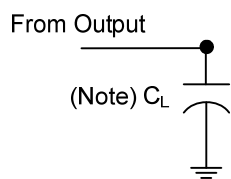
■ SWITCHING CHARACTERISTICS ($C_L=50\text{pF}$, $T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from Input (1-7) to Output(A0~A2)	t _{PD}	V _{CC} =2.0V		17	180			270	ns
		V _{CC} =4.5V		11	36			54	ns
		V _{CC} =6.0V		6	31			46	ns
Propagation delay from Input (0-7) to Output(E0)		V _{CC} =2.0V		17	150			225	ns
		V _{CC} =4.5V		12	30			45	ns
		V _{CC} =6.0V		7	26			38	ns
Propagation delay from Input (0-7) to Output(GS)		V _{CC} =2.0V		18	190			285	ns
		V _{CC} =4.5V		11	38			57	ns
		V _{CC} =6.0V		7	32			48	ns
Propagation delay from Input (EI) to Output(A0~A2)		V _{CC} =2.0V		15	195			295	ns
		V _{CC} =4.5V		10	39			59	ns
		V _{CC} =6.0V		6	33			50	ns
Propagation delay from Input (EI) to Output(GS)		V _{CC} =2.0V		14	145			220	ns
		V _{CC} =4.5V		10	29			44	ns
		V _{CC} =6.0V		6	25			38	ns
Propagation delay from Input (EI) to Output(E0)		V _{CC} =2.0V		15	166			250	ns
		V _{CC} =4.5V		10	33			50	ns
		V _{CC} =6.0V		6	28			43	ns
Propagation delay to Output(Any)	t _t	V _{CC} =2.0V		16	75			110	ns
		V _{CC} =4.5V		11	15			22	ns
		V _{CC} =6.0V		7	13			19	ns

■ OPERATING CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C_i	$V_{CC}=2.0\sim6.0\text{V}$, $V_{IN}=V_{CC}$ or GND		3	10	pF
Power Dissipation Capacitance	C_{PD}	No load.		35		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

Note: C_L includes probe and jig capacitance. $C_L=50\text{pF}$

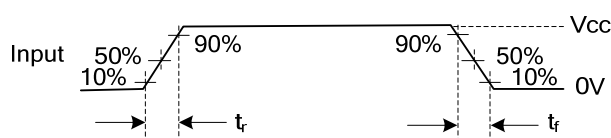


Fig. 1 Input Rise and Fall Times

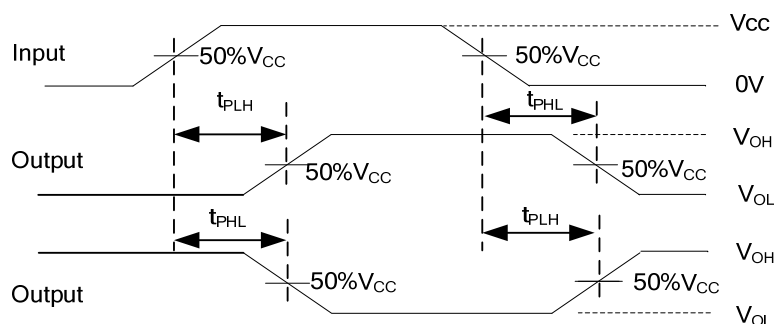


Fig. 2 Load circuitry for switching times.

Notes: 1. C_L includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: $\text{PRR} \leq 10\text{MHz}$, $Z_o = 50\Omega$.

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