



U74LVC1G139

CMOS IC

2-TO-4 LINE DECODER

■ DESCRIPTION

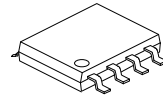
The **U74LVC1G139** is a 2-line to 4-line decoder which is designed for 1.65V to 5.5V V_{CC} operation.

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

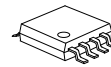
This device has power-down protective circuit, preventing device destruction when it is powered down.

■ 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



SOP-8



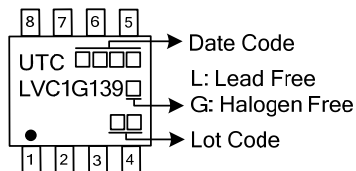
MSOP-8

■ ORDERING INFORMATION

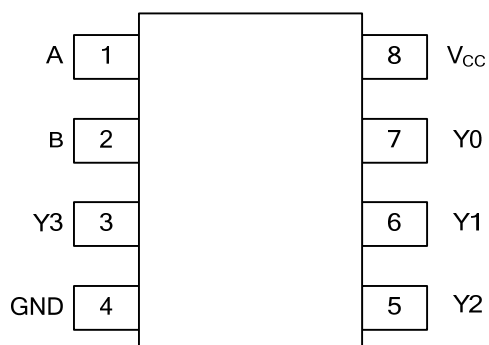
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G139L-S08-R	U74LVC1G139G-S08-R	SOP-8	Tape Reel
U74LVC1G139L-SM1-R	U74LVC1G139G-SM1-R	MSOP-8	Tape Reel

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



PIN CONFIGURATION

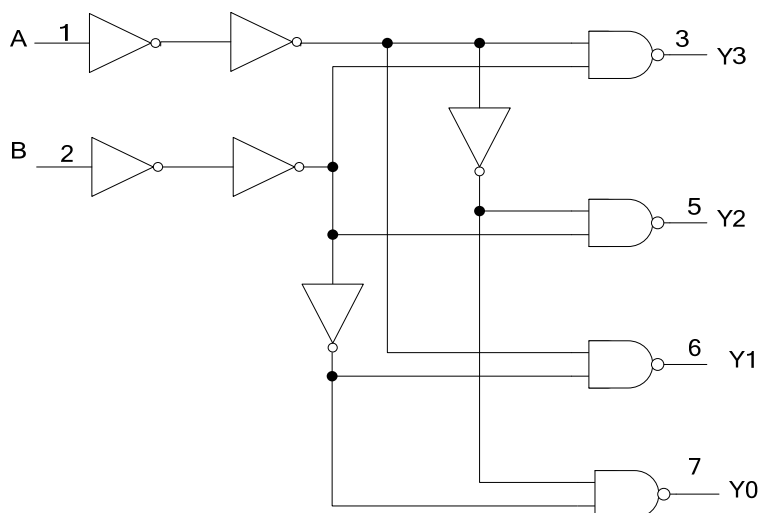


FUNCTION TABLE

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	$\Delta t/\Delta v$	$V_{CC}=1.8V\pm0.15V$, $V_{CC}=2.5V\pm0.2V$			20	ns/V
		$V_{CC}=3.3V\pm0.3V$			15	ns/V
		$V_{CC}=5.0V\pm0.5V$			10	ns/V
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	$T_A=25^\circ C$			$T_A=-40\sim+125^\circ C$			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-level Input Voltage	V_{IH}	$V_{CC}=1.8V\pm0.15V$	0.65 $\times V_{CC}$			0.65 $\times V_{CC}$			V
		$V_{CC}=2.5V\pm0.2V$	1.7			1.7			V
		$V_{CC}=3.3V\pm0.3V$	2			2			V
		$V_{CC}=5.0V\pm0.5V$	0.7 $\times V_{CC}$			0.7 $\times V_{CC}$			V
Low-level Input Voltage	V_{IL}	$V_{CC}=1.8V\pm0.15V$			0.35 $\times V_{CC}$			0.35 $\times V_{CC}$	V
		$V_{CC}=2.5V\pm0.2V$			0.7			0.7	V
		$V_{CC}=3.3V\pm0.3V$			0.8			0.8	V
		$V_{CC}=5.0V\pm0.5V$			0.3 $\times V_{CC}$			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_{CC} -0.1			V
		$V_{CC}=1.65V$, $I_{OH}=-4mA$	1.2			0.95			V
		$V_{CC}=2.3V$, $I_{OH}=-8mA$	1.9			1.7			V
		$V_{CC}=3.0V$, $I_{OH}=-16mA$	2.4			2.1			V
		$V_{CC}=3.0V$, $I_{OH}=-24mA$	2.3			2.0			V
		$V_{CC}=4.5V$, $I_{OL}=-32mA$	3.8			3.4			V

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Low-Level Output Voltage	V _{OL}	V _{CC} =1.65V ~ 5.5V, I _{OL} =100μA			0.1			0.1	V
		V _{CC} =1.65V, I _{OL} =4mA			0.45			0.7	V
		V _{CC} =2.3V, I _{OL} =8mA			0.3			0.45	V
		V _{CC} =3.0V, I _{OL} =16mA			0.4			0.5	V
		V _{CC} =3.0V, I _{OL} =24mA			0.55			0.8	V
		V _{CC} =4.5V, I _{OL} =32mA			0.55			0.8	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =0~5.5V, V _{IN} =V _{CC} or GND			±1			±1	μA
Power OFF Leakage Current	I _{off}	V _{CC} =0V, V _{IN} or V _{OUT} =5.5V			±5			±5	μA
Quiescent Supply Current	I _{CC}	V _{CC} =1.65~5.5V, V _{IN} =5.5V or GND, I _{OUT} =0A			10			10	μA
Additional Quiescent Supply Current Per Input Pin	ΔI _{CC}	V _{CC} =3V~5.5V, One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND			500			500	μA

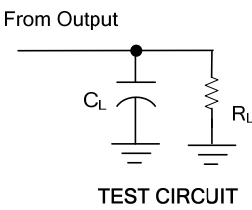
■ SWITCHING CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		T _A =25°C			T _A =-40~-+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Propagation delay from input (A or B) to output(Y)	t _{PD}	C _L =15pF, R _L =1MΩ	V _{CC} =1.8V±0.15V	2.7		17.3	2.7		18.3	ns
			V _{CC} =2.5V±0.2V	1.5		9.5	1.5		10.5	ns
			V _{CC} =3.3V±0.3V	0.9		6.9	0.9		7.9	ns
			V _{CC} =5.0V±0.5V	0.8		4.2	0.8		5.2	ns
		C _L =30pF, R _L =1KΩ	V _{CC} =1.8V±0.15V	3		18.7	3		19.7	ns
			V _{CC} =2.5V±0.2V	1.6		10.2	1.6		11.2	ns
			V _{CC} =3.3V±0.3V	1.2		7.9	1.2		8.9	ns
			V _{CC} =5.0V±0.5V	1.1		4.5	1.1		5.5	ns

■ OPERATING CHARACTERISTICS (Unless otherwise specified)

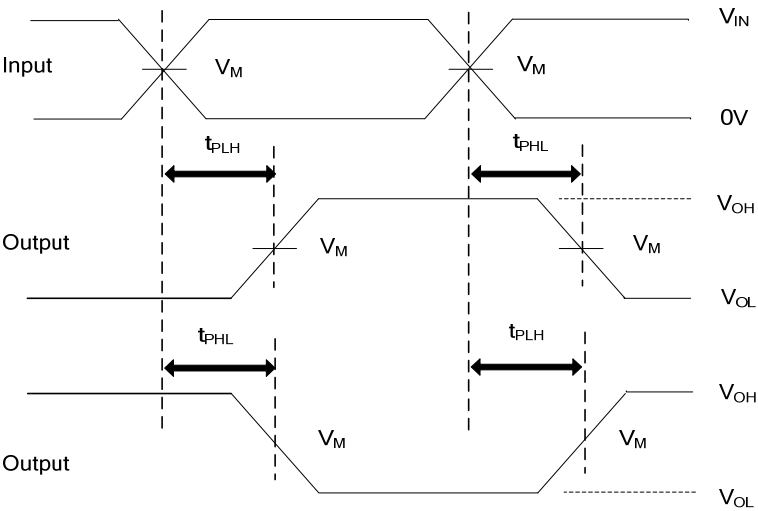
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C _I	V _{CC} = 3.3V, V _{IN} = V _{CC} or GND		4		pF
Power Dissipation Capacitance	C _{PD}	V _{CC} =3.3V, f=10MHz		36		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST	S1
t_{PLH} / t_{PHL}	OPEN
t_{PLZ} / t_{PZL}	V_{LOAD}
t_{PHZ} / t_{PZL}	GND

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L		R_L		V_{Δ}
	V_{IN}	t_R/t_F							
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	30pF	1M Ω	1k Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	30pF	1M Ω	500 Ω	0.15V
$3.3V \pm 0.3V$	3.0V	$\leq 2.5ns$	1.5V	6V	15pF	50pF	1M Ω	500 Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	50pF	1M Ω	500 Ω	0.3V



PROPAGATION DELAY TIMES

- Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR $\leq 10MHz$, $Z_O = 50\Omega$.

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