

74LS247

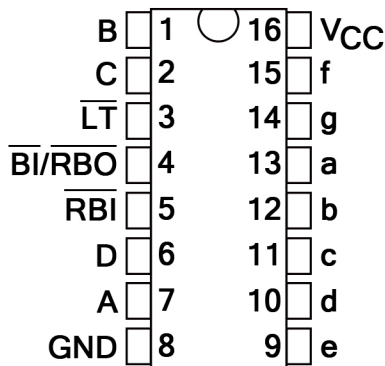
- **Open-Collector Outputs Drive Indicators Directly**
- **Lamp-Test Provision**
- **Leading/Trailing Zero Suppression**
- **All Circuit Types Feature Lamp Intensity Modulation Capability**

74LS248

- **Internal Pull-Ups Eliminate Need for External Resistors**
- **Lamp-Test Provision**
- **Leading/Trailing Zero Suppression**

TYPE	DRIVER OUTPUTS				TYPICAL POWER DISSIPATION	PACKAGES
	ACTIVE LEVEL	OUTPUT CONFIGURATION	SINK CURRENT	MAX VOLTAGE		
74LS247	low	open-collector	24 mA	15 V	35 mW	J,N
74LS248	high	2-kΩ pull-up	6 mA	5.5 V	125 mW	J,N

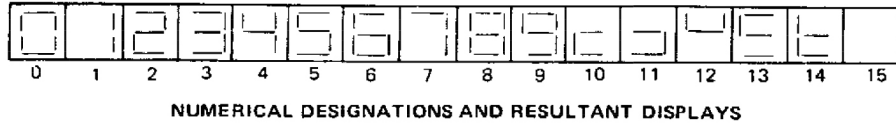
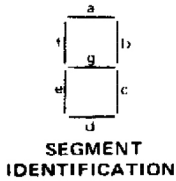
74LS247 74LS248



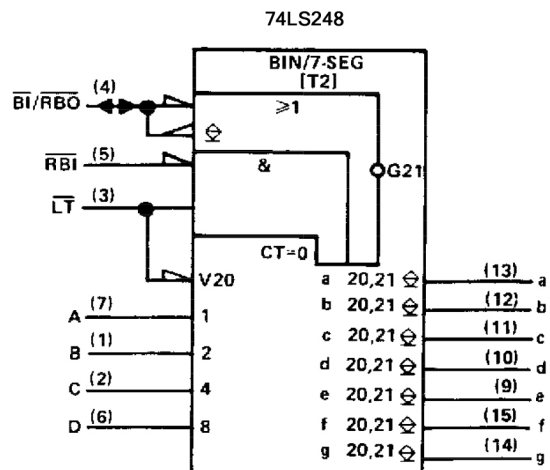
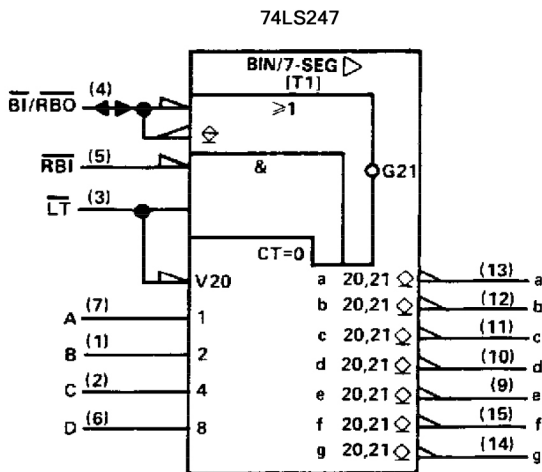
XD74LS247 DIP16 XD74LS248 DIP16

description

74LS247, and 74LS248 compose the 5 and with tails. Composition of all other characters, including display patterns for BCD inputs above nine. Is Identical. 74LS247 feature active-low outputs designed for driving Indicators directly, and the 74LS248 features active-high outputs for driving lamp buffers. All of the circuits have full ripple-blanking input/output controls and a lamp test input Segment identification and resultant displays are shown below. Display patterns for BCD input counts above 9 are unique symbols to authenticate input conditions. All of these circuits incorporate automatic leading and/or trailing zero-blanking control (RBI and RBO). Lamp test (CT) of these types may be performed at any time when the bF/RBO node is at a high level. AH types contain an overriding blanking input (BO which can be used to control tile lamp intensity by pulsing or to inhibit the outputs. Inputs and outputs are entirely compatible for use with TTL logic outputs. Series 74 and Series 74LS devices are characterized for operation from 0°C to 70°C



logic symbols†



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DECIMAL OR FUNCTION	INPUTS						$\overline{\text{BI}}/\overline{\text{RBO}}^\dagger$	OUTPUTS							NOTE
	LT	RBI	D	C	B	A		a	b	c	d	e	f	g	
0	H	H	L	L	L	L	H	ON	ON	ON	ON	ON	ON	OFF	1
1	H	X	L	L	L	H	H	OFF	ON	ON	OFF	OFF	OFF	OFF	
2	H	X	L	L	H	L	H	ON	ON	OFF	ON	ON	OFF	ON	
3	H	X	L	L	H	H	H	ON	ON	ON	ON	OFF	OFF	ON	
4	H	X	L	H	L	L	H	OFF	ON	ON	OFF	OFF	ON	ON	
5	H	X	L	H	L	H	H	ON	OFF	ON	ON	OFF	ON	ON	
6	H	X	L	H	H	L	H	ON	OFF	ON	ON	ON	ON	ON	
7	H	X	L	H	H	H	H	ON	ON	ON	OFF	OFF	OFF	OFF	
8	H	X	H	L	L	L	H	ON	ON	ON	ON	ON	ON	ON	
9	H	X	H	L	L	H	H	ON	ON	ON	ON	OFF	ON	ON	
10	H	X	H	L	H	L	H	OFF	OFF	OFF	ON	ON	OFF	ON	
11	H	X	H	L	H	H	H	OFF	OFF	ON	ON	OFF	OFF	ON	
12	H	X	H	H	L	L	H	OFF	ON	OFF	OFF	OFF	ON	ON	
13	H	X	H	H	L	H	H	ON	OFF	OFF	ON	OFF	ON	ON	
14	H	X	H	H	H	L	H	OFF	OFF	OFF	ON	ON	ON	ON	
15	H	X	H	H	H	H	H	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
$\overline{\text{BI}}$	X	X	X	X	X	X	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2
$\overline{\text{RBI}}$	H	L	L	L	L	L	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3
$\overline{\text{LT}}$	L	X	X	X	X	X	H	ON	ON	ON	ON	ON	ON	ON	4

74LS248

DECIMAL OR FUNCTION	INPUTS						$\overline{\text{BI}}/\overline{\text{RBO}}^\dagger$	OUTPUTS							NOTE
	LT	RBI	D	C	B	A		a	b	c	d	e	f	g	
0	H	H	L	L	L	L	H	H	H	H	H	H	H	L	1
1	H	X	L	L	L	H	H	L	H	H	L	L	L	L	
2	H	X	L	L	H	L	H	H	H	L	H	H	L	H	
3	H	X	L	L	H	H	H	H	H	H	H	L	L	H	
4	H	X	L	H	L	L	H	L	H	H	L	L	H	H	
5	H	X	L	H	L	H	H	H	L	H	H	L	H	H	
6	H	X	L	H	H	L	H	H	L	H	H	H	H	H	
7	H	X	L	H	H	H	H	H	H	H	L	L	L	L	
8	H	X	H	L	L	L	H	H	H	H	H	H	H	H	
9	H	X	H	L	L	H	H	H	H	H	L	H	H	H	
10	H	X	H	L	H	L	H	L	L	L	H	H	L	H	
11	H	X	H	L	H	H	H	L	L	H	H	L	L	H	
12	H	X	H	H	L	L	H	L	H	L	L	L	H	H	
13	H	X	H	H	L	H	H	H	L	L	H	L	H	H	
14	H	X	H	H	H	L	H	L	L	L	H	H	H	H	
15	H	X	H	H	H	H	H	L	L	L	L	L	L	L	
$\overline{\text{BI}}$	X	X	X	X	X	X	L	L	L	L	L	L	L	L	2
$\overline{\text{RBI}}$	H	L	L	L	L	L	L	L	L	L	L	L	L	L	3
$\overline{\text{LT}}$	L	X	X	X	X	X	H	H	H	H	H	H	H	H	4

H = high level, L = low level, X = irrelevant

NOTES: 1. The blanking input ($\overline{\text{BI}}$) must be open or held at a high logic level when output functions 0 through 15 are desired. The ripple-blanking input ($\overline{\text{RBI}}$) must be open or high if blanking of a decimal zero is not desired.

2. When a low logic level is applied directly to the blanking input ($\overline{\text{BI}}$), all segment outputs are low regardless of the level of any other input.

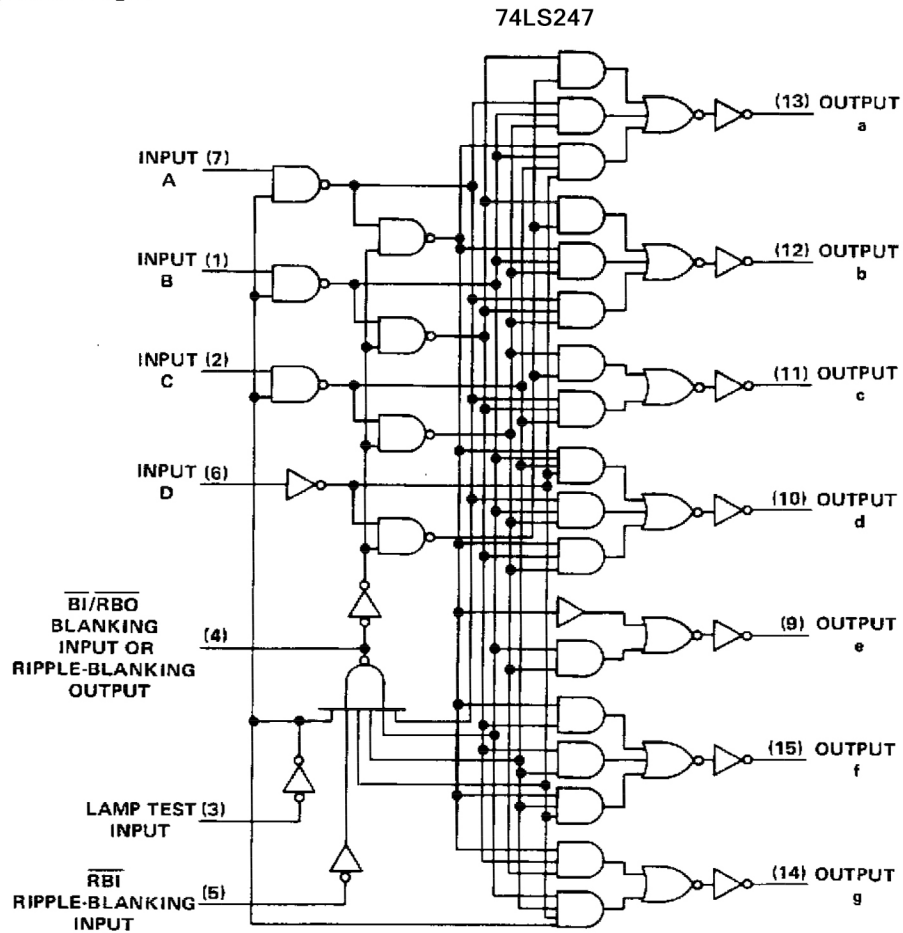
3. When ripple-blanking input ($\overline{\text{RBI}}$) and inputs A, B, C, and D are at a low level with the lamp test input high, all segment outputs go low and the ripple-blanking output ($\overline{\text{RBO}}$) goes to a low level (response condition).

4. When the blanking input/ripple-blanking output ($\overline{\text{BI}}/\overline{\text{RBO}}$) is open or held high and a low is applied to the lamp-test input, all segment outputs are high.

$^\dagger \overline{\text{BI}}/\overline{\text{RBO}}$ is wire-AND logic serving as blanking input ($\overline{\text{BI}}$) and/or ripple-blanking output ($\overline{\text{RBO}}$).

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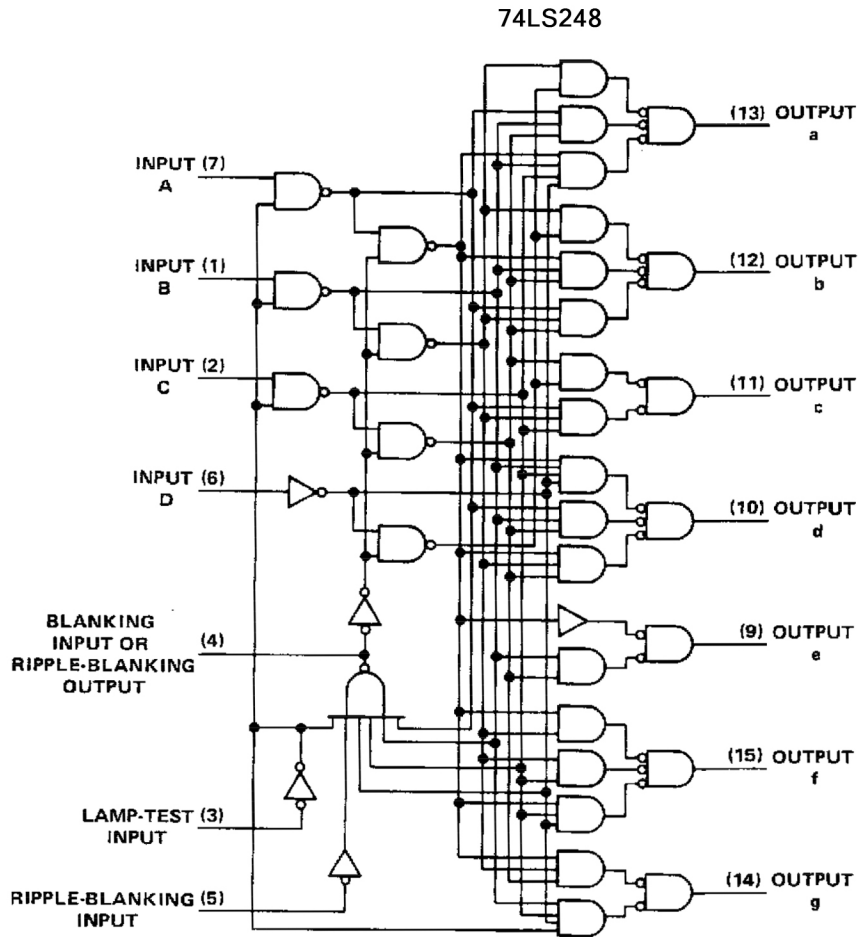
logic diagram (positive logic)



Pin numbers shown are for D, J, N, and W packages.

XD74LS247 DIP16 XD74LS248 DIP16

logic diagram (positive logic)

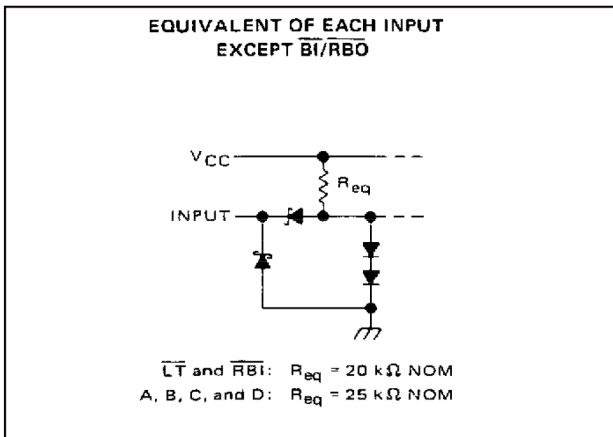


Pin numbers shown are for D, J, N, and W packages.

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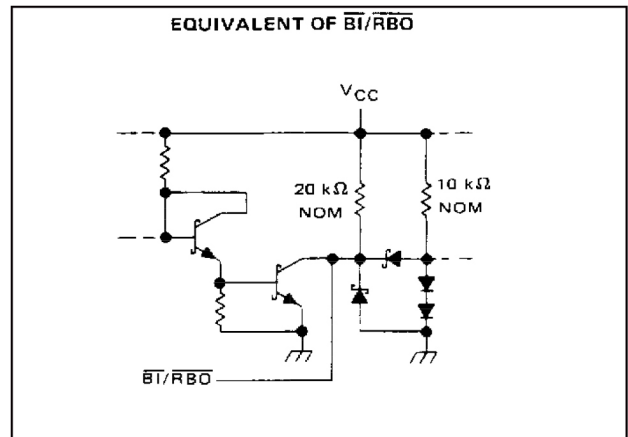
schematics of inputs and outputs

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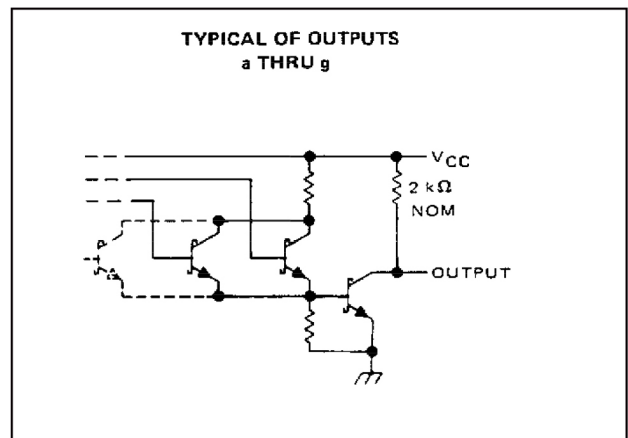
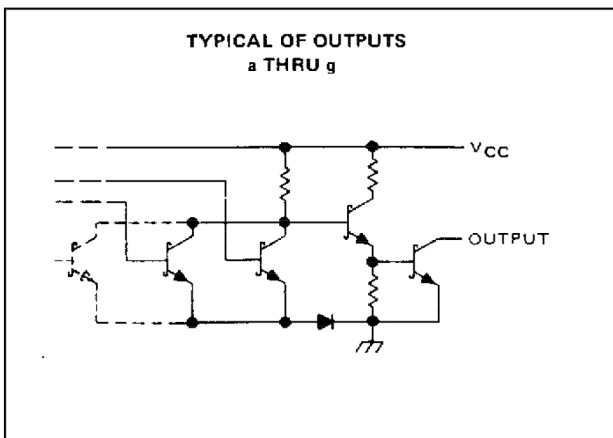


74LS247

74LS247 74LS248



74LS248



XD74LS247 DIP16 XD74LS248 DIP16

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

Supply voltage, V_{CC} (see Note 1)	7V
Input voltage	7V
Peak output current ($t_w \leq 1$ ms, duty cycle $\leq 10\%$)	200mA
Current forced into any output in the off state	1mA
Operating free-air temperature range: 74LS247 74LS248	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

NOTE 1: Voltage values are with respect to network ground terminal.

recommended operating conditions

		74LS247 74LS248			UNIT
		MIN	NOM	MAX	
Supply voltage, V_{CC}		4.75	5	5.25	V
Off-state output voltage, $V_{O(off)}$	a thru g	15			V
On-state output current, $I_{O(on)}$	a thru g	24			mA
High-level output current, I_{OH}	$\overline{BI}/\overline{RBO}$	-50			μ
Low-level output current, I_{OL}	$\overline{BI}/\overline{RBO}$	3.2			mA
Operating free-air temperature, T_A		0	70		°C

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

PARAMETER		TEST CONDITIONS †	74LS247 74LS248		UNIT
			MIN	TYP ‡	
V_{IH}	High-level input voltage		2		V
V_{IL}	Low-level input voltage		0.8		V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = -18\text{mA}$	-1.5		V
V_{OH}	High-level output voltage	$\overline{BI}/\overline{RBO}$ $V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = V_{IL \text{ max}}, I_{OH} = -50\mu\text{A}$	2.4	4.2	V
V_{OL}	Low-level output voltage	$\overline{BI}/\overline{RBO}$ $V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = V_{IL \text{ max}}, I_{OL} = 1.6\text{mA}$	0.25	0.4	V
		$I_{OL} = 3.2\text{mA}$	0.35	0.5	
$I_{O(off)}$	Off-state output current	a thru g $V_{CC} = \text{MAX}, V_{IH} = 2\text{V}, V_{IL} = V_{IL \text{ max}}, V_{O(off)} = 15\text{V}$	250		μA
$V_{O(on)}$	On-state output voltage	a thru g $V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = V_{IL \text{ max}}, I_{O(on)} = 12\text{mA}$	0.25	0.4	V
		$I_{O(on)} = 24\text{mA}$	0.35	0.5	
I_I	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 7\text{V}$	0.1		mA
I_{IH}	High-level input current	$V_{CC} = \text{MAX}, V_I = 2.7\text{V}$	20		μA
I_{IL}	Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.4\text{V}$	-0.4		mA
	Any input except $\overline{BI}/\overline{RBO}$		-1.2		
I_{OS}	Short-circuit output current	$\overline{BI}/\overline{RBO}$ $V_{CC} = \text{MAX}$	-0.3	-2	mA
I_{CC}	Supply current	$V_{CC} = \text{MAX},$ See Note 2	7	13	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at $V_{CC}=5$ V, $T_A = 25^\circ\text{C}$.

NOTE 2: I_{CC} is measured with all outputs open and all inputs at 4.5 V.

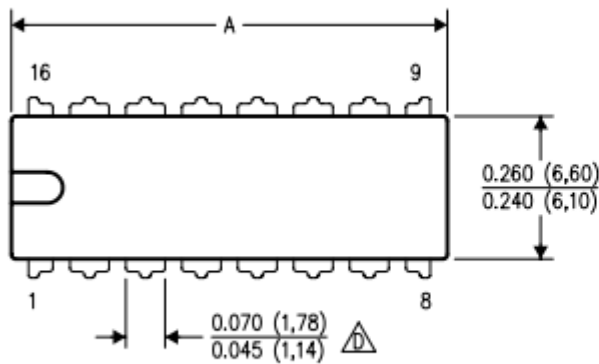
switching characteristics, $V_{CC}=5\text{V}, T_A=25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{off}	Turn-off time from A input	$C_L = 15$ pF, $R_L = 665 \Omega$, See Note 3	100			ns
t_{on}	Turn-on time from A input		100			
t_{off}	Turn-off time from \overline{RBI} input		100			ns
t_{on}	Turn-on time from \overline{RBI} input		100			

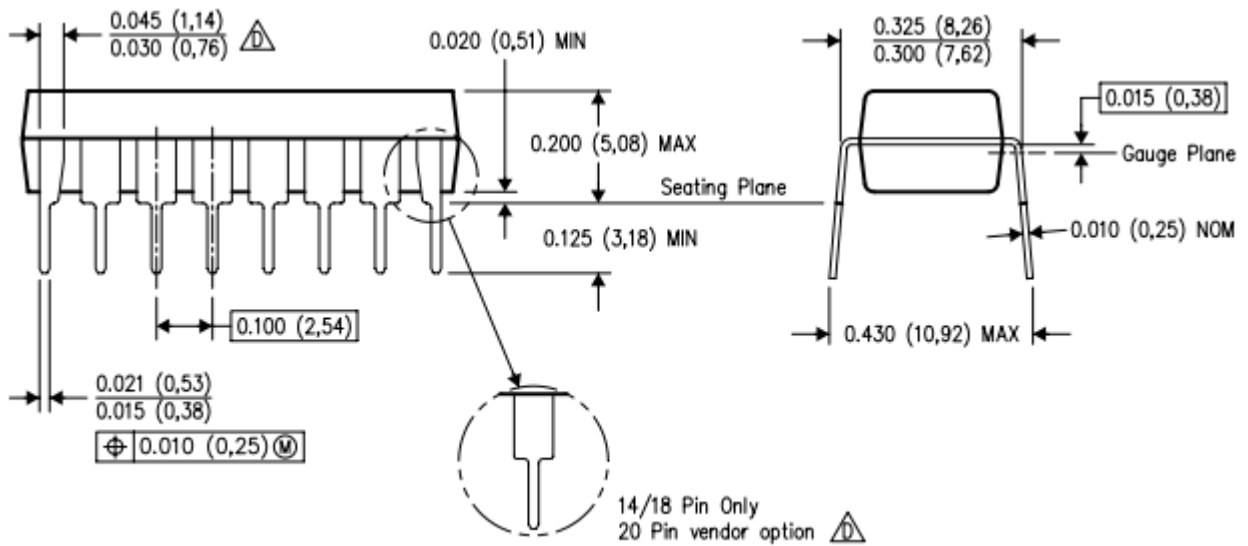
NOTE3: Load circuits and voltage waveforms are shown in Section 1.

XD74LS247 DIP16 XD74LS248 DIP16

DIP



DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-001 VARIATION	AA	BB	AC	AD



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