

Single 2-input AND Gate

General Description

The ET74LVC1G08 is a single 2-input AND 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.

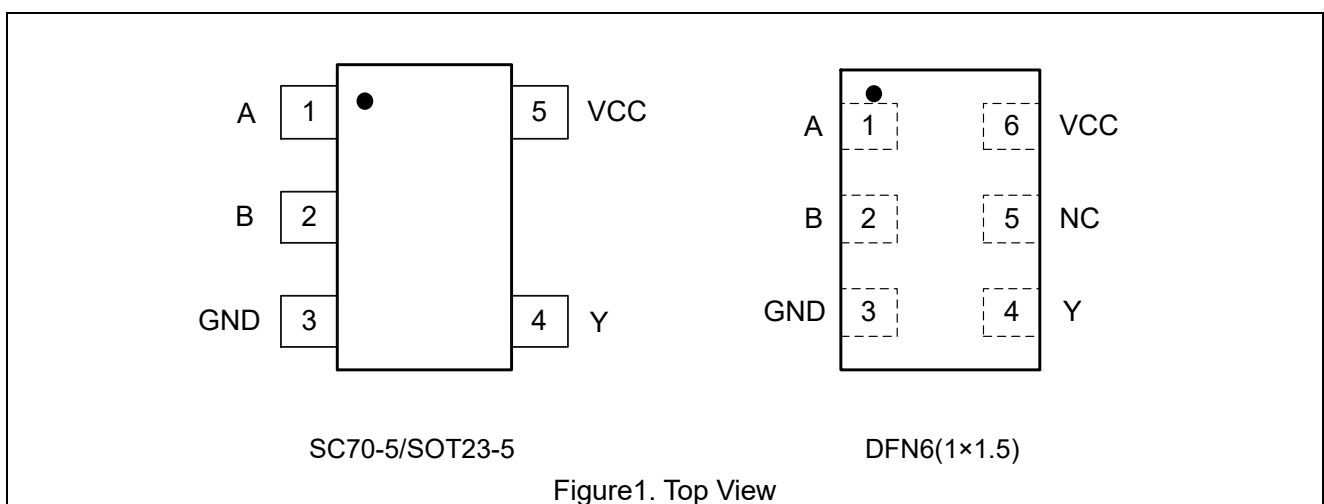
Features

- Designed for 1.65V to 5.5V V_{CC} Operation
- Over-voltage Tolerant Inputs
- 24mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and are RoHS Compliant
- Packages are SC70-5, SOT23-5 or small DFN6
- MSL1 (DFN6) , MSL3(SC70-5, SOT23-5)

Device Information

Part No.	Package	Size
ET74LVC1G08	SC70-5	1.3mm×2.1mm
ET74LVC1G08T	SOT23-5	1.6mm×2.9mm
ET74LVC1G08Y	DFN6	1.0mm×1.5mm

Pin Configuration



ET74LVC1G08

Pin Function

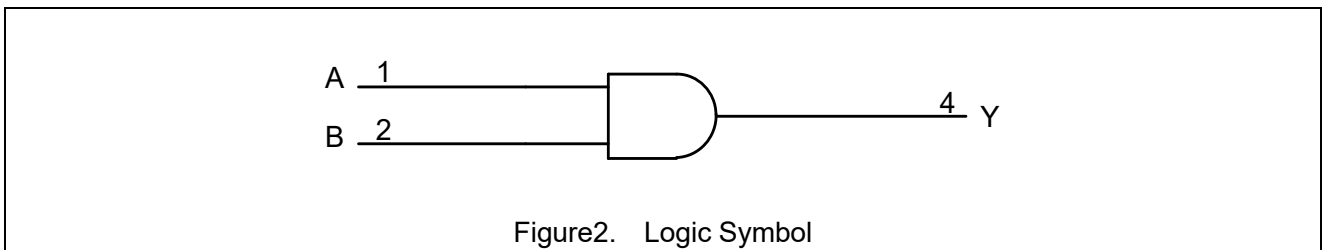
SC70-5/ SOT23-5

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

DFN6

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

Block Diagram



Functional Description

Function Table

Input		Output
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

ET74LVC1G08

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V _{CC}	DC Supply Voltage		-0.5 to 7.0	V
V _I	DC Input Voltage ⁽¹⁾		-0.5 ≤ V _I ≤ +7.0	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, V _O > V _{CC}	±50	mA
I _O	DC Output Sink Current		±50	mA
I _{CC}	DC Supply Current per Supply Pin		±100	mA
I _{GND}	DC Ground Current per Supply Pin		±100	mA
T _{STG}	Storage Temperature Range		-65 to 150	°C
T _L	Lead Temperature, Soldering 10 Seconds		260	°C
T _J	Max Junction Temperature		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 this 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. Tested to EIA/JESD22-A114-A.

Note3. Tested to JESD22-C101-A.

Note4. Tested to EIA/JESD78.

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
R _{θJA}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-Air	300	°C/W
	SOT23-5		250	
	DFN6(1.0×1.5)		440	
R _{θJB}	SC70-5	Thermal Characteristics, Thermal Resistance, Junction-to-board	75	mW
	SOT23-5		65	
	DFN6(1.0×1.5)		270	
P _D	SC70-5	Power Dissipation in Still Air at 85°C	215	
	SOT23-5		260	
	DFN6(1.0×1.5)		150	

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Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V _{CC}	DC Supply Voltage Operating		1.65	5.5	V
	Date Retention Voltage Operating		1.5	5.5	
V _{IN}	DC Input Voltage		0	5.5	V
V _{OUT}	DC Output Voltage (High or Low State)		0	5.5	V
T _A	Operating Temperature Range		-40	125	°C
t _r ,t _f	Input Rise and Fall Time	V _{CC} = 2.5 V ± 0.2 V	0	20	ns/V
		V _{CC} = 3.0 V ± 0.3 V	0	10	
		V _{CC} = 5.0 V ± 0.5 V	0	5	

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied.

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		1.65to1.95 2.3 to 5.5	0.75V _{CC} 0.7V _{CC}			0.75V _{CC} 0.7V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65to1.95 2.3 to 5.5			0.25V _{CC} 0.3V _{CC}		0.25V _{CC} 0.3V _{CC}	V
V _{OH}	High-Level Output Voltage	I _{OH} =-100μA	1.65 to 5.5	V _{CC} -0.1	V _{CC}		V _{CC} -0.1		V
		I _{OH} =-3mA	1.65	1.29	1.52		1.29		
		I _{OH} =-8mA	2.3	1.9	2.1		1.9		
		I _{OH} =-12mA	2.7	2.2	2.4		2.2		
		I _{OH} =-16mA	3.0	2.4	2.7		2.4		
		I _{OH} =-24mA	3.0	2.3	2.5		2.3		
		I _{OH} =-32mA	4.5	3.8	4.0		3.8		
V _{OL}	Low-Level Output Voltage	I _{OL} =100μA	1.65 to 5.5		0.0	0.1		0.1	V
		I _{OL} =3mA	1.65		0.08	0.24		0.24	
		I _{OL} =8mA	2.3		0.20	0.3		0.3	
		I _{OL} =12mA	2.7		0.22	0.4		0.4	
		I _{OL} =16mA	3.0		0.28	0.4		0.4	
		I _{OL} =24mA	3.0		0.38	0.55		0.55	
		I _{OL} =32mA	4.5		0.42	0.55		0.55	
I _{IN}	Input Leakage Current	V _{IN} = 5.5V or GND	0 to 5.5			± 0.1		±1.0	μA

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I_{OFF}	Power Off Leakage Current	$V_{IN}=5.5V$ or $V_{OUT}=5.5V$	0			1.0		10	μA
I_{CC}	Quiescent Supply Current	$V_{IN}=5.5V$ or GND	5.5			1.0		10	μA

AC Electrical Characteristics

$t_r = t_f = 2.5ns$

Symbol	Parameter	Condition	$V_{CC}(V)$	$T_A = 25^\circ C$			$-40^\circ C \leq T_A \leq 125^\circ C$		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3 & 4)	$R_L = 1M\Omega$ $C_L = 15pF$	1.65	2.0	10.1	12.9	2.0	13.9	ns
			1.8	2.0	9.1	11.6	2.0	12.4	
		$R_L = 1M\Omega$ $C_L = 15pF$	2.5	0.2	6.0	7.7	0.8	8.2	
		$R_L = 1M\Omega$ $C_L = 15pF$	3.3	0.8	5.0	6.5	0.5	7.0	
				1.2	5.6	7.1	1.5	7.6	
		$R_L = 1M\Omega$ $C_L = 15pF$	5.0	0.5	4.4	5.6	0.5	6.1	
		$R_L = 500\Omega$ $C_L = 50pF$		0.8	4.8	6.1	0.8	6.6	

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)	10 MHz, $V_{CC} = 3.3V$, $V_I = 0V$ or V_{CC}	26	pF
		10 MHz, $V_{CC} = 5.5V$, $V_I = 0V$ or V_{CC}	30	

Note5. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(OPR)} = C_{PD} \times V_{CC} \times f_{in} + I_{CC} \times C_{PD}$ is used to determine the no-load dynamic power consumption; $P_D = C_{PD} \times V_{CC}^2 \times f_{in} + I_{CC} \times V_{CC} \times Fig.$

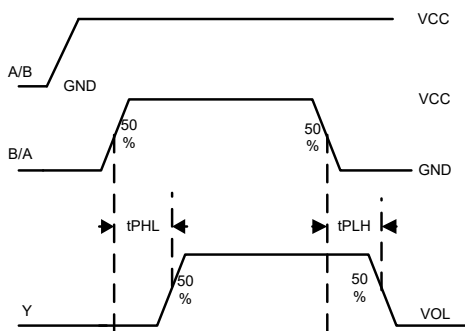


Figure 3. Switching Waveform

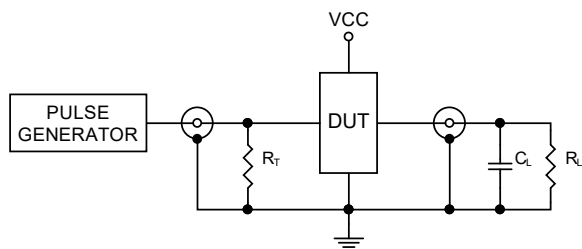
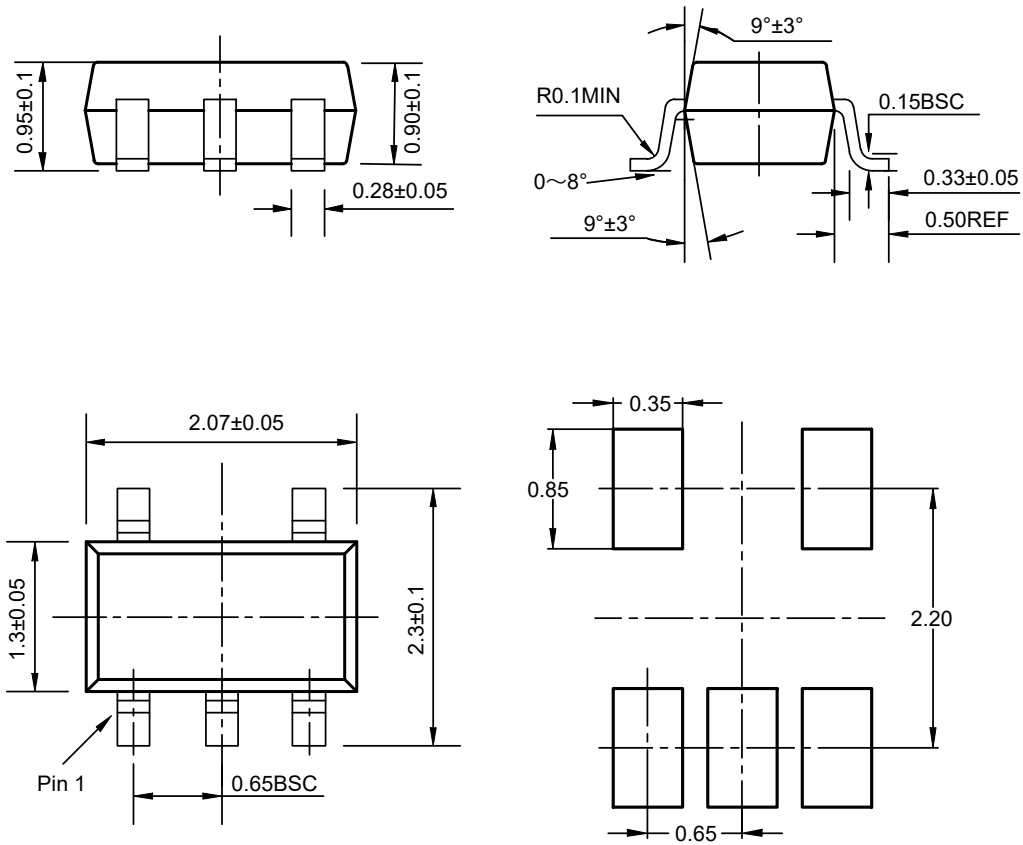


Figure 4. Test Circuit

ET74LVC1G08

Package Dimension

SC70-5

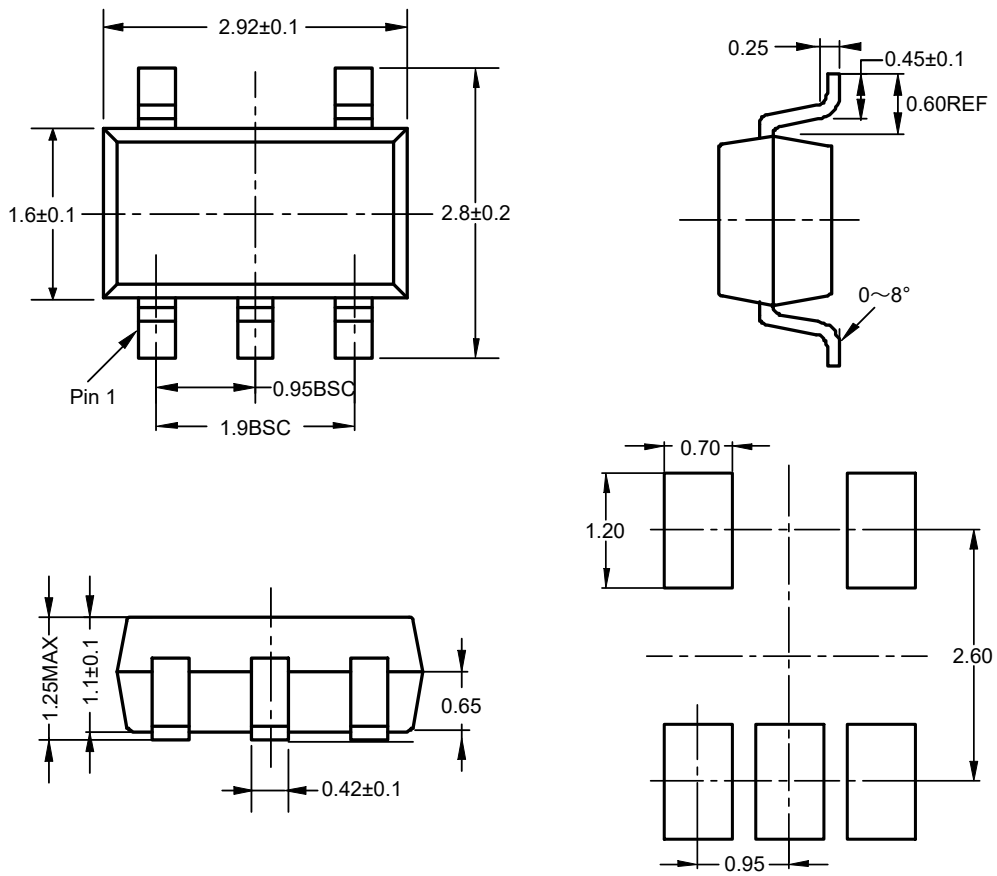


Recommended Land Pattern

Unit: mm

ET74LVC1G08

SOT23-5

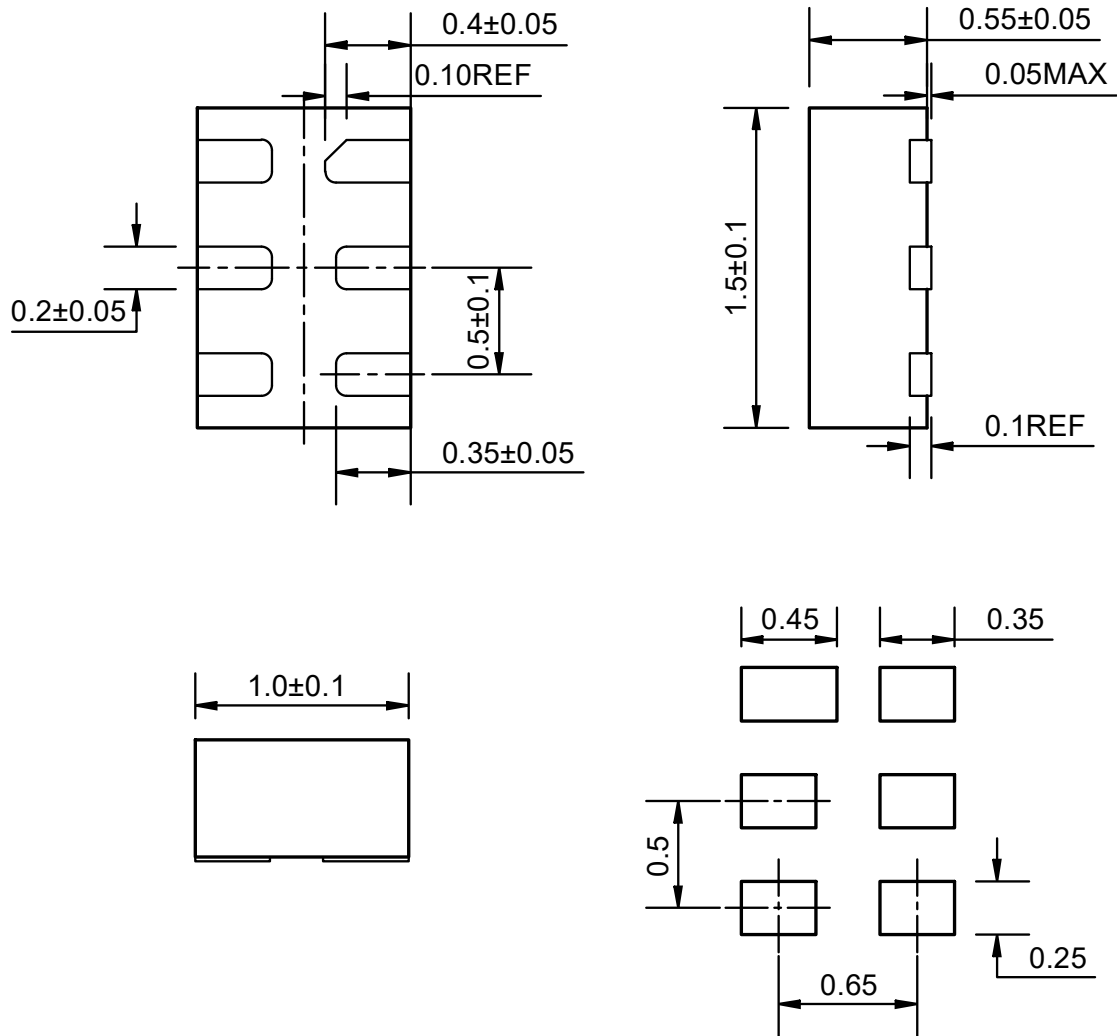


Recommended Land Pattern

Unit: mm

ET74LVC1G08

DFN6 (1.0×1.5)



Recommended Land Pattern

Unit: mm

ET74LVC1G08

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2017-07-18	Original Version	Ma Yong jian	Ma Yong jian	Liu Jia Ying
1.1	2019-07-18	Update AC table and device information	Ma Yong jian	Ma Yong jian	Liu Jia Ying
1.2	2021-06-25	Update Cpd in AC table and lin/loff/lcc in dc table	Ma Yong jian	Ma Yong jian	Liu Jia Ying
1.3	2022-01-18	Add SC70-5 Recommended Pad Layout	Shibo	Shibo	Zhuji
1.4	2022-04-26	ESD update	Shibo	Shibo	Zhuji
1.5	2022-07-07	Add $\theta_{JB}, T_A = 125^{\circ}\text{C}$	Shibo	Shibo	Zhuji
1.6	2022-10-14	Update format and Thermal Characteristics	Wuhan	Shibo	Zhuji
1.7	2023-11-29	Update Typeset / package picture	Shibo	Shibo	Liuji