

GS74LVC1G125 Series

Bus BUFFER Gate with 3-State Output

Product Description

The GS74LVC1G125 provides one non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input ($\overline{OE}$). The output is disabled when the output-enable ($\overline{OE}$) input is high.

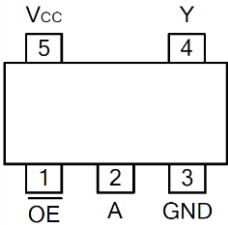
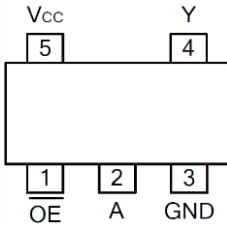
This bus buffer gate is designed for 1.65V to 5.5V V_{CC} operation.

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

Features

- Supports 1.65V to 5.5V V_{CC} operation
- $\pm 24\text{mA}$ output drive ($V_{CC}=3.0\text{V}$)
- CMOS low power consumption
- Direct interface with TTL levels
- Input accepts voltages up to 5V
- Latch-up performance exceeds 100 mA
- RoHS Compliant and Halogen Free

Package & Pin Assignment

GS74LVC1G125LF (SOT-23-5L)			GS74LVC1G125JCF (SOT-353)	
				
Pin	Pin Name	Type	Description	
1	$\overline{OE}$	I	Output Enable Control	
2	A	I	Data Input	
3	GND	G	Ground	
4	Y	O	Data Output	
5	V_{CC}	P	Supply Voltage	

I = Input;
O = Output;
P = Power;
G = Ground.

Function Diagram & Description

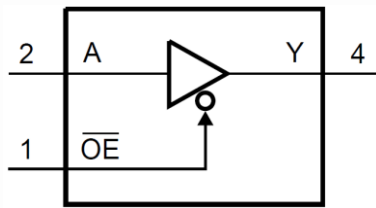


Fig 1. Function Diagram

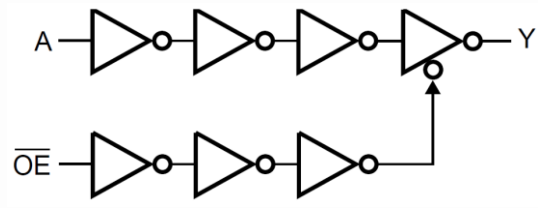


Fig 2. Logic Diagram

Input $\overline{OE}$	Input A	Output Y
L	L	L
L	H	H
H	X	Z

H = HIGH voltage level;
L = LOW voltage level;
X = Don't care;
Z = High-impedance OFF-state.

Ordering and Marking Information

Ordering Information			
Part Number	Package	Part Marking	Quantity / Reel
GS74LVC1G125LF	SOT-23-5L	G25□□	3,000 PCS
GS74LVC1G125JCF	SOT-353	G25□□	3,000 PCS
GS74LVC1G125 1 2			
- Product GS74LVC1G125 - Package Code: 1 is L or 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: G25 - GS Code: □□			

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

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}	SOT-23-5L	239		°C/W
		SOT-353	278		
Latch up	LU	T _A =25°C, 125°C	100	--	mA

NOTE

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

Recommended Operating Condition (T_A=25°C unless otherwise specified)

(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	Δt/ΔV	V _{CC} = 1.65V to 2.7V	--	--	20	ns/V
		V _{CC} = 2.7V to 5.5V	--	--	10	ns/V

Electrical Characteristics (T_A=25°C unless otherwise specified)

■ 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	0.65V _{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}	V _I =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}	V _I =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
OFF-state output current	I _{OZ}	V _{CC} = 3.6V; V _I = V _{CC} or GND; V _O = 5.5V or GND	--	±0.1	±2.0	--	±2.0	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; I _O =0A ; V _{CC} =1.65V to 5.5V	--	0.1	4.0	--	4.0	μA
Additional supply current	ΔI _{CC}	V _{CC} =2.3 V to 5.5V V _I = V _{CC} =-0.6V; I _O =0A ; Per input pin;	--	5	500	--	500	μA

Characteristics	Symbol	Test condition	-40°C to 85°C			-40°C to +125°C		Unit
			Min.	Typ. ^[1]	Max.	Min.	Max.	
Input capacitance	C _I	--	--	8	--	--	--	pF

NOTE

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

■ Dynamic Characteristics

(GND=0V. for test circuit see Fig.5)

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.3 ^[2]						
		V _{CC} =1.65V to 1.95V	1.0	5.2	13.0	1.0	15.6	ns
		V _{CC} =2.3V to 2.7V	0.5	3.2	8.0	0.5	9.6	ns
		V _{CC} =2.7V	0.5	3.8	8.4	0.5	10.6	ns
		V _{CC} =3.0V to 3.6V	0.5	3.5	7.5	0.5	10.0	ns
		V _{CC} =4.5V to 5.5V	0.5	2.1	5.0	0.5	6.6	ns
Enable time	t _{EN}	$\overline{\text{OE}}$ to Y; see Fig.4 ^[2]						
		V _{CC} = 1.65V to 1.95V	1.0	5.1	12.8	1.0	15.3	ns
		V _{CC} = 2.3V to 2.7V	0.5	3.2	8.0	0.5	9.6	ns
		V _{CC} = 2.7V	0.5	3.5	7.5	0.5	10	ns
		V _{CC} = 3.0V to 3.6V	0.5	3.2	7.1	0.5	9.3	ns
		V _{CC} = 4.5V to 5.5V	0.5	2.1	5.0	0.5	6.5	ns
Disable time	t _{DIS}	$\overline{\text{OE}}$ to Y; see Fig.4 ^[2]						
		V _{CC} = 1.65V to 1.95V	1.0	5.2	13	1.0	15.6	ns
		V _{CC} =2.3V to 2.7V	0.5	3.0	5.6	0.5	7.5	ns
		V _{CC} = 2.7V	0.5	4.2	9.5	0.5	10.5	ns
		V _{CC} = 3.0V to 3.6V	0.5	3.1	6.5	0.5	8.0	ns
		V _{CC} = 4.5V to 5.5V	0.5	3.0	6.5	0.5	8.0	ns

NOTE

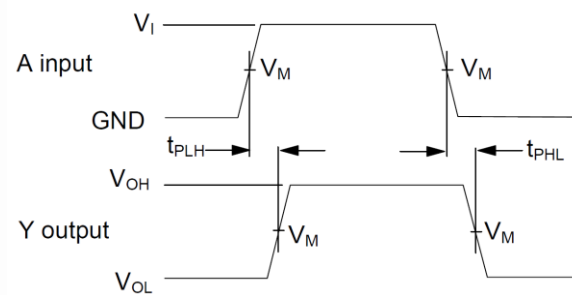
1. Typical values are measured at T_A=25°C, V_{CC} = 1.8V, 2.5V, 3.3V and 5.0V respectively.

2. t_{pd} is the same as t_{PLH} and t_{PHL}

t_{EN} is the same as t_{PZH} and t_{PZL}

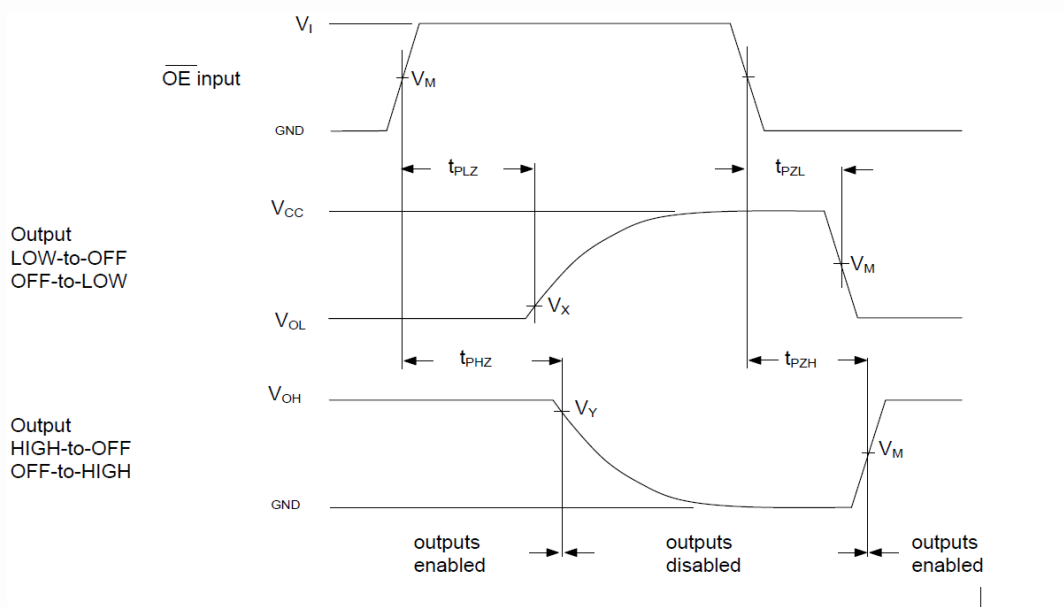
t_{DIS} is the same as t_{PLZ} and t_{PHZ}.

Waveforms and Test Circuit



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

Fig 3. Input A to Output Y Propagation Delay Times



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

Fig 4. Enable and Disable Times

■ Measurement Points

Supply voltage	Input	Output		
	V_M	V_M	V_X	V_Y
1.65V to 1.95V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15V$	$V_{OH} - 0.15V$
2.3V to 2.7V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.15V$	$V_{OH} - 0.15V$
2.7V	1.5V	1.5V	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$
3.0V to 3.6V	1.5V	1.5V	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$
4.5V to 5.5V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$

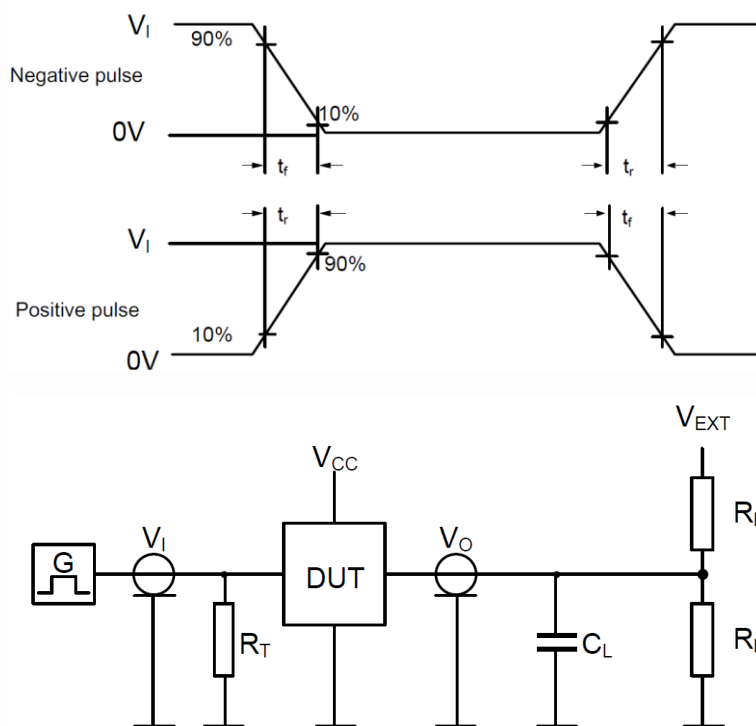


Fig 5. Test circuit for measuring switching times

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

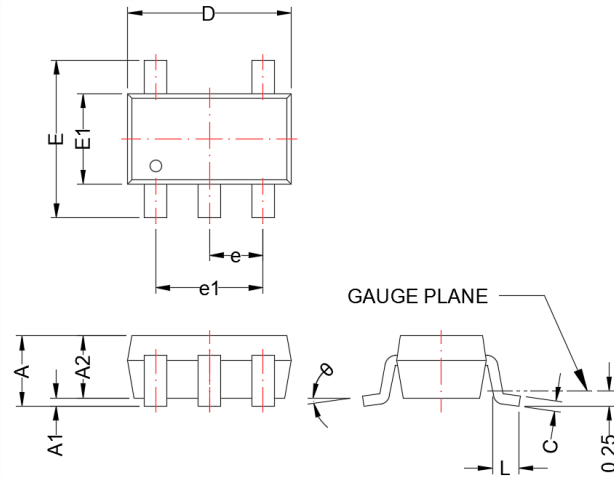
R_L = Load resist

■ Test Data

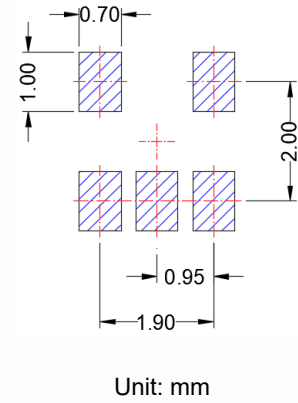
Supply voltage	Input		Load		V_{EXT}		
	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PLZ}, t_{PZL}
1.65V to 1.95V	V_{CC}	3.0ns	30pF	1k Ω	open	GND	$2V_{CC}$
2.3V to 2.7V	V_{CC}	3.0ns	30pF	500 Ω	open	GND	$2V_{CC}$
2.7V	2.7V	3.0ns	50pF	500 Ω	open	GND	6V
3.0V to 3.6V	2.7V	3.0ns	50pF	500 Ω	open	GND	6V
4.5V to 5.5V	V_{CC}	3.0ns	50pF	500 Ω	open	GND	$2V_{CC}$

SOT-23-5L

Package Dimension



Recommended Land Pattern

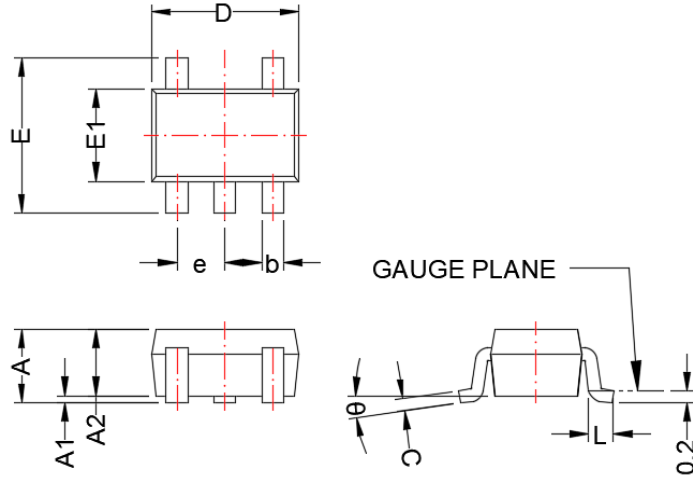


Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC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

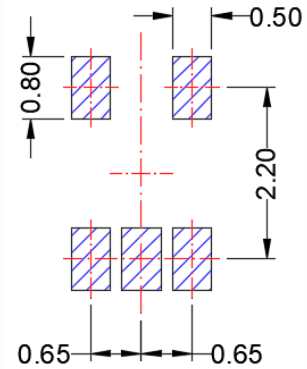
NOTE:
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

SOT-353

Package Dimension



Recommended Land Pattern



Unit: mm

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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