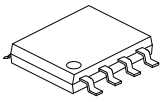
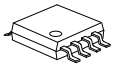
U74LVC1G139

CMOS IC

2-TO-4 LINE DECODER



SOP-8



MSOP-8

■ 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

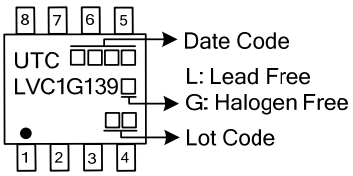
* Operate From 1.65V to 5.5V
* Inputs Accept Voltages to 5.5 V
* ±24mA output drive (V_{CC}=3.0V)
* Low power dissipation
* I_{off} Supports Partial-Power-Down Mode Operation

■ ORDERING INFORMATION

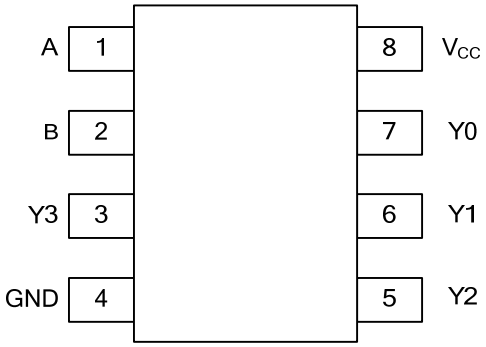
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC1G139L-S08-R	U74LVC1G139G-S08-R	SOP-8	Tape Reel
U74LVC1G139L-SM1-R	U74LVC1G139G-SM1-R	MSOP-8	Tape Reel

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

■ MARKING



■ PIN CONFIGURATION

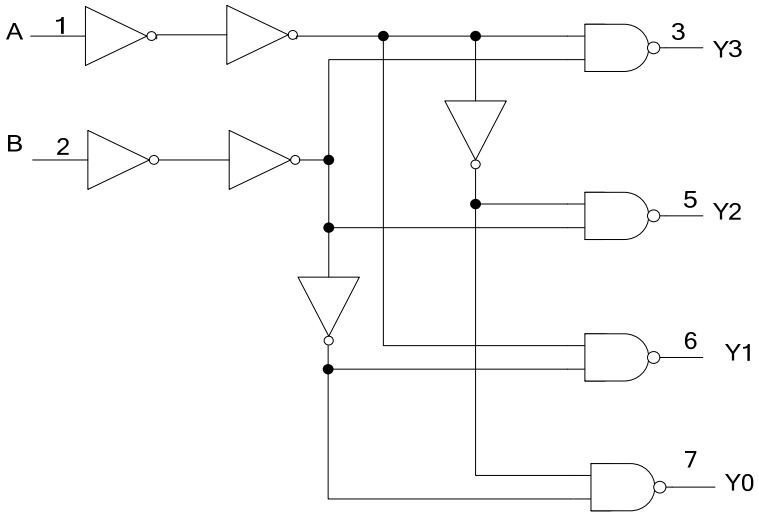


■ FUNCTION TABLE

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 ~ 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	Δt/Δv	V_{CC}=1.8V±0.15V, V_{CC}=2.5V±0.2V			20	ns/V
		V_{CC}=3.3V±0.3V			15	ns/V
		V_{CC}=5.0V±0.5V			10	ns/V
Operating Temperature	T_A		-40		+85	°C

■ ELECTRICAL CHARACTERISTICS (T_A =25°C , unless otherwise specified)

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

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0~5.5V, V_{IN}=V_{CC} or GND			±1	μA
Power OFF Leakage Current	I_{off}	V_{CC}=0V, V_{IN} or V_{OUT}=5.5V			±5	μA
Quiescent Supply Current	I_{CC}	V_{CC}=1.65~5.5V, V_{IN}=5.5V or GND, I_{OUT}=0A			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	μA
Input Capacitance	C_I	V_{CC}= 3.3V, V_{IN}= V_{CC} or GND		4		pF

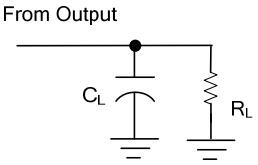
■ SWITCHING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

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=1MΩ	V_{CC}=1.8V±0.15V	2.7		15.3	ns
			V_{CC}=2.5V±0.2V	1.5		7.5	ns
			V_{CC}=3.3V±0.3V	0.9		4.9	ns
			V_{CC}=5.0V±0.5V	0.8		3.6	ns
		C_L=30pF, R_L=1KΩ	V_{CC}=1.8V±0.15V	3		16.7	ns
		C_L=30pF, R_L=500Ω	V_{CC}=2.5V±0.2V	1.6		8.2	ns
		C_L=50pF, R_L=500Ω	V_{CC}=3.3V±0.3V	1.2		5.9	ns
			V_{CC}=5.0V±0.5V	1.1		4.2	ns

■ OPERATING CHARACTERISTICS (T_A =25°C , unless otherwise specified)

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

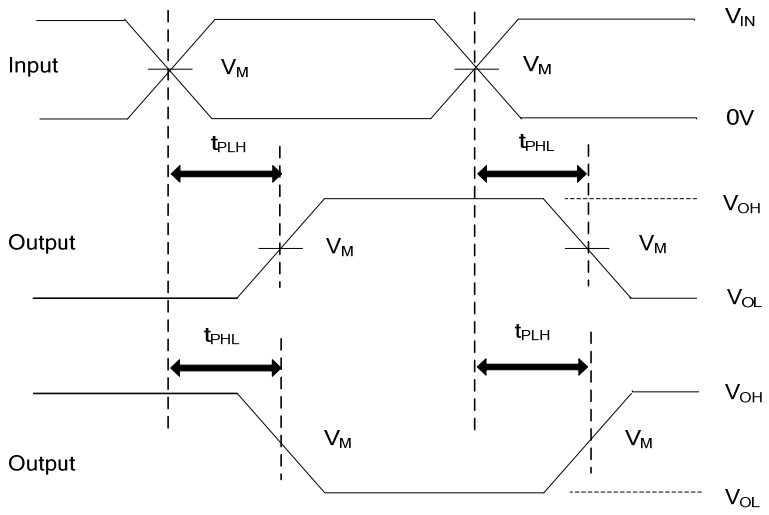
■ TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

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±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	30pF	1MΩ	1kΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	$2\times V_{CC}$	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_{CC}	≤2.5ns	$V_{CC}/2$	$2\times V_{CC}$	15pF	50pF	1MΩ	500Ω	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 ≤10MHz, Z_O = 50Ω.