



LV5609V

Bi-CMOS LSI Vertical Clock Driver for CCD

ON Semiconductor®

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Overview

The LV5609V is vertical clock driver for CCD.

Functions

- Ternary output $\times 2$ ch
- Binary output $\times 2$ ch
- SHT output $\times 1$ ch
- Output ON resistance : 30Ω typ

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$, $V_{SS} = VM = 0\text{V}$

Parameter	Symbol	Conditions	Ratings		Unit
Maximum supply voltage	V_{DD} max			6	V
	VH max			20	V
	VL max			-10	V
	VH-VL max			24	V
Allowable power dissipation	P_d max	with specified substrate *		0.67	W
Operating temperature	Topr			-20 to +80	°C
Storage temperature	Tstg			-40 to +125	°C

* : Specified substrate : $114.3 \times 76.1 \times 1.6\text{mm}^3$, glass epoxy board

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Allowable Operating Ratings at $T_a = 25^\circ\text{C}$, $V_{SS} = VM = 0\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply voltage	V_{DD}		2.0	3.3	5.5	V
	VH			15	17	V
	VL		-8.5	-7.5	-4	V
	VH-VL				23.5	V
CMOS input High voltage	V_{IH}		$0.8V_{DD}$		V_{DD}	V
CMOS input Low voltage	V_{IL}		-0.1		0.4	V

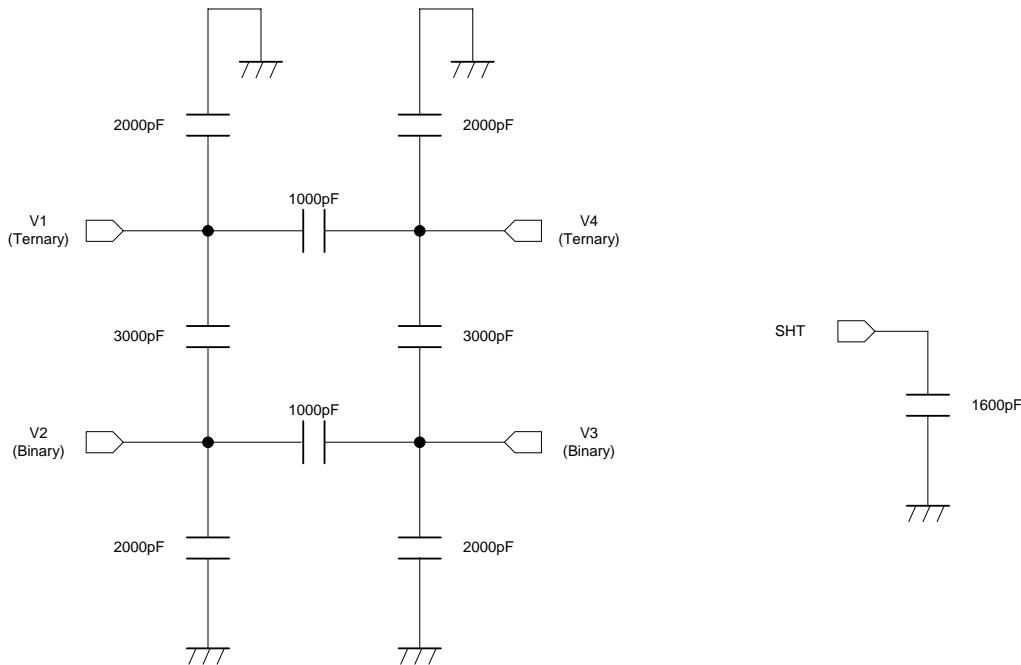
LV5609V

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{DD} = 3.3\text{V}$, $V_{SS} = 0\text{V}$, $V_H = 15\text{V}$, $V_L = -7.5\text{V}$, $V_M = 0\text{V}$,
Unless otherwise specified

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Static current drain	I_{DD}	V_{DD} pin			1	μA
	I_H	V_H pin			10	μA
	I_L	V_L pin			1	μA
Dynamic current drain	I_{DD}	V_{DD} pin See *1 and *2.			1	mA
	I_H	V_H pin See *1 and *2.		2.4	4.5	mA
	I_L	V_L pin See *1 and *2.		3	5	mA
Output ON resistance	R_L	$I_O = +10\text{mA}$		20	30	Ω
	R_M	$I_O = \pm 10\text{mA}$		30	45	Ω
	R_H	$I_O = -10\text{mA}$		30	40	Ω
	R_{SHT}	$I_O = -10\text{mA}$		30	40	Ω
Propagation delay time	T_{PLM}	No load			200	ns
	T_{PMH}	No load			200	ns
	T_{PLH}	No load			200	ns
	T_{PML}	No load			200	ns
	T_{PHM}	No load			200	ns
	T_{PHL}	No load			200	ns
Rise time	T_{TLM}	$VL \rightarrow VM$ $V1, V3$ See *1.			800	ns
		$VL \rightarrow VM$ $V2, V4$ See *1.			800	ns
	T_{TMH}	$VM \rightarrow VL$ $V1, V3$ See *1.			800	ns
	T_{TLH}	$VL \rightarrow VH$ SHT See *1.			200	ns
Fall time	T_{TML}	$VM \rightarrow VL$ $V1, V3$ See *1.			800	ns
		$VM \rightarrow VL$ $V2, V4$ See *1.			800	ns
	T_{THM}	$VH \rightarrow VM$ $V1, V3$ See *1.			800	ns
	T_{THL}	$VH \rightarrow VL$ SHT See *1.			200	ns

*1 : Refer to the CCD equivalent load shown below.

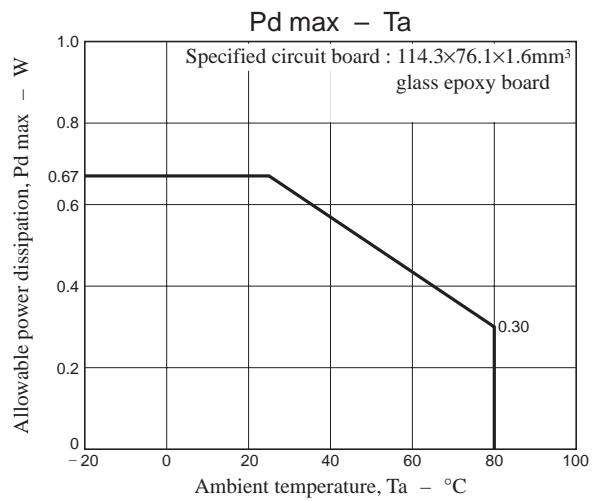
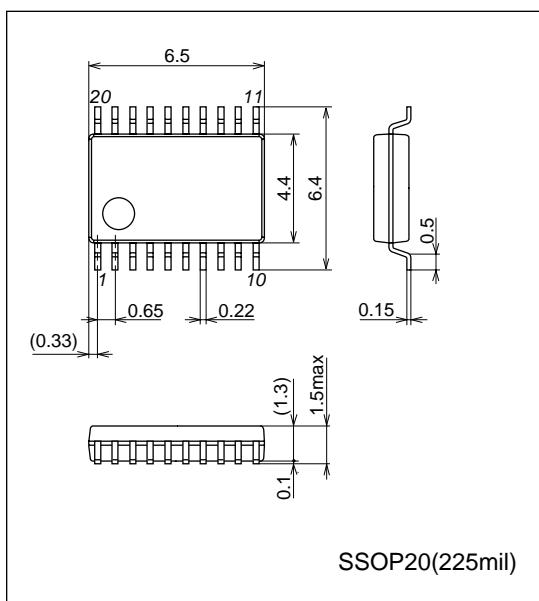
*2 : Refer to the timing waveform on Page 7.

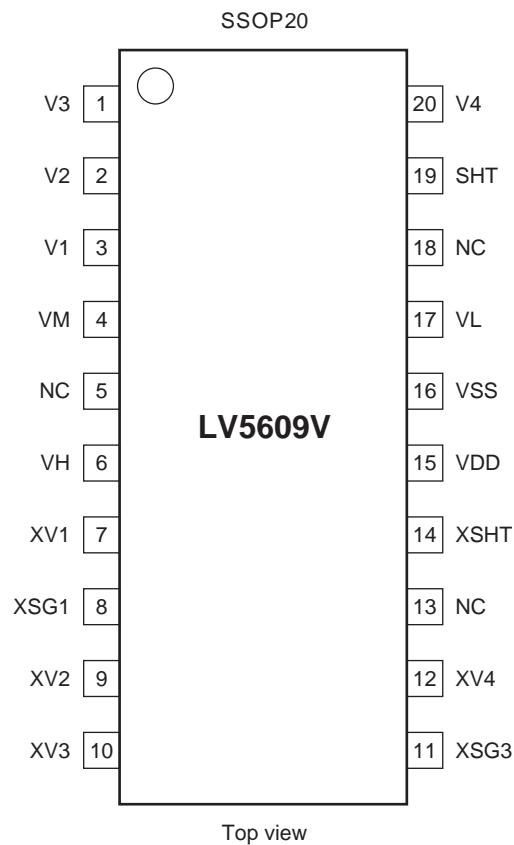


Package Dimensions

unit : mm (typ)

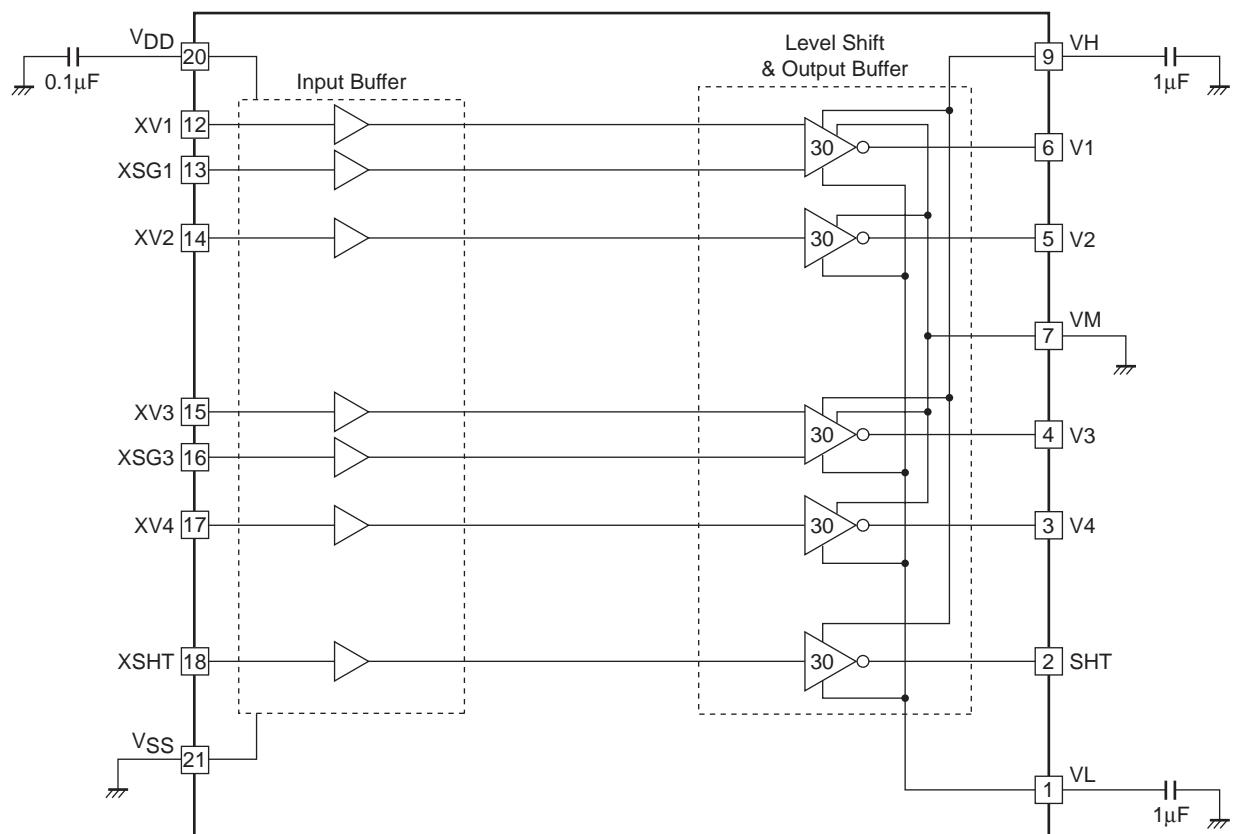
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Pin Assignment**Pin Function**

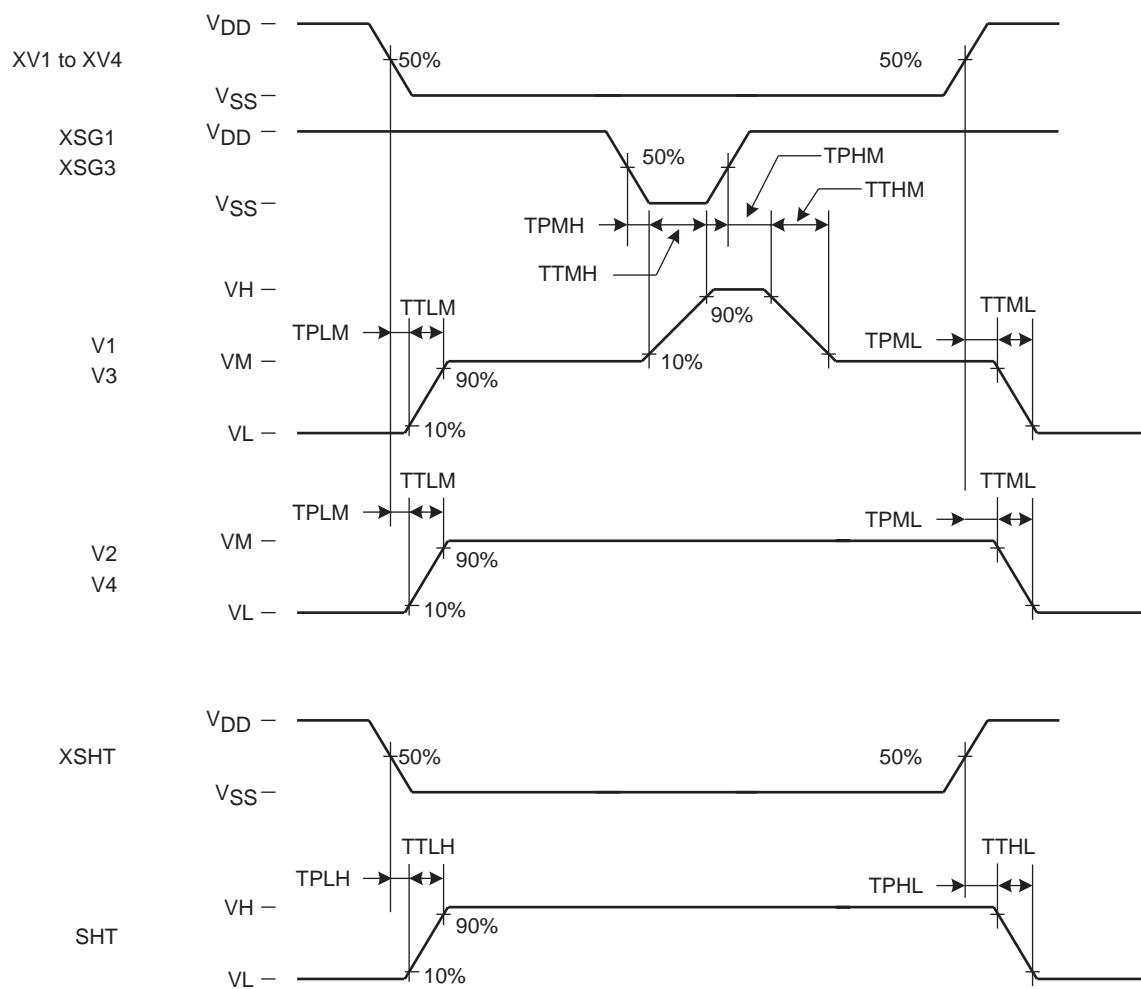
Pin No.	Name	Mode
1	V3	Level shift output (ternary VH, VM, VL)
2	V2	Level shift output (binary VM, VL)
3	V1	Level shift output (ternary VH, VM, VL)
4	VM	GND for output
5	NC	
6	VH	Hi power supply (15V system) for output
7	XV1	V1 transfer pulse input
8	XSG1	V1 read pulse input
9	XV2	V2 transfer pulse input
10	XV3	V3 transfer pulse input
11	XSG3	V3 read pulse input
12	XV4	V4 transfer pulse input
13	NC1	
14	XSHT	SHT pulse input
15	V _{DD}	Power supply (3.3V system) for input buffer
16	V _{SS}	GND for input buffer
17	VL	LO power supply (-7.5V system) for output
18	NC	
19	SHT	Level shift output (binary VH, VL)
20	V4	Level shift output (ternary VM, VL)

Block Diagram

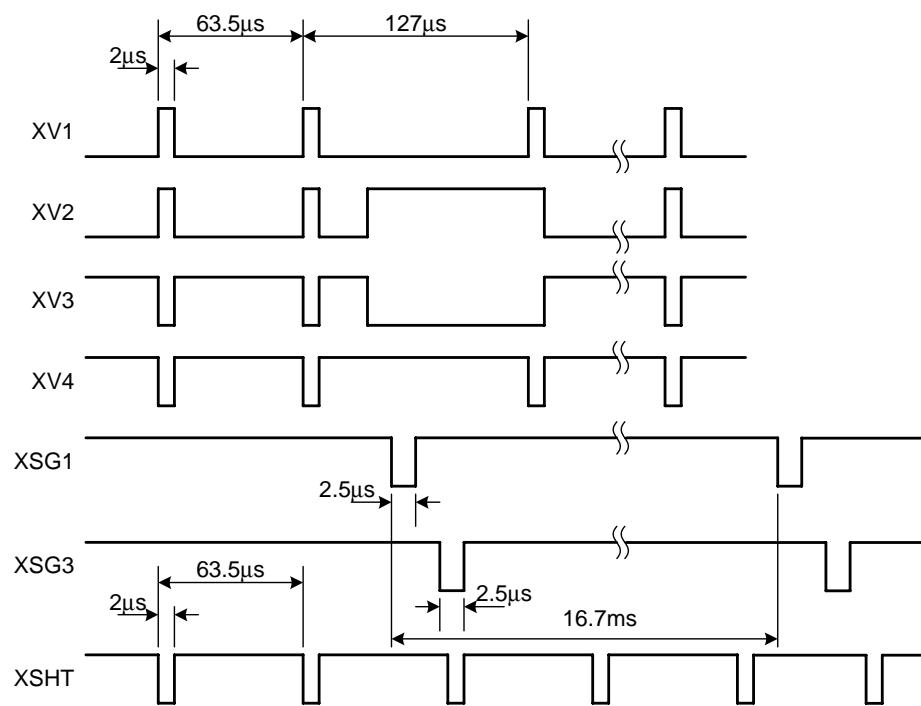


Logical Function Table

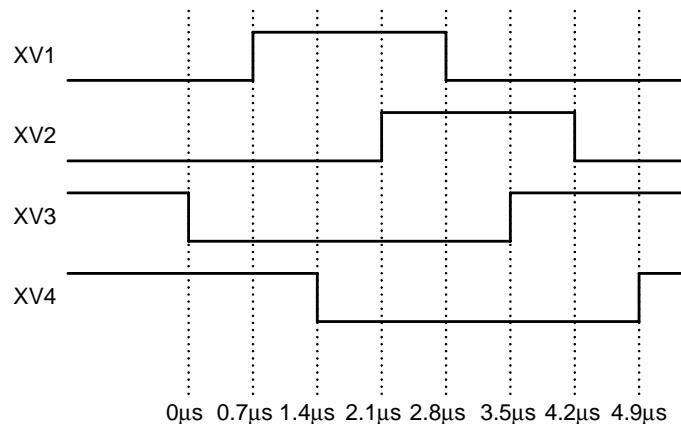
Input				Output			
XV1	XSG1	XV2	XSHT	V1	V2	SHT	
XV3	XSG3	XV4		V3	V4		
L	L	X	X	VH	X	X	
L	H	X	X	VM	X	X	
H	L	X	X	VL	X	X	
H	H	X	X	VL	X	X	
X	X	L	X	X	VM	X	
X	X	H	X	X	VL	X	
X	X	X	L	X	X	VH	
X	X	X	H	X	X	VL	

Timing Chart

CCD Equivalent Load Measurement Timing Waveform



Enlarged View of overlapped portion



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