Ordering number : EN5912

CMOS IC

LC4120NV

LCD Power Supply Switching IC

Overview

The LC4120NV is an LCD power supply switching IC that provides 3 input channels and 6 output channels. It is fabricated in an 80-V high-voltage CMOS process and features low power dissipation, high speed, and a low output impedance. This IC is optimal for switching the row driver LCD drive voltage in a wide range of LCD products.

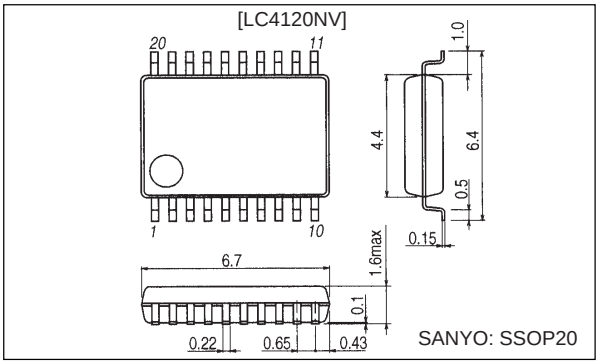
Features

- 3 input channels/6 output channels
- Logic voltage: 2.7 to 5.5 V
- Output voltage: 80 V (maximum)
- Output impedance: 110Ω (maximum)
  (When $V_{HA} - V_{LA}$ = 60 V)
- Output delay time: 0.5 µs (maximum)
- Operating temperature: –20 to 75°C
- Package: 20-pin SSOP

Package Dimensions

unit: mm

3179A-SSOP20



Specifications

Absolute Maximum Ratings (The following conditions must hold at all times: $V_{HA} \geq V_{HB} > V_{DD} > V_{SS} > V_{LB} \geq V_{LA}$)

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{DD} max	V_{DD}	–0.3 to +7.0	V
	$V_{HA, B}$–$V_{LA, B}$	$V_{HA, B}$/$V_{LA, B}$	–0.3 to +85	V
	V_{HA}/V_{HB}	V_{HA}/V_{HB}	–0.3 to +45.0	V
	V_{LA}/V_{LB}	V_{LA}/V_{LB}	–40.0 to +0.3	V
Input voltage	V_{IN}	S1 to S3	–0.3 to V_{DD} +0.3	V
Operating temperature	Topr		–20 to +75	℃
Storage temperature	Tstg		–40 to +125	℃

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Electrical Characteristics

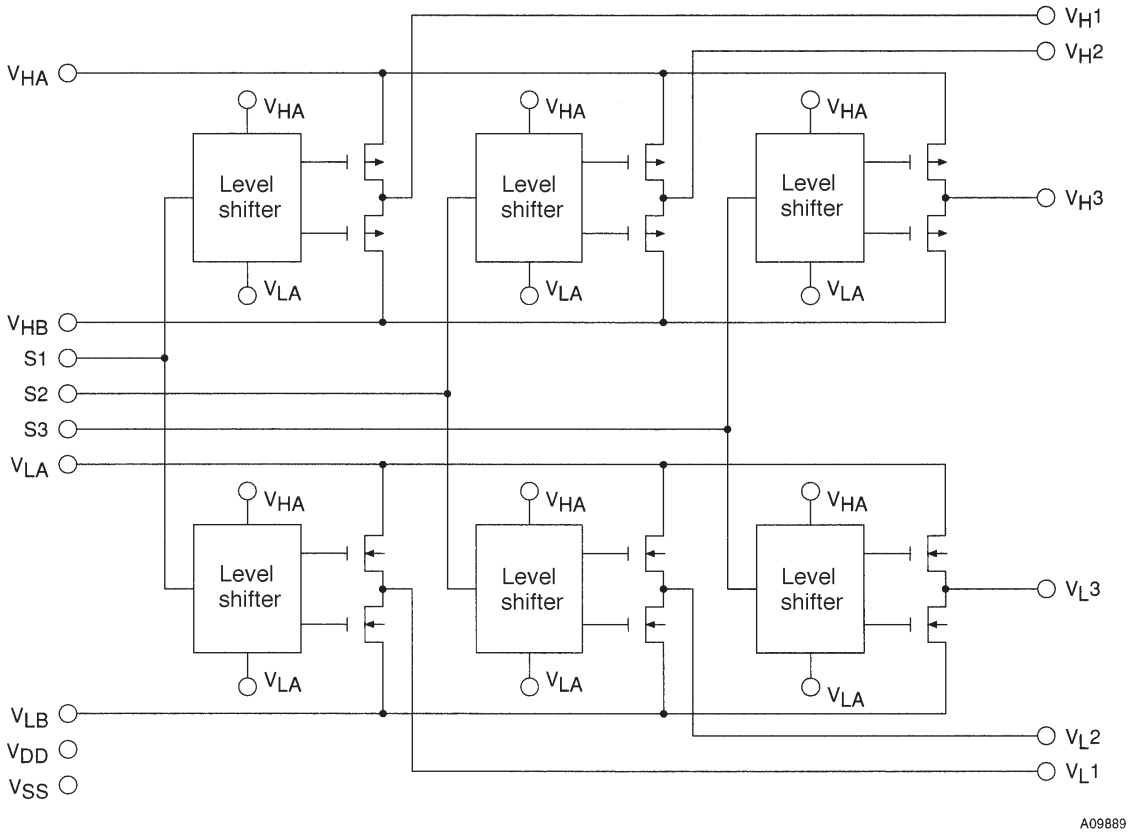
DC Characteristics at Ta = –20 to 75°C, V_{SS} = 0 V, V_{DD} = 2.7 to 5.5 V unless otherwise specified

(The following conditions must hold at all times: $V_{HA} \geq V_{HB} > V_{DD} > V_{SS} > V_{LB} \geq V_{LA}$.)

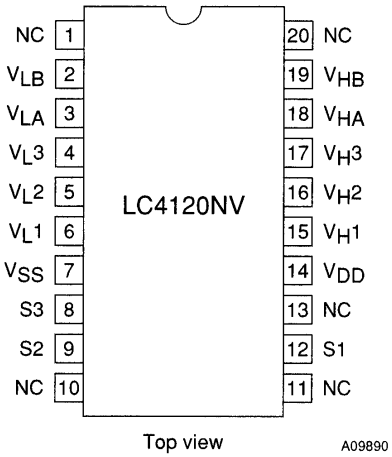
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Operating voltage	V_{DD}	V_{DD}	2.7	5.0	5.5	V
	$V_{HA, B}$–$V_{LA, B}$	$V_{HA, B}$, $V_{LA, B}$	40.0		80.0	V
	V_{HA}, V_{HB}	V_{HA}, V_{HB}	20.0		42.5	V
	V_{LA}, V_{LB}	V_{LA}, V_{LB}	–37.5		–20.0	V
Potential difference	V_{HA}–V_{HB}	V_{HA}, V_{HB}	0		5.0	V
	V_{LA}–V_{LB}	V_{LA}, V_{LB}	0		5.0	V
Input high-level voltage	V_{IH}	S1 to S3	$V_{DD} \times 0.8$		V_{DD}	V
Input low-level voltage	V_{IL}	S1 to S3	0		$V_{DD} \times 0.2$	V
Output high-level voltage	R_{OHA}	$V_{OUT} = V_{HA} – 0.5 : V_H1$ to V_H3 *1		70	110	Ω
	R_{OHB}	$V_{OUT} = V_{HB} – 0.5 : V_H1$ to V_H3 *1		70	110	Ω
Output low-level voltage	R_{OLA}	$V_{OUT} = V_{LA} + 0.5 : V_L1$ to V_L3 *2		70	110	Ω
	R_{OLB}	$V_{OUT} = V_{LB} + 0.5 : V_L1$ to V_L3 *2		70	110	Ω
Current drain	I_{DDOPE}	f = 40 kHz, Input signals operating *3			80	μA
	I_{HOPE}	f = 40 kHz, Input signals operating *3			600	μA
	I_{HLEAK}	f = 40 kHz, Input signals stopped *3	–10		+10	μA

Notes: 1. $V_{HA} – V_{LA}$ = 60 V, $V_{HA} – V_{HB}$ = 1.0 V
2. $V_{HA} – V_{LA}$ = 60 V, $V_{LA} – V_{LB}$ = 1.0 V
3. $V_{HA} – V_{LA}$ = 60 V, $V_{HA} – V_{HB} = V_{LA} – V_{LB}$ = 1.0 V

Block Diagram



Pin Assignment



Pin Functions

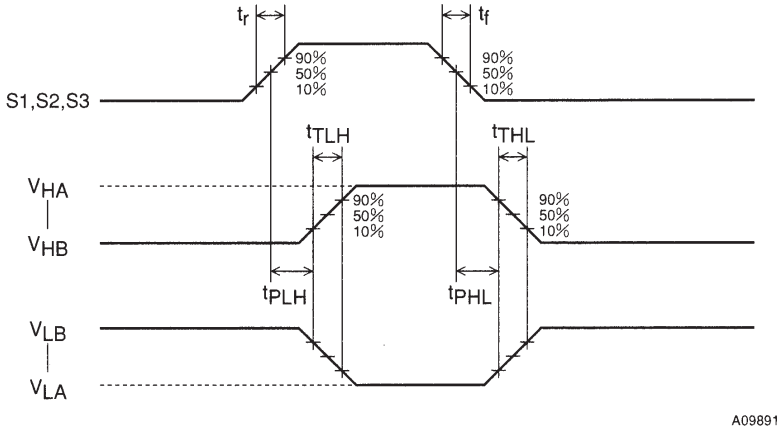
Pin	I/O	Function	Signal voltage
V_H1	O	High-voltage output 1	V_{HA}/V_{HB}
V_H2	O	High-voltage output 2	V_{HA}/V_{HB}
V_H3	O	High-voltage output 3	V_{HA}/V_{HB}
V_L1	O	Low-voltage output 1	V_{LA}/V_{LB}
V_L2	O	Low-voltage output 2	V_{LA}/V_{LB}
V_L3	O	Low-voltage output 3	V_{LA}/V_{LB}
S1	I	Logic input 1	V_{DD}/V_{SS}
S2	I	Logic input 2	V_{DD}/V_{SS}
S3	I	Logic input 3	V_{DD}/V_{SS}
V_{HA}		High-voltage power supply A	
V_{HB}		High-voltage power supply B	
V_{LA}		Low-voltage power supply A	
V_{LB}		Low-voltage power supply B	
V_{DD}		Logic system power supply	
V_{SS}		Logic system ground	

Truth Table

Input signal	Output	
Sn	V_{Hn}	V_{Ln}
H	V_{HA}	V_{LA}
L	V_{HB}	V_{LB}

(n = 1, 2, 3)

AC Characteristics



Conditions 1 at Ta = –20 to 75°C, V_{SS} = 0 V, V_{DD} = 2.7 to 5.5 V, V_{HA} = 42.5 V, V_{HB} = 37.5 V, V_{LA} = –37.5 V, V_{LB} = –32.5 V, C_L = 50 pF,unless otherwise specified

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output rise time	t_{TLH}			80	160	ns
Output fall time	t_{THL}			80	160	ns
High-level transmission delay time	t_{PLH}			200	500	ns
Low-level transmission delay time	t_{PHL}			200	500	ns
Input rise and fall times	t_r/t_f				30	ns