

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance crystal oscillator driver microcircuit, with an operating temperature range of -55°C to +125°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

<u>V62/07632</u> Drawing number	-	<u>01</u> Device type (See 1.2.1)	<u>X</u> Case outline (See 1.2.2)	<u>E</u> Lead finish (See 1.2.3)
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1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	SN74LVC1GX04-EP	Crystal oscillator driver

1.2.2 Case outline(s). The case outlines are as specified herein.

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	8	N/A	Plastic small outline

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

<u>Finish designator</u>	<u>Material</u>
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
Z	Other

1.3 Absolute maximum ratings. ^{1/}

Supply voltage range (V_{CC})	-0.5 V to 6.5 V
Input voltage range (V_I)	-0.5 V to 6.5 V ^{2/}
Voltage range applied to Y output in the high impedance or power off state (V_O)	-0.5 V to 6.5 V ^{2/}
Voltage range applied to any output in the high or low state (V_O)	-0.5 V to $V_{CC} + 0.5 V$ ^{2/ 3/}
Maximum input clamp current (I_{IK}) ($V_I < 0$)	-50 mA
Maximum output clamp current (I_{OK}) ($V_O < 0$)	-50 mA
Maximum continuous output current (I_O)	±50 mA
Maximum continuous current through V_{CC} or GND	±100 mA
Maximum package thermal impedance (θ_{JA})	142°C/W ^{4/}
Storage temperature range (T_{STG})	-65°C to 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/} This value of V_{CC} is provided in the recommended operating conditions stable.

^{4/} The package thermal impedance is calculated in accordance with JESD 51-7.

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1.4 Recommended operating conditions. 5/

Supply voltage range (V_{CC}):	
Operating	1.65 V to 5.5 V
Minimum data retention only	1.5 V
Minimum crystal oscillator use	2.0 V
Minimum high level input voltage, ($V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$)	$0.75 \times V_{CC}$
Maximum high level input voltage, ($V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$)	$0.25 \times V_{CC}$
Input voltage (V_i)	0 V to 5.5 V
Output voltage (V_o):	
X2, Y	0 to V_{CC}
Y output only, Power down mode, $V_{CC} = 0 \text{ V}$	0 to 5.5 V
Maximum high level output current (I_{OH}):	
$V_{CC} = 1.65 \text{ V}$	-4 mA
$V_{CC} = 2.3 \text{ V}$	-8 mA
$V_{CC} = 3 \text{ V}$	-16 mA
$V_{CC} = 3 \text{ V}$	-24 mA
$V_{CC} = 4.5 \text{ V}$	-32 mA
Maximum low level output current (I_{OL}):	
$V_{CC} = 1.65 \text{ V}$	4 mA
$V_{CC} = 2.3 \text{ V}$	8 mA
$V_{CC} = 3 \text{ V}$	16 mA
$V_{CC} = 3 \text{ V}$	24 mA
$V_{CC} = 4.5 \text{ V}$	32 mA
Maximum input transition rise or fall rate ($\Delta t/\Delta v$) :	
$V_{CC} = 1.8 \text{ V} \pm 0.15 \text{ V}, 2.5 \text{ V} \pm 0.2 \text{ V}$	20 ns/V
$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$	10 ns/V
$V_{CC} = 5.0 \text{ V} \pm 0.5 \text{ V}$	10 ns/V
Operating free-air temperature range (T_A)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Applications for copies should be addressed to the Electronic Industry Alliance, 2500 Wilson Boulevard, Arlington, VA 22201-3834 or at <http://www.jedec.org>)

5/ All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

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3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

- A. Manufacturer's name, CAGE code, or logo
- B. Pin 1 identifier
- C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

3.5.3 Function table. The Function table shall be as shown in figure 3.

3.5.4 Logic diagram. The logic diagram shall be as shown in figure 4.

3.5.5 Load circuit and timing waveforms. The load circuit and timing waveforms shall be as shown in figure 5.

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TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions -55°C ≤ T _A ≤ 125°C unless otherwise specified	V _{CC}	Limits		Unit	
				Min	Max		
High level output voltage	V _{OH}	I _{OH} = -100 μA	1.65 V to 5.5 V	V _{CC} - 0.1		V	
		I _{OH} = -4 mA	1.65V	1.2			
		I _{OH} = -8 mA	2.3 V	1.9			
		I _{OH} = -16 mA	3.0 V	2.4			
		I _{OH} = -24 mA		2.3			
		I _{OH} = -32 mA	4.5 V	3.8			
Low level output voltage	V _{OL}	I _{OL} = 100 μA	1.65 V to 5.5 V		0.1	V	
		I _{OL} = 4 mA	1.65V		0.45		
		I _{OL} = 8 mA	2.3 V		0.3		
		I _{OL} = 16 mA	3.0 V		0.4		
		I _{OL} = 24 mA			0.63		
		I _{OL} = 32 mA	4.5 V		0.70		
Input current	X1	I _I	V _I = 5.5 V or GND	0 to 5.5 V		±5	μA
Off current	X1, Y	I _{off}	V _I or V _O = 5.5 V	0		±10	μA
Supply current		I _{CC}	V _I = 5.5 V or GND, I _O = 0,	1.65 V to 5.5V		10	μA
Input capacitance		C _i	V _I = V _{CC} or GND, T _A = 25°C	3.3 V	5 Typ		pF

Test	Symbol	Conditions -55°C ≤ T _A ≤ 125°C unless otherwise specified	V _{CC} = 3.3 V ±0.3 V		V _{CC} = 5.0 V ±0.5 V		Unit
			Min	Max	Min	Max	

Switching characteristics

Test	Symbol	Conditions	V _{CC} = 3.3 V ±0.3 V		V _{CC} = 5.0 V ±0.5 V		Unit
Propagation delay time, from input X1 to output X2	t _{pd}	C _L = 30 pF or 50 pF See figure 5	0.8	3.7	0.8	3.2	ns
Propagation delay time, from input X1 to output Y 2/			2	7.8	2	5	

Test	Symbol	Conditions -55°C ≤ T _A ≤ 125°C unless otherwise specified	V _{CC} = 3.3 V		V _{CC} = 5.0 V		Unit
			Min	Max	Min	Max	

Operating characteristics

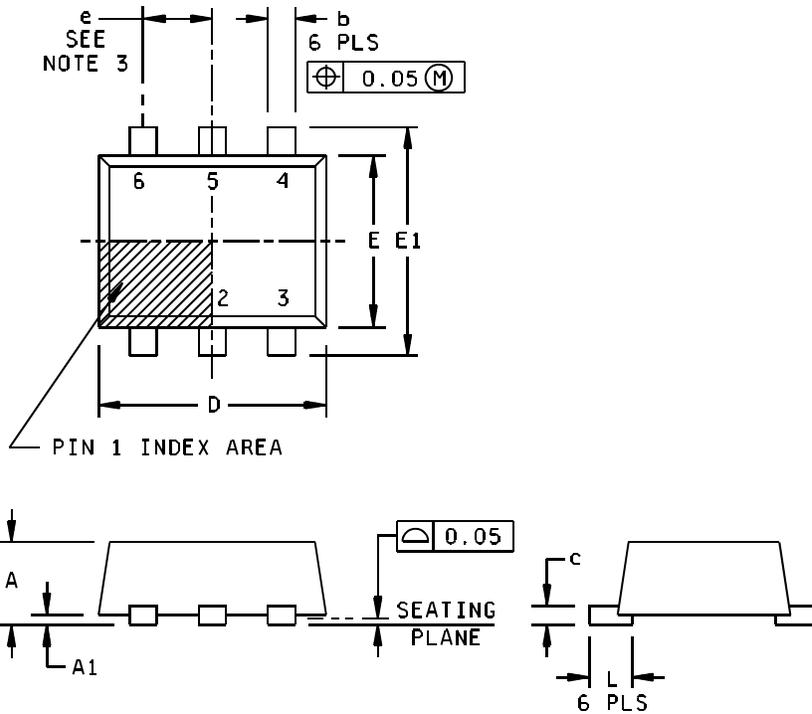
Test	Symbol	Conditions	V _{CC} = 3.3 V	V _{CC} = 5.0 V	Unit
Power dissipation capacitance	C _{pd}	f = 10 MHz, T _A = 25°C	24 Typ	35 Typ	pF

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/ X2 – no external load.

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Case X



Dimension					
Symbol	Millimeters		Symbol	Millimeters	
	Min	Max		Min	Max
A	0.50	0.60	E	1.10	1.30
A1	0.00	0.05	E1	1.50	1.70
b	0.15	0.25	e	0.50 BSC	
c	0.08	0.18	L	0.20	0.40
D	1.50	1.70			

NOTES:

1. This drawing is subject to change without notice.
2. Body dimensions do not include mold flash, interlead flash, protrusions or gate burrs. Mold flash, interlead flash, protrusions, or gate burrs shall not exceed 0.15 per end or side.
3. JEDEC package is pending.

FIGURE 1. Case outline.

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Case X

Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	NC	4	X2
2	GND	5	V _{CC}
3	X1	6	Y

NC = Not connection

FIGURE 2. Terminal connections.

Input X1	Outputs	
	X2	Y
H	L	H
L	H	L

FIGURE 3. Function table.

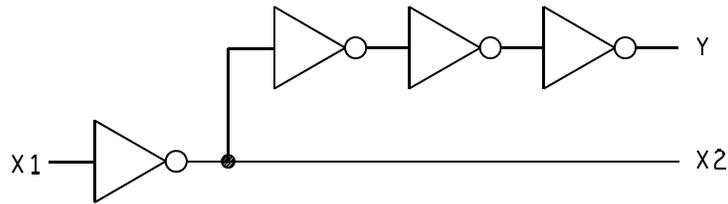
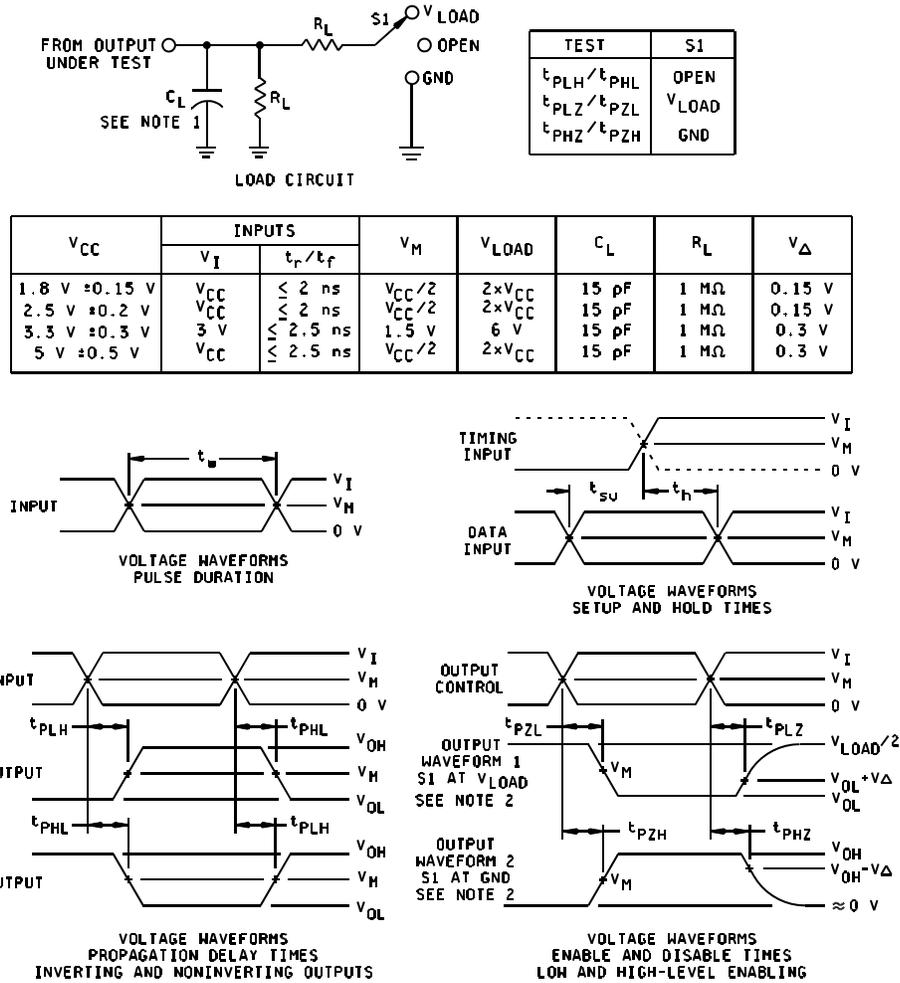


FIGURE 4. Logic diagram.

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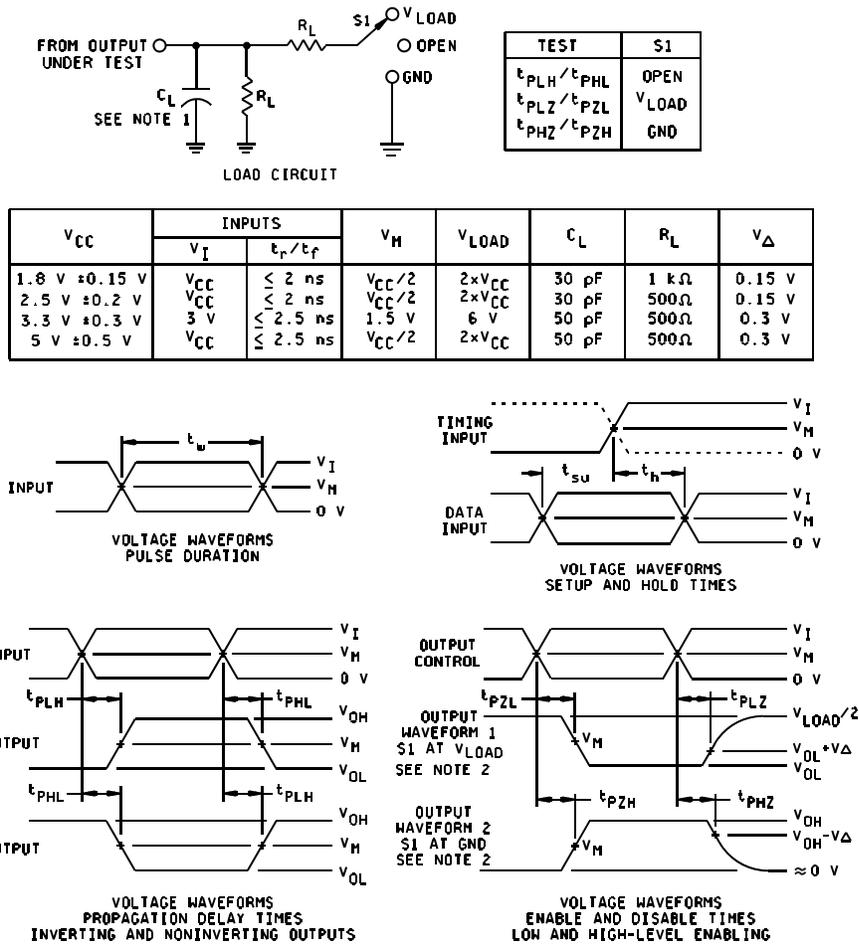


NOTES:

1. C_L includes probe and jig capacitance.
2. 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.
3. All input pulses are supplied by generators having the following characteristics: PRR \leq 10 MHz, $Z_0 = 50 \Omega$.
4. The outputs are measured one at a time with one input transition per measurement.
5. t_{PLZ} and t_{PHZ} are the same as t_{dis} .
6. t_{PZL} and t_{PZH} are the same as t_{en} .
7. t_{PHL} and t_{PLH} are the same as t_{pd} .
8. All parameters and waveforms are not applicable to all devices.

FIGURE 5. Load circuit and timing waveforms.

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NOTES:

- C_L includes probe and jig capacitance.
- 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.
- All input pulses are supplied by generators having the following characteristics: $PRR \leq 10$ MHz, $Z_o = 50 \Omega$.
- The outputs are measured one at a time with one input transition per measurement.
- t_{PLZ} and t_{PHZ} are the same as t_{dis} .
- t_{PZL} and t_{PZH} are the same as t_{en} .
- t_{PHL} and t_{PLH} are the same as t_{pd} .
- All parameters and waveforms are not applicable to all devices.

FIGURE 5. Load circuit and timing waveforms - Continued.

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4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at <http://www.landandmaritime.dla.mil/Programs/Smcr/>.

Vendor item drawing administrative control number <u>1/</u>	Device manufacturer CAGE code	Vendor part number	Top side marking
V62/07632-01XE	01295	CLVC1GX04MDRLREP	CDD

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

CAGE code

01295

Source of supply

Texas Instruments, Inc.
 Semiconductor Group
 8505 Forest lane
 P.O. Box 660199
 Dallas, TX 75243
 Point of contact: U.S. Highway 75 South
 P.O. Box 84, M/S 853
 Sherman, TX 75090-9493

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