



## U74LVC1G139

CMOS IC

### 2-TO-4 LINE DECODER

#### DESCRIPTION

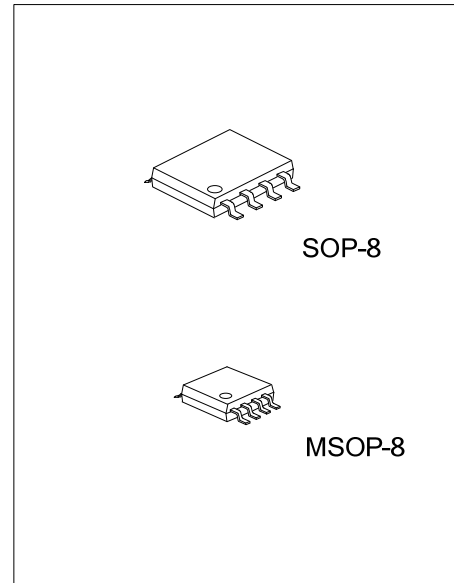
The **U74LVC1G139** is a 2-line to 4-line decoder which is designed for 1.65-V to 5.5-V  $V_{CC}$  operation.

This decoder can be used to minimize the effects of system decoding in high-performance memory systems.

This device has power-down protective circuit, preventing device destruction when it is powered down.

#### FEATURES

- \* Operate From 1.65V to 5.5V
- \* Inputs Accept Voltages to 5.5 V
- \*  $\pm 24\text{mA}$  output drive ( $V_{CC}=3.0\text{V}$ )
- \* Low power dissipation
- \*  $I_{off}$  Supports Partial-Power-Down Mode Operation

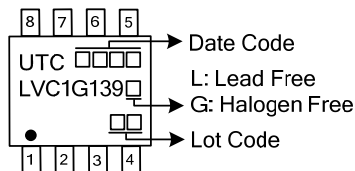


#### ORDERING INFORMATION

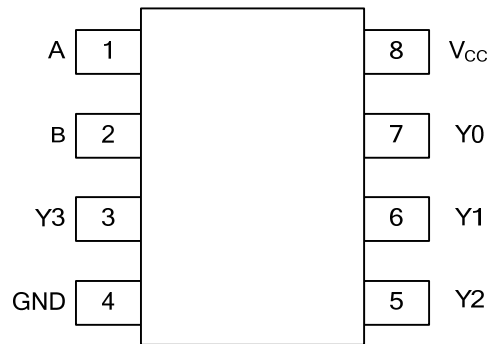
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G139L-S08-R	U74LVC1G139G-S08-R	SOP-8	Tape Reel
U74LVC1G139L-SM1-R	U74LVC1G139G-SM1-R	MSOP-8	Tape Reel

<p>U74LVC1G139G-S08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8, SM1: MSOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



■ PIN CONFIGURATION

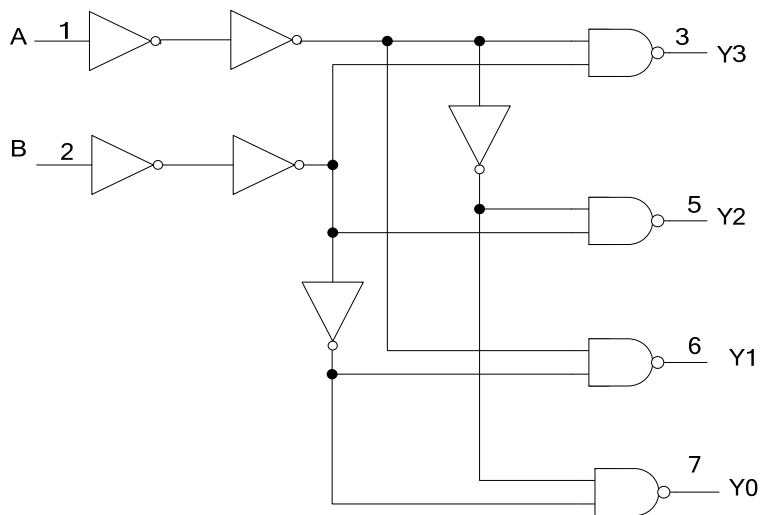


■ FUNCTION TABLE

INPUTS		OUTPUT(Y)			
B	A	Y0	Y1	Y2	Y3
L	L	L	H	H	H
L	H	H	L	H	H
H	L	H	H	L	H
H	H	H	H	H	L

H = High voltage level ; L = Low voltage level ; X = Don't care

■ LOGIC DIAGRAM



## ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	$V_{CC}$		-0.5 ~ +6.5	V
Input Voltage	$V_{IN}$		-0.5 ~ +6.5	V
Output Voltage	$V_{OUT}$	Output in the high or low state	-0.5 ~ + $V_{CC}+0.5$	V
		Output in the power-off state	-0.5 ~ +6.5	V
Continuous $V_{CC}$ or GND Current	$I_{CC}$		±100	mA
Continuous Output Current	$I_{OUT}$	$V_{OUT}=0V \sim V_{CC}$	±50	mA
Input Clamp Current	$I_{IK}$	$V_{IN}<0V$	-50	mA
Output Clamp Current	$I_{OK}$	$V_{OUT}>V_{CC}$ or $V_{OUT}<0V$	-50	mA
Storage Temperature Range	$T_{STG}$		-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{CC}$	Operating	1.65		5.5	V
		Data retention only	1.5			V
Input Voltage	$V_{IN}$		0		5.5	V
Output Voltage	$V_{OUT}$	High or low state	0		$V_{CC}$	V
		power-off state	0		5.5	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	$V_{CC}=1.8V\pm 0.15V, V_{CC}=2.5V\pm 0.2V$			20	ns/V
		$V_{CC}=3.3V\pm 0.3V$			15	ns/V
		$V_{CC}=5.0V\pm 0.5V$			10	ns/V
Operating Temperature	$T_A$		-40		+85	°C

## ■ ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
High-level Input Voltage	$V_{IH}$	$V_{CC}=1.8V\pm 0.15V$	$0.65 \times V_{CC}$			V	
		$V_{CC}=2.5V\pm 0.2V$	1.7			V	
		$V_{CC}=3.3V\pm 0.3V$	2			V	
		$V_{CC}=5.0V\pm 0.5V$	$0.7 \times V_{CC}$			V	
Low-level Input Voltage	$V_{IL}$	$V_{CC}=1.8V\pm 0.15V$			$0.35 \times V_{CC}$	V	
		$V_{CC}=2.5V\pm 0.2V$			0.7	V	
		$V_{CC}=3.3V\pm 0.3V$			0.8	V	
		$V_{CC}=5.0V\pm 0.5V$			$0.3 \times V_{CC}$	V	
High-Level Output Voltage	$V_{OH}$	$V_{CC}=1.65V \sim 5.5V, I_{OH}=-100\mu A$	$V_{CC}-0.1$			V	
		$V_{CC}=1.65V, I_{OH}=-4mA$	1.2			V	
		$V_{CC}=2.3V, I_{OH}=-8mA$	1.9			V	
		$V_{CC}=3.0V$	$I_{OH}=-16mA$	2.4			V
			$I_{OH}=-24mA$	2.3			V
$V_{CC}=4.5V, I_{OH}=-32mA$	3.8			V			
Low-Level Output Voltage	$V_{OL}$	$V_{CC}=1.65V \sim 3.6V, I_{OH}=100\mu A$			0.1	V	
		$V_{CC}=1.65V, I_{OH}=4mA$			0.45	V	
		$V_{CC}=2.3V, I_{OH}=8mA$			0.3	V	
		$V_{CC}=3.0V$	$I_{OH}=-16mA$			0.4	V
			$I_{OH}=-24mA$			0.55	V
$V_{CC}=4.5V, I_{OH}=32mA$			0.55	V			

### ■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=0\sim 5.5V, V_{IN}=V_{CC}$ or GND			$\pm 1$	$\mu A$
Power OFF Leakage Current	$I_{off}$	$V_{CC}=0V, V_{IN}$ or $V_{OUT}=5.5V$			$\pm 5$	$\mu A$
Quiescent Supply Current	$I_{CC}$	$V_{CC}=1.65\sim 5.5V, V_{IN}=5.5V$ or GND, $I_{OUT}=0A$			10	$\mu A$
Additional Quiescent Supply Current Per Input Pin	$\Delta I_{CC}$	$V_{CC}=3V\sim 5.5V$ , One input at $V_{CC}-0.6V$ , Other inputs at $V_{CC}$ or GND			500	$\mu A$
Input Capacitance	$C_I$	$V_{CC}=3.3V, V_{IN}=V_{CC}$ or GND		4		pF

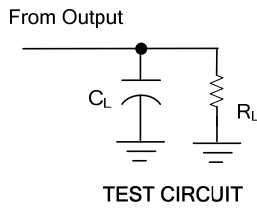
### ■ SWITCHING CHARACTERISTICS ( $T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Propagation delay from input (A or B) to output(Y)	$t_{PD}$	$C_L=15pF, R_L=1M\Omega$	$V_{CC}=1.8V\pm 0.15V$	2.7		15.3	ns
			$V_{CC}=2.5V\pm 0.2V$	1.5		7.5	ns
			$V_{CC}=3.3V\pm 0.3V$	0.9		4.9	ns
			$V_{CC}=5.0V\pm 0.5V$	0.8		3.6	ns
		$C_L=30pF, R_L=1K\Omega$	$V_{CC}=1.8V\pm 0.15V$	3		16.7	ns
		$C_L=30pF, R_L=500\Omega$	$V_{CC}=2.5V\pm 0.2V$	1.6		8.2	ns
		$C_L=50pF, R_L=500\Omega$	$V_{CC}=3.3V\pm 0.3V$	1.2		5.9	ns
		$V_{CC}=5.0V\pm 0.5V$	1.1		4.2	ns	

### ■ OPERATING CHARACTERISTICS ( $T_A=25^\circ C$ , unless otherwise specified)

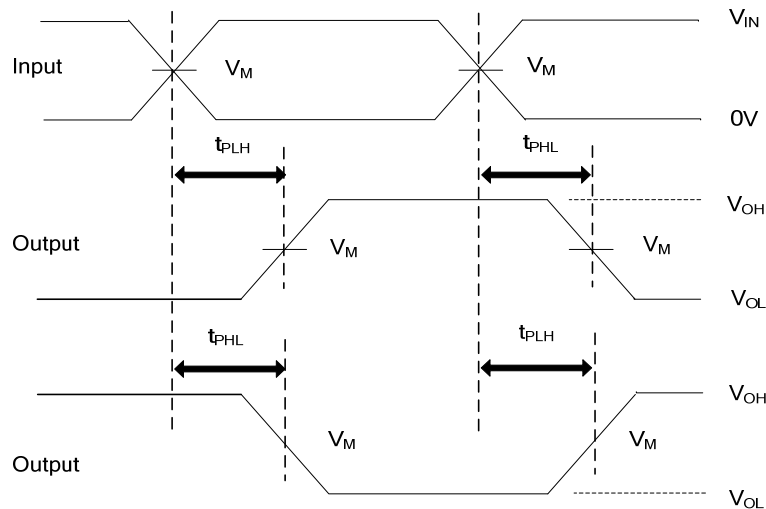
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	$V_{CC}=3.3V, f=10MHz$		36		pF

## TEST CIRCUIT AND WAVEFORMS



TEST	S1
t <sub>PLH</sub> / t <sub>PHL</sub>	OPEN
t <sub>PLZ</sub> / t <sub>PZL</sub>	V <sub>LOAD</sub>
t <sub>PHZ</sub> / t <sub>PZL</sub>	GND

V <sub>CC</sub>	INPUTS		V <sub>M</sub>	V <sub>LOAD</sub>	C <sub>L</sub>		R <sub>L</sub>		V <sub>Δ</sub>
	V <sub>IN</sub>	t <sub>R</sub> /t <sub>F</sub>							
1.8V±0.15V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	2×V <sub>CC</sub>	15pF	30pF	1MΩ	1kΩ	0.15V
2.5V±0.2V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	2×V <sub>CC</sub>	15pF	30pF	1MΩ	500Ω	0.15V
3.3V±0.3V	3.0V	≤2.5ns	1.5V	6V	15pF	50pF	1MΩ	500Ω	0.3V
5V±0.5V	V <sub>CC</sub>	≤2.5ns	V <sub>CC</sub> /2	2×V <sub>CC</sub>	15pF	50pF	1MΩ	500Ω	0.3V



PROPAGATION DELAY TIMES

Notes: 1. C<sub>L</sub> includes probe and jig capacitance.

2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, Z<sub>O</sub> = 50Ω.

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