

General Description

The operating voltage range of the bus buffer gate is 1.65-V to 5.5-V.

The SN74LVC1G125DBVR device is a single line driver with a 3-state output. The output is disabled when the output-enable (OE) input is high.

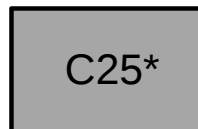
This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

Features

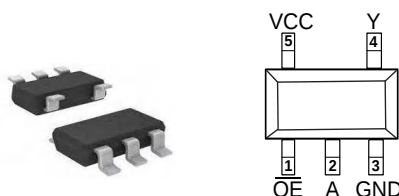
- 3-State output
- Wide supply voltage range from 1.65 to 5.5V
- Inputs accept voltages to 5.5 V
- Max t_{pd} of 4.7 ns at 3.3 V
- ± 24 -mA output drive at 3.3 V
- I_{off} supports partial-power-down mode

Applications

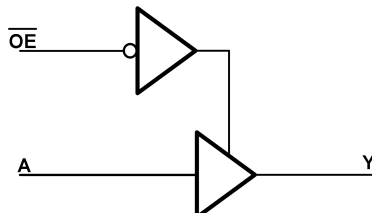
- Cable modem termination system
- Video communications system
- High-speed data acquisition and generation
- Military: radar and sonar
- Motor control: high-voltage



SOT23-5



Functional Block Diagram



Pin Functions

Pin		I/O	Description
Name	SOT23-5		
$\overline{OE}$	1	I	Enable Input
A	2	I	Input
GND	3	—	Ground
Y	4	O	Output
V_{CC}	5	—	Positive Supply

Absolute Maximum Ratings

Parameters		Min	Max.	Unit
V_{CC}	Supply voltage range	-0.5	6.5	V
V_I	Input voltage range	-0.5	6.5	V
V_O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	-0.5	6.5	V
V_O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾	-0.5	$V_{CC}+0.5$	V
I_{IK}	Input clamp current		-50	mA
I_{OK}	Output clamp current		-50	mA
I_O	Continuous output current		± 50	mA
	Continuous current through V_{CC} or GND		± 100	mA
T_J	Junction temperature under bias		150	°C
T_{stg}	Storage temperature range	-65	150	°C

(1) Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The output positive-voltage rating may be exceeded up to 6.5 V maximum if the output current rating is observed.

ESD Ratings

ESD		Value	Unit
V(ESD)	Electrostatic discharge	Human-Body Model (HBM) ⁽¹⁾	8 K
		Charge-Device Model (CDM) ⁽²⁾	2 K

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
SOT23-5	250	81	°C/W

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

Symbol	Parameter		Min	Max	Unit
V_{CC}	Supply voltage		1.65	5.5	V
V_I	Input voltage		0	5.5	V
V_O	Output voltage		0	V_{CC}	V
I_{OH}	High-level output current	$V_{CC}=1.65V$		-4	mA
		$V_{CC}=2.3V$		-8	
		$V_{CC}=3V$		-16	
				-24	
		$V_{CC}=4.5V$		-32	
I_{OL}	Low-level output current	$V_{CC}=1.65V$		4	mA
		$V_{CC}=2.3V$		8	
		$V_{CC}=3V$		16	
				24	
		$V_{CC}=4.5V$		32	
T_A	Operating free-air temperature		-40	125	°C

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

All typical values are at V_{CC} = 3.3V, T_A = +25°C

Parameter	Test Conditions	V _{CC}	-40°C to 85°C			-40°C to 125°C			Unit
			Min	Typ	Max	Min	Typ	Max	
V _{OH}	I _{OH} =-100 μA	1.65 V to 5.5 V	V _{CC} -0.1			V _{CC} -0.1			V
	I _{OH} =-4 mA	1.65 V	1.2			1.2			
	I _{OH} =-8 mA	2.3 V	1.9			1.9			
	I _{OH} =-16 mA	3 V	2.4			2.4			
	I _{OH} =-24 mA		2.3			2.3			
	I _{OH} =-32 mA	4.5 V	3.8			3.8			
V _{OL}	I _{OL} =100 μA	1.65 V to 5.5 V			0.1			0.1	V
	I _{OL} =4 mA	1.65 V			0.45			0.45	
	I _{OL} =8 mA	2.3 V			0.3			0.3	
	I _{OL} =16 mA	3 V			0.4			0.4	
	I _{OL} =24 mA				0.55			0.55	
	I _{OL} =32 mA	4.5 V			0.55			0.55	
I _I	V _I =5.5 V or GND	V _I =5.5 V or GND	0 to 5.5 V		±5			±5	μA
	Input								
I _{off}	V _I or V _O =5.5 V	0			±10			±10	μA
I _{OZ}	V _O =0 to 5.5 V	3.6 V			10			10	μA
I _{CC}	V _I =5.5 V or GND, I _O =0	1.65 V to 5.5 V			10			10	μA
ΔI _{CC}	One Input at V _{CC} -0.6 V, Other Inputs at V _{CC} or GND	3 V to 5.5 V			500			500	μA
C _i	V _I =V _{CC} or GND	3.3 V		5			5		pF

(1) All unused digital inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

Switching Characteristics

Typical Values at T_A=+25°C and nominal voltages 1.8V, 2.5V, 3.3V, and 5.0V.

Parameter	From (Input)	To (Output)	-40°C to 125°C								Unit
			V _{CC} =1.8 V ± 0.15 V		V _{CC} =2.5 V ± 0.15 V		V _{CC} =3.3 V ± 0.15 V		V _{CC} =5 V ± 0.15 V		
			Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	A	Y	2.8	9.5	1.2	5.8	1	4.7	1	3.2	
t _{en}	$\overline{\text{OE}}$	Y	3.3	10.8	1.5	6.9	1	5.6	1	5.2	ns
t _{dis}	$\overline{\text{OE}}$	Y	1.3	11.8	1	5.2	1	5.2	1	4.4	ns

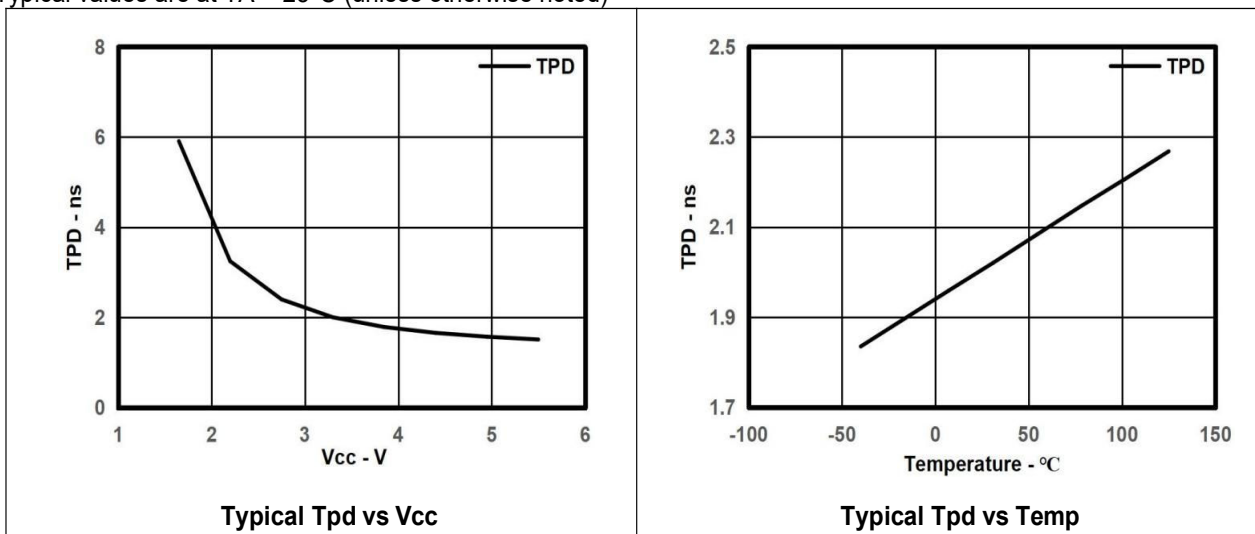
Operating Characteristics

T_A=25°C

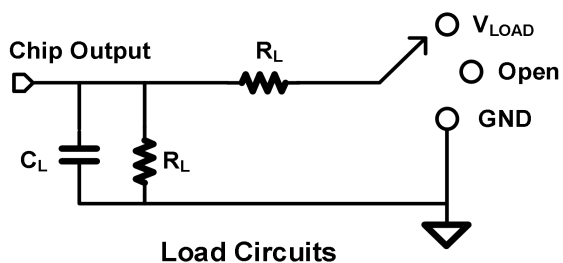
Parameter		Test Conditions	V _{CC} =1.8 V	V _{CC} =2.5 V	V _{CC} =3.3 V	V _{CC} =5 V	Unit
			Typ	Typ	Typ	Typ	
C _{pd}	Power Dissipation Capacitance	f=10 MHz	17	18	25	30	pF

RATING AND CHARACTERISTIC CURVES

Typical values are at $T_A = +25^\circ\text{C}$ (unless otherwise noted)



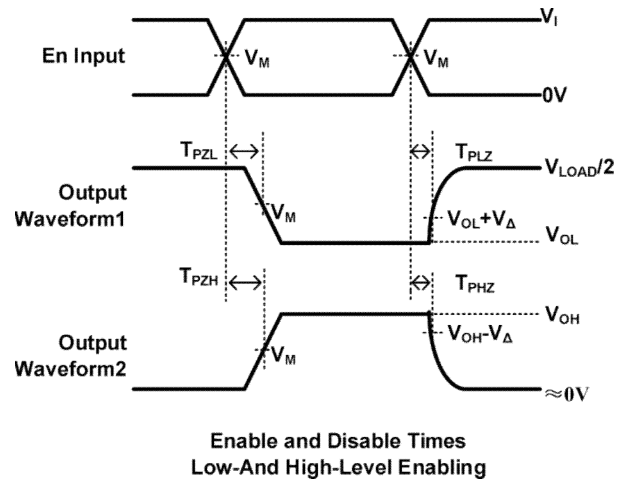
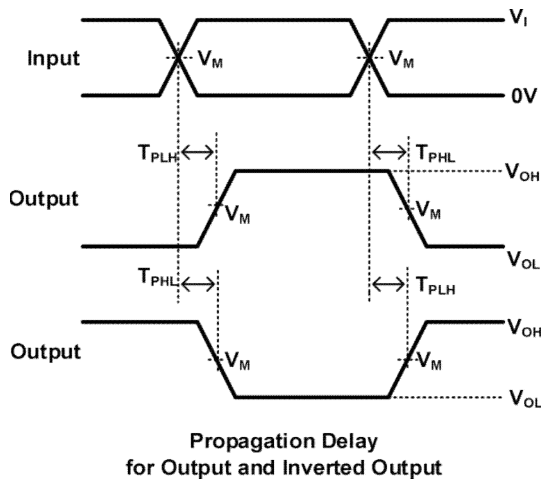
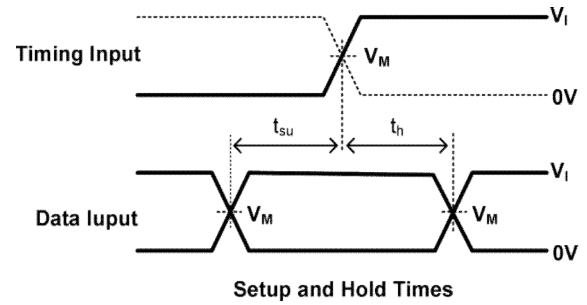
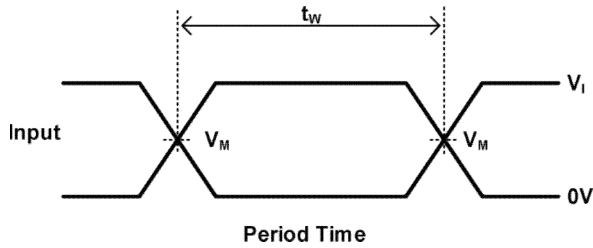
Parameter Measurement Information



TEST	S1
T_{PHL}/T_{PLH}	OPEN
T_{PLZ}/T_{PZL}	V_{LOAD}
T_{PHZ}/T_{PZH}	GND

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	T_r/T_f					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
$2.5V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
$3.3V \pm 0.15V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$5V \pm 0.15V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V

Parameter Measurement Information



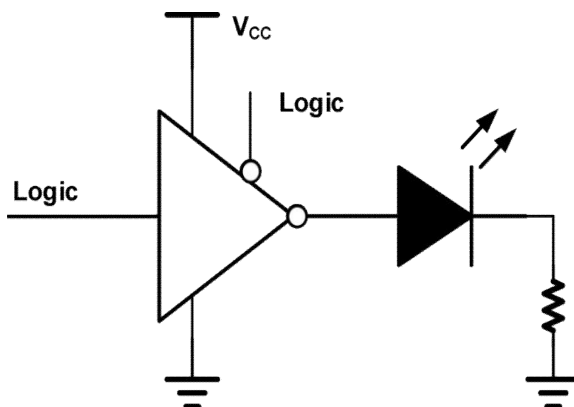
- Notes: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: PRR 10 MHz, $Z = 50 \Omega$.

- D. The outputs are measured one at a time, with one transition per measurement.
E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
F. t_{PZL} and t_{PZH} are the same as t_{en} .
G. t_{PLH} and t_{PHL} are the same as t_{pd} .
H. All parameters and waveforms are not applicable to all devices.

Application Note

The SN74LVC1G125DBVR device is a high drive CMOS device that can be used as an output enabled buffer with a high output drive, such as an LED application. It can produce 24 mA of drive current at 3.3 V making it Ideal for driving multiple outputs and good for high-speed applications up to 100 MHz. The inputs are 5.5 V tolerant allowing it to translate down to V_{CC} .

Typical Power Button Circuit

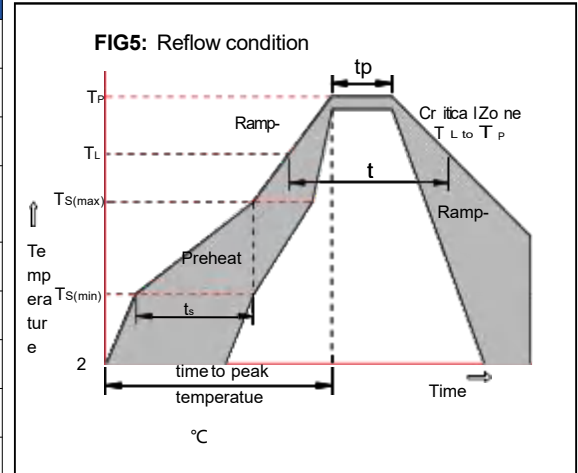


Device Functional Modes

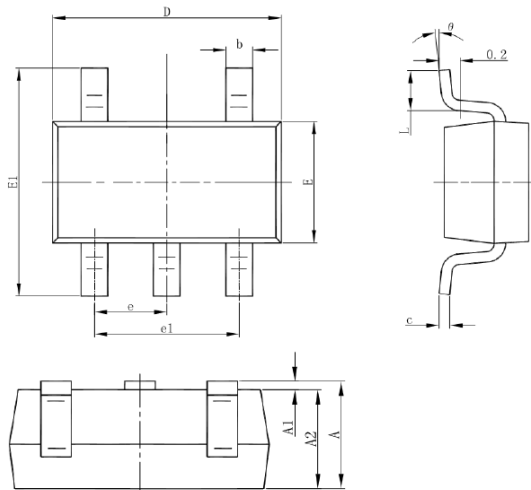
Inputs		Output
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

Soldering parameters

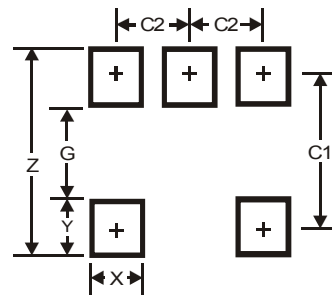
Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150 °C
	-Temperature Max($T_{s(max)}$)	+200 °C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3 °C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3 °C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217 °C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5) °C
Time within 5 °C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6 °C/sec. Max
Time 25 °C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260 °C



Package Dimensions & Suggested Pad Layout



SOT-23-5L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Dimensions	Value (in mm)
Z	3.50
G	1.30
X	0.60
Y	1.10
C1	2.40
C2	0.95

Tape & reel specification

Tape

Technical drawing of a tape component. The top view shows a rectangular tape with a central row of circular holes. Dimensions include: $P0$, $P2$, $P1$ (pitch distances); $\varnothing D0$, $\varnothing D1$ (hole diameters); E , F (vertical dimensions); W (total width); and $A0$ (width of the central section). The side view, labeled 'SECTION : B-B', shows the profile of the tape with dimensions T (thickness), $B0$ (height), and $K0$ (width of the central section).

Symbol	Dimension (mm)
P0	4.00±0.20
P1	4.00±0.20
P2	2.00±0.20
D0	1.55±0.20
D1	1.20±0.20
E	1.55±0.20
F	3.60±0.20
W	8.00±0.20
A0	3.80±0.20
B0	3.50±0.20
K0	1.55±0.20
T	0.25±0.15

7" Reel

Technical drawing of a 7-inch reel component. The top view shows a circular reel with a central hub and a rectangular component. Dimensions include: $D4$ (outer diameter), G (inner diameter), and I (width of the central section). The side view shows the profile of the reel with dimensions $D3$ (height of the central section), $D2$ (total height), and $W1$ (width of the base).

D2	178.0±5.0
D3	55Min.
D4	R24.0±3.0
G	R82.0±3.0
I	13.0±2.0
W1	11.0±3.0

Quantity: 3000PCS