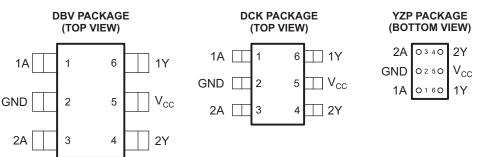


FEATURES

- Available in the Texas Instruments NanoFree[™] Package
- Supports 5-V V_{CC} Operation
- Max t_{pd} of 3.4 ns at 3.3 V
- Low Power Consumption, 10-µA Max Icc •
- ±24-mA Output Drive at 3.3 V
- Typical V_{OLP} (Output Ground Bounce) <0.8 V . at V_{CC} = 3.3 V, T_A = 25°C
- Typical V_{OHV} (Output V_{OH} Undershoot) >2 V at V_{CC} = 3.3 V, T_A = 25°C

- Inputs and Open-Drain Outputs Accept Voltages up to 5.5 V
- I_{off} Supports Partial-Power-Down Mode Operation
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)



See mechanical drawings for dimensions.

DESCRIPTION/ORDERING INFORMATION

This dual inverter buffer/driver is designed for 1.65-V to 5.5-V V_{CC} operation.

The output of the SN74LVC2G06 device is open drain and can be connected to other open-drain outputs to implement active-low wired-OR or active-high wired-AND functions. The maximum sink current is 32 mA.

This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

NanoFree™ package technology is a major breakthrough in IC packaging concepts, using the die as the package.

ORDERING INFORMATION

T _A	PACKAGE ⁽¹⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING ⁽²⁾
-40°C to 85°C	NanoFree™ – WCSP (DSBGA) 0.23-mm Large Bump – YZP (Pb-free)	Reel of 3000	SN74LVC2G06YZPR	CT_
	SOT (SOT-23) – DBV	Reel of 3000	SN74LVC2G06DBVR	C06_
	SOT (SC-70) – DCK	Reel of 3000	SN74LVC2G06DCKR	CT_

(1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

(2)DBV/DCK: The actual top-side marking has one additional character that designates the assembly/test site. YZP: The actual top-side marking has three preceding characters to denote year, month, and sequence code, and one following character to designate the assembly/test site. Pin 1 identifier indicates solder-bump composition (1 = SnPb, • = Pb-free).



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet. NanoFree is a trademark of Texas Instruments.

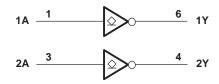
SN74LVC2G06 **DUAL INVERTER BUFFER/DRIVER** WITH OPEN-DRAIN OUTPUTS

SCES307G-AUGUST 2001-REVISED JANUARY 2007

FUNCTION TABLE (EACH INVERTER)

INPUT A	OUTPUT Y
Н	L
L	Н

LOGIC DIAGRAM (POSITIVE LOGIC)



Absolute Maximum Ratings⁽¹⁾

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

			MIN	MAX	UNIT		
V_{CC}	Supply voltage range		-0.5	6.5	V		
VI	Input voltage range ⁽²⁾		-0.5	6.5	V		
Vo	Voltage range applied to any output in the	e high-impedance or power-off state ⁽²⁾	-0.5	6.5	V		
Vo	Voltage range applied to any output in the	e high or low state ⁽²⁾⁽³⁾	-0.5	6.5	V		
I _{IK}	Input clamp current	V ₁ < 0		-50	mA		
I _{OK}	Output clamp current	V _O < 0		-50	mA		
lo	Continuous output current			±50	mA		
	Continuous current through $V_{CC} \mbox{ or } GND$			±100	mA		
		DBV package		165			
θ_{JA}	Package thermal impedance ⁽⁴⁾	DCK package		259	°C/W		
		YZP package		123	123		
T _{stg}	Storage temperature range		-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 negative-voltage and output 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 package thermal impedance is calculated in accordance with JESD 51-7.

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Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT			
V	Supply voltage	Operating	1.65	5.5	V			
V _{CC}	Supply voltage	Data retention only			v			
		V _{CC} = 1.65 V to 1.95 V	$0.65 imes V_{CC}$					
\ <i>\</i>	Link level in not velte ne	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7		V			
VIH	High-level input voltage	$V_{CC} = 3 V \text{ to } 3.6 V$	2		V			
		V_{CC} = 4.5 V to 5.5 V	$0.7 imes V_{CC}$					
		V _{CC} = 1.65 V to 1.95 V		$0.35 \times V_{CC}$				
V _{IL}		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		0.7	V			
	Low-level input voltage	$V_{CC} = 3 V \text{ to } 3.6 V$		0.8	v			
		$V_{CC} = 4.5 \text{ V} \text{ to } 5.5 \text{ V}$		$0.3 imes V_{CC}$				
VI	Input voltage		0	5.5	V			
Vo	Output voltage		0	5.5	V			
		V _{CC} = 1.65 V		4				
		$V_{CC} = 2.3 V$		8				
I _{OL}	Low-level output current	N 2 N		16	mA			
		$V_{CC} = 3 V$		24				
		V _{CC} = 4.5 V		32				
Δt/Δv		V_{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V		20				
	Input transition rise or fall rate	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		10	ns/V			
		$V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$		5				
T _A	Operating free-air temperature		-40	85	°C			

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.

Electrical Characteristics

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

PAR	AMETER	TEST CONDITIONS	V _{cc}	MIN TYP ⁽¹⁾ MAX	UNIT	
		I _{OL} = 100 μA	1.65 V to 5.5 V	0.1		
		I _{OL} = 4 mA	1.65 V	0.45	0.45	
M		I _{OL} = 8 mA	2.3 V	0.3	V	
V _{OL}		I _{OL} = 16 mA			V	
I _{OL}		I _{OL} = 24 mA	3 V	0.55		
		I _{OL} = 32 mA	4.5 V	0.55		
lj –	A inputs	V _I = 5.5 V or GND	0 to 5.5 V	±5	μA	
I _{off}		V_{I} or V_{O} = 5.5 V	0	±10	μA	
I _{CC}		$V_{I} = 5.5 \text{ V or GND}, \qquad I_{O} = 0$	1.65 V to 5.5 V	10	μA	
ΔI_{CC}		One input at $V_{CC} - 0.6 V$, Other inputs at V_{CC} or G	GND 3 V to 5.5 V	500	μA	
Ci		$V_{I} = V_{CC} \text{ or } GND$	3.3 V	3.5	pF	

(1) All typical values are at V_{CC} = 3.3 V, T_A = 25° C.

SN74LVC2G06 DUAL INVERTER BUFFER/DRIVER WITH OPEN-DRAIN OUTPUTS

SCES307G-AUGUST 2001-REVISED JANUARY 2007

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Switching Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 1.8 V ± 0.15 V		V_{CC} = 2.5 V \pm 0.2 V		V _{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A	Y	1.8	7.2	1	3.9	1	3.4	1	2.9	ns

Operating Characteristics

 $T_A = 25^{\circ}C$

PARAMETER	TEST CONDITIONS	V _{CC} = 1.8 V	$V_{CC} = 2.5 V$	$V_{CC} = 3.3 V$	$V_{CC} = 5 V$	UNIT	
		TYP	TYP	TYP	TYP	UNIT	
C _{pd} Power dissipation capac	tance f = 10 MHz	2	2	3	4	pF	

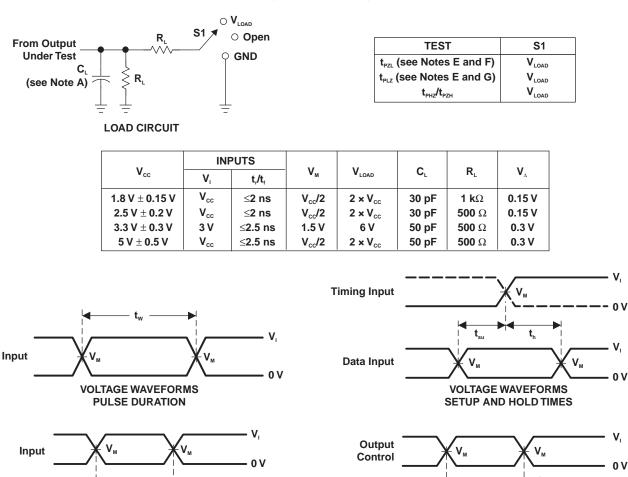
Output

Output

SN74LVC2G06 **DUAL INVERTER BUFFER/DRIVER** WITH OPEN-DRAIN OUTPUTS

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PARAMETER MEASUREMENT INFORMATION (OPEN DRAIN)





VOLTAGE WAVEFORMS

PROPAGATION DELAY TIMES

INVERTING AND NONINVERTING OUTPUTS

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.

t_{PZL}

Output

Output Waveform 2

S1 at GND

(see Note B)

Waveform 1

S1 at VLOAD (see Note B)

- C. All input pulses are supplied by generators have the following characteristics: PRR \leq 10 MHz, Z_o = 50 Ω .
- D. The outputs are measured one at a time, with one transition per measurement.
- E. Because this device has open-drain outputs, t_{PIZ} and t_{PZI} are the same as t_{PDI} .

٧.,

 \mathbf{V}_{ol}

- F. t_{PZL} is measured at V_M.
- G. t_{PLZ} is measured at $V_{OL} + V_{\Delta}$.
- H. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

0 V

V, 04D/2

≈0 V

t_{PLZ}

VOLTAGE WAVEFORMS

ENABLE AND DISABLE TIMES

LOW- AND HIGH-LEVEL ENABLING

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN74LVC2G06DBVR	ACTIVE	SOT-23	DBV	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC2G06DBVRE4	ACTIVE	SOT-23	DBV	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC2G06DBVRG4	ACTIVE	SOT-23	DBV	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC2G06DCKR	ACTIVE	SC70	DCK	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC2G06DCKRE4	ACTIVE	SC70	DCK	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC2G06DCKRG4	ACTIVE	SC70	DCK	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LVC2G06YZPR	ACTIVE	DSBGA	YZP	6	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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OTHER QUALIFIED VERSIONS OF SN74LVC2G06 :

- Automotive: SN74LVC2G06-Q1
- Enhanced Product: SN74LVC2G06-EP

NOTE: Qualified Version Definitions:

• Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects





5-Dec-2008

• Enhanced Product - Supports Defense, Aerospace and Medical Applications

PACKAGE MATERIALS INFORMATION

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TAPE AND REEL INFORMATION

REEL DIMENSIONS

Texas Instruments





TAPE AND REEL INFORMATION

TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

*All dimensions are nominal												
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC2G06DBVR	SOT-23	DBV	6	3000	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3
SN74LVC2G06DCKR	SC70	DCK	6	3000	178.0	9.2	2.4	2.4	1.22	4.0	8.0	Q3
SN74LVC2G06YZPR	DSBGA	YZP	6	3000	180.0	8.4	1.02	1.52	0.63	4.0	8.0	Q1

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PACKAGE MATERIALS INFORMATION

14-Mar-2012



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC2G06DBVR	SOT-23	DBV	6	3000	180.0	180.0	18.0
SN74LVC2G06DCKR	SC70	DCK	6	3000	180.0	180.0	18.0
SN74LVC2G06YZPR	DSBGA	YZP	6	3000	220.0	220.0	34.0

DBV (R-PDSO-G6)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
- D. Leads 1,2,3 may be wider than leads 4,5,6 for package orientation.
- È. Falls within JEDEC MO-178 Variation AB, except minimum lead width.



LAND PATTERN DATA



NOTES:

- A. All linear dimensions are in millimeters.B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



DCK (R-PDSO-G6)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES: A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
 - D. Falls within JEDEC MO-203 variation AB.



LAND PATTERN DATA



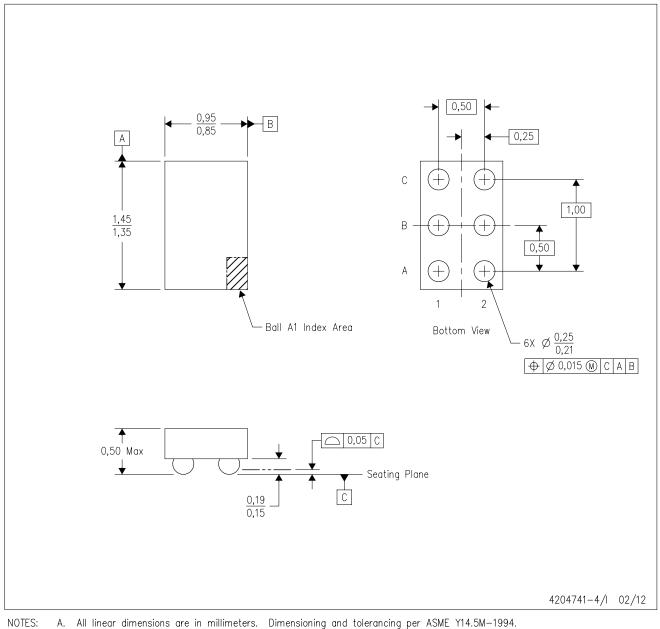
NOTES:

- A. All linear dimensions are in millimeters.B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



YZP (R-XBGA-N6)

DIE-SIZE BALL GRID ARRAY



B. This drawing is subject to change without notice.

- C. NanoFree™ package configuration.
- D. This package is a Pb-free solder ball design. Refer to the 6 YEP package (drawing 4204725) for tin-lead (SnPb).

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