Single Non-Inverting Buffer with Open Drain Output

General Description

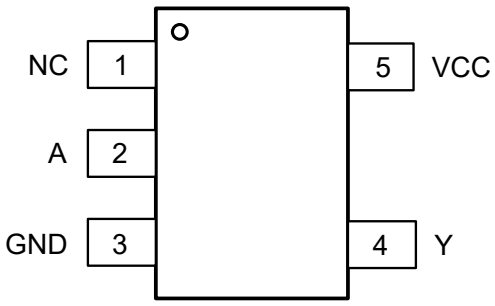
The ETQ74LVC1G07 is a single non-inverting buffer with open drain output operating from a 1.65V to 5.5V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

Features

- Designed for 1.65V to 5.5V V_{CC} Operation
- Over-voltage Tolerant Inputs Accept Voltages to 5.5V
- 32mA Output Sink Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and RoHS Compliant
- Multiple Package Options Automotive AEC-Q100 Grade 1 Qualified
  -- Ambient Temperature Range of -40°C to 125°C
  -- ESD HBM ±4KV PASS
  -- ESD CDM ±1KV PASS
  -- Latch Up Current to ±100mA PASS
- Part No. and Package Information

Part No.	Package	Packing Option	MSL
ETQ74LVC1G07T	SOT23-5 (1.6mm × 2.9mm)	Tape and Reel, 3K/Reel	1

Pin Configuration



SOT23-5

Figure1. Pin Configuration

Pin Function

SOT23-5

Pin No.	Pin Name	Function
1	NC	No Connect
2	A	Input
3	GND	Ground
4	Y	Output
5	VCC	Supply Voltage
1	NC	No Connect

Block Diagram

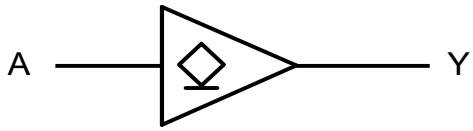


Figure2. Logic Symbol

Functional Table

Input A	Output Y
L	L
H	Z

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage (VCC Pin)		-0.5 to 6.5	V
I_{IK}	DC Input Diode Current, V_I < GND		-50	mA
V_I	DC Input Voltage (1)		-0.5 ≤ V_I ≤ 6.5	V
I_{OK}	DC Output Diode Current, V_O < GND		±50	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}		±50	mA
I_{CC}	DC Supply Current per Supply Pin		100	mA
I_{GND}	DC Ground Current per Supply Pin		-100	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: IO absolute maximum rating must be observed.

Note2: HBM tested per AEC-Q100-002(JEDEC JS-001);

Note3: CDM tested per AEC-Q100-011(JEDEC JS-002);

Note4: Latch Up Current Maximum Rating tested per AEC-Q100-004(JEDEC JESD78F).

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
$R_{\theta JA}$	SOT23-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	180	°C/W
P_D	SOT23-5	Power Dissipation in Still Air at 85°C	360	mW

Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V_{CC}	DC Supply Voltage Operating		1.65	5.5	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
t_r, t_f	Input Rise and Fall Time	V_{CC} = 1.65V to 2.7V		20	ns/V
		V_{CC} = 2.7V to 5.5V		10	

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		1.65~1.95	0.75V_{CC}			0.75V_{CC}		V
			2.3~5.5	0.7V_{CC}			0.7V_{CC}		
V_{IL}	Low-Level Input Voltage		1.65~1.95			0.25V_{CC}		0.25V_{CC}	V
			2.3~5.5			0.3V_{CC}		0.3V_{CC}	
V_{OL}	Low-Level Output Voltage	I_{OL} = 100uA	1.65~5.5			0.1		0.1	V
		I_{OL} = 4mA	1.65			0.24		0.24	
		I_{OL} = 8mA	2.3			0.3		0.3	
		I_{OL} = 12mA	2.7			0.4		0.4	
		I_{OL} = 24mA	3.0			0.55		0.55	
		I_{OL} = 32mA	4.5			0.55		0.55	
I_I	Input Leakage Current	V_I = 5.5V or GND	0~5.5		±0.1	±1		±1	μA
I_{OZ}	OFF-state Output Current	V_I = 5.5V or GND	0~5.5		±0.1	±2		±2	μA
I_{OFF}	Power Off Leakage Current	V_I = 5.5V or V_O = 5.5V	0		±0.1	±2		±2	μA
I_{CC}	Quiescent Supply Current	V_I = 5.5V or GND	5.5		0.1	4		4	μA
ΔI_{CC}	Additional Supply Current	Per Pin:V_I = V_{CC} - 0.6V; I_O = 0mA	2.3~5.5		5	500		500	μA

AC Electrical Characteristics

Symbol	Parameter	Condition	V_{CC}(V)	T_A = 25°C			-40°C ≤ T_A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
t_{PLZ} t_{PZL}	Propagation Delay	xA to xY; See Figure3	1.65~1.95	2.0	13.0	33.0	2.0	39.0	ns
			2.3~2.7	1.0	11.0	13.7	1.0	15.8	
			2.7	1.2	6.2	8.2	1.2	8.7	
			3.0~3.6	0.5	4.9	7.8	0.5	8.2	
			4.5~5.5	0.5	4.3	4.9	0.5	5.6	

Capacitance Characteristics

Symbol	Parameter	Condition	Typ	Unit
C_{IN}	Input Capacitance	V_{CC} = 5.5V, V_I = 0V or V_{CC}	2.5	pF
C_{PD}	Power Dissipation Capacitance (5)	10MHz, V_{CC} = 3.3V, V_I = 0V or V_{CC}	3.0	pF
		10MHz, V_{CC} = 5.5V, V_I = 0V or V_{CC}	3.5	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;

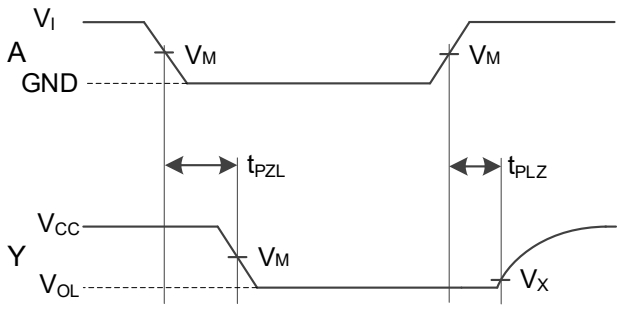
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

Test Waveform



Measurement points are given in Table1.

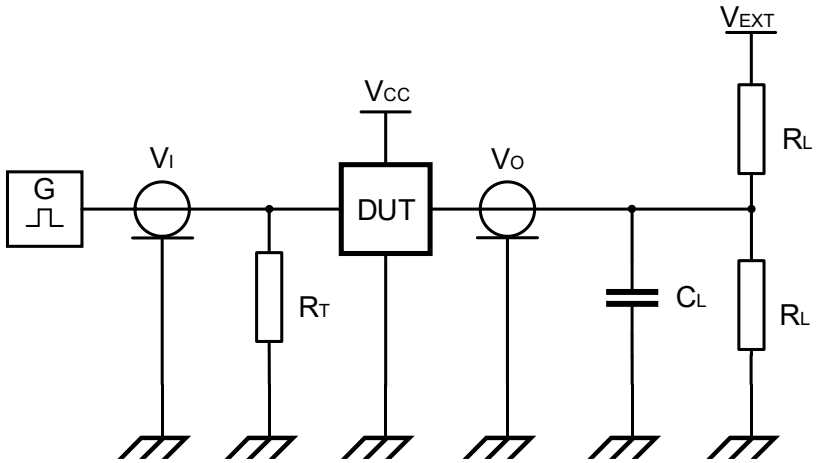
V_{OL} is typical output voltage levels that occur with the output load.

Figure3. Input xA to Output xY Propagation Delay Times

Table1. Measurement Points

Supply Voltage	Input	Output	
V_{CC}	V_M	V_M	Vx
1.65V to 1.95V	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V
2.3V to 2.7V	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.15V
2.7V	1.5V	1.5V	V_{OL} + 0.3V
3.0V to 3.6V	1.5V	1.5V	V_{OL} + 0.3V
4.5V to 5.5V	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.3V

Test Circuit



Measurement points are given in Table2.

Definitions test circuit:

R_L = Load resistance;

C_L = Load capacitance including jig and probe capacitance;

R_T = Termination resistance should be equal to output impedance Z_O of the pulse generator;

V_{EXT} = External voltage for measuring switching times.

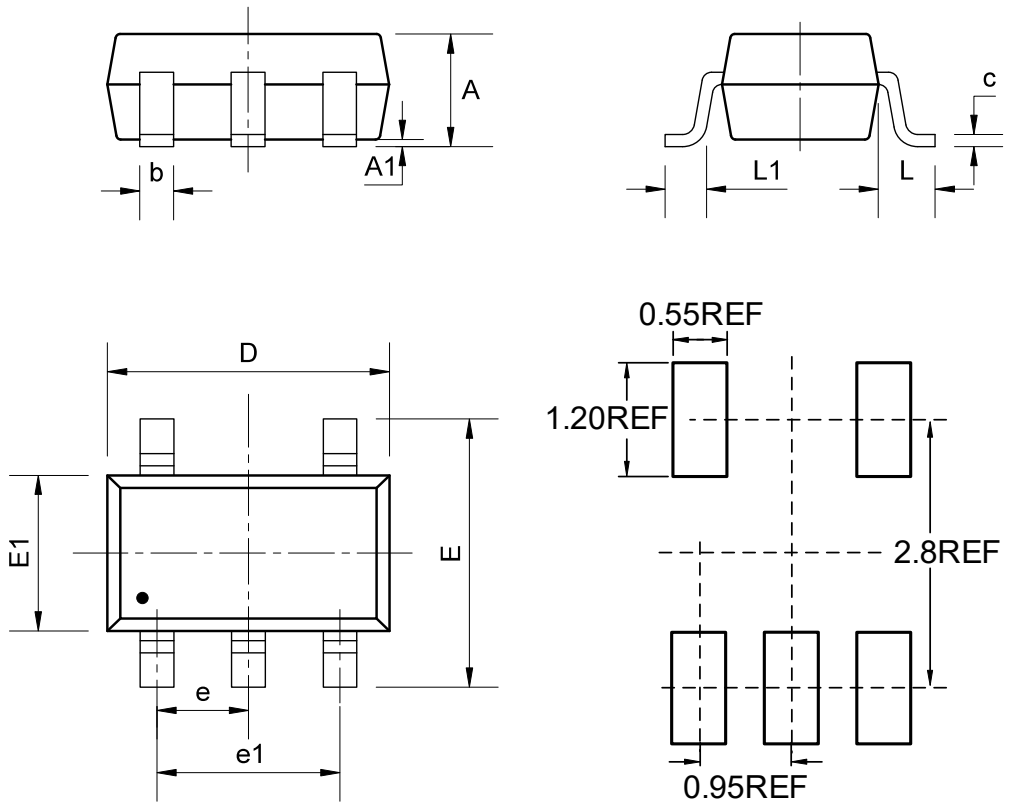
Figure4. Test Circuit for Measuring Switching Times

Table2. Test Data

Supply Voltage	Input		Load		V_{EXT}
V_{CC}	V_I	$t_r = t_f$	C_L	R_L	t_{PZL}, t_{PLZ}
1.65V to 1.95V	V_{CC}	3.0ns	30pF	1kΩ	2 × V_{CC}
2.3V to 2.7V	V_{CC}	3.0ns	30pF	500Ω	2 × V_{CC}
2.7V	2.7V	3.0ns	50pF	500Ω	6V
3.0V to 3.6V	2.7V	3.0ns	50pF	500Ω	6V
4.5V to 5.5V	V_{CC}	3.0ns	50pF	500Ω	2 × V_{CC}

Package Dimension

SOT23-5 (1.6mm × 2.9mm)



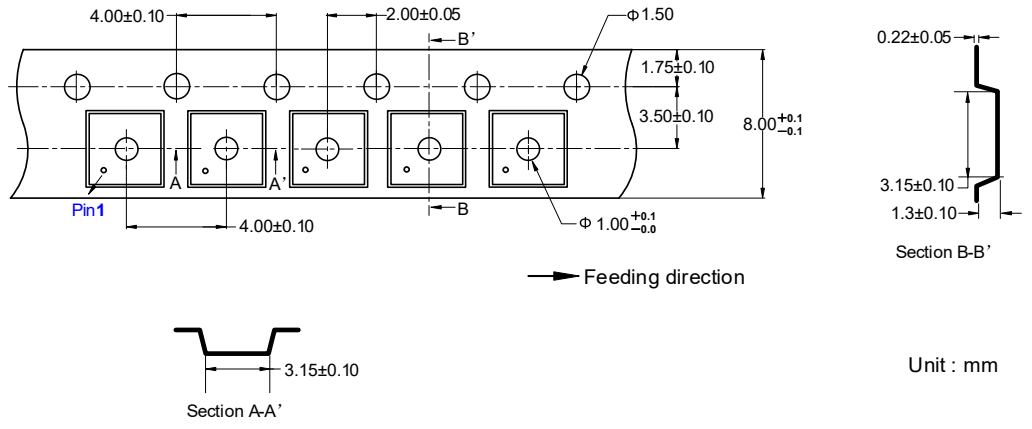
COMMON DIMENSIONS

(Unit: mm)

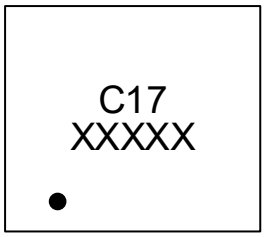
SYMBOL	MIN	NOM	MAX
A	-	-	1.45
A1	0.00	-	0.15
b	0.28	0.35	0.50
c	0.08	0.15	0.22
D	2.75	2.9	3.05
e	0.90	0.95	1.00
e1	1.80	1.90	2.00
E	2.60	2.80	3.00
E1	1.45	1.6	1.75
L	0.60REF		
L1	0.30	0.45	0.60

Tape Information

SOT23-5 (1.6mm × 2.9mm)



Marking Information



ETQ74LVC1G07T

C17 = Part Number

XXXXX = Tracking Numbe

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2026-04-20	Official Version	Xu tao	Yang xiaoxu	Liu jiaying