Hex Inverter Buffer and Driver With Open-Drain Outputs

General Description

The ET74HC06 device is a hex inverter buffer and driver operating from a 2.0V to 6.0V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

Features

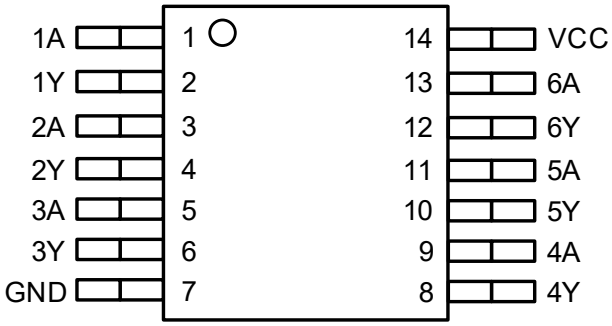
- Designed for 2.0V to 6.0V V_{CC} Operation
- Over-voltage Tolerant Inputs Accept Voltages to 6.0V
- 5.2mA Output Sink Capability
- ESD Protection Complies with JESD22 Standard
  -- HBM: ±4000V Pass (JEDEC JS-001)
  -- CDM: ±1000V Pass (JEDEC JS-002)
- Latch-up Performance Exceeds ±100mA per JEDEC JESD78F
- Part No. and Package Information

Part No.	Package	Packing Option	MSL
ET74HC06M	SOP14 (3.9mm × 8.65mm)	Tape and Reel, 4K/Reel	3
ET74HC06V	TSSOP14 (4.4mm × 5.0mm)	Tape and Reel, 4K/Reel	3

Applications

- Mobile Device
- AV Receiver
- Audio Dock: Portable
- Blu-ray Player and Home Theater
- MP3 Player or Recorder
- Personal Digital Assistant (PDA)
- Power: Telecom/Server AC/DC Supply: Single
- Controller: Analog and Digital
- Solid State Drive (SSD): Client and Enterprise
- TV: LCD, Digital, and High-definition (HDTV)
- Tablet: Enterprise
- Video Analytics: Server
- Wireless Headset, Keyboard and Mouse

Pin Configuration



SOP14/TSSOP14

Figure1. Pin Configuration

Pin Function

Pin No.	Pin Name	I/O	Description
1	1A	Input	Channel 1, Input A
2	1Y	Input	Channel 1, Output Y
3	2A	Output	Channel 2, Input A
4	2Y	Input	Channel 2, Output Y
5	3A	Input	Channel 3, Input A
6	3Y	Output	Channel 3, Output Y
7	GND	—	Ground
8	4Y	Output	Channel 4, Output Y
9	4A	Input	Channel 4, Input A
10	5Y	Input	Channel 5, Output Y
11	5A	Output	Channel 5, Input A
12	6Y	Input	Channel 6, Output Y
13	6A	Input	Channel 6, Input A
14	VCC	—	Positive Supply

Block Diagram

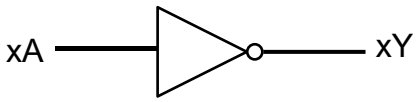


Figure2. Logic Symbol

Functional Table

Input	Output
xA	**xY**
L	Z
H	L

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage(VCC Pin)		-0.5 to 7.0	V
I_{IK}	DC Input Diode Current, V_I < GND		±20	mA
V_I	DC Input Voltage (1)		-0.5 ≤ V_I ≤ 7.0	V
I_{OK}	DC Output Diode Current, V_O < GND		±20	mA
V_O	DC Output Voltage Output in Higher or Low State		-0.5 to V_{CC} + 0.5	V
I_O	DC Output Sink Current, V_O = 0V to V_{CC}		±25	mA
I_{CC}	DC Supply Current per Supply Pin		50	mA
I_{GND}	DC Ground Current per Supply Pin		-50	mA
T_J	Max Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-65 to 150	°C
V_{ESD}	ESD Classification	Human Body Model (2)	±4000	V
		Charged Device Model (3)	±1000	
I_{LU}	Max Latch Up Current Above V_{CC} and GND at 125°C (4)		±100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Note1: I_O absolute maximum rating must be observed.

Note2: HBM tested per JEDEC JS-001;

Note3: CDM tested per JEDEC JS-002;

Note4: Latch up Current Maximum Rating tested per JEDEC JESD78F.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage Operating	2.0	6.0	V
V_I	DC Input Voltage	0	V_{CC}	V
V_O	DC Output Voltage (High or Low State)	0	V_{CC}	V
T_A	Operating Temperature Range	-40	125	°C

Electrical Characteristics

DC Electrical Characteristics

Symbol	Parameter	Condition	V_{CC}(V)	T_A = 25°C			-40°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
V_{IH}	High-Level Input Voltage		2.0	1.5			1.5		V
			4.5	3.15			3.15		
			6.0	4.2			4.2		
V_{IL}	Low-Level Input Voltage		2.0			0.5		0.5	V
			4.5			1.35		1.35	
			6.0			1.8		1.8	
V_{OL}	Low-Level Output Voltage	I_{OL} = 20uA	2~6	V_{CC} - 0.1	V_{CC}		V_{CC} - 0.1		V
		I_{OL} = 4mA	4.5	4.13	4.32		3.7		
		I_{OL} = 5.2mA	6.0	5.63	5.81		5.2		
I_I	Input Leakage Current	V_I = 6V or GND	0~6		±0.1			±1.0	μA
I_{OFF}	Power Off Leakage Current	V_I = 6V or V_O = 6V	0			1		10	μA
I_{CC}	Quiescent Supply Current	V_I = 6V or GND	6			1		10	μA

AC Electrical Characteristics

Over operating free-air temperature range; typical values measured at T_A = 25°C (unless otherwise noted)

Symbol	Parameter	From	To	V_{CC}(V)	T_A = 25°C			-40°C ≤ T_A ≤ 125°C		Unit
					Min	Typ	Max	Min	Max	
t_{PZL} t_{PLZ}	Propagation Delay	A	Y	2.0		13	33		39	ns
				4.5		4.3	4.9		5.6	
				6.0		3.9	4.4		4.9	

Capacitance Characteristics

Over operating free-air temperature range; typical values measured at T_A = 25°C (unless otherwise noted)

Symbol	Parameter	Test Conditions	Typ	Unit
C_{IN}	Input Capacitance	V_{CC} = 6V, V_I = 0V or V_{CC}	5	pF
C_{PD}	Power Dissipation Capacitance (5)	10MHz, V_{CC} = 3.3V, V_I = 0V or V_{CC}	25	pF

Note5: C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ where:

f_i = input frequency in MHz;

f_o = output frequency in MHz;

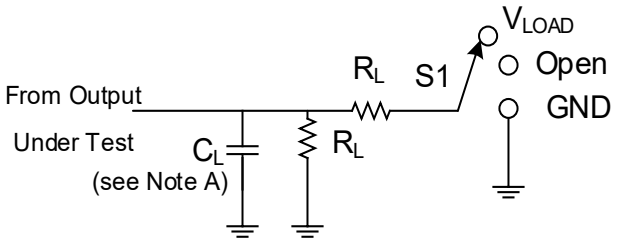
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

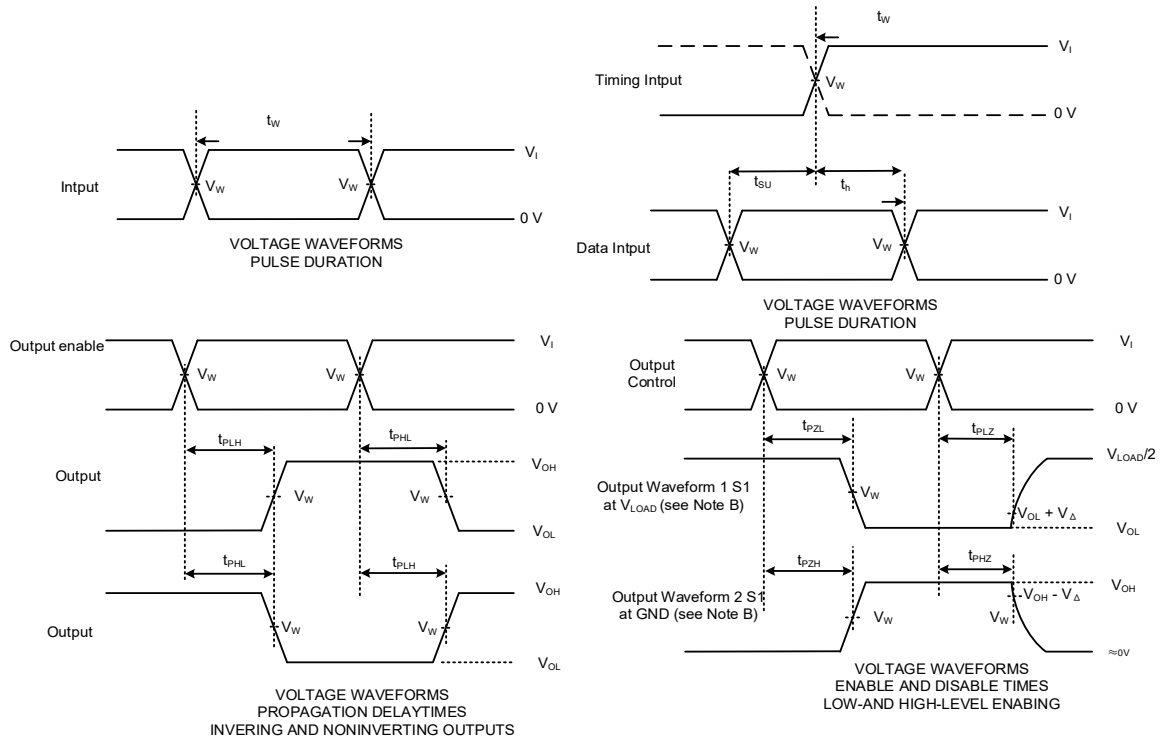
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

Parameter Measurement Information



TEST	S1
t_{PLH}/t_{PHL}	OPEN
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

Figure3. Test circuit for Measuring Switching Times



Notes:

A. C_L includes probe and jig capacitance.

B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.

C. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.

D. All input pulses are supplied by generators having the following characteristics:

PRR ≤ 10MHz, Z_O = 50Ω

E. The outputs are measured one at a time, with one transition per measurement.

F. t_{PLZ} and t_{PHZ} are the same as t_{dis}.

G. t_{PZL} and t_{PZH} are the same as t_{en}.

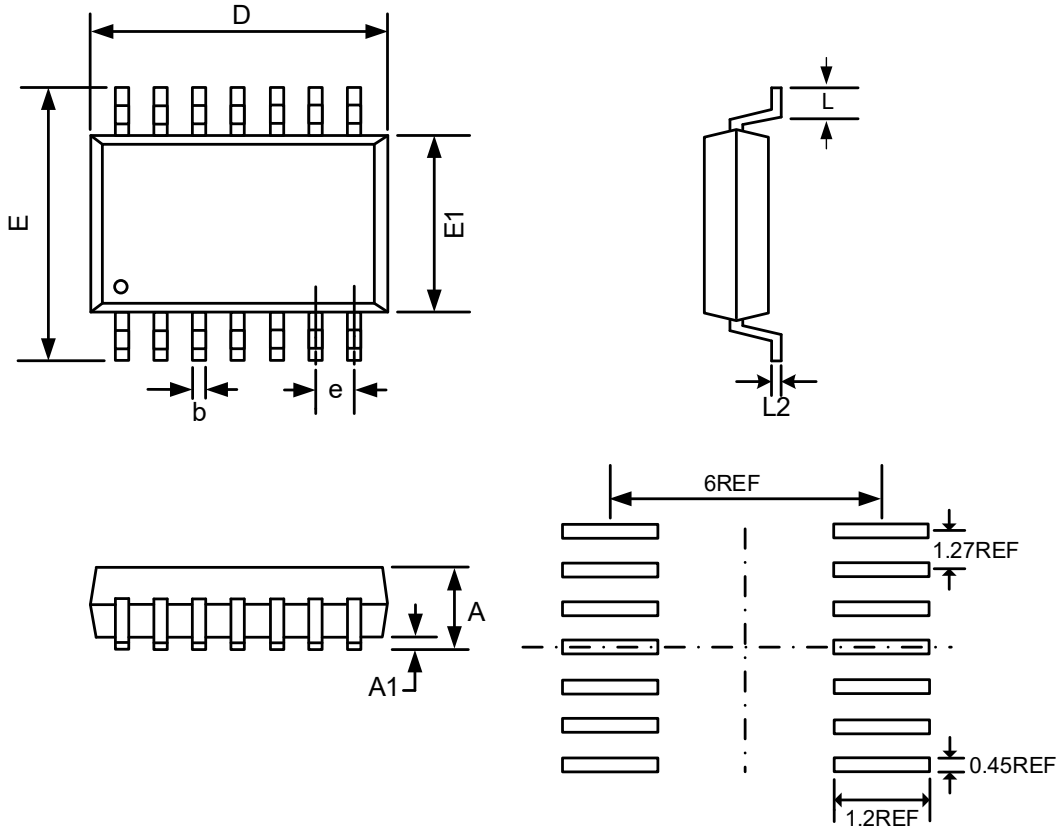
H. t_{PLH} and t_{PHL} are the same as t_{pd}.

I. All parameters and waveforms are not applicable to all devices.

Figure4. Input to Output Propagation Delay Times

Package Dimension

SOP14 (3.9mm × 8.65mm)

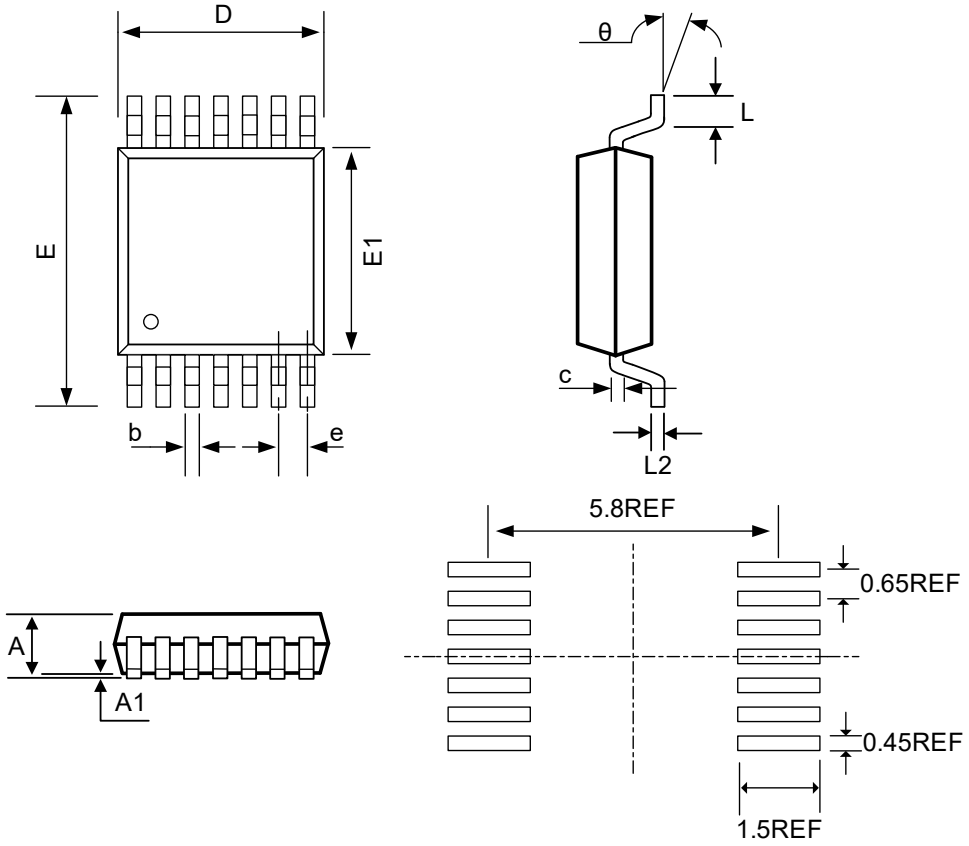


COMMON DIMENSIONS

(Unit: mm)

SYMBOL	MIN	MAX
A	--	1.75
A1	0.10	0.25
b	0.36	0.51
D	8.55	8.75
E	5.80	6.20
E1	3.80	4.00
e	1.22	1.32
L	0.45	0.75
L2	0.25 BSC	

TSSOP14 (4.4mm × 5.0mm)



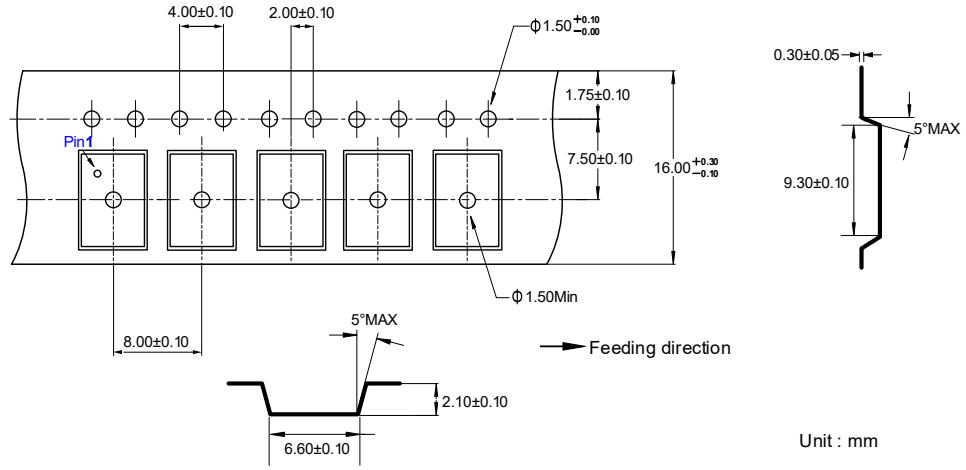
COMMON DIMENSIONS

(Unit: mm)

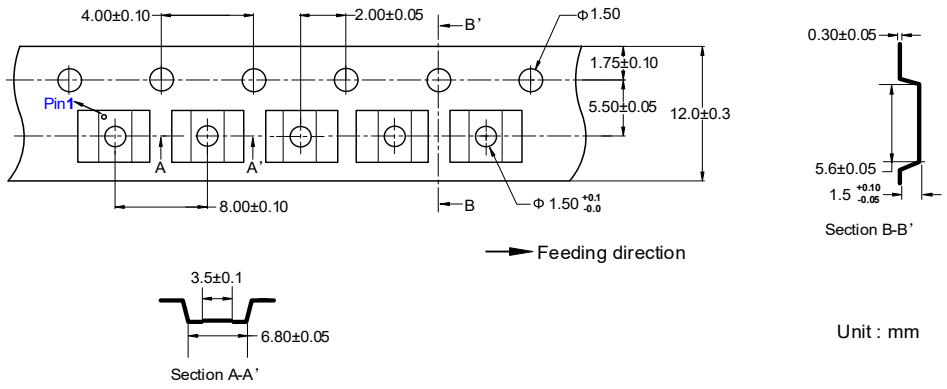
SYMBOL	MIN	MAX
A	--	1.20
A1	0.05	0.15
b	0.19	0.30
c	0.15 REF	
D	4.86	5.10
E	6.20	6.60
E1	4.30	4.50
e	0.65BSC	
L	0.45	0.75
L2	0.25 REF	
θ	0°	8°

Tape Information

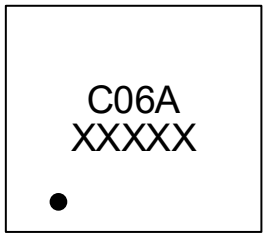
SOP14 (3.9mm × 8.65mm)



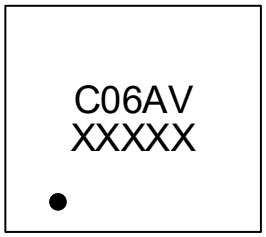
TSSOP14 (4.4mm × 5.0mm)



Marking Information



ET74HC06M
C06A = Part Number
XXXXX = Tracking Number



ET74HC06V
C06AV = Part Number
XXXXX = Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2026-03-23	Official Version	Xu tao	Yang xiaoxu	Liu jiaying