

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance quad differential line receiver 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>V62/07648</u>	-	<u>01</u>	<u>X</u>	<u>E</u>
Drawing number		Device type (See 1.2.1)	Case outline (See 1.2.2)	Lead finish (See 1.2.3)

1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	26C32-EP	Quad differential line receiver

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

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	16	MS-012-AC	Plastic surface mount

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

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 2

1.3 Absolute maximum ratings. 1/

Supply voltage (V_{CC})	+7 V maximum 2/
Input voltage range (V_I):	
A or B inputs	-11 V to 14 V
G or \bar{G} inputs	-0.5 V to $V_{CC} + 0.5$ V
Differential input voltage range (V_{ID})	-14 V to 14 V
Output voltage range (V_O)	-0.5 V to $V_{CC} + 0.5$ V
Output current (I_O)	± 25 mA
Package thermal impedance (θ_{JA})	73°C/W 3/ 4/
Operating virtual junction temperature range (T_J)	+150°C
Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds	+260°C
Storage temperature range	-65°C to +150°C

1.4 Recommended operating conditions. 5/

Supply voltage range (V_{CC})	4.5 V to 5.5 V
High level input voltage (V_{IH})	2 V minimum
Low level input voltage (V_{IL})	0.8 V maximum
Common mode input voltage (V_{IC})	± 7 V maximum
High level output current (I_{OH})	-6 mA maximum
Low level output current (I_{OL})	+6 mA maximum
Operating free-air temperature range (T_A)	-55°C to +125°C

- 1/ Stresses beyond those listed under “absolute maximum rating” 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/ All voltage values, except differential output voltage (V_{OD}) are with respect to network GND. Currents into the device are positive and current out of the device are negative.
- 3/ Maximum power dissipation is a function of T_J (max), θ_{JA} , and T_A . The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(\text{max}) - T_A) / \theta_{JA}$. Operating at the absolute maximum T_J at +150°C can affect reliability.
- 4/ The package thermal impedance is calculated in accordance with JESD 51-7.
- 5/ Use of this product beyond the manufacturers design rules or stated parameters is done at the user’s risk. The manufacturer and/or distributor maintain no responsibility or liability for product used beyond the stated limits.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 3

2. APPLICABLE DOCUMENTS

JEDEC – SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

- JEP95 – Registered and Standard Outlines for Semiconductor Devices
- JESD51-7 – High Effective Thermal Conductivity Test Board for Leaded Surface Mount Packages

(Copies of these documents are available online at <http://www.jedec.org> or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240–S, Arlington, VA 22201-2107).

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 Truth table. The truth 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 Timing waveforms and test circuits. The timing waveforms and test circuits shall be as shown in figures 5 and 6.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 4

TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions <u>2/</u>	Temperature, T _A	Device type	Limits		Unit
					Min	Max	
Differential input high threshold voltage	V _{IT+}	V _{IC} = -7 V to +7 V, V _O = V _{OH} (min), I _{OH} = -440 μA	-55°C to +125°C	01		0.2	V
		V _{IC} = 0 V to +5.5 V, V _O = V _{OH} (min), I _{OH} = -440 μA				0.1	
Differential input low threshold voltage	V _{IT-}	V _{IC} = -7 V to +7 V, V _O = 0.45 V, I _{OL} = 8 mA	-55°C to +125°C	01	-0.2 <u>3/</u>		V
		V _{IC} = 0 V to +5.5 V, V _O = 0.45 V, I _{OL} = 8 mA			-0.1 <u>3/</u>		
Hysteresis voltage (V _{IT+} - V _{IT-})	V _{hys}	V _{CC} = 5 V, V _{IC} = 0 V	+25°C	01	60	typical	mV
Enable input clamp voltage	V _{IK}	V _{CC} = 4.5 V, I _I = -18 mA	-55°C to +125°C	01		-1.5	V
High level output voltage	V _{OH}	V _{ID} = 200 mV, I _{OH} = -6 mA	-55°C to +125°C	01	3.8		V
Low level output voltage	V _{OL}	V _{ID} = -200 mV, I _{OL} = 6 mA	-55°C to +125°C	01		0.3	V
Offset state (high impedance state) output current	I _{OZ}	V _O = V _{CC} or GND	-55°C to +125°C	01		±5	μA
Line input current	I _I	V _I = 10 V, other input at 0 V	-55°C to +125°C	01		1.5	mA
		V _I = -10 V, other input at 0 V				-2.5	
High level enable current	I _{IH}	V _I = 2.7 V	-55°C to +125°C	01		20	μA
Low level enable current	I _{IL}	V _I = 0.4 V	-55°C to +125°C	01		-100	μA
Input resistance	r _i	One input to ground	-55°C to +125°C	01	12		kΩ
Supply current	I _{CC}	V _{CC} = 5.5 V	-55°C to +125°C	01		15	mA

See footnotes at end of table.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 5

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>2/</u>	Temperature, T _A	Device type	Limits		Unit
					Min	Max	
Switching characteristics section. Unless otherwise specified, C _L = 50 pF.							
Propagation delay time, low to high level output	t _{PLH}	See figure 5	-55°C to +125°C	01	9	27	ns
Propagation delay time, high to low level output	t _{PHL}	See figure 5	-55°C to +125°C	01	9	27	ns
Output transition time, low to high output	t _{TLH}	See figure 5	-55°C to +125°C	01		10	ns
Output transition time, high to low output	t _{THL}	See figure 5	-55°C to +125°C	01		9	ns
Output enable time to high level	t _{PZH}	See figure 6	-55°C to +125°C	01		22	ns
Output enable time to low level	t _{PZL}	See figure 6	-55°C to +125°C	01		22	ns
Output disable time from high level	t _{PHZ}	See figure 6	-55°C to +125°C	01		26	ns
Output disable time from low level	t _{PLZ}	See figure 6	-55°C to +125°C	01		25	ns

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/ Unless otherwise specified, V_{CC} = 4.5 V to 5.5 V and V_{IC} = ±7 V.

3/ The algebraic convention, in which the less positive (more negative) limit is designated minimum, is used in this data sheet for common mode input voltage.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 6

Case X

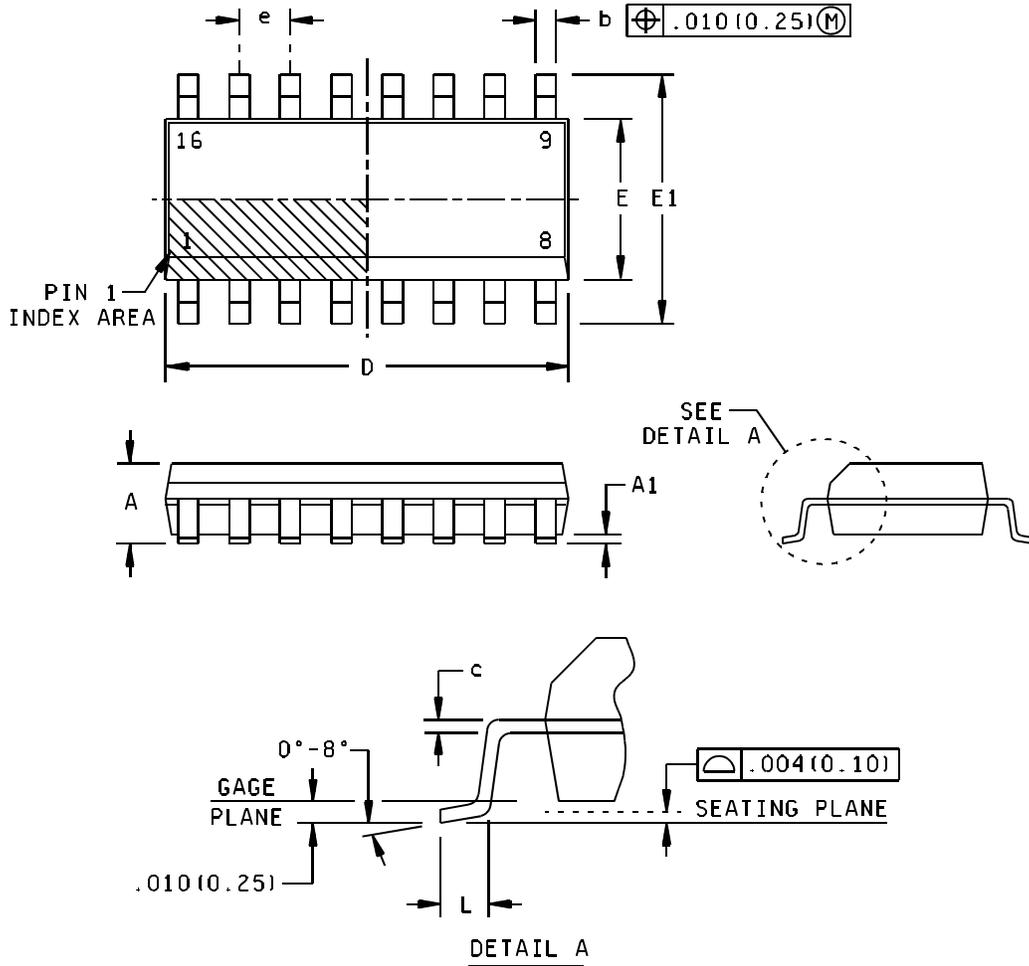


FIGURE 1. Case outlines.

<p>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 16236</p>	<p>DWG NO. V62/07648</p>
		<p>REV A</p>	<p>PAGE 7</p>

Case X

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	---	0.069	---	1.75
A1	0.004	0.010	0.10	0.25
b	0.012	0.020	0.31	0.51
c	0.007	0.010	0.17	0.25
D	0.386	0.394	9.80	10.00
E	0.150	0.157	3.80	4.00
E1	0.228	0.244	5.80	6.20
e	0.050 BSC		1.27 BSC	
L	0.016	0.050	0.40	1.27

NOTES:

1. All linear dimensions are in inches (millimeters).
2. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 inch (0.15 mm) per end.
3. Body width does not include interlead flash. Interlead flash shall not exceed .017 inch (0.43 mm) per side.
4. Falls within JEDEC MS-012 variation AC.

FIGURE 1. Case outlines - Continued.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 8

Device type	01
Case outline	X
Terminal number	Terminal symbol
1	1B
2	1A
3	1Y
4	G
5	2Y
6	2A
7	2B
8	GND
9	3B
10	3A
11	3Y
12	\bar{G}
13	4Y
14	4A
15	4B
16	V _{CC}

FIGURE 2. Terminal connections.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 9

Differential input	Enables		Output
	G	\bar{G}	Y
$V_{ID} \geq V_{IT+}$	H	X	H
	X	L	H
$V_{IT-} < V_{ID} < V_{IT+}$	H	X	?
	X	L	?
$V_{ID} \leq V_{IT-}$	H	X	L
	X	L	L
X	L	H	Z

FIGURE 3. Truth table.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 10

POSITIVE LOGIC

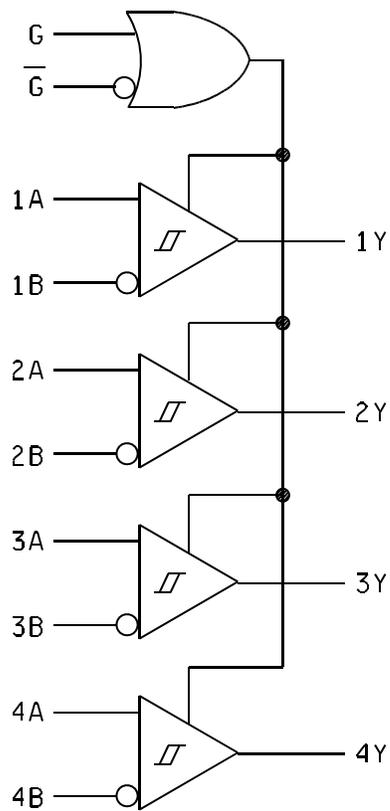
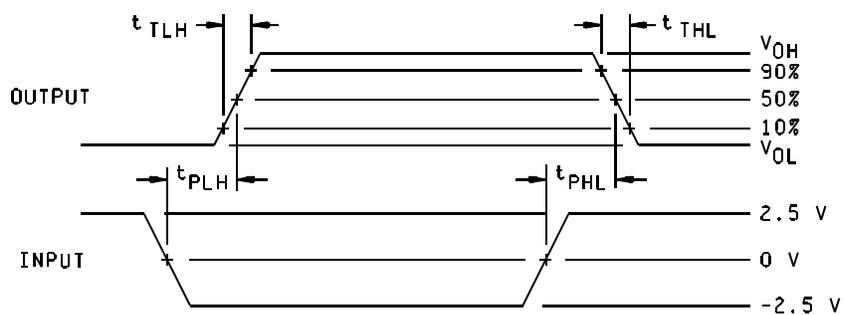
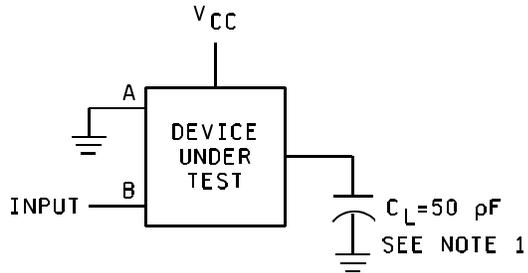


FIGURE 4. Logic diagram.

<p>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 16236</p>	<p>DWG NO. V62/07648</p>
		<p>REV A</p>	<p>PAGE 11</p>

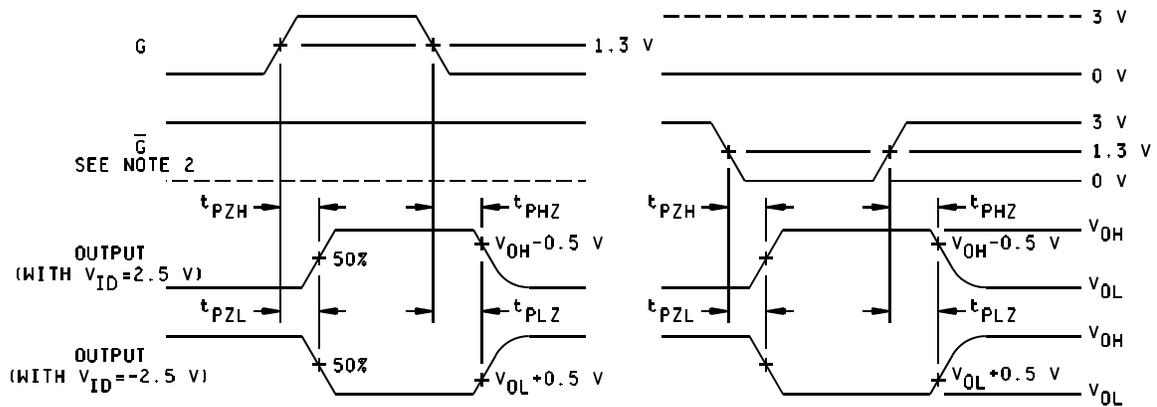
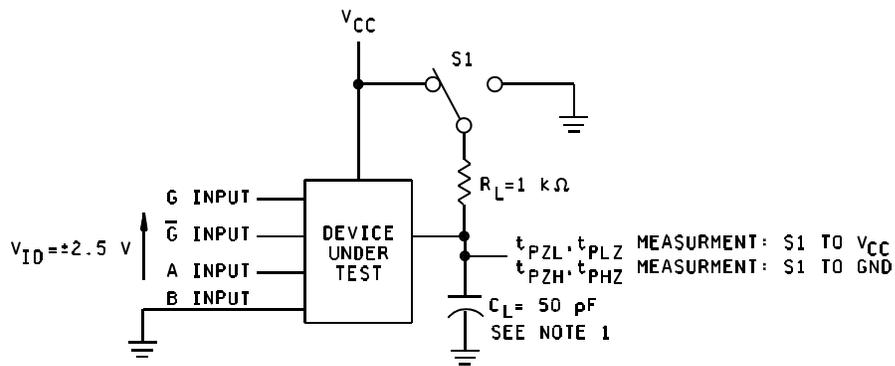


NOTE:

- 1. C_L includes probe and jig capacitance.

FIGURE 5. Timing waveforms and test circuit.

<p>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 16236</p>	<p>DWG NO. V62/07648</p>
		<p>REV A</p>	<p>PAGE 12</p>



NOTES:

1. C_L includes probe and jig capacitance.
2. The input is supplied by a generator having the following characteristics: PRR = 1 MHz, duty cycle \leq 50 %, $t_r = t_f = 6$ ns.

FIGURE 6. Enable / disable time test circuit and output voltage waveforms.

<p>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 16236</p>	<p>DWG NO. V62/07648</p>
		<p>REV A</p>	<p>PAGE 13</p>

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	Package <u>2/</u>	Top side marking	Vendor part number
V62/07648-01XE	01295	Reel of 2500	26C32EP	AM26C32MDREP

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

2/ For the most current package and ordering information, see the package option addendum at the end of the manufacturer's datasheet, or at website www.ti.com.

CAGE code

01295

Source of supply

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

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/07648
		REV A	PAGE 14