



HCT139
HCT239

Octal Decoders/Demultiplexers

Ordering Information

Package	Outputs	Commercial 74HCT	Military 54HCT	Military Hi-Rel RB 54HCT
16-pin plastic DIP	Inverted Non-Inverted	74HCT139P 74HCT239P	N/A	N/A
16-pin CERDIP	Inverted Non-Inverted	74HCT139D 74HCT239D	54HCT139D 54HCT239D	RB54HCT139D RB54HCT239D
16-pin ceramic side-brazed DIP	Inverted Non-Inverted	74HCT139C 74HCT239C	54HCT139C 54HCT239C	RB54HCT139C RB54HCT239C
20-pin ceramic leadless chip carrier	Inverted Non-Inverted	74HCT139LC 74HCT239LC	54HCT139LC 54HCT239LC	RB54HCT139LC RB54HCT239LC

Features

- Meets or exceeds JEDEC #7 specs
- Max DC operating supply current: 8 μ A @25°C
- Fast propagation delay times
- Plug in replacement for LSTTL series
- Full TTL, NMOS and CMOS compatibility
- 55°C to +125°C operating temperature range
- Capable of operation over 3-volt to 6-volt range
- High speed silicon-gate CMOS technology
- MIL STD 883B Screening
- Leadless chip carrier available
- Excellent latch-up immunity

General Description

These decoders/demultiplexers are designed for use in high speed memory and peripheral address decoding systems.

The 139 and 239 feature two individual, two-line to four-line decoders with separate enable inputs.

These devices are manufactured and tested to meet or exceed the specifications of the EIA JEDEC 40.2 committee Standard #7 for High Speed CMOS Logic.

Absolute Maximum Ratings*

Rating	Value
Supply voltage, V_{CC}	-0.5V to +7.0V
Input voltage, V_I	-1.5V to $V_{CC} + 1.5V$
DC input diode current, I_{IK}	$\pm 100mA$
DC output diode current, I_{OK}	$\pm 100mA$
Short circuit output current, I_{SC} (not more than 1 output for 1 second)	$\pm 100mA$
DC V_{CC} or ground current, I_{CC} or I_{GND}	$\pm 50mA$
Operating temperature range, T_A : 74HCT (Commercial) 54HCT (Military)	-40 °C to +85 °C -55 °C to +125 °C
Storage temperature, T_S	-65 °C to +150 °C
Power dissipation, P_D	500mW

* Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may effect device reliability.

Recommended Operating Conditions

Symbol	Parameter	74HCT			54HCT			Unit
		min	typ	max	min	typ	max	
V_{CC}	Supply voltage	4.50	5.00	5.50	4.50	5.00	5.50	V
V_I	Input voltage	0		V_{CC}	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	0		V_{CC}	V
T_A	Operating free-air temperature	-40		85	-55		125	°C
t_r and t_f	Input rise and fall time	0		500	0		500	ns
V_{CCF}	Functional operating V_{CC} range	3.00		6.00	3.00		6.00	V

Electrical Characteristics

Symbol	Parameter	VCC V	Temperature °C						Unit	Test Conditions		
			54HCT/74HCT 25°C		74HCT -40 to +85°C		54HCT -55 to +125°C					
			min	max	min	max	min	max				
V _{IH}	High Level Input Voltage	4.5 to 5.5	2.0		2.0		2.0		V			
V _{IL}	Low Level Input Voltage	4.5 to 5.5		0.8		0.8		0.8	V			
V _{OH}	High Level Output Voltage	4.5	4.4		4.4		4.4		V	V _I	I _O	
		4.5	3.86		3.76		3.7		V	V _{IH} or V _{IL}	-20.0 -4.0	μA mA
V _{OL}	Low Level Output Voltage	4.5		0.1		0.1		0.1	V	V _{IH} or V _{IL}	20.0	μA
		4.5		0.32		0.37		0.4	V		4.0	mA
I _I	Input Leakage Current	5.5		±0.1		±1.0		±1.0	μA	V _I = V _{CC} or GND		
I _{CC}	Quiescent Supply Current	5.5		8.0		80.0		160.	μA	V _I = V _{CC} or GND I _O = 0		

Switching Characteristics (VCC = 4.5V)

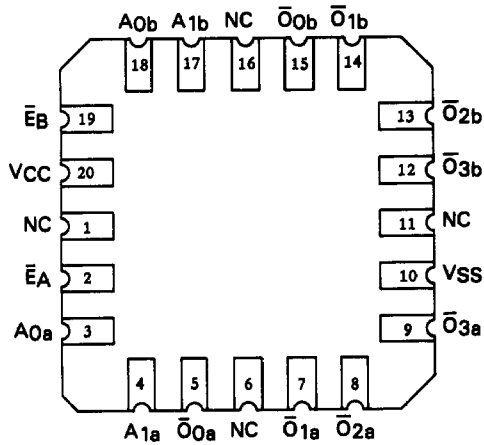
Symbol	Parameter	Temperature °C			Unit	Conditions
		25°C	-40 to +85°C	-55 to +125°C		
		54HCT/74HCT	74HCT	54HCT		
t _{PLH} , t _{PHL}	Maximum propagation delay time, address to output	35 ns	40 ns	45 ns	ns	C _L = 50 pF
t _{PLH} , t _{PHL}	Maximum propagation delay time, E ₂ or E ₁ to output	35 ns	40 ns	45 ns	ns	
C _I	Typical input capacitance	8	8	8	pF	

RE: Switching waveforms

Pin Configurations Functional Block Diagrams and Function Tables

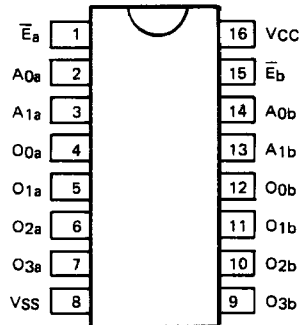
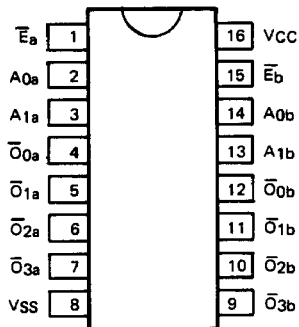
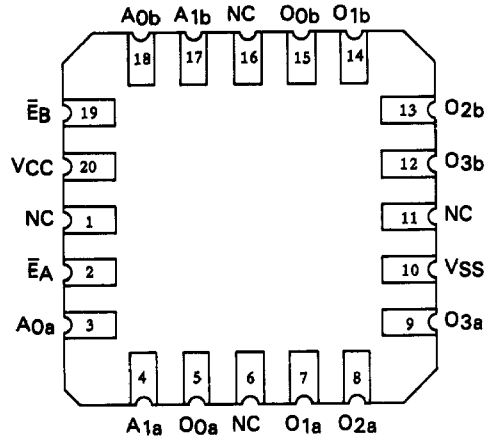
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Pin Configuration

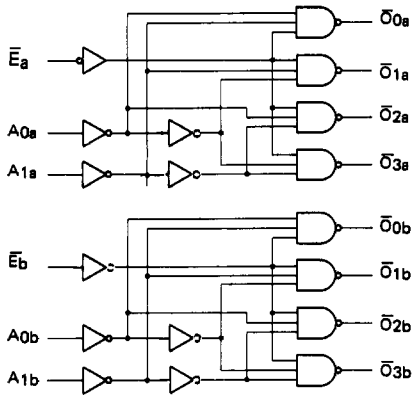


239

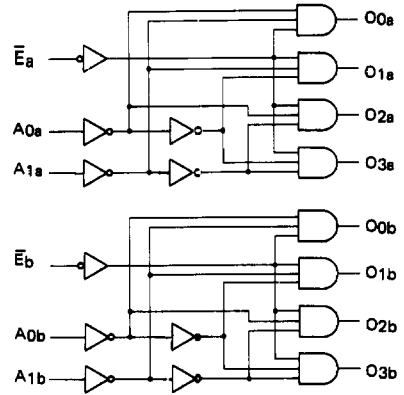
Pin Configuration



Functional Block Diagram



Functional Block Diagram



Function Table

Inputs			Outputs			
Enable	Select		\bar{O}_0	\bar{O}_1	\bar{O}_2	\bar{O}_3
\bar{E}	A1	A0				
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

H = high level, L = low level, X = irrelevant

Function Table

Inputs			Outputs			
Enable	Select		O0	O1	O2	O3
\bar{E}	A1	A0				
H	X	X	L	L	L	L
L	L	L	H	L	L	L
L	L	H	L	H	L	L
L	H	L	L	L	H	L
L	H	H	L	L	L	H

H = high level, L = low level, X = irrelevant