GS74LVC1G04 Series

Single INVERTER

Product Description

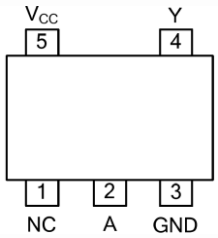
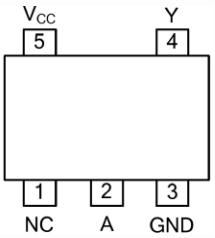
The GSP74LVC1G04 is a single inverter. Inputs can be driven from either 3.3V or 5V devices. This feature allowsthe use of these devices as translators in mixed 3.3V and 5V environments.

This device is fully specified for partial power down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

Features

- Wide supply voltage ranges from 1.65V to 5.5V
- Overvoltage tolerant inputs to 5.5V
- High noise immunity
- CMOS low power dissipation
- I_{OFF} Circuitry provides partial Power-down mode operation
- ±24 mA output drive (V_{CC} = 3.0V)
- Latch-up performance exceeds 100mA
- Direct interface with TTL levels
- RoHS Compliant and Halogen Free

Packages & Pin Assignments

GS74LVC1G04LF (SOT-23-5L)	GS74LVC1G04JCF (SOT-353)
	

Pin	Pin Name	I/O	Description
1	NC	--	Not Connected
2	A	I	Data input
3	GND	--	Ground (0V)
4	Y	O	Data output
5	V_{CC}	--	Supply voltage

Functional Block Diagram & Description

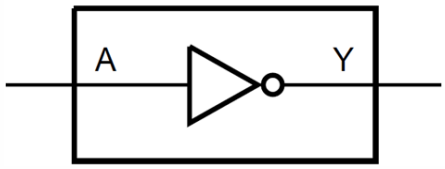


Fig 1. Function Diagram

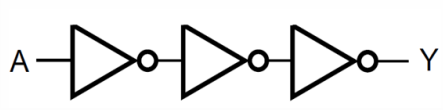


Fig 2. Logic Diagram

Input A	Output Y
L	H
H	L

H = HIGH Voltage Level
L = LOW Voltage Level

Ordering and Marking Information

Ordering Information			
Part Number	**Package**	**Part Marking**	**Quantity / Reel**
GS74LVC1G04LF	SOT-23-5L	G04□□	3,000 PCS
GS74LVC1G04JCF	SOT-353	G04□□	3,000 PCS

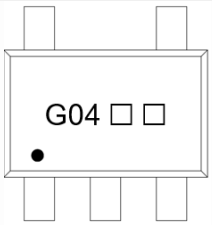
GS74LVC1G04 1 2

- **Product**
  GS74LVC1G04

- **Package Code:**
- 1 is L and JC
  L is SOT-23-5L
  JC is SOT-353

- **Green Level:**
  2 is **F** for RoHS Compliant and Halogen Free

Marking Information



- **Product Code:**
  G04

- **GS Code:**
  □ □

Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

Characteristics	Symbol	Conditions	Min.	Max.	Unit
Supply Voltage	V_{CC}	--	-0.5	+6.5	V
Input Voltage	V_I	[1]	-0.5	+6.5	V
Input Clamping Current	I_{IK}	V_I < 0V	-50	--	mA
Output Clamping Current	I_{OK}	V_O < 0V or V_O > V_{CC}	-50	+50	mA
Output Voltage	V_O	Active mode [1]	-0.5	V_{CC}+0.5	V
		Power-down mode [1]	-0.5	+6.5	V
Output Current	I_O	V_O=0V to V_{CC}	-50	+50	mA
Supply Current	I_{CC}	--	--	+100	mA
Ground Current	I_{GND}	--	-100	--	mA
Storage Temperature	T_{stg}	--	-65	+150	°C
Thermal Resistance, Junction to Ambient	R_{thJA}	--	--	239	°C /W
Latch up	LU	T_A=25°C, 125°C	--	--	mA

NOTE

1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed

Recommended Operating Condition (unless otherwise specified, T_A=25℃)

(Voltages are referenced to GND (ground=0V))

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	--	1.65	--	5.5	V
Input Voltage	V_I	--	0	--	5.5	V
Output Voltage	V_O	--	0	--	V_{CC}	V
Ambient Temperature	T_A	--	-40	+25	+125	°C
Input transition rise and fall rate	$\Delta t/\Delta V$	VCC=1.65V to 2.7V	--	--	20	ns/V
		VCC=2.7V to 5.5V	--	--	10	ns/V

Electrical Characteristics

■ **Static characteristics** (Voltages are referenced to GND (ground=0V)

Characteristics	Symbol	Test condition	-40°C to 85°C			-40°C to +125°C		Unit
			Min.	Typ.[1]	Max.	Min.	Max.	
High-level input voltage	V_{IH}	V_{CC}=1.65V to 1.95V	0.65 V_{CC}	--	--	0.65 V_{CC}	--	V
		V_{CC} =2.3V to 2.7V	1.7	--	--	1.7	--	V
		V_{CC} =2.7V to 3.6V	2.0	--	--	2.0	--	V
		V_{CC} =4.5V to 5.5V	0.7 V_{CC}	--	--	0.7 V_{CC}	--	V
Low-level input voltage	V_{IL}	V_{CC} =1.65V to 1.95V	--	--	0.35 V_{CC}	--	0.35 V_{CC}	V
		V_{CC} =2.3V to 2.7V	--	--	0.7	--	0.7	V
		V_{CC} =2.7V to 3.6V	--	--	0.8	--	0.8	V
		V_{CC} =4.5V to 5.5V	--	--	0.3 V_{CC}	--	0.3 V_{CC}	V
High-level output voltage	V_{OH}	VI=V_{IH} or V_{IL}						
		I_O =-100μA; V_{CC} =1.65V to 5.5V	V_{CC}-0.1	--	--	V_{CC} -0.1	--	V
		I_O =-4mA; V_{CC} =1.65V	1.2	--	--	0.95	--	V
		I_O =-8mA; V_{CC} =2.3V	1.9	--	--	1.7	--	V
		I_O =-12mA; V_{CC} =2.7V	2.2	--	--	1.9	--	V
		I_O =-24mA; V_{CC} =3.0V	2.3	--	--	2.0	--	V
		I_O =-32mA; V_{CC} =4.5V	3.8	--	--	3.4	--	V
Low-level output voltage	V_{OL}	VI=V_{IH} or V_{IL}						
		I_O =100μA; V_{CC} =1.65V to 5.5V	--	--	0.1	--	0.1	V
		I_O =4mA; V_{CC} =1.65V	--	--	0.45	--	0.7	V
		I_O =8mA; V_{CC} =2.3V	--	--	0.30	--	0.45	V
		I_O =12mA; V_{CC} =2.7V	--	--	0.40	--	0.60	V
		I_O =24mA; V_{CC} =3.0V	--	--	0.55	--	0.80	V
		I_O =32mA; V_{CC} =4.5V	--	--	0.55	--	0.80	V
Input leakage current	I_I	V_I=5.5V or GND; V_{CC} =0V to 5.5V	--	±0.1	±1.0	--	±1.0	μA
Power-off leakage current	I_{OFF}	V_{CC} =0V; V_I or V_O =5.5V	--	±0.1	±2.0	--	±2.0	μA
Supply current	I_{CC}	V_I =5.5V or GND; IO=0A; V_{CC} =1.65V to 5.5V	--	0.1	4.0	--	4.0	μA
Additional supply current	ΔI_{CC}	V_{CC} =2.3V to 5.5V V_I=V_{CC} -0.6V; IO=0A; Per input pin;	--	5	500	--	500	μA
Input capacitance	C_I	--	--	8	--	--	--	pF

NOTE

1.Typical values are measured at V_{CC}=3.3V and T_A=25°C.

Electrical Characteristics

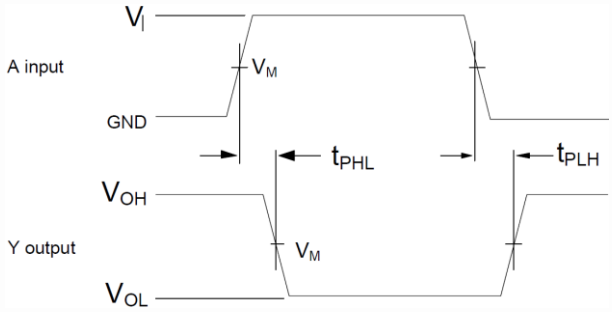
■ **Dynamic characteristics** (GND=0V. for test circuit see Fig.4)

Characteristics	Symbol	Test condition	-40°C to 85°C			-40°C to +125°C		Unit
			Min.	Typ.[1]	Max.	Min.	Max.	
Propagation delay	T_{PD}	A to Y; see Fig.4 [2]						
		V_{CC}=1.65V to 1.95V	1.0	5.2	10.8	1.0	13.2	ns
		V_{CC}=2.3V to 2.7V	0.5	3.0	7.5	0.5	9.0	ns
		V_{CC}=2.7V	0.5	3.5	8.4	0.5	9.8	ns
		V_{CC}=3.0V to 3.6V	0.5	2.6	6.2	0.5	7.5	ns
		V_{CC}=4.5V to 5.5V	0.5	2.2	5.4	0.5	6.3	ns

NOTE

1. Typical values are measured at T_A=25°C, V_{CC} = 1.8V, 2.5V, 3.3V and 5.0 V respectively.
2. t_{PD} is the same as t_{PLH} and t_{PHL}.

Waveforms and Test Circuit



V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig 3. Propagation delay input (A) to output (Y)

■ **Measurement Points**

Supply voltage	Input	Output
	V_M	V_M
1.65V to 1.95V	0.5 x V_{CC}	0.5 x V_{CC}
2.3V to 2.7V	0.5 x V_{CC}	0.5 x V_{CC}
2.7V	1.5V	1.5V
3.0V to 3.6V	1.5V	1.5V
4.5V to 5.5V	0.5 x V_{CC}	0.5 x V_{CC}

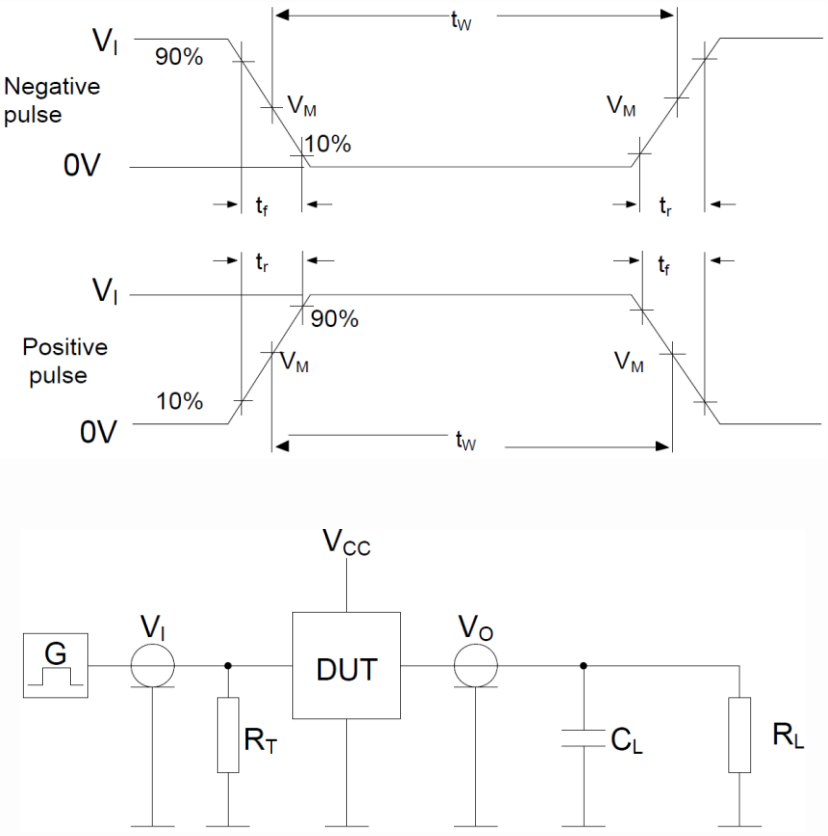


Fig 4. Test circuit for measuring switching times

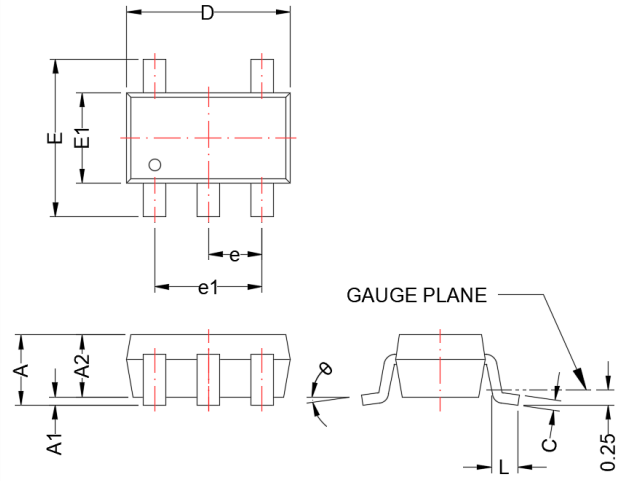
Definitions test circuit：
R_T= Termination resistance should be equal to output impedance Z_O of the pulse generator
C_L= Load capacitance including jig and probe capacitance
R_L= Load resistor

■ Test Data

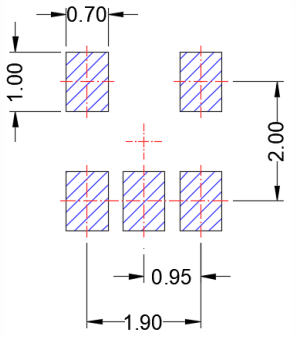
Supply voltage	Input		Load	
	V_I	t_R, t_F	C_L	R_L
1.65V to 1.95V	V_{CC}	≦ 3.0ns	30pF	1kΩ
2.3V to 2.7V	V_{CC}	≦ 3.0ns	30pF	500Ω
2.7V	2.7V	≦ 3.0ns	50pF	500Ω
3.0V to 3.6V	2.7V	≦ 3.0ns	50pF	500Ω
4.5V to 5.5V	V_{CC}	≦ 3.0ns	50pF	500Ω

SOT-23-5L

Package Dimension



Recommended Land Pattern

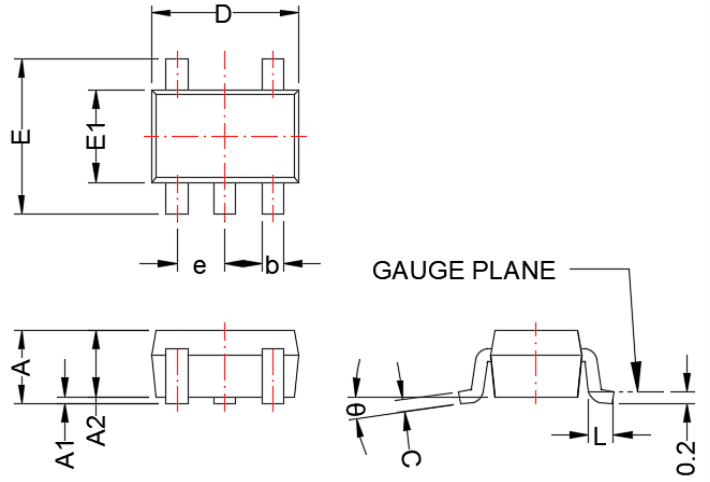


Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

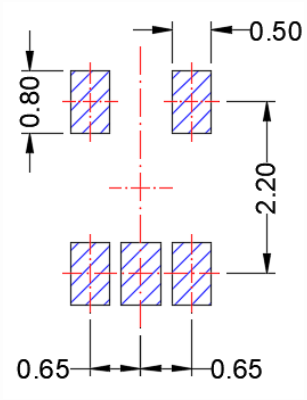
Note:
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

SOT-353

Package Dimension



Recommended Land Pattern



Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	---	1.10	---	0.043
A1	0.00	0.10	0.000	0.004
A2	0.70	1.00	0.028	0.039
b	0.15	0.35	0.006	0.014
c	0.08	0.25	0.003	0.010
D	1.80	2.20	0.071	0.087
E	1.80	2.45	0.071	0.096
E1	1.15	1.35	0.045	0.053
e	0.65 BSC		0.026 BSC	
L	0.26	0.46	0.010	0.018
θ	0°	8°	0°	8°

Note:
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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