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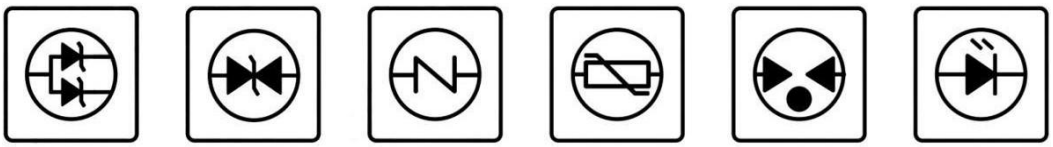
SEMICONDUCTOR



SN74LVC2G14DBVR(MS)

Product specification

SN74LVC2G14DBVR(MS)

DESCRIPTIONS

The SN74LVC2G14DBVR(MS) Dual Schmitt trigger inverter is designed for 1.65V to 5.5V V_{CC} operation.

The SN74LVC2G14DBVR(MS) device contains two inverter andperforms the Boolean function $Y=\overline{A}$. The devicefunctions as two independent inverters with Schmitt-trigger inputs,so the device has different inputthreshold levels for positive-going (V_{T+})and negativegoing (V_{T-})signals to provide hysteresis ($\triangle V_T$)whichmakes the device tolerant to slow or noisy inputsignals.

This device is fuly specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the through the device when it is powered down. backflow through the device when it is powered down.

The SN74LVC2G14DBVR(MS) is available in Green SOT23-6 packages.It operates over an ambient temperature range of-40℃ to +125°C.

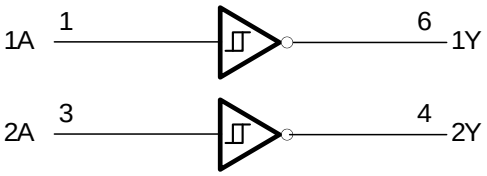
FEATURES

- Operating Voltage Range:1.65V to 5.5V
- Low Power Consumption:1μA (Max)
- Operating Temperature Range: -40°C to +125°C
- Input Accept Voltage to 5.5V
- High Output Drive: ±24mA at VCC=3.0V
- Ioff Supports Partial-Power-Down Mode Operation
- Micro SIZE PACKAGES: SOT23-6

APPLICATIONS

- AC Receiver and
- Home Theaters
- Blu-ray Players and Home Theaters
- Desktops or Notebook PCs
- Digital Video Cameras (DVC)
- Mobile Phones
- Personal Navigation Device (GPS)
- Portable Media Player

Functional Block Diagram



FUNCTION TABLE

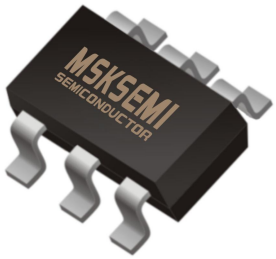
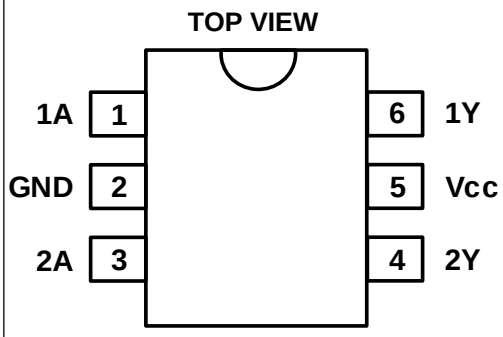
INPUT	OUTPUT
A	**Y**
H	L
L	H

$Y=\overline{A}$

H=High Voltage Level

L=Low Voltage Level

Pin Configuration and Functions

PACKAGE OUTLINE	PIN CONFIGURATIONS	MARKING
 SOT-23-6		

PIN DESCRIPTION

PIN	NAME	I/O TYPE (1)	FUNCTION
1	1A	I	Input 1
2	GND	P	Ground
3	2A	I	Input 2
4	2Y	O	Output 2
5	Vcc	P	Power Pin
6	1Y	O	Output 1

(1) I = Input, O = Output, P = Power

SPECIFICATIONS

Absolute Maximum Ratings (1)

over operating free-air temperature range (unless otherwise noted) (1) (2)

			MIN	MAX	UNIT
V_{CC}	Supply voltage range		-0.5	6.5	V
V_I	Input voltage range (2)		-0.5	6.5	V
Vo	Voltage range applied to any output in the high-impedance or power-off state (2)		-0.5	6.5	V
Vo	Voltage range applied to any output in the high or low state (2) (3)		-0.5	V_{CC}+0.5	V
I_{IK}	Input clamp current	V_I<0		-50	mA
I_{OK}	Output clamp current	V_O<0		-50	mA
I_O	Continuous output current			±50	mA
	Continuous current through V_{CC} or GND			±100	mA
T_J	Junction temperature (4)		-65	150	°C
T_{stg}	Storage temperature		-65	150	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The value of V_{CC} is provided in the *Recommended Operating Conditions table*.

(4) The maximum power dissipation is a function of $T_{J(MAX)}$, $R_{\theta JA}$, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{\theta JA}$. All numbers apply for packages soldered directly onto a PCB.

ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001(1)	±6000	V
		Charged device model (CDM), per ANSI/ESDA/JEDEC JS-002(2)	±1500	V
		Machine model (MM)	±200	V

(1) JEDEC document JEP155 states that 500 V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250 V CDM allows safe manufacturing with a standard ESD control process.

ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

Thermal Information:

THERMAL METRIC (1)		RS2G14 6PINS	UNIT
$R_{\Theta JA}$	Junction-to-ambient thermal resistance	273.8	°C/W
$R_{\Theta JC(top)}$	Junction-to-case(top) thermal resistance	126.8	°C/W
$R_{\Theta JB}$	Junction-to-board thermal resistance	85.9	°C/W
Ψ_{JT}	Junction-to-top characterization parameter	10.9	°C/W
Ψ_{JB}	Junction-to-board characterization parameter	84.9	°C/W
$R_{\Theta JC(bot)}$	Junction-to-case(bottom) thermal resistance	N/A	°C/W

(1) Thermal resistance varies with operating conditions.

ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range (Full [4] = -40°C to +125°C, typical values are at T_A = +25°C, unless otherwise noted.) [1]

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
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		0	V_{CC}	V
Operating temperature	T_A		-40	+125	°C

DC Characteristics

PARAMETER		TEST CONDITIONS	V_{CC}	TEMP	MIN [2]	TYP [3]	MAX [2]	UNIT
V_{T+}	Positive going input threshold voltage		1.65V	Full	0.75		1.05	V
			2.3V		1.25		1.55	
			3V		1.5		2.1	
			4.5V		2.3		3.0	
			5.5V		2.8		3.4	
V_{T-}	Negative going input threshold voltage		1.65V	Full	0.3		0.6	V
			2.3V		0.35		0.650.	
			3V		0.45		75	
			4.5V		0.7		1.0	
			5.5V		0.85		1.15	
ΔV_T	Hysteresis (V_{T+}-V_{T-})		1.65V	Full	0.35		0.6	V
			2.3V		0.6		1.2	
			3V		1.05		1.65	
			4.5V		1.6		2.0	
			5.5V		1.95		2.25	
V_{OH}		I_{OH} = -100μA	1.65V to 5.5V	Full	V_{CC}-0.1			V
		I_{OH} = -4mA	1.65V		1.2			
		I_{OH} = -8mA	2.3V		1.9			
		I_{OH} = -16mA	3V		2.4			
		I_{OH} =- 24mA			2.3			
		I_{OH} = -32mA	4.5V		3.8			
V_{OL}		I_{OL} = 100μA	1.65V to 5.5V	Full			0.1	V
		I_{OL} = 4mA	1.65V				0.45	
		I_{OL} = 8mA	2.3V				0.3	
		I_{OL} = 16mA	3V				0.4	
		I_{OL} = 24mA					0.55	
		I_{OL} = 32mA	4.5V				0.55	
I_I	A input	V_I=5.5V or GND	0V to 5.5V	+25°C		±0.1	±1	μA
				Full			±5	
I_{off}		V_I or V_O=5.5V	0	+25°C		±0.1	±1	μA
				Full			±10	
I_{CC}		V_I=5.5V or GND, I_O=0	1.65V to 5.5V	+25°C		0.1	1	μA

			Full			10	
ΔI_{CC}	One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND	3V to 5.5V	Full			500	μA

AC Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS		TEMP	MIN (2)	TYP (3)	MAX (2)	UNIT
Propagation Delay	t_{pd}	V_{CC}=1.8V±0.15V	C_L=30pF, R_L=500Ω	Full		7.5		ns
		V_{CC}=2.5V±0.2V	C_L=30pF, R_L=500Ω	Full		3.6		
		V_{CC}=3.3V±0.3V	C_L=50pF, R_L=500Ω	Full		3.1		
		V_{CC}=5V±0.5V	C_L=50pF, R_L=500Ω	Full		2.7		
Input Capacitance	C_i	V_{CC}=3.3V	V_I=V_{CC} or GND	+25°C		4		pF
Power dissipation capacitance	C_{pd}	V_{CC}=1.8V	f=10MHz	+25°C		20		pF
		V_{CC}=2.5V				21		
		V_{CC}=3.3V				22		
		V_{CC}=5V				25		

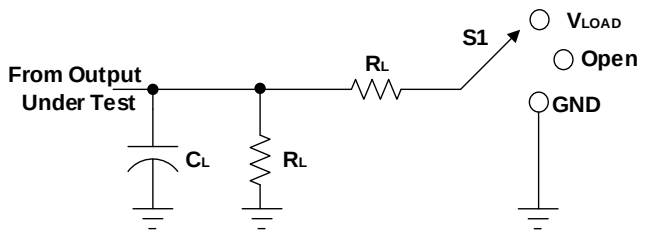
(1) All unused inputs of the device must be held at VCC or GND to ensure proper device operation.

(2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.

(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

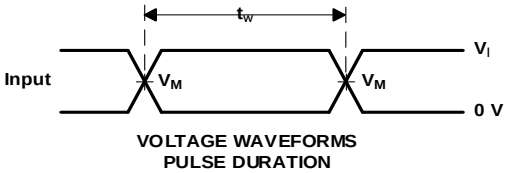
(4) Specified by characterization only.

Parameter Measurement Information

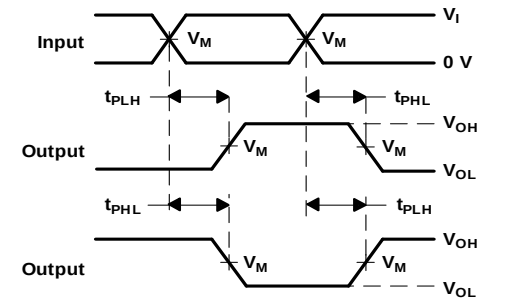


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PIZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

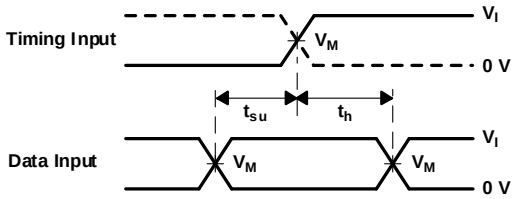
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_I	t_r/t_f					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	30pF	1kΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	30pF	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	2 x V_{CC}	50pF	500Ω	0.3V



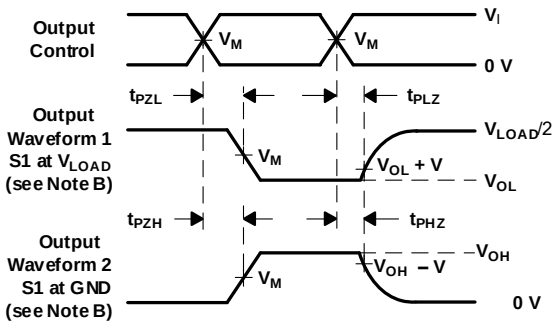
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS PROPAGATION DELAY
TIMES INVERTION AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES

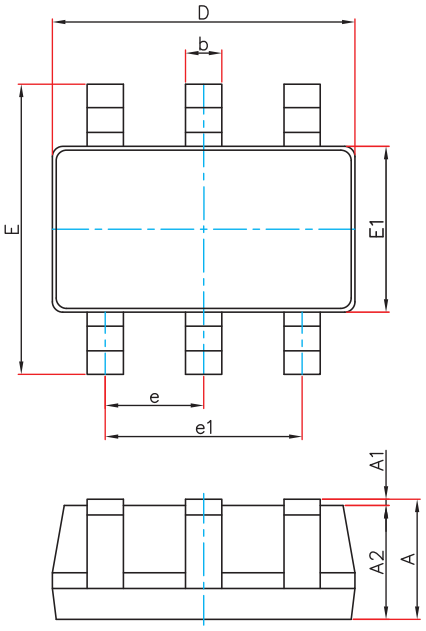


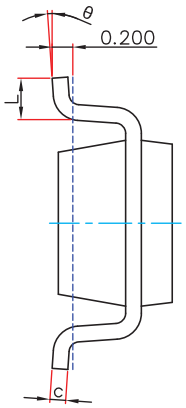
VOLTAGE WAVEFORMS ENABLE AND DISABLE
TIMES LOW-AND HIGH-LEVEL ENABLING

NOTES: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω.
D. The outputs are measured one at a time, with one transition per measurement.
E. t_{PLZ} and t_{PHZ} are the same as t_{dis}.
F. t_{PZL} and t_{PZH} are the same as t_{en}.
G. t_{PLH} and t_{PHL} are the same as t_{pd}
H. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

SOT-23-6 Package Outline Dimensions

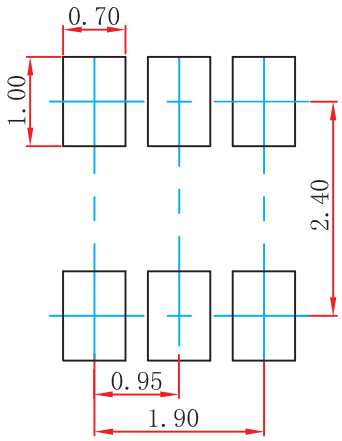




Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

M 2012 P A

SOT-23-6 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

REEL SPECIFICATION

P/N	PKG	QTY
SN74LVC2G14DXXR(MS)	SOT-23-6	3000

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