

GS74LVC1G125 Series

Single 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.

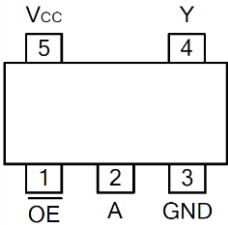
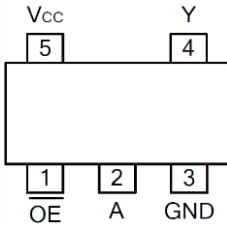
This bus buffer gate is designed for 1.65V to 5.5V V_{CC} operation.

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	I/O	Description		
1	$\overline{OE}$	I	Enable input		
2	A	I	Data input		
3	GND	/	Ground (0V)		
4	Y	O	Data output		
5	V_{CC}	/	Supply voltage		

Functional Block Diagram & Description

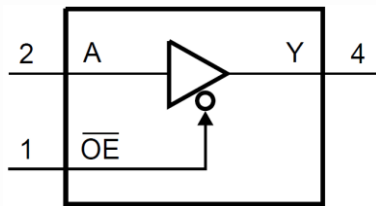


Fig 1. Function Diagram

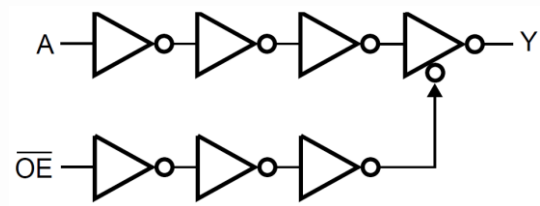


Fig 2. Logic Diagram

Input $\overline{OE}$	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	229		°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

Input capacitance	C_i	--	--	8	--	--	--	pF
-------------------	-------	----	----	---	----	----	----	----

NOTE

1. Typical values are measured at $V_{CC} = 3.3V$ and $T_A = 25^\circ C$

■ 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	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
Enable time	t_{EN}	$\overline{OE}$ 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}	$\overline{OE}$ 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

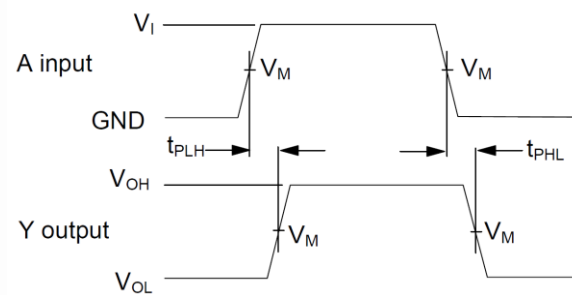
1. Typical values are measured at $T_A = 25^\circ C$, $V_{CC} = 1.8V, 2.5V, 3.3V$ and $5.0V$ respectively.

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

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

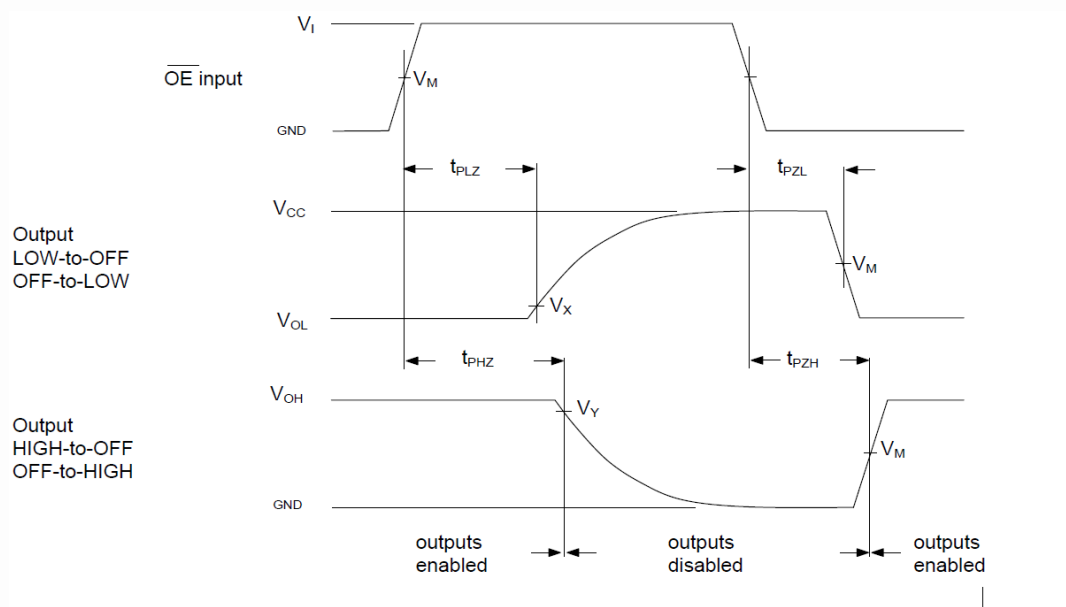
t_{DIS} is the same as t_{PLZ} and t_{PHZ} .

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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.3V$	$V_{OH} - 0.3V$

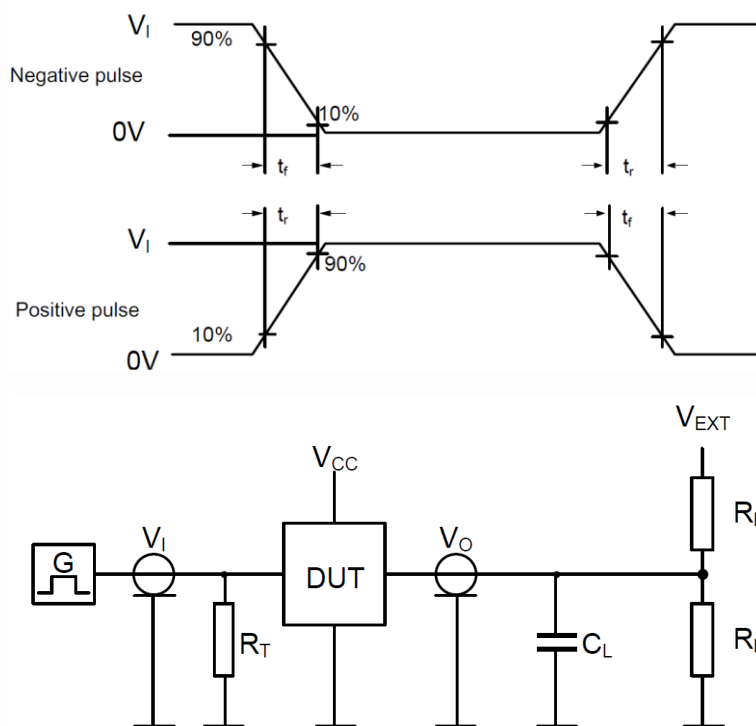


Fig 5. Test circuit for measuring switching times

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

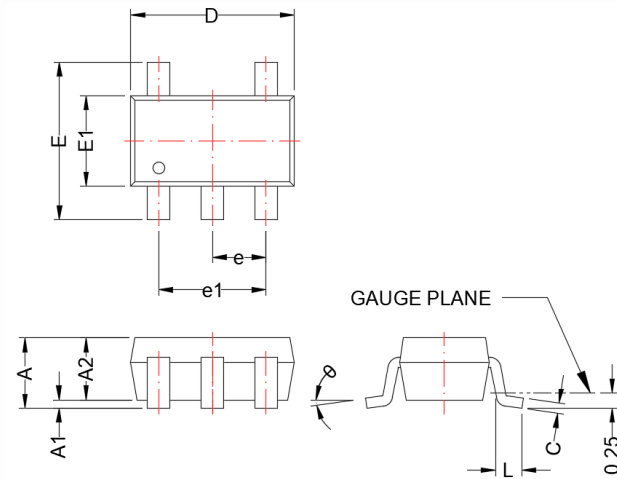
R_L = Load resist

■ Test Data

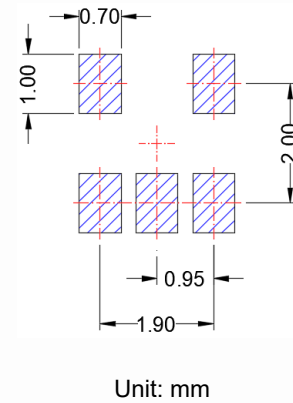
Supply voltage	Input		Load		V_{EXT}		
	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PLZ}, t_{PZL}
1.65V to 1.95V	V_{CC}	3.0ns	30pF	1k Ω	open	GND	$2V_{CC}$
2.3V to 2.7V	V_{CC}	3.0ns	30pF	500 Ω	open	GND	$2V_{CC}$
2.7V	2.7V	3.0ns	50pF	500 Ω	open	GND	6V
3.0V to 3.6V	2.7V	3.0ns	50pF	500 Ω	open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



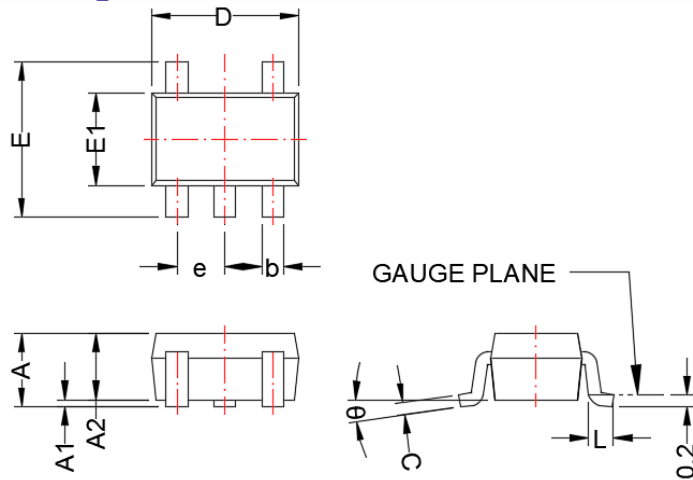
Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC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

NOTE:

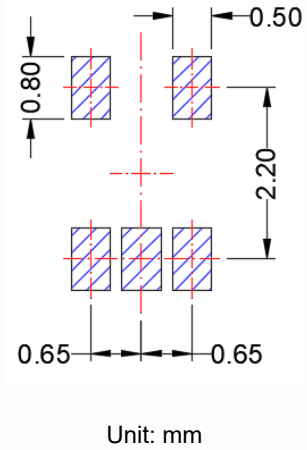
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

SOT-353

Package Dimension



Recommended Land Pattern



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.

NOTICE

- Globaltech Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all Globaltech Semiconductor products described or contained herein. Globaltech Semiconductor products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Globaltech Semiconductor makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- Information furnished is believed to be accurate and reliable. However Globaltech Semiconductor assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Globaltech Semiconductor. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information without express written approval of Globaltech Semiconductor.

CONTACT US

GS Headquarter	
	4F, NO.43-1, Lane 11, Sec. 6, Minquan E. Rd Neihu District, Taipei City 114761, Taiwan (R.O.C).
	886-2-2657-9980
	886-2-2657-3630
	sales_twn@gs-power.com

RD Division	
	824 Bolton Drive Milpitas. CA. 95035
	1-408-457-0587