PJ74LVC1G126 Datasheet

Single Bus Buffer Gate With 3-State Output In a SOT23-5 and SC70-5 Package

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MetaWells Co., Ltd.

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General Description

The PJ74LVC1G126 is a single bus buffer gate. The device is designed for 1.65 V to 5.5 V V_{CC} operation, it can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environments.

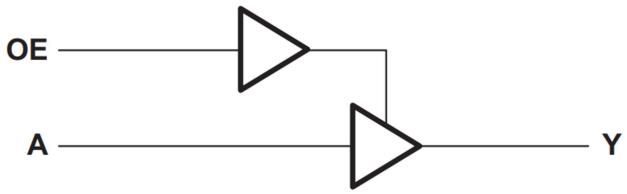
The PJ74LVC1G126 device is a single line driver with a 3-state output. The output is disabled when the output-enable input is low.

The PJ74LVC1G126 is available in SOT23-5 and SC70-5 packages.

Features

- Wide Supply Voltage Range : 1.65 V to 5.5 V
- Max. T_{PD} of 4.5 ns at V_{CC} = 3.3 V
- Low Power Consumption, 10 μA (Max. I_{CC})
- ±24 mA Output Drive at V_{CC} = 3.3 V
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  - 2000 V Human-Body Model (A114-A)
  - 1000 V Charged-Device Model (C101)
- Operating temperature Range : -40°C to 125°C
- Available Package : SOT23-5 and SC70-5

Simplified Schematic



Applications

- Cable Modem Termination System
- High-Speed Data Acquisition and Generation
- Military: Radar and Sonar
- Motor Control: High-Voltage
- Power Line Communication Modem
- SSD: Internal or Externa
- Video Broadcasting and Infrastructure: Scalable Platform
- Video Broadcasting: IP-Based Multi-Format Transcoder
- Video Communications System

Ordering Information

Ordering Information

Order number	Marking ID	Package	MSL	Description
PJ74LVC1G126S5	C2 DNN	SOT23-5	Level-3	Halogen free RoHS compliant in T/R, 3,000 pcs/Reel
PJ74LVC1G126C5	AM W	SC70-5	Level-3	Halogen free RoHS compliant in T/R, 3,000 pcs/Reel

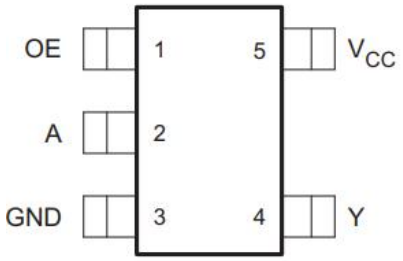
Note:

(1) MetaWells can meet RoHS 2.0/REACH requirement. So most package types MetaWells offers only states halogen free, instead of lead free.

Marking Information

Marking	Package	Definition
C2 DNN	SOT23-5	C2: Product code D: Date code NN: Serial number
AM W	SC70-5	AM: Product code W: Week code

Pin Configuration



SOT23-5 and SC70-5 (Top View)

Pin Description

Pin		Function
Num	Name	
1	OE	Output Enable Input
2	A	Data Input
3	GND	Ground
4	Y	Data Output
5	V_{CC}	Supply Power Input

Function Table

H = HIGH voltage level; L = LOW voltage level; Z = High impedance

INPUTs		OUTPUT
OE	A	Y
H	H	H
H	L	L
L	X	Z

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) (1)

Parameter	Symbol	Value	Units
Supply Voltage	V_{CC}	-0.5 to 6.5	V
Input Voltage	V_I	-0.5 to 6.5	V
Voltage range applied to any output in the high-impedance or power-off state(2)	V_O	-0.5 to V_{CC}+0.5	V
Voltage range applied to any output in the high or low state(2)(3)	V_O	-0.5 to V_{CC}+0.5	V
Input clamp current, V_I < 0	I_{IK}	-50	mA
Output clamp current, V_O < 0	I_{OK}	-50	mA
Continuous output current	I_O	±50	mA
Storage temperature range	T_{STG}	-65 to 150	°C
ESD HBM, ANSI/ESDA/JEDEC JS-001(4)	ESD_{HBM}	±2000	V
ESD CDM, JESD22-C101(5)	ESD_{CDM}	±1000	V

(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 value of V_{CC} is provided in the Recommended Operating Conditions table.

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

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

Recommended Operating Conditions

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply voltage	V_{CC}	Operating	1.65		5.5	V
		Data retention only	1.5			
Input voltage	V_I		0		5.5	V
Output voltage	V_O				V_{CC}	V
High-level input voltage	V_{IH}	V_{CC} = 1.65 V to 1.95 V	0.65 x V_{CC}			V
		V_{CC} = 2.3 V to 2.7 V	1.7			
		V_{CC} = 3 V to 3.6 V	2			
		V_{CC} = 4.5 V to 5.5 V	0.7 x V_{CC}			
Low-level input voltage	V_{IL}	V_{CC} = 1.65 V to 1.95 V			0.35 x V_{CC}	V
		V_{CC} = 2.3 V to 2.7 V			0.7	
		V_{CC} = 3 V to 3.6 V			0.8	
		V_{CC} = 4.5 V to 5.5 V			0.3 x V_{CC}	
High-level output current	I_{OH}	V_{CC} = 1.65 V			-4	mA
		V_{CC} = 2.3 V			-8	
		V_{CC} = 3 V			-16	
		V_{CC} = 3 V			-24	
		V_{CC} = 4.5 V			-32	
Low-level output current	I_{OL}	V_{CC} = 1.65 V			4	mA
		V_{CC} = 2.3 V			8	
		V_{CC} = 3 V			16	
		V_{CC} = 3 V			24	
		V_{CC} = 4.5 V			32	
Input transition rise or fall rate	△T/△V	V_{CC} = 1.8 V ±0.15 V, 2.5 V ±0.2 V			20	ns/V
		V_{CC} = 3.3 V ±0.3 V			10	
		V_{CC} = 5 V ±0.5 V			5	
Operating temperature	T_A		-40		125	°C

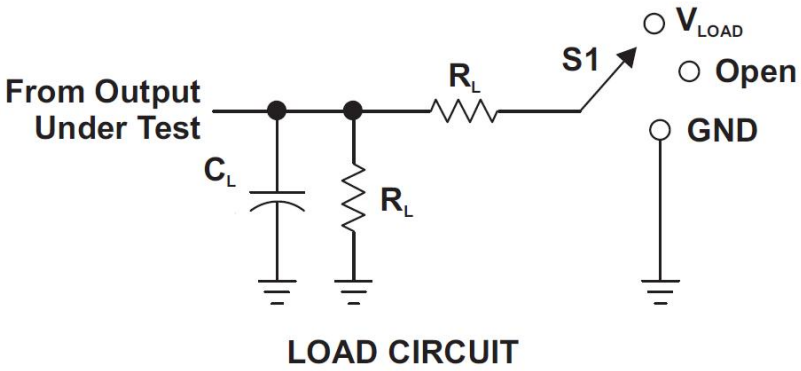
Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
High-level output voltage	V_{OH}	V_{CC} = 1.65 V to 5.5 V, I_{OH} = -100 μA	V_{CC}-0.1			V
		V_{CC} = 1.65 V, I_{OH} = -4 mA	1.2			
		V_{CC} = 2.3 V, I_{OH} = -8 mA	1.9			
		V_{CC} = 3 V, I_{OH} = -16 mA	2.4			
		V_{CC} = 3 V, I_{OH} = -24 mA	2.3			
		V_{CC} = 4.5 V, I_{OH} = -32 mA	3.8			
Low-level output voltage	V_{OL}	V_{CC} = 1.65 V to 5.5 V, I_{OL} = 100 μA			0.1	V
		V_{CC} = 1.65 V, I_{OL} = 4 mA			0.45	
		V_{CC} = 2.3 V, I_{OL} = 8 mA			0.3	
		V_{CC} = 3 V, I_{OL} = 16 mA			0.4	
		V_{CC} = 3 V, I_{OL} = 24 mA			0.55	
		V_{CC} = 4.5 V, I_{OL} = 32 mA			0.55	
Input leakage current	I_L	V_I = 5.5 V or GND, V_{CC} = 0 V to 5.5 V			±5	μA
Power off leakage current	I_{OFF}	V_I or V_O = 5.5 V, V_{CC} = 0 V			±10	μA
Supply current	I_{CC}	V_I = 5.5 V or GND, I_O = 0, V_{CC} = 1.65 V to 5.5 V			10	μA
Additional supply current per input pin	$\triangle I_{CC}$	V_{CC} = 3 V to 5.5 V, one input at V_{CC} - 0.6 V, other input at V_{CC} or GND			500	μA

Switching Characteristics for T_A = -40°C to 85°C

Parameter	From (Input)	To (Output)	V_{CC} = 1.8 V ± 0.15 V		V_{CC} = 2.5 V ± 0.2 V		V_{CC} = 3.3 V ± 0.3 V		V_{CC} = 5 V ± 0.5 V		Units
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{PD}	A	Y	2.6	8	1.1	5.5	1	4.5	1	4	nS
t_{en}	OE	Y	2.8	9.4	1.3	6.6	1.2	5.3	1	5	nS
t_{dis}	OE	Y	1.6	9.8	1	5.5	1	5.5	1	4.2	nS

Parameter Measurement Information



LOAD CIRCUIT

TEST	S1
t_{PLH}/t_{PHL}	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					
1.8 V ±0.15 V	V_{CC}	≦2 ns	$V_{CC}/2$	2 x V_{CC}	30 pF	1 kΩ	0.15 V
2.5 V ±0.2 V	V_{CC}	≦2 ns	$V_{CC}/2$	2 x V_{CC}	30 pF	500 Ω	0.15 V
3.3 V ±0.3 V	3 V	≦2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
5 V ±0.5 V	V_{CC}	≦2.5 ns	$V_{CC}/2$	2 x V_{CC}	50 pF	500 Ω	0.3 V

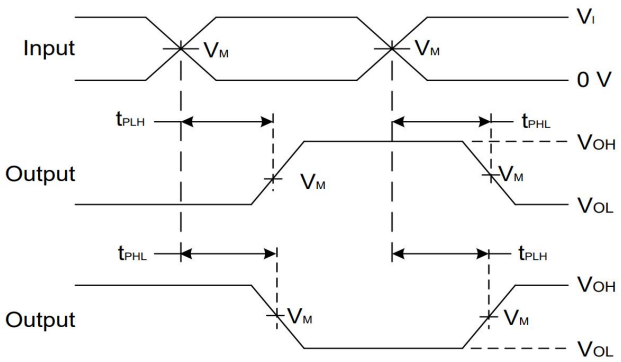


Figure 1. Voltage Waveform Propagation Delay Times

Inverting and Non Inverting Outputs

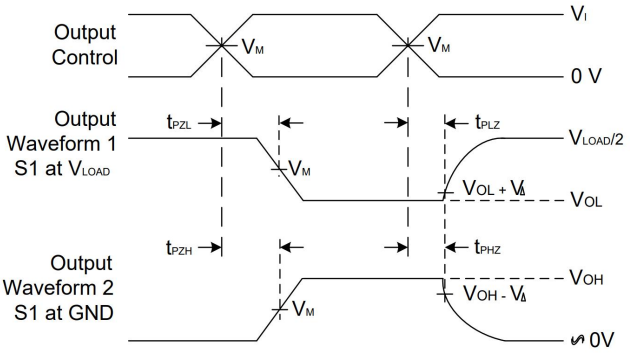


Figure 2. Voltage Waveform Enable and DisableTimes

Low- and High-Level Enabling

Notes:

(1) C_L includes probe and jig capacitance.

(2) All pulses and supplied at pulse repetition rate ≤ 10 MHz.

(3) The Inputs are measured separately one transition per measurement.

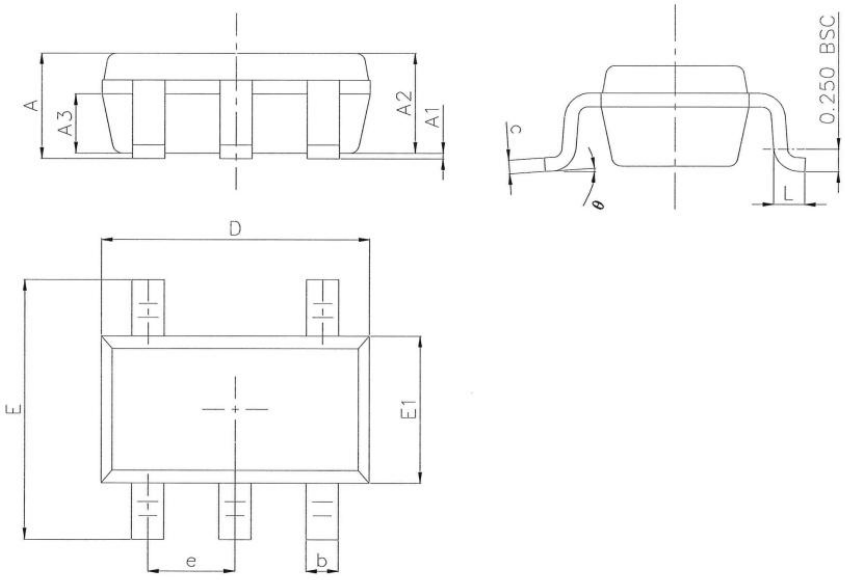
(4) t_{PLZ} and t_{PHZ} are the same as t_{dis}.

(5) t_{PZL} and t_{PZH} are the same as t_{en}.

(6) t_{PLH} and t_{PHL} are the same as t_{PD}.

Package Outline Dimension-SOT23-5

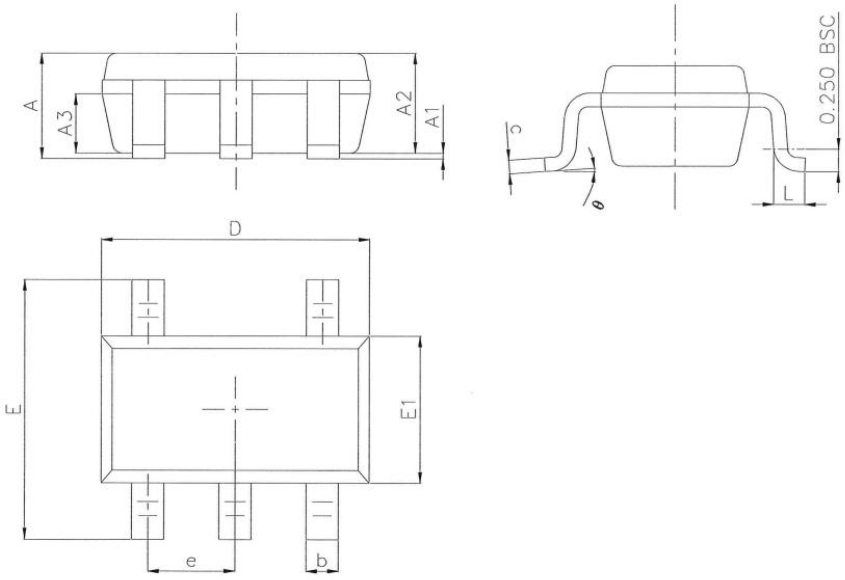
SOT23-5 Unit (mm)



Symbol	Dimension in mm		
	Min.	Nom.	Max.
A	1.050	1.150	1.250
A1	0.000	0.060	0.100
A2	1.000	1.100	1.200
A3	0.550	0.650	0.750
D	2.820	2.920	3.020
E1	1.510	1.610	1.700
E	2.650	2.800	2.950
b	0.300	0.400	0.500
e	0.950BSC		
θ	0°	4°	8°
L	0.300	0.420	0.570
c	0.100	0.152	0.200

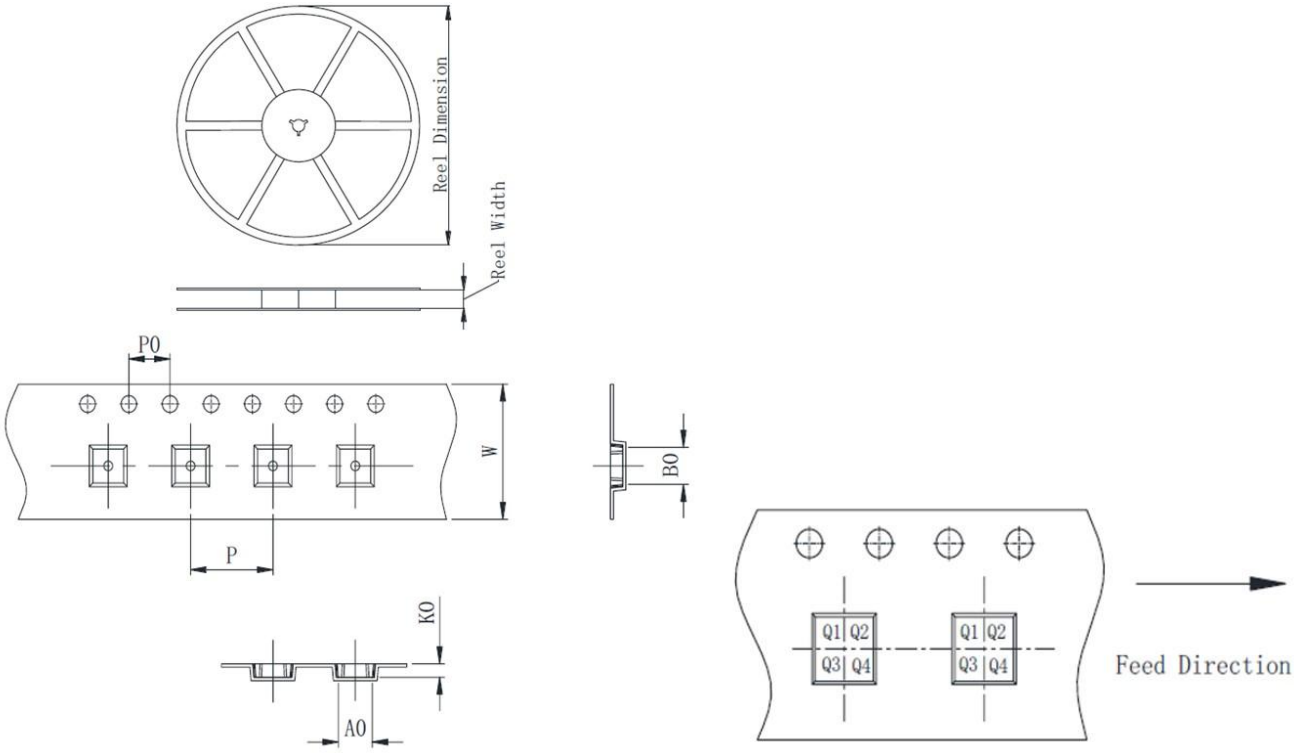
Package Outline Dimension-SC70-5

SC70-5 Unit (mm)



Symbol	Dimension in mm		
	Min.	Nom.	Max.
A	0.90	0.95	1.00
A1	0.00	0.05	0.10
A2		0.9	
A3		0.55	
D	2.00	2.10	2.20
E1	1.15	1.25	1.35
E	2.00	2.10	2.20
b	0.15	0.225	0.30
e	0.65BSC		
θ	0°	4°	8°
L	0.26	0.35	0.46
c	0.10	0.15	0.20

Packing information



Package type	Reel size	Reel dimension (±3.0mm)	Reel width (±1.0mm)	A0 (±0.1mm)	B0 (±0.1mm)	K0 (±0.1mm)	P (±0.1mm)	P0 (±0.1mm)	W (±0.3mm)	Pin1
SOT23-5	7'	180	8.4	3.23	3.17	1.32	4.0	4.0	8.0	Q3
SC70-5	7'	180	8.4	3.23	3.17	1.32	4.0	4.0	8.0	Q3

Version History

Version	Date	Changes
Rev.1.0	2025-11-19	Initial release

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