Dual Buffer with Open Drain Output

General Description

The ET74LVC2G07 is a high-performance dual buffer with open drain outputs operating from a 1.65V to 5.5V supply. The internal circuit is composed of multiple stages, including an open drain output. The open drain output provides the capability to set the output switching level to a user selectable value with an external resistor and power supply.

The logic high output value is set by the external power supply and can be less than, equal or greater than the VCC power supply, provided the voltage supply is less than 5.5V.

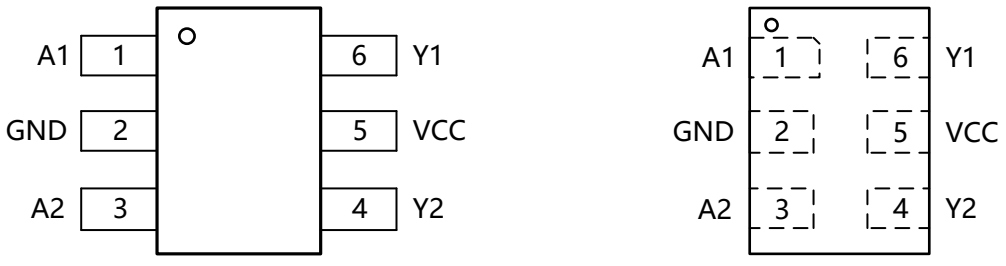
Features

- Designed for 1.65V to 5.5V VCC Operation
- Extremely High Speed t_{PD} =2.3ns (typical) at V_{CC} = 5.0V
- 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
ET74LVC2G07	SC70-6 (1.3mm×2.1mm)	Tape and Reel, 3K	1
ET74LVC2G07T	SOT23-6 (1.6mm×2.9mm)	Tape and Reel, 3K	3
ET74LVC2G07Y	DFN6 (1.0mm×1.5mm)	Tape and Reel, 3K	1

Pin Configuration



SC70-6/SOT23-6 DFN6(1X1.5)

Figure1. Top View

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

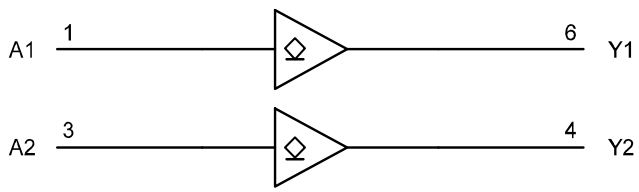


Figure2. Logic Symbol

Function Table

Input A	Output Y
L	L
H	Z

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
$R_{\theta JA}$	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	

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_{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
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.

Electrical Characteristics(continued)

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 °C			−40°C ≤T_A≤125°C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay (Figure3 and4)	R_L= 1MΩ, C_L=15pF	1.65	2.0	5.3	11.4	2.0	12.0	ns
			1.8	2.0	4.4	9.5	2.0	10.0	
		R_L= 1MΩ, C_L=15pF	2.5	0.2	3.5	6.5	0.8	4.1	
		R_L=1MΩ, C_L=15pF	3.3	0.8	2.1	4.5	0.5	3.7	
		R_L= 500Ω, C_L=50pF		1.2	2.9	5.5	1.5	5.2	
		R_L=1MΩ, C_L=15pF	5.0	0.5	1.8	3.9	0.5	4.1	
		R_L=500Ω, C_L=50pF		0.8	2.4	4.3	0.8	4.5	

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: $I_{CC(OPR)}=C_{PD}\times V_{CC}\times fin+I_{CC}\times C_{PD}$ is used to determine the no−load dynamic power consumption; $P_D=C_{PD}\times V_{CC}^2\times fin+I_{CC}\times V_{CC}\times Fig$.

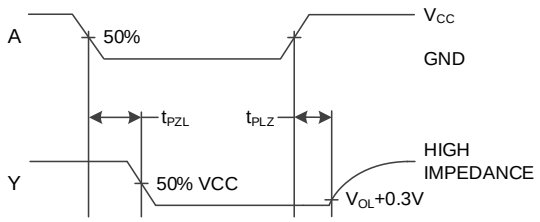


Figure 3. Switching Waveform

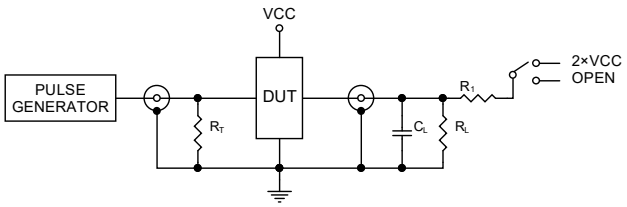


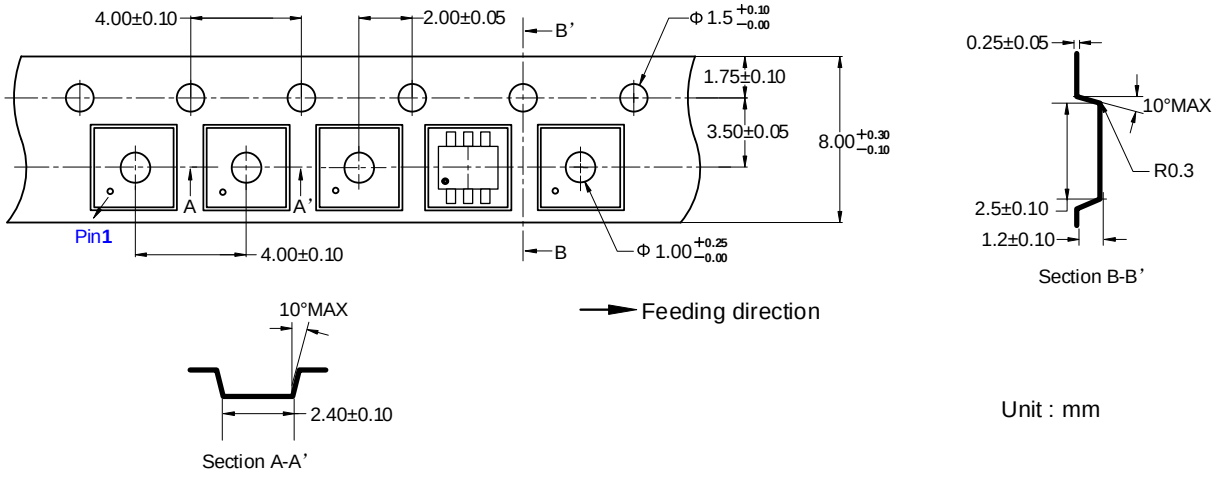
Figure4. Test Circuit

Marking

2G07 - Part Number
X - Tracking Number
SC70-6

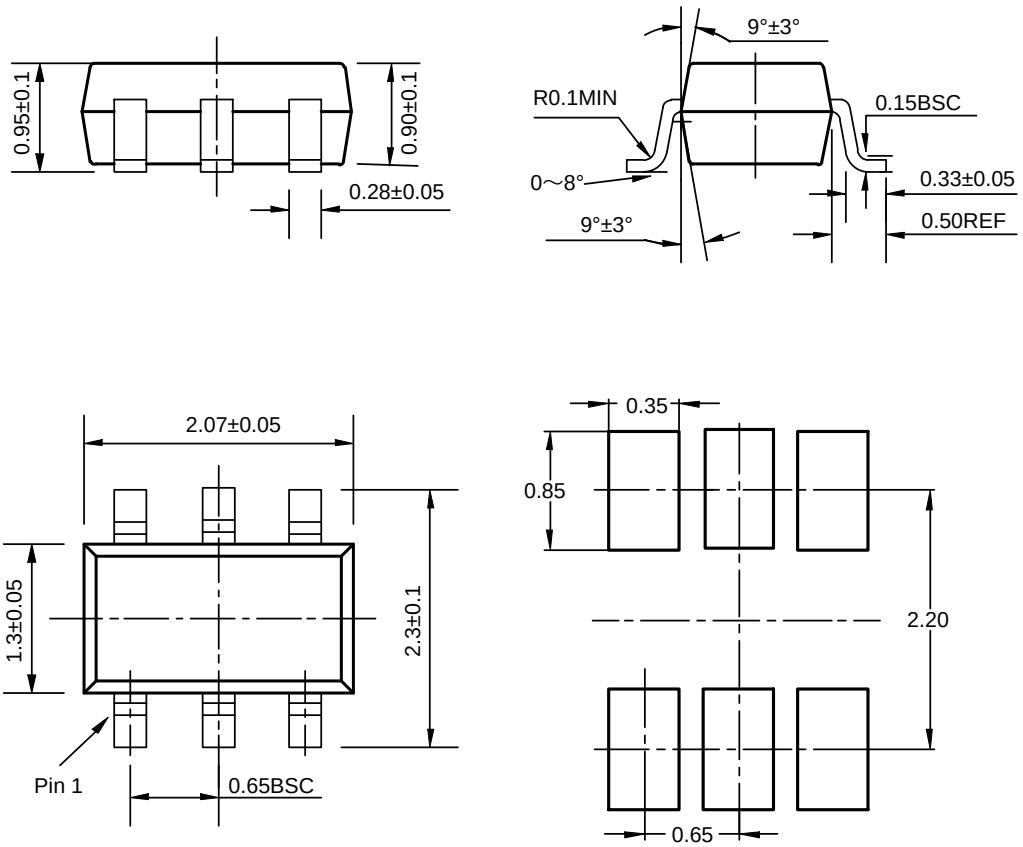
Tape

SC70-6



Package Dimension

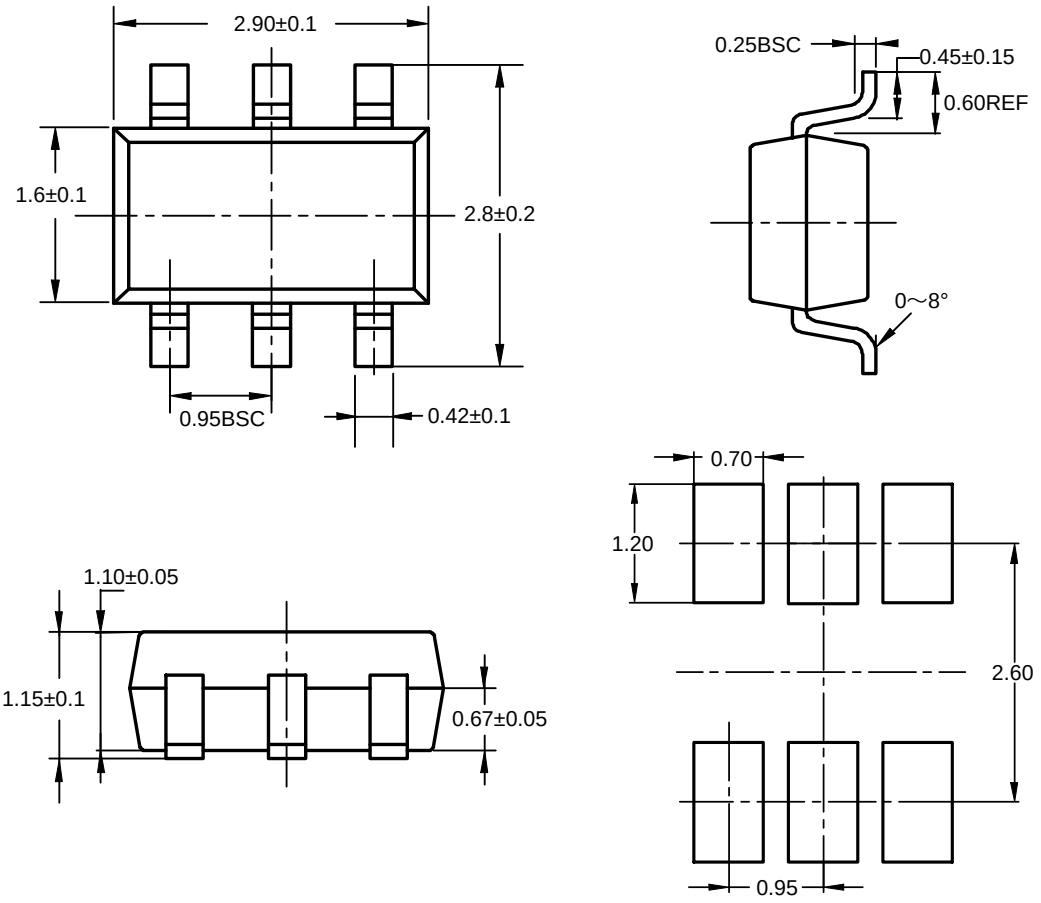
SC70-6



Recommended Land Pattern

Unit: mm

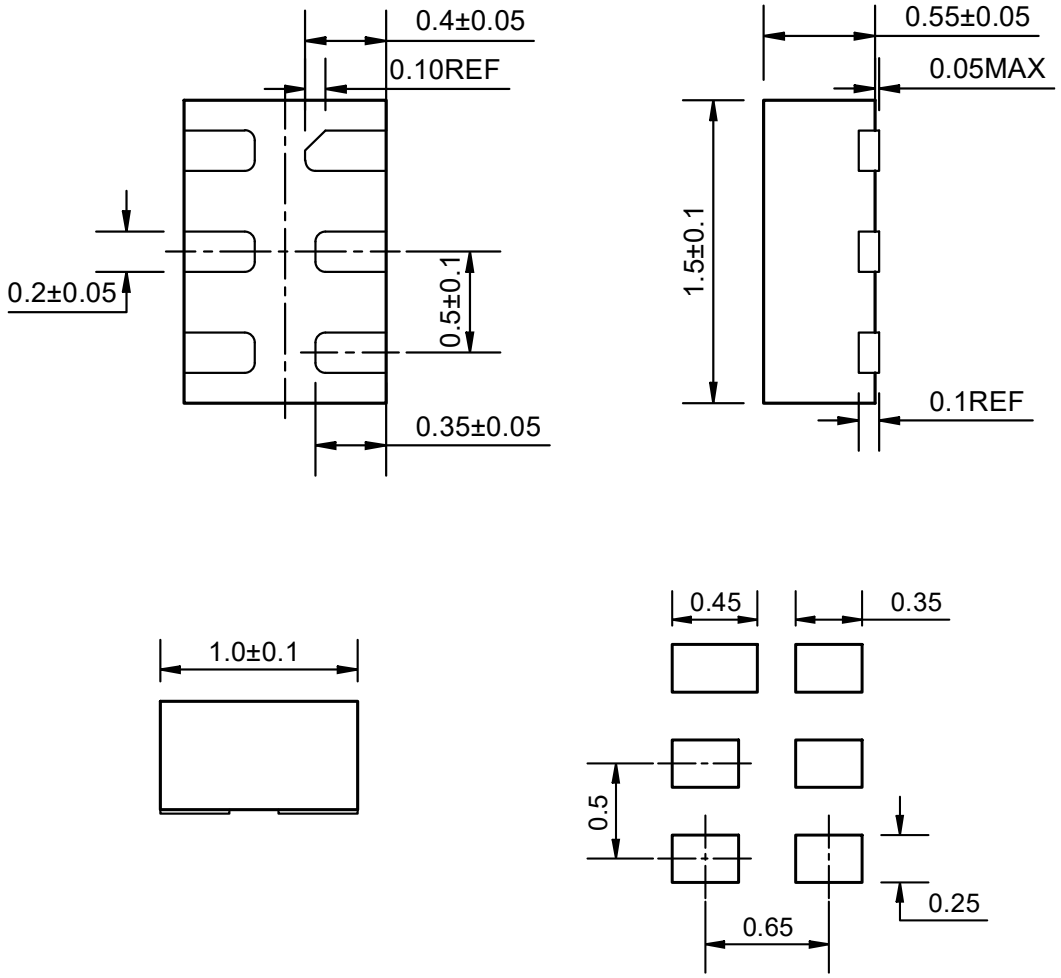
SOT23-6



Recommended Land Pattern

Unit: mm

DFN6



Recommended Land Pattern

Unit: mm

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2017-7-17	Original Version	Ma Yong jian	Ma Yong jian	Liu Jia Ying
1.1	2022-11-26	Update format and Thermal Characteristics	Shibo	Shibo	Shibo
1.2	2023-11-29	Update package picture /ESD	Shibo	Shibo	Shibo
1.3	2025-2-20	Update marking and tape	Wanganran	Shibo	Liu Jia Ying
1.4	2025-06-04	Add Packing Option	Yang xiaoxu	Yang xiaoxu	Liu jiaying