

Dual 2-Input Positive-NAND Gate

General Description

The ETQ74LVC2G00 is a dual 2-input positive-NAND gate 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.

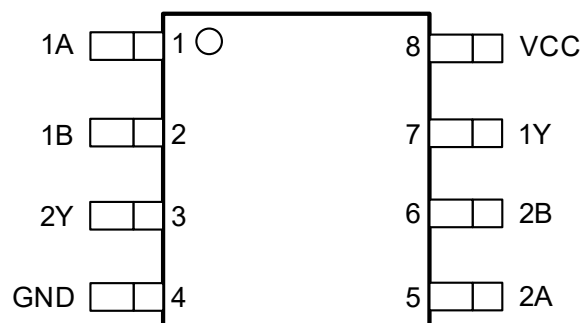
This product has been qualified to the AEC-Q100 and is suitable for use in automotive applications

Features

- Designed for 1.65V to 5.5V V_{CC} Operation
- Over-voltage Tolerant Inputs Accept Voltages to 5.5V
- $\pm 32\text{mA}$ Balanced Output Sink and Source 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 $\pm 8\text{KV}$ PASS
 - ESD CDM $\pm 2\text{KV}$ PASS
 - Latch Up Current to $\pm 200\text{mA}$ PASS
- Part No. and Package Information

Part No.	Package	Packing Option	MSL
ETQ74LVC2G00U	VSSOP8 (2.0mm $\times$ 2.3mm)	Tape and Reel, 3K/Reel	1
ETQ74LVC2G00U1	MSOP8 (3.0mm $\times$ 3.0mm)	Tape and Reel, 3K/Reel	1

Pin Configuration



VSSOP8/MSOP8

Figure1. Pin Configuration

ETQ74LVC2G00

Pin Function

VSSOP8/MSOP8

Pin No.	Pin Name	Function
1	1A	Channel 1, Input A
2	1B	Channel 1, Input B
3	2Y	Channel 2, Output Y
4	GND	Ground
5	2A	Channel 2, Input A
6	2B	Channel 2, Input B
7	1Y	Channel 1, Output Y
8	VCC	Supply Voltage

Block Diagram

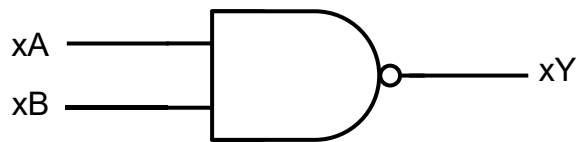


Figure2. Logic Symbol

Functional Table

Input		Output
xA	xB	xY
L	L	H
L	H	H
H	L	H
H	H	L

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Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V _{CC}	DC Supply Voltage (VCC Pin)		-0.5 to 6.5	V
V _I	DC Input Voltage ⁽¹⁾		-0.5 ≤ V _I ≤ 6.5	V
V _O	DC Output Voltage Output in Higher or Low State		-0.5 to V _{CC} + 0.5	V
I _{IK}	DC Input Diode Current, V _I < GND		-50	mA
I _{OK}	DC Output Diode Current, V _O < GND		-50	mA
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⁾	±8000	V
		Charged Device Model ⁽³⁾	±2000	
I _{LU}	Max Latch Up Current Above V _{CC} and GND at 125°C ⁽⁴⁾		±200	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 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 _{θJA}	VSSOP8	Thermal Characteristics, Thermal Resistance, Junction-to-Air	390	°C/W
	MSOP8		320	

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	

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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 2.3~5.5	0.65V _{CC} 0.7V _{CC}			0.65V _{CC} 0.7V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65~1.95 2.3~5.5			0.25V _{CC} 0.3V _{CC}		0.25V _{CC} 0.3V _{CC}	V
V _{OH}	High-Level Output Voltage	I _{OH} = -100uA	1.65~5.5	V _{CC} - 0.1	V _{CC}		V _{CC} - 0.1		V
		I _{OH} = -4mA	1.65	1.2	1.53		0.95		
		I _{OH} = -8mA	2.3	1.9	2.13		1.7		
		I _{OH} = -12mA	2.7	2.2	2.5		1.9		
		I _{OH} = -24mA	3.0	2.3	2.6		2.0		
		I _{OH} = -32mA	3.0	3.8	4.1		3.4		
V _{OL}	Low-Level Output Voltage	I _{OL} = 100uA	4.5			0.1		0.1	V
		I _{OL} = 4mA	1.65~5.5		0.08	0.45		0.7	
		I _{OL} = 8mA	1.65		0.14	0.3		0.45	
		I _{OL} = 12mA	2.3		0.19	0.4		0.6	
		I _{OL} = 24mA	2.7		0.37	0.55		0.8	
		I _{OL} = 32mA	3.0		0.43	0.55		0.8	
I _I	Input Leakage Current	V _I = 5.5V or GND	0~5.5		±0.1	±1		±1	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

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AC Electrical Characteristics

$t_r = t_f = 3\text{ns}$

Symbol	Parameter	Condition	$V_{CC}(\text{V})$	$T_A = 25^\circ\text{C}$			$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3 and 4)	$R_L = 1\text{k}\Omega$, $C_L = 30\text{pF}$	1.65~1.95	1.2	11.4	14.8	1.2	16.1	ns
		$R_L = 500\Omega$, $C_L = 30\text{pF}$	2.3~2.7	0.7	7.2	9.4	0.7	11.0	
		$R_L = 500\Omega$, $C_L = 50\text{pF}$	2.7	0.7	6.6	8.6	0.7	9.6	
		$R_L = 500\Omega$, $C_L = 50\text{pF}$	3.0~3.6	0.7	6.0	7.8	0.7	8.6	
		$R_L = 500\Omega$, $C_L = 50\text{pF}$	4.5~5.5	0.5	4.8	6.2	0.5	6.8	

Capacitance Characteristics

Symbol	Parameter	Condition	Typ	Unit
C_{IN}	Input Capacitance	$V_{CC} = 5.5\text{V}$, $V_I = 0\text{V}$ or V_{CC}	5	pF
C_{PD}	Power Dissipation Capacitance ⁽⁵⁾	10MHz, $V_{CC} = 3.3\text{V}$, $V_I = 0\text{V}$ 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.

AC Test Circuit

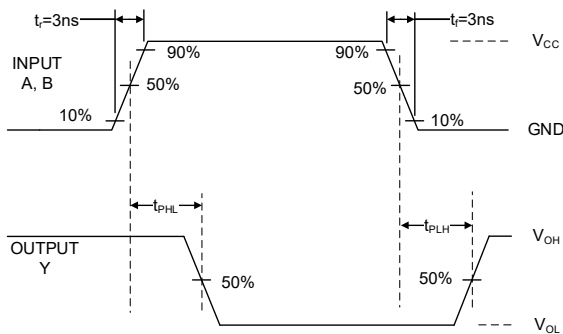


Figure3. Switching Waveform

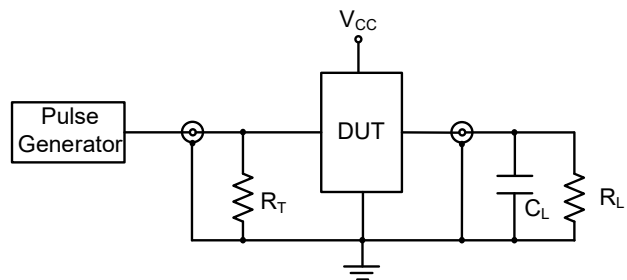
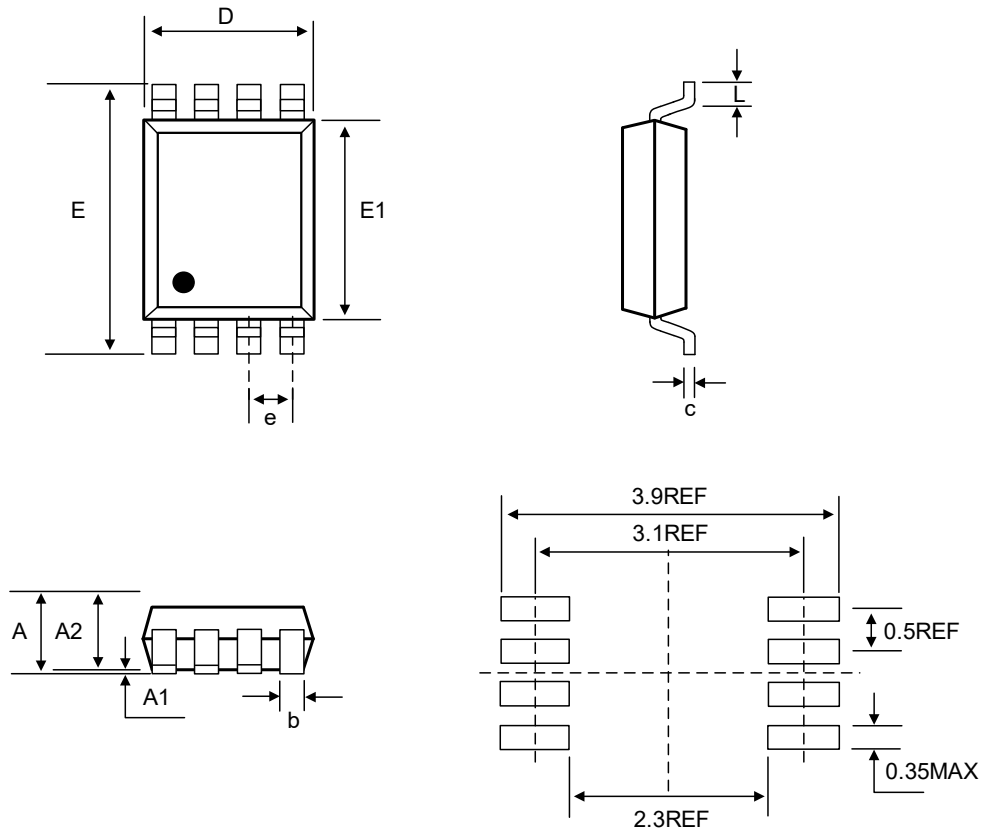


Figure4. Test Circuit

ETQ74LVC2G00

Package Dimension

VSSOP8 (2.0mm × 2.3mm)



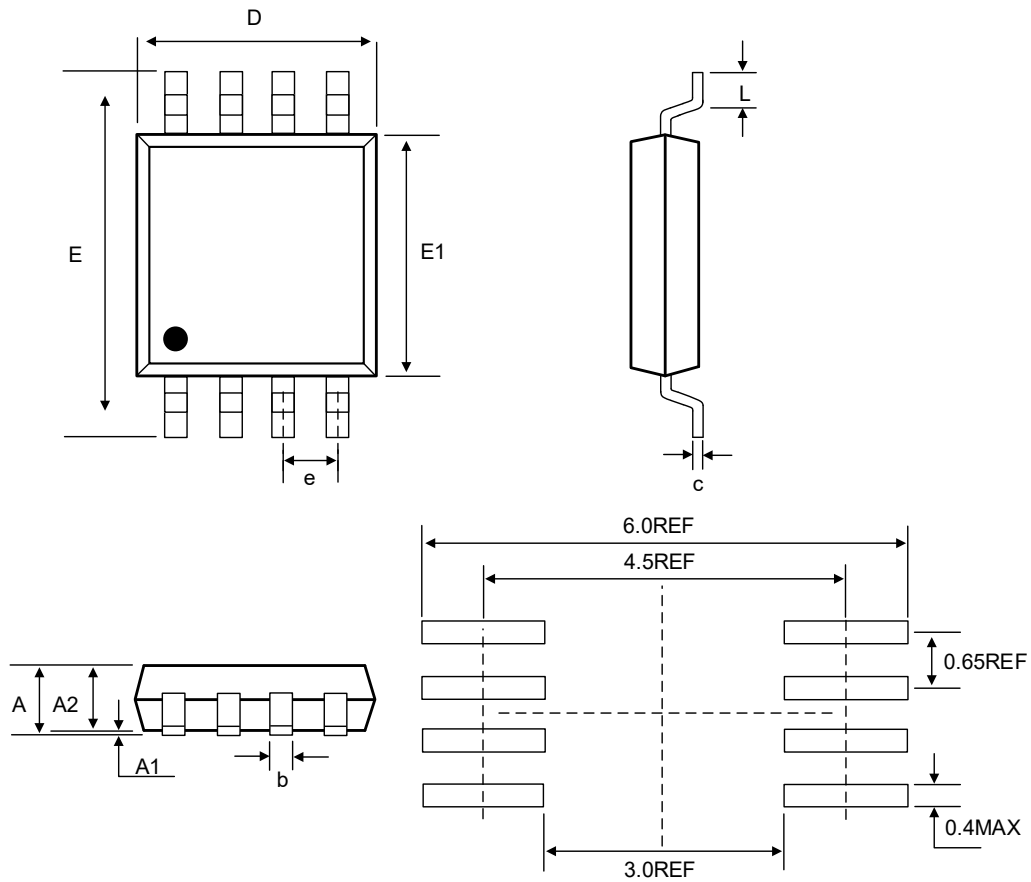
COMMON DIMENSIONS

(Unit: mm)

SYMBOL	MIN	NOM	MAX
A	-	-	0.90
A1	0.00	-	0.10
A2	0.65	0.75	0.80
b	0.17	-	0.27
c	0.08	-	0.20
D	1.90	2.00	2.10
E	3.00	3.10	3.20
E1	2.20	2.30	2.40
e	0.50BSC		
L	0.20	-	0.35

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MSOP8 (3.0mm × 3.0mm)



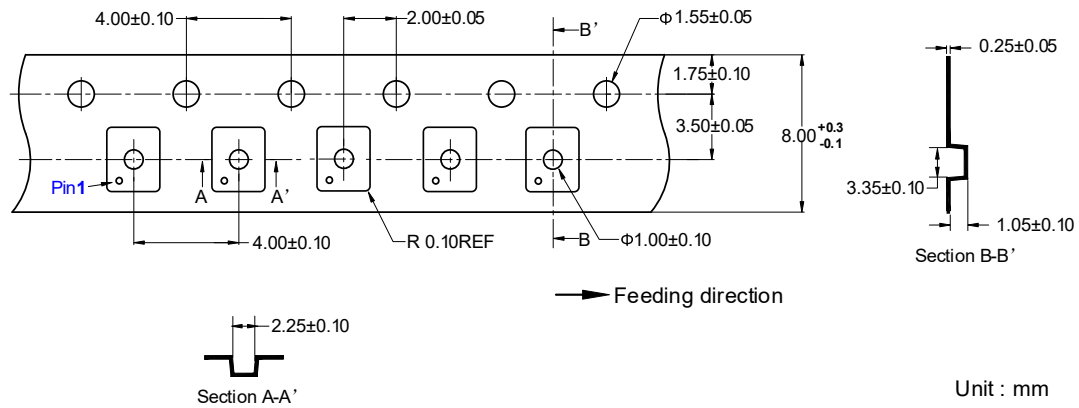
COMMON DIMENSIONS
(Unit: mm)

SYMBOL	MIN	NOM	MAX
A	-	-	1.10
A1	0.00	-	0.15
A2	0.75	0.85	0.95
b	0.22	0.30	0.38
c	0.08	0.1	0.20
D	2.90	3.00	3.10
E	3.90	-	5.10
E1	2.90	3.00	3.10
e	0.65BSC		
L	0.33	-	0.7

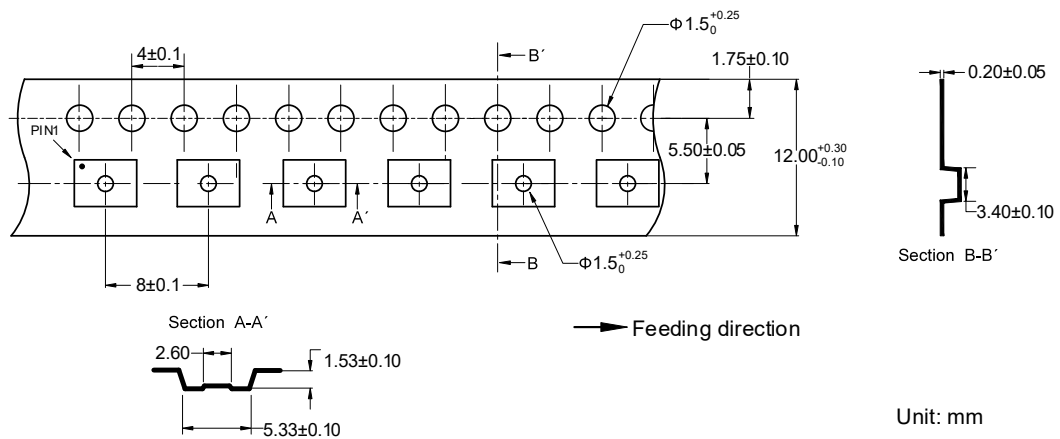
ETQ74LVC2G00

Tape Information

VSSOP8 (2.0mm × 2.3mm)



MSOP8 (3.0mm × 3.0mm)



ETQ74LVC2G00

Marking Information

C200U XXXXX ● ETQ74LVC2G00U C200U = Part Number XXXXX = Tracking Number	C200U1 XXXXX ● ETQ74LVC2G00U1 C200U1 = Part Number XXXXX = Tracking Number
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Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2026-02-26	Official Version	Lu shaojie	Yang xiaoxu	Liu jiaying