2-Input Positive-AND Gate

Description

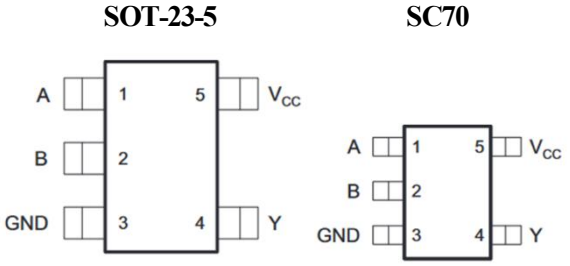
This single 2-input positive-AND gate is designed for 1.65V to 5.5V V_{CC} operation.

The HM74LVC1G08 device performs the Boolean function Y=AxB in positive logic.

The CMOS device has high output drive while maintaining low static power dissipation over a broad V_{CC} operating range.

The HM74LVC1G08 is available in a variety of packages, including the ultra-small DFN package with a body size of 1 mm ×1 mm.

Pin Connections



Features

- Inputs Accept Voltages 1.65V to 5.5V
- Max Tpd of 3.6 ns at 3.3V
- Low Power Consumption, 10μA Max I_{CC}
- ±24 mA Output Drive at 3.3 V
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  – 2000V Human-Body Model (A114-A)
  – 1000V Charged-Device Model (C101)

Pin Name	Pin No.	Pin Function
A	1	Input
B	2	Input
GND	3	Ground
Y	4	Output
VCC	5	Power pin

Application

- ATCA Solutions
- Active Noise Cancellation (ANC)
- Barcode Scanner
- Blood Pressure Monitor
- CPAP Machine
- Cable Solutions
- DLP 3D Machine Vision, Hyperspectral Imaging, Optical Networking, and Spectroscopy
- E-Book
- Embedded PC
- Field Transmitter: Temperature or Pressure
- Sensor
- Fingerprint Biometrics
- HVAC: Heating, Ventilating, and Air Conditioning
- Network-Attached Storage (NAS)
- Server Motherboard and PSU
- Software Defined Radio (SDR)
- TV: High-Definition (HDTV), LCD, and Digital
- Video Communications System
- Wireless Data Access Card, Headset, Keyboard,
- Mouse, and LAN Card
- X-ray: Baggage Scanner, Medical, and Dental

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.5 to 6.5	V
Input Voltage	V_{IN}	-0.5 to 6.5	V
Voltage Range Applied To Any Output In The High-Impedance Or Power-Off State	V_{OUT}	-0.5 to 6.5	V
Voltage Range Applied To Any Output In The High Or Slow State	V_{OUT}	-0.5 to 7.0	V
Input Clamp Current	I_{IN}	-50	mA
Output Clamp Current	I_{OUT}	-50	mA
Continuous Output Current	$I_{OUT\text{-}continuous}$	±50	mA
Storage Temperature Range	T_{STG}	-65 to 150	℃

Recommended Operating Conditions

Parameter	Symbol	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} = 1.65V to 1.95V	0.65V_{CC}			V
		V_{CC} = 2.3V to 2.7V	1.7			
		V_{CC} = 3V to 3.6V	2			
		V_{CC} = 4.5V to 5.5V	0.7V_{CC}			
Low- level input voltage	V_{IL}	V_{CC} = 1.65V to 1.95V			0.35V_{CC}	V
		V_{CC} = 2.3V to 2.7V			0.7	
		V_{CC} = 3V to 3.6V			0.8	
		V_{CC} = 4.5V to 5.5V			0.3V_{CC}	
High- level output current	I_{OH}	V_{CC} = 1.65V			-4	mA
		V_{CC} = 2.3V			-8	
		V_{CC} = 3V			-16	
		V_{CC} = 3V			-24	
		V_{CC} = 4.5V			-32	
Low- level output current	I_{OL}	V_{CC} = 1.65V			4	mA
		V_{CC} = 2.3V			8	
		V_{CC} = 3V			16	
		V_{CC} = 3V			24	
		V_{CC} = 4.5V			32	
Input transition rise or fall rate	$\triangle T/\triangle V$	V_{CC} = 1.8V±0.15V, 2.5V±0.2V			20	ns/V
		V_{CC} = 3.3V±0.3V			10	
		V_{CC} = 5V±0.5V			5	
Operating temperature	T_A		-40		125	℃

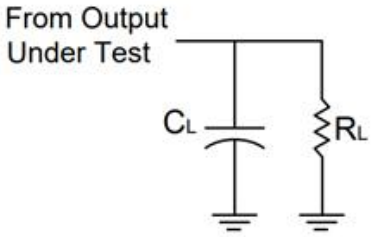
Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Positive-going input threshold voltage	V_{T+}	V_{CC} = 1.65V	0.76		1.13	V
		V_{CC} = 2.3V	1.08		1.56	
		V_{CC} = 3V	1.48		1.92	
		V_{CC} = 4.5V	2.19		2.74	
		V_{CC} = 5.5V	2.65		3.33	
Negative-going input threshold voltage	V_{T-}	V_{CC} = 1.65V	0.35		0.59	V
		V_{CC} = 2.3V	0.56		0.88	
		V_{CC} = 3V	0.89		1.2	
		V_{CC} = 4.5V	1.51		1.97	
		V_{CC} = 5.5V	1.88		2.4	
Hysteresis Voltage	$\triangle V_T$	V_{CC} = 1.65V	0.36		0.64	V
		V_{CC} = 2.3V	0.45		0.78	
		V_{CC} = 3V	0.51		0.83	
		V_{CC} = 4.5V	0.58		0.93	
		V_{CC} = 5.5V	0.69		1.04	
High- level output voltage	V_{OH}	V_{CC} = 1.65~5.5V, I_{OH}= -100uA	V_{CC}-0.15			V
		V_{CC} = 1.65V, I_{OH}= -4mA	1.2			
		V_{CC} = 2.3V, I_{OH}= -8mA	1.9			
		V_{CC} = 3V, I_{OH}= -16mA	2.4			
		V_{CC} = 3V, I_{OH}= -24mA	2.3			
		V_{CC} = 4.5V, I_{OH}= -32mA	3.8			
Low- level output voltage	V_{OL}	V_{CC} = 1.65~5.5V, I_{OL}= 100uA			0.1	V
		V_{CC} = 1.65V, I_{OL}= 4mA			0.45	
		V_{CC} = 2.3V, I_{OL}= 8mA			0.3	
		V_{CC} = 3V, I_{OL}= 16mA			0.4	
		V_{CC} = 3V, I_{OL}= 24mA			0.55	
		V_{CC} = 4.5V, I_{OL}= 32mA			0.55	
Input leakage current	I_I	V_{IN}= 5.5V or GND, V_{CC}= 0~5.5V			±5	μA
Power off leakage current	I_{OFF}	V_{IN} or GND, V_{CC}=0~5.5V			±10	μA
Quiescent supply current	I_Q	V_{IN}= V_{CC} or GND, I_{OUT}=0, V_{CC}=1.65~5.5V			10	μA
Additional quiescent supply current per input pin	$\triangle I_Q$	V_{CC}=3~5.5V, one input ate V_{CC}-0.6V, other input at V_{CC} or GND			500	μA

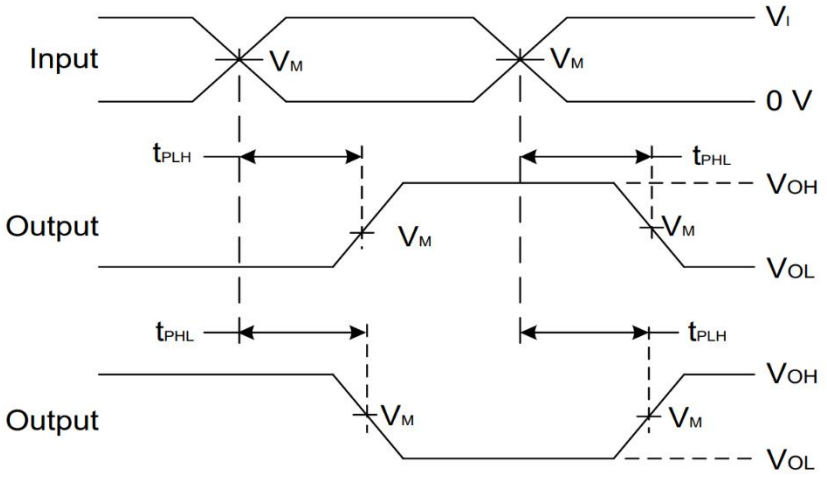
Switching Characteristics

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Propagation delay from input(A or B) to output(Y)	T_{PD}	V_{CC} = 1.8V±0.15V,	C_L=15pF R_L=1MΩ	2.8		9.9	ns
		V_{CC} = 2.5V±0.2V		1.6		5.5	
		V_{CC} = 3.3V±0.3V		1.5		4.6	
		V_{CC} = 5V±0.5V		0.9		4.4	

Parameter Measurement Information



VCC	INPUTS		V_M	C_L	R_L
	V_I	t_r/t_f			
1.8V ± 0.15V	V_{CC}	≦2ns	$V_{CC}/2$	15pF	1MΩ
2.5V ± 0.2V	V_{CC}	≦2ns	$V_{CC}/2$	15pF	1MΩ
3.3V ± 0.3V	3V	≦2.5ns	1.5V	15pF	1MΩ
5V ± 0.5V	V_{CC}	≦2.5ns	$V_{CC}/2$	15pF	1MΩ



Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs

Simplified Schematic