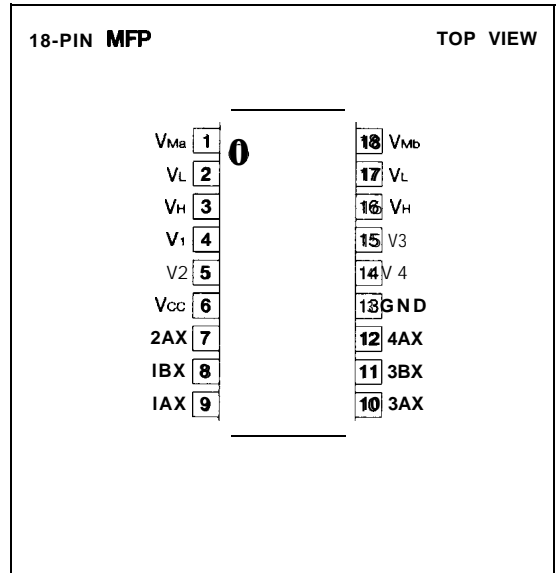# LR36683N

Vertical Driver LSI for CCD

DESCRIPTION

The LR36683N is a vertical clock driver designed for use with CCD area sensors. The driver transforms voltage levels from CMOS level (O to 5 V) to 27 Vp-p (MAX.) and impedanse conversion.
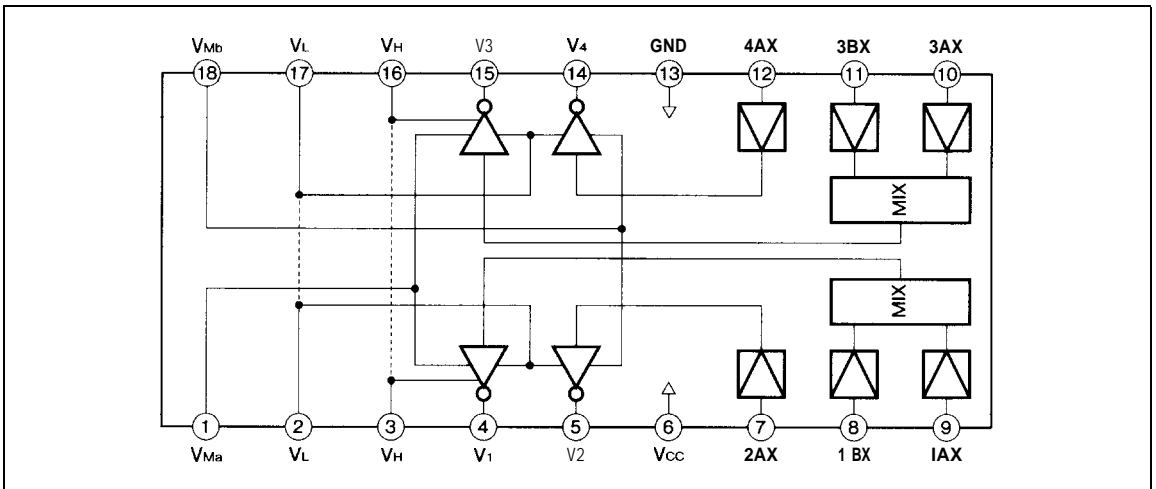
FEATURES

- **Two hi-level output circuits**
  Two tri-level output circuits
- **Supply voltage :** $V_{CC} = 5.0$ **V** (TYP.)
  $V_H - V_L = 27$ **Vp-p (MAX.)**
  $V_H = 20.0$ **V (MAX.)**
  $V_L = -5.0$ V (MAX.)
  $V_M = O$ **to** 4.0 **V** (independently controllable with bi- or tri-level outputs)
- Switchable **between NTSC** (EIA) **and PAL** (CCIR) **systems**
- **Package : 18-pin MFP(MFPOI 8-P)**

PIN CONNECTIONS

18-PIN MFP   **TOP VIEW**

V_{Ma}	1	18	V_{Mb}
V_L	2	17	V_L
V_H	3	16	V_H
V_1	4	15	V3
V2	5	14	V4
V_{CC}	6	13	GND
2AX	7	12	4AX
IBX	8	11	3BX
IAX	9	10	3AX

BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT	NOTE
Supply voltage	V_{CC}	$V_{SS} - 0.3$ V to $V_{SS} + 6.0$	V	1
	$V_H - V_L$	29.0		
	V_{Ma}, V_{Mb}	V_L to V_H		
Input voltage	V_{IN} 'S3	-0.3 to $V_{CC} + 0.3$	v	
DC load current	I_{ODC}	± 3	mA	
Power dissipation	P_D	300 (70℃)	mW	
Storage temperature	T_{stg}	-55 to $+150$	℃	

NOTE :

1. 'H (MIN.) $= V_{CC}$, V_L (MAX.) $=$ GND

AC CHARACTERISTICS

$(V_{CC} = 5.0$ V, $V_H = 15.0$ V, $V_L = -9.0$ V, $V_{Ma} = V_{Mb} = 0$ to 4 V, $Ta = -20$ to 70℃$)$

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_M level transition raise delay	t_{TRM}	V_{IN} to $V_L \rightarrow V_M - 1.0$ V Applied to V_1 - V_4		800	1200	ns
V_L level transition fall delay	t_{TFL}	V_{IN} to $V_M \rightarrow V_L + 1.0$ V Applied to V_1 - V_4		800	1200	ns
V_H level transition raise delay	t_{TRH}	V_{IN} to $V_M \rightarrow V_H - 1.0$ V Applied to V_1 and V_3		800	1200	ns
V_M level transition fall delay	t_{TFM}	V_{IN} to $V_H \rightarrow V_M + 1.0$ V Applied to V_1 and V_3		800	1200	ns
Supply current	I_{DYN}	During operation		9	18	mA

NOTES :

. The maximum applicable voltage on any pin with respect to GND.

. Referenced to the "TIMING DIAGRAM"

. Applied to "EQUIVALENCE CIRCUIT"

. Applied to "PRECAUTION" 1 and 3.

DC CHARACTERISTICS

$(V_{CC} = 5.0$ V, $V_H = 15.0$ V, $V_L = -9.0$ V, $V_{Ma} = V_{Mb} = 0$ to 4 V, **referenced to** GND, Ta = −20 to 70℃)

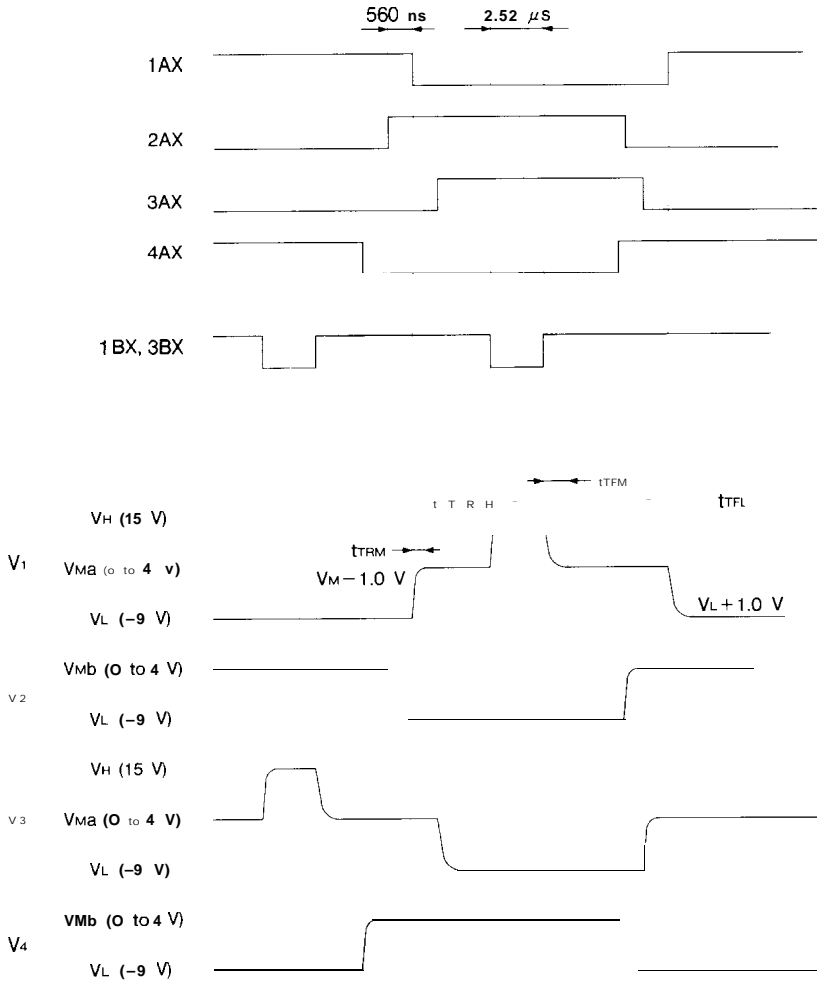| PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	NOTE
Low level input voltage	V_{IL}		0		1.0	v	
High level input voltage	V_{IH}		4.0		5.0	v	
Low level input current	$|I_{IH}|$	$V_{IL} = 0$ v			1.0	μA	
High level input current	$|I_{IH}|$	$V_{IH} = 5$ v			1.0	μA	
Low level output voltage	V_{OL}	$I_{OL} < 1$ μA			−8.95	v	
High level output voltage	V_{OH}	$I_{OH} < 1$ μA	14.95			v	2
intermediate level output voltage	V_{OMLa}	$I_{OMLa} < 1$ μA	−0.05			v	2
	V_{OMHa}	$I_{OMHa} < 1$ μA			0.05	v	2
	V_{OMLb}	$I_{OMLb} < 1$ μA	−0.05			v	1
	V_{OMHb}	$I_{OMHb} < 1$ μA			0.05	v	1
Low level output current	I_{OL}	$V_{OL} = V_L + 0.1$ v	1.0			mA	
High level output current	I_{OH}	$V_{OH} = V_H − 0.1$ v	1.0			mA	2
intermediate -level output current	I_{OMLa}	$V_{OMLa} = V_M − 0.1$ v	1.0			mA	2
	I_{OMHa}	$V_{OMHa} = V_M + 0.1$ V	1.0			mA	2
	I_{OMLb}	$V_{OMLb} = V_M − 0.1$ V	1.0			mA	1
	I_{OMHb}	$V_{OMHb} = V_M + 0.1$ V	1.0			mA	1
Output on resistance	R_{ONH}	$I_{OH} = 30$ mA		20		Ω	2
	R_{ONM}	$I_{OH} = 30$ mA		20		Ω	
	R_{ONL}	$I_{OH} = 30$ mA		20		Ω	
Static current	I_{CC}				200	μA	
	I_H				200	μA	
	I_M				200	μA	
	I_L				200	μA	

. The current must be specified with the absolute value.
● Applied to "PRECAUTION" 1 and 3.

NOTES :
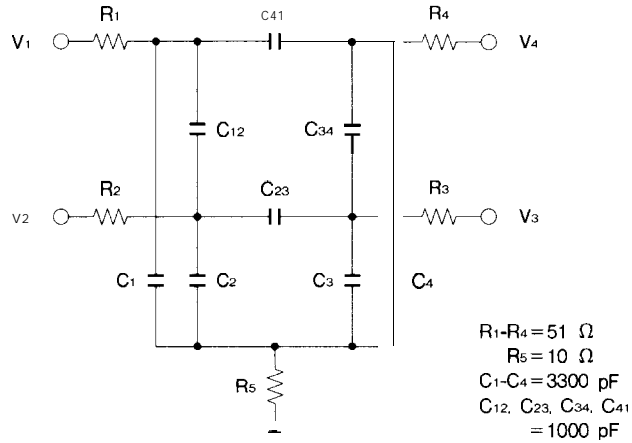 1. Applied to pins v_2 and V_4.
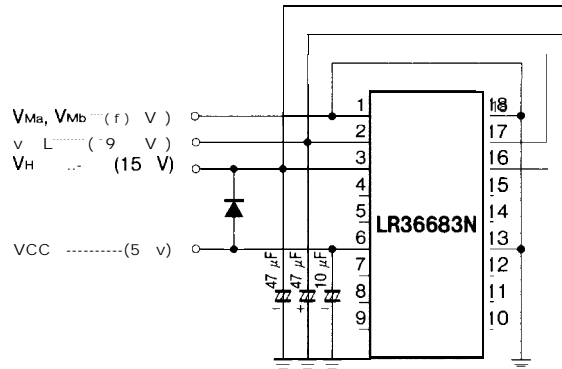 2. Applied to pins v_1 and v_3.

TIMING DIAGRAM

INPUT CYCLE

EQUIVALENCE CIRCUIT

R₁-R₄ = 51 Ω
R₅ = 10 Ω
C₁-C₄ = 3300 pF
C₁₂, C₂₃, C₃₄, C₄₁
= 1000 pF

R_1-R_4 = 51 Ω
R_5 = 10 Ω
C_1-C_4 = 3300 pF
C_{12}, C_{23}, C_{34}, C_{41} = 1000 pF
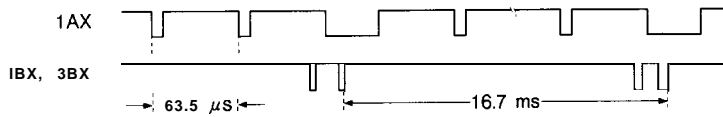
SYSTEM CONFIGURATION EXAMPLE

V_{Ma}, V_{Mb} ···(f) V)
v L (⁻9 V)
V_H ..- (15 V)

VCC ----------(5 v)

LR36683N

47 μF   47 μF   10 μF

PRECAUTION

Use this LSI under the following condition 1 and condition 2 or 3.

1. **10 μF capacitor should be applied between the power supply and GND. (Capacitor is not necessary when V_{Ma} and V_{Mb} are GND level.)** V_H, V_L, V_{CC}, V_{Ma}, V_{Mb}

2. **Diode should be applied between Vcc and VH.**

3. **Resister should be applied to pins as below. (Capacitors is not necessary when V_{Ma} and V_{Mb} are GND level.)**
   a) **390 Ω to Vcc**
   b) **10 Ω to V_H**
   c) **10 Ω to V_L**
   d) **10 Ω to V_{Ma} and V_{Mb}**

CCD PERIPHERALS

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