

Dual Inverter Gate

General Description

The ET74LVC2G04 is a high-performance dual inverter 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.

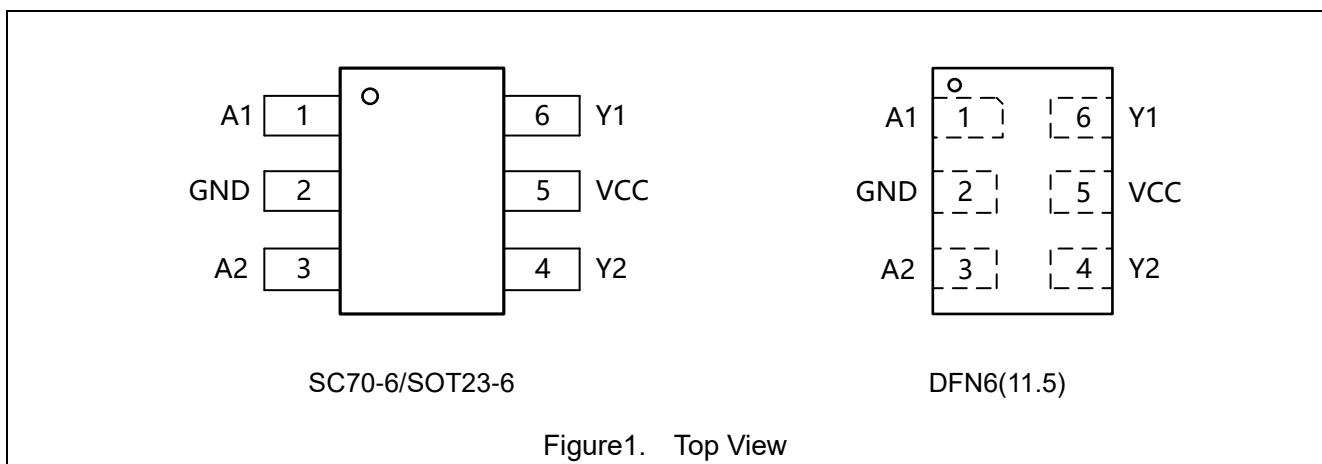
Features

- Designed for 1.65V to 5.5V VCC Operation
- Over-Voltage Tolerant Inputs and Outputs
- 24mA Balanced Output Sink and Source Output Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and are RoHS Compliant

Device Information

Part No.	Package	Packing Option	MSL
ET74LVC2G04	SC70-6 (1.3mm×2.1mm)	Tape and Reel, 3K	1
ET74LVC2G04T	SOT23-6 (1.6mm×2.9mm)	Tape and Reel, 3K	3
ET74LVC2G04Y	DFN6 (1.0mm×1.5mm)	Tape and Reel, 3K	1

Pin Configuration



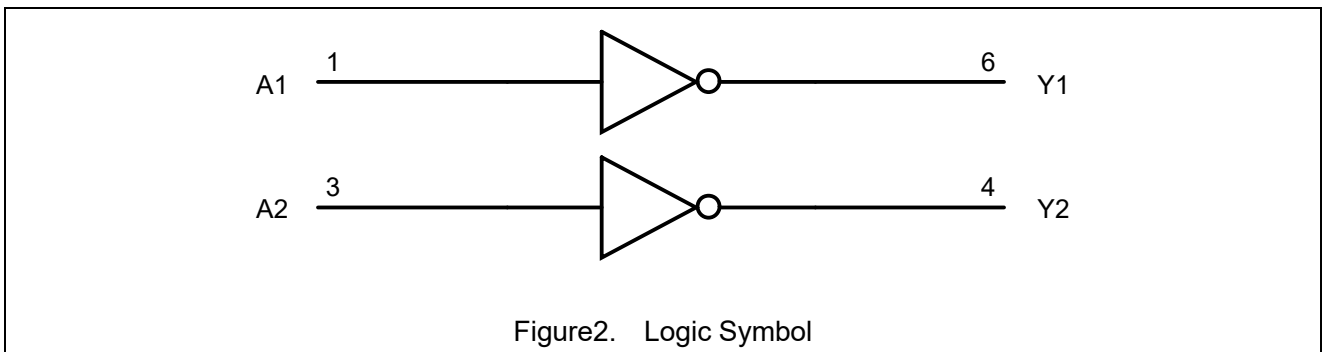
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Pin Function

SC70-6/ SOT23-6/DFN6

Pin No.	Pin Name	Function
1	A1	Input CH1
2	GND	Ground
3	A2	Input CH2
4	Y2	Output CH2
5	VCC	Supply Voltage
6	Y1	Output CH1

Block Diagram



Function Table

Input A	Output Y
L	H
H	L

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Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage		-0.5 to 7.0	V
V_I	DC Input Voltage ⁽¹⁾		$-0.5 \leq V_I \leq +7.0$	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
$R_{\theta JA}$	SC70-6	Thermal Characteristics, Thermal Resistance, Junction-to-Air	280	°C/W
	SOT23-6		180	
	DFN6(1.0×1.5)		440	
P_D	SC70-6	Power Dissipation in Still Air at 85°C	230	mW
	SOT23-6		360	
	DFN6(1.0×1.5)		150	

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Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
V _{CC}	DC Supply Voltage		1.65	5.5	V
	Operating Date Retention		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	85	°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	

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 to 1.95 2.3 to 5.5	0.75V _{CC} 0.7V _{CC}			0.75V _{CC} 0.7V _{CC}		V
V _{IL}	Low-Level Input Voltage		1.65 to 1.95 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} = -100uA	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 _{OH} = 100uA	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		10	μA
I_{CC}	Quiescent Supply Current	$V_{IN} = 5.5V$ or GND	5.5					10	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC Electrical Characteristics

$t_r = t_f = 2.5ns$; $C_L = 50pF$; $R_L = 500 \Omega$

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 and4)	$R_L = 1M\Omega, C_L = 15pF$	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	
		$R_L = 500\Omega, C_L = 50pF$		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	

Capacitive 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}	26	pF
		10MHz, $V_{CC} = 5.5V, V_I = 0V$ 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: $I_{CC(OPR)} = C_{PD} \times V_{CC} \times f_{in} + I_{CC} \times V_{CC}$ is used to determine the no-load dynamic power consumption; $P_D = C_{PD} \times V_{CC}^2 \times f_{in} + I_{CC} \times V_{CC} \times Fig.$

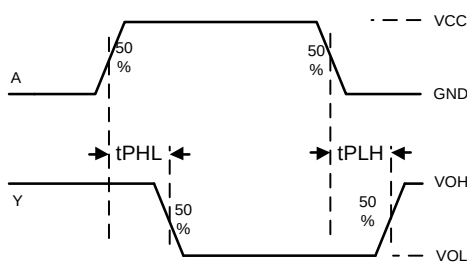


Figure 3. Switching Waveform

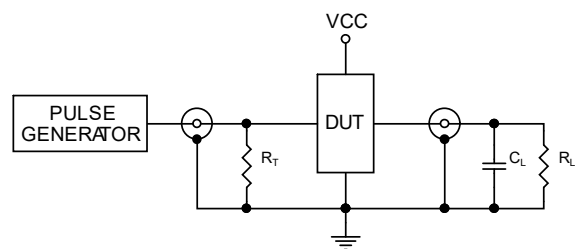
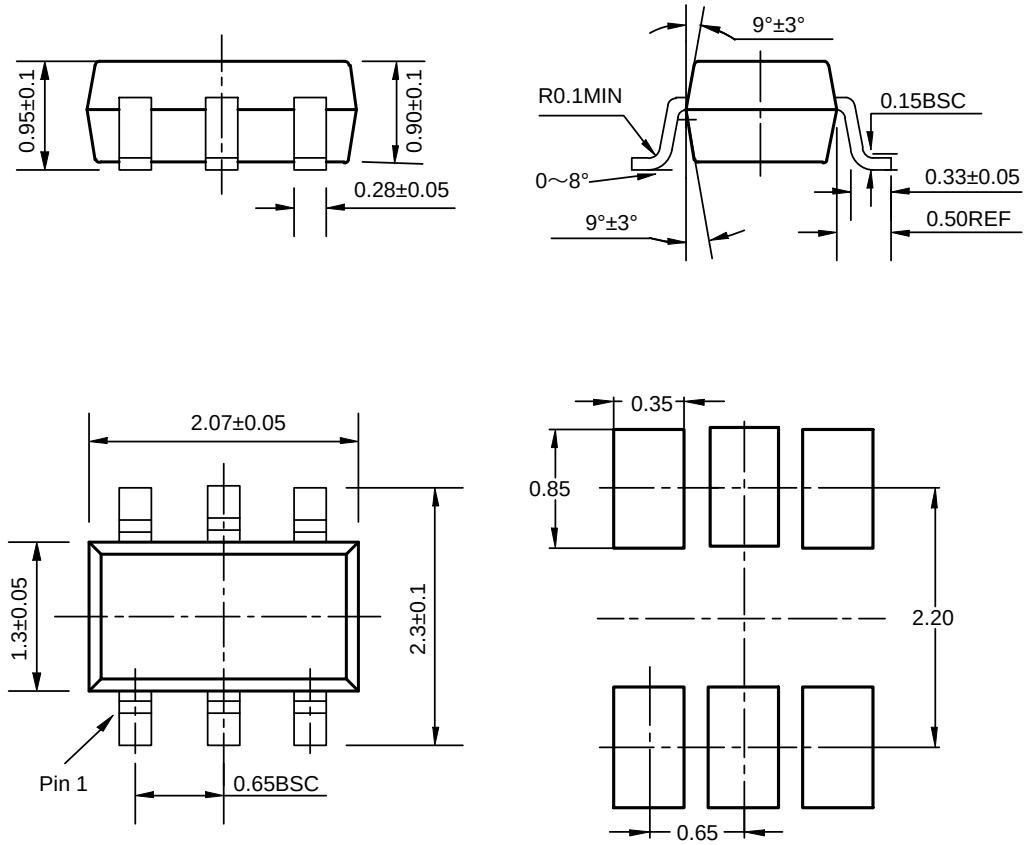


Figure4. Test Circuit

ET74LVC2G04

Package Dimension

SC70-6

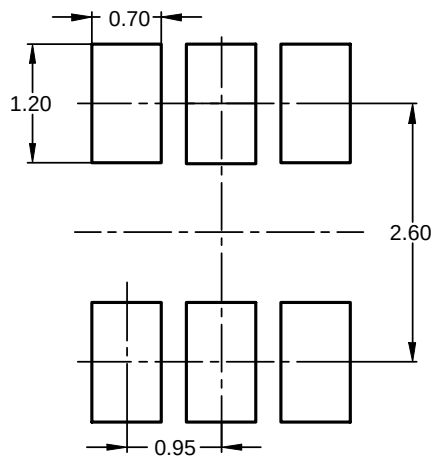
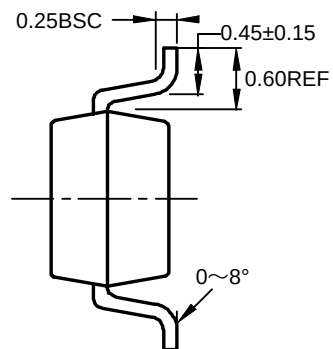
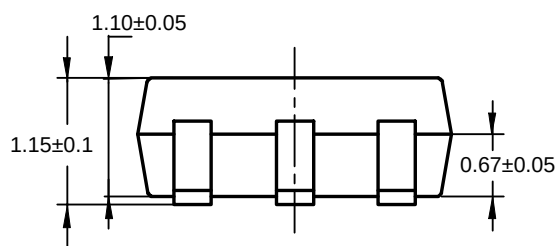
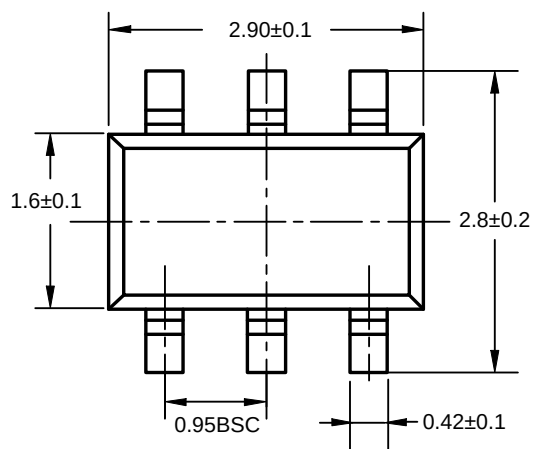


Recommended Land Pattern

Unit: mm

ET74LVC2G04

SOT23-6

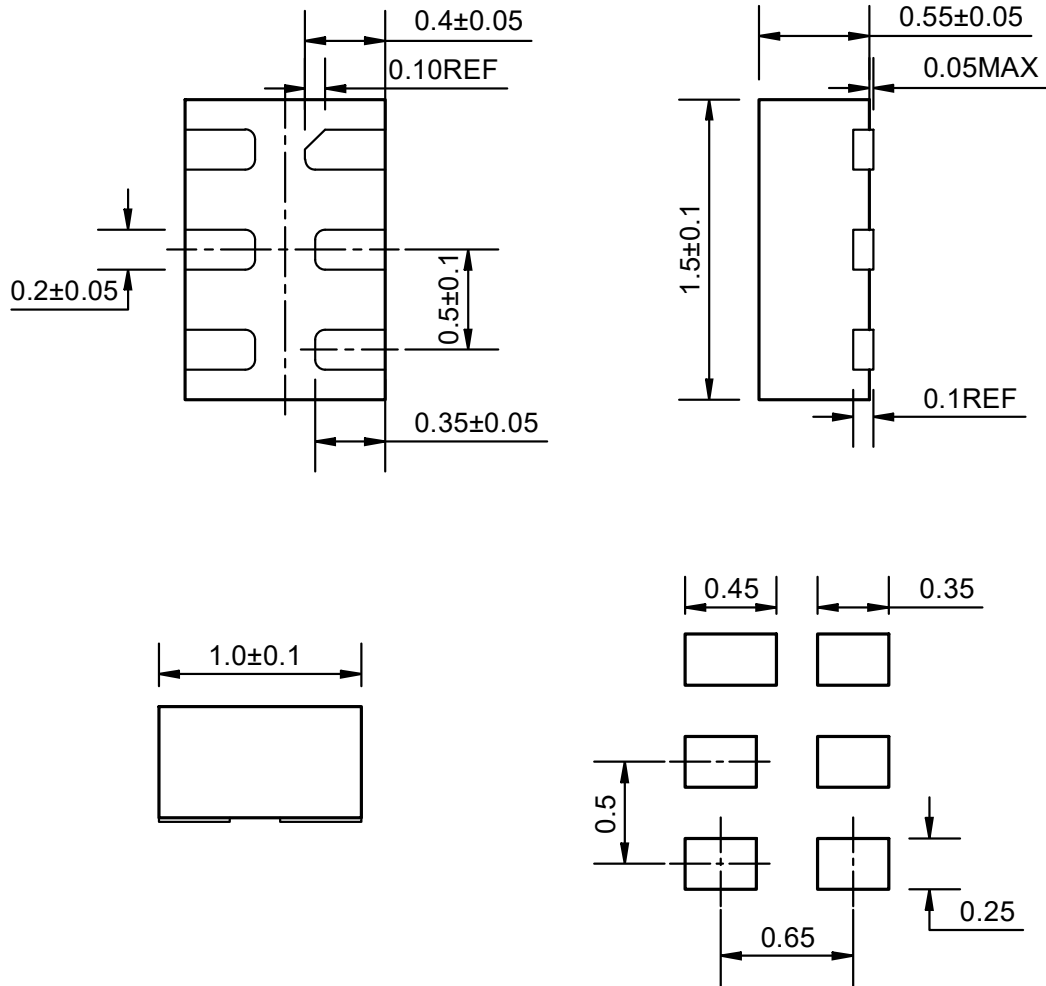


Recommended Land Pattern

Unit: mm

ET74LVC2G04

DFN6



Recommended Land Pattern

Unit: mm

ET74LVC2G04

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2017-10-23	Original Version	Ma Yong jian	Ma Yong jian	Liu Jia Ying
1.1	2019-04-18	Update package size	Ma Yong jian	Ma Yong jian	Liu Jia Ying
1.2	2019-04-18	Update AC table and device information	Ma Yong jian	Ma Yong jian	Liu Jia Ying
1.3	2022-10-14	Update format and Thermal Characteristics And C _{PD}	Wuhan	Shibo	Shibo
1.4	2023-12-09	Update Package picture /ESD	Shibo	Shibo	Shibo
1.5	2025-05-27	Add Packing Option	Yang xiaoxu	Yang xiaoxu	Liu jiaying