The CD54HC158 and CD74HC158 are obsolete and no longer are supplied.

CD54/74HC157, CD54/74HCT157, CD54/74HC158, CD54/74HC158

Data sheet acquired from Harris Semiconductor SCHS153C

September 1997 - Revised October 2003

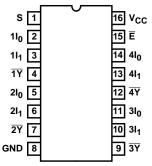
High-Speed CMOS Logic Quad 2-Input Multiplexers

Features

- Common Select Inputs
- Separate Enable Inputs
- · Buffered inputs and Outputs
- Fanout (Over Temperature Range)
- Standard Outputs...... 10 LSTTL Loads
- Bus Driver Outputs 15 LSTTL Loads
- Wide Operating Temperature Range ... -55°C to 125°C
- Balanced Propagation Delay and Transition Times
- Significant Power Reduction Compared to LSTTL Logic ICs
- HC Types
 - 2V to 6V Operation
 - High Noise Immunity: N_{IL} = 30%, N_{IH} = 30% of V_{CC} at V_{CC} = 5V
- HCT Types
 - 4.5V to 5.5V Operation
 - Direct LSTTL Input Logic Compatibility,
 V_{IL}= 0.8V (Max), V_{IH} = 2V (Min)
 - CMOS Input Compatibility, $I_I \le 1\mu A$ at V_{OL} , V_{OH}

Pinout

CD54HC157, CD54HCT157, CD54HC158, CD54HCT158 (CERDIP) CD74HC157, CD74HCT157, CD74HC158 (PDIP, SOIC) CD74HCT158 (PDIP) TOP VIEW



Description

The 'HC157, 'HCT157, 'HC158, and 'HCT158 are quad 2-input multiplexers which select four bits of data from two sources under the control of a common Select input (S). The Enable input (\overline{E}) is active Low. When (\overline{E}) is High, all of the outputs in the 158, the inverting type, ($\overline{1Y-4Y}$) are forced High and in the 157, the non-inverting type, all of the outputs ($\overline{1Y-4Y}$) are forced Low, regardless of all other input conditions.

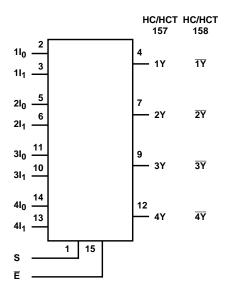
Moving data from two groups of registers to four common output buses is a common use of these devices. The state of the Select input determines the particular register from which the data comes. They can also be used as function generators.

Ordering Information

PART NUMBER	TEMP. RANGE (°C)	PACKAGE
CD54HC157F3A	-55 to 125	16 Ld CERDIP
CD54HCT157F3A	-55 to 125	16 Ld CERDIP
CD54HCT158F3A	-55 to 125	16 Ld CERDIP
CD74HC157E	-55 to 125	16 Ld PDIP
CD74HC157M	-55 to 125	16 Ld SOIC
CD74HC157MT	-55 to 125	16 Ld SOIC
CD74HC157M96	-55 to 125	16 Ld SOIC
CD74HCT157E	-55 to 125	16 Ld PDIP
CD74HCT157M	-55 to 125	16 Ld SOIC
CD74HCT157MT	-55 to 125	16 Ld SOIC
CD74HCT157M96	-55 to 125	16 Ld SOIC
CD74HCT158E	-55 to 125	16 Ld PDIP

NOTE: When ordering, use the entire part number. The suffix 96 denotes tape and reel. The suffix T denotes a small-quantity reel of 250.

Functional Diagram



TRUTH TABLE

	SELECT			OUTPUT			
ENABLE	INPUT	DATA I	NPUTS	157	158		
Ē	s	10	I1	Y	Ÿ		
Н	Х	Х	Х	L	Н		
L	L	L	Х	L	Н		
L	L	Н	Х	Н	L		
L	Н	Х	L	L	Н		
L	Н	Х	Н	Н	L		

H = High Voltage Level, L = Low Voltage Level, X = Don't Care

Absolute Maximum Ratings

Thermal Information

Thermal Resistance (Typical, Note 1)	θ_{JA} (°C/W)
E (PDIP) Package	67
M (SOIC) Package	
Maximum Junction Temperature	150 ⁰ C
Maximum Storage Temperature Range	65°C to 150°C
Maximum Lead Temperature (Soldering 10s)	300°C
(SOIC - Lead Tips Only)	

Operating Conditions

Temperature Range (T _A)55°C to 125°C
Supply Voltage Range, V _{CC}
HC Types2V to 6V
HCT Types
DC Input or Output Voltage, V _I , V _O 0V to V _{CC}
Input Rise and Fall Time
2V
4.5V 500ns (Max)
6V

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

1. The package thermal impedance is calculated in accordance with JESD 51-7.

DC Electrical Specifications

		TE: CONDI		V _{CC}		25 ⁰ C			O 85°C	-55°C T	O 125°C	
PARAMETER	SYMBOL	V _I (V)	I _O (mA)	(S)	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNITS
HC TYPES												
High Level Input	V _{IH}	-	-	2	1.5	-	-	1.5	-	1.5	-	V
Voltage				4.5	3.15	-	-	3.15	-	3.15	-	V
				6	4.2	-	-	4.2	-	4.2	-	V
Low Level Input	V _{IL}	-	-	2	-	-	0.5	-	0.5	-	0.5	V
Voltage				4.5	-	-	1.35	-	1.35	-	1.35	V
				6	-	-	1.8	-	1.8	-	1.8	V
High Level Output	VoH	V _{IH} or V _{IL}	-0.02	2	1.9	-	-	1.9	-	1.9	-	V
Voltage CMOS Loads			-0.02	4.5	4.4	-	-	4.4	-	4.4	-	V
OWOO LOAGS			-0.02	6	5.9	-	-	5.9	-	5.9	-	V
High Level Output	7		-	-	-	-	-	-	-	-	-	V
Voltage TTL Loads			-4	4.5	3.98	-	-	3.84	-	3.7	-	V
TTE LOGUS			-5.2	6	5.48	-	-	5.34	-	5.2	-	V
Low Level Output	V _{OL}	V _{IH} or V _{IL}	0.02	2	-	-	0.1	-	0.1	-	0.1	V
Voltage CMOS Loads			0.02	4.5	-	-	0.1	-	0.1	-	0.1	V
OWIGO Edads			0.02	6	-	-	0.1	-	0.1	-	0.1	V
Low Level Output	7		-	-	-	-	-	-	-	-	-	V
Voltage TTL Loads			4	4.5	-	-	0.26	-	0.33	-	0.4	V
I I L Loads			5.2	6	-	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	IĮ	V _{CC} or GND	-	6	-	-	±0.1	-	±1	-	±1	μΑ
Quiescent Device Current	lcc	V _{CC} or GND	0	6	-	-	8	-	80	-	160	μΑ

DC Electrical Specifications (Continued)

		TES CONDI	_	Vcc	25°C			-40°C 1	O 85°C	-55°C TO 125°C		
PARAMETER	SYMBOL	V _I (V)	I _O (mA)	(V)	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNITS
HCT TYPES												
High Level Input Voltage	V _{IH}	-	-	4.5 to 5.5	2	-	-	2	-	2	-	V
Low Level Input Voltage	V _{IL}	-	-	4.5 to 5.5	-	-	0.8	-	0.8	-	0.8	V
High Level Output Voltage CMOS Loads	Voн	V _{IH} or V _{IL}	-0.02	4.5	4.4	-	-	4.4	-	4.4	-	V
High Level Output Voltage TTL Loads			-4	4.5	3.98	-	-	3.84	-	3.7	-	V
Low Level Output Voltage CMOS Loads	V _{OL}	V _{IH} or V _{IL}	0.02	4.5	-	-	0.1	-	0.1	-	0.1	V
Low Level Output Voltage TTL Loads			4	4.5	-	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	lį	V _{CC} and GND	0	5.5	-		±0.1	-	±1	-	±1	μΑ
Quiescent Device Current	Icc	V _{CC} or GND	0	5.5	-	-	8	-	80	-	160	μА
Additional Quiescent Device Current Per Input Pin: 1 Unit Load	ΔI _{CC} (Note 2)	V _{CC} -2.1	-	4.5 to 5.5	-	100	360	-	450	-	490	μА

NOTE:

HCT Input Loading Table

	UNIT LOADS						
INPUT	HCT157	HCT158					
I (AII)	0.95	0.4					
Ē	0.6	0.6					
S	3	2.8					

NOTE: Unit Load is ΔI_{CC} limit specified in DC Electrical Table, e.g., 360 μ A max at 25 o C.

Switching Specifications Input t_r , t_f = 6ns

		TEST		25°C			-40°C TO 85°C		-55°C TO 125°C		
PARAMETER	SYMBOL	CONDITIONS	V _{CC} (V)	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNITS
HC/HCT157 TYPES											
Propagation Delay (Figure 1)	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	125	-	155	-	190	ns
Data to Output			4.5	-	-	25	-	31	-	38	ns
HC157		C _L =15pF	5	-	10	-	-	-	-	-	ns
HCT157				-	12	-	-	-	-	-	ns
		C _L = 50pF	6	-	-	21	-	26	-	32	ns

^{2.} For dual-supply systems theoretical worst case ($V_I = 2.4V$, $V_{CC} = 5.5V$) specification is 1.8mA.

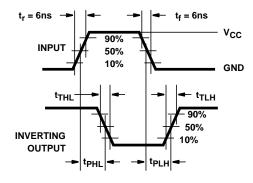
Switching Specifications Input $t_{\text{r}},\,t_{\text{f}}$ = 6ns (Continued)

		TEST	v _{cc}		25°C		-40°C T	O 85°C	-55°C T	O 125°C	
PARAMETER	SYMBOL	CONDITIONS	(V)	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNITS
Enable to Output	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	135	-	170	-	205	ns
			4.5	-	-	27	-	34	-	41	ns
HC157		C _L =15pF	5	-	11	-	-	-	-	-	ns
HCT157				-	12	-	-	-	-	-	ns
		C _L = 50pF	6	-	-	23	-	29	-	35	ns
Select to Output	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	145	-	180	-	220	ns
			4.5	-	-	29	-	36	-	44	ns
HC157		C _L =15pF	5	-	12	-	-	-	-	-	ns
HCT157				-	15	-	-	-	-	-	ns
		C _L = 50pF	6	-	-	25	-	31	-	38	ns
Power Dissipation Capacitance (Notes 3, 4)	C _{PD}	-	5								
HC157				-	62	-	-	-	-	-	pF
HCT157				-	70	-	-	-	-	-	pF
HC/HCT158 TYPES											
Data to Output	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	140	-	175	-	210	ns
			4.5	-	-	28	-	35	-	42	
HC158		C _L =15pF	5	-	11	-	-	-	-	-	ns
HCT 158				-	13	-	-	-	-	-	ns
		C _L = 50pF	6	-	-	24	-	30	-	36	ns
Enable to Output	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	160	-	200	-	240	ns
			4.5	-	-	32	-	40	-	48	ns
HC158		C _L =15pF	5	-	13	-	-	-	-	-	ns
HCT 158				-	15	1	-	-	-	-	ns
		C _L = 50pF	6	-	-	27	-	34	-	41	ns
Select to Output	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	-	150	-	190	-	225	ns
			4.5	-	-	30	-	38	-	45	ns
HC158		C _L =15pF	5	-	12	-	-	-	-	-	ns
HCT 158				-	14	-	-	-	-	-	ns
		C _L = 50pF	6	-	-	26	-	33	-	38	ns
Output Transition Time	t _{TLH} , t _{THL}	C _L = 50pF	2	-	-	75	-	95	-	110	ns
			4.5	-	-	15	-	19	-	22	ns
			6	-	-	13	-	16	-	19	ns
Power Dissipation Capacitance (Notes 3, 4)	C _{PD}	-	5								
HC158	1			-	35	-	-	-	-	-	pF
HCT 158	1			-	35	-	-	-	-	-	pF
Input Capacitance	C _{IN}	$C_L = 50pF$	-	-	-	10	-	10	-	10	pF

NOTES

- 3. $C_{\mbox{\scriptsize PD}}$ is used to determine the dynamic power consumption, per multiplexer.
- 4. $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$ where f_i = input frequency, C_L = output load capacitance, V_{CC} = supply voltage.

Test Circuits and Waveforms



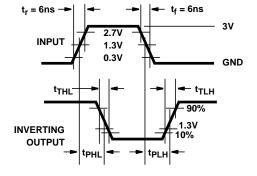


FIGURE 1. HC AND HCU TRANSITION TIMES AND PROPAGA-TION DELAY TIMES, COMBINATION LOGIC

FIGURE 2. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC



5-Sep-2011

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
5962-9070201MEA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Call TI	
5962-9070301MEA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Call TI	
CD54HC157F	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
CD54HC157F3A	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
CD54HCT157F3A	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
CD54HCT158F3A	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	
CD74HC157E	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
CD74HC157EE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
CD74HC157M	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157M96	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157M96E4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157M96G4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157ME4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157MG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157MT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157MTE4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HC157MTG4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157E	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
CD74HCT157EE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
CD74HCT157M	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157M96	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	





www.ti.com 5-Sep-2011

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
CD74HCT157M96E4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157M96G4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157ME4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157MG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157MT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157MTE4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT157MTG4	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
CD74HCT158E	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	
CD74HCT158EE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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PACKAGE OPTION ADDENDUM

5-Sep-2011

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OTHER QUALIFIED VERSIONS OF CD54HC157, CD54HCT157, CD54HCT158, CD74HC157, CD74HCT157, CD74HCT158:

- Catalog: CD74HC157, CD74HCT157, CD74HCT158
- Military: CD54HC157, CD54HCT157, CD54HCT158

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications



TAPE AND REEL INFORMATION



TAPE DIMENSIONS + K0 - P1 - B0 W Cavity - A0 -

A0	Dimension designed to accommodate the component width
В0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing			Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD74HC157M96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
CD74HCT157M96	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1





*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74HC157M96	SOIC	D	16	2500	333.2	345.9	28.6
CD74HCT157M96	SOIC	D	16	2500	333.2	345.9	28.6

14 LEADS SHOWN



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



D (R-PDS0-G16)

PLASTIC SMALL OUTLINE



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AC.



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