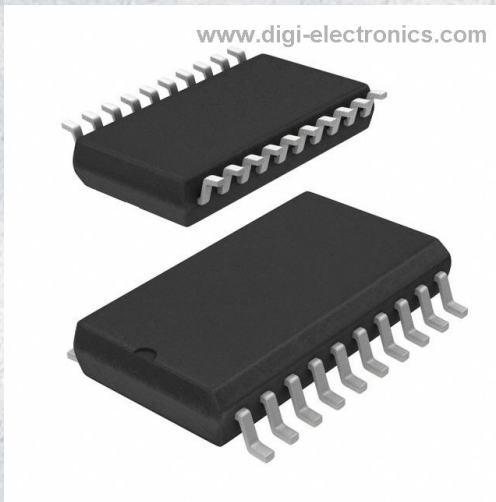


# MC74LVX373MG Datasheet



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	MC74LVX373MG-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	MC74LVX373MG
Description	IC DTYPE TRANSP SGL 8:8 20SOEIAJ
Detailed Description	D-Type Transparent Latch 1 Channel 8:8 IC Tri-State SOEIAJ-20



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

MC74LVX373MG

Series:

74LVX

Logic Type:

D-Type Transparent Latch

Output Type:

Tri-State

Independent Circuits:

1

Current - Output High, Low:

4mA, 4mA

Mounting Type:

Surface Mount

Supplier Device Package:

SOEIAJ-20

Manufacturer:

onsemi

Product Status:

Obsolete

Circuit:

8:8

Voltage - Supply:

2V ~ 3.6V

Delay Time - Propagation:

5.8ns

Operating Temperature:

-40°C ~ 85°C

Package / Case:

20-SOIC (0.209", 5.30mm Width)

Base Product Number:

74LVX373

## Environmental & Export classification

Moisture Sensitivity Level (MSL):

3 (168 Hours)

ECCN:

EAR99

REACH Status:

REACH Unaffected

HTSUS:

8542.39.0001

# Octal D-Type Latch with 3-State Outputs

With 5V-Tolerant Inputs

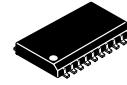
## MC74LVX373

The MC74LVX373 is an advanced high speed CMOS octal latch with 3-state outputs. The inputs tolerate voltages up to 7.0 V, allowing the interface of 5.0 V systems to 3.0 V systems.

This 8-bit D-type latch is controlled by a latch enable input and an output enable input. When the output enable input is high, the eight outputs are in a high impedance state.

### Features

- High Speed:  $t_{PD} = 5.8$  ns (Typ) at  $V_{CC} = 3.3$  V
- Low Power Dissipation:  $I_{CC} = 4$   $\mu$ A (Max) at  $T_A = 25^\circ$ C
- Power Down Protection Provided on Inputs
- Balanced Propagation Delays
- Low Noise:  $V_{OLP} = 0.8$  V (Max)
- Pin and Function Compatible with Other Standard Logic Families
- Latchup Performance Exceeds 300 mA
- ESD Performance:
  - Human Body Model > 2000 V;
  - Machine Model > 200 V
- These Devices are Pb-Free and are RoHS Compliant

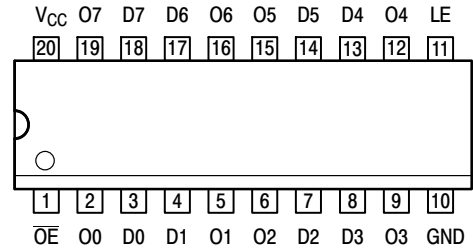


SOIC-20  
DW SUFFIX  
CASE 751D



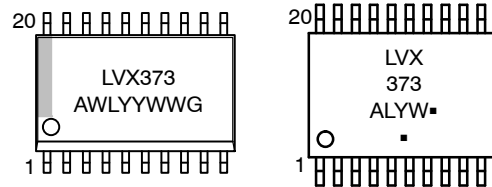
TSSOP-20  
DT SUFFIX  
CASE 948E

### PIN ASSIGNMENT



20-Lead (Top View)

### MARKING DIAGRAMS



SOIC-20

TSSOP-20

LVX373 = Specific Device Code  
 A = Assembly Location  
 WL, L = Wafer Lot  
 Y = Year  
 WW, W = Work Week  
 G or ▪ = Pb-Free Package

(Note: Microdot may be in either location)

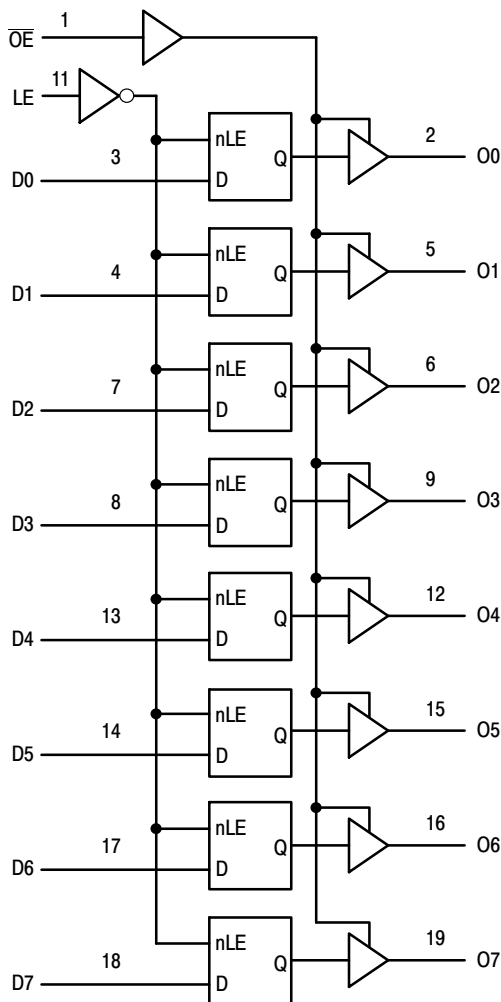
### PIN NAMES

Pins	Function
$\overline{OE}$	Output Enable Input
LE	Latch Enable Input
D0-D7	Data Inputs
O0-O7	3-State Latch Outputs

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

**MC74LVX373**



**Figure 1. Logic Diagram**

INPUTS			OUTPUTS	OPERATING MODE
$\overline{OE}$	LE	Dn	On	
L	H	H	H	Transparent (Latch Disabled); Read Latch
L	H	L	L	
L	L	h	H	Latched (Latch Enabled) Read Latch
L	L	l	L	
L	L	X	NC	Hold; Read Latch
H	L	X	Z	Hold; Disabled Outputs
H	H	H	Z	Transparent (Latch Disabled); Disabled Outputs
H	H	L	Z	
H	L	h	Z	Latched (Latch Enabled); Disabled Outputs
H	L	l	Z	

H = High Voltage Level; h = High Voltage Level One Setup Time Prior to the Latch Enable High-to-Low Transition; L = Low Voltage Level; l = Low Voltage Level One Setup Time Prior to the Latch Enable High-to-Low Transition; NC = No Change, State Prior to the Latch Enable High-to-Low Transition; X = High or Low Voltage Level or Transitions are Acceptable; Z = High Impedance State; For I<sub>CC</sub> Reasons DO NOT FLOAT Inputs

**MC74LVX373****MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	DC Supply Voltage	-0.5 to +7.0	V
V <sub>in</sub>	DC Input Voltage	-0.5 to +7.0	V
V <sub>out</sub>	DC Output Voltage	-0.5 to V <sub>CC</sub> +0.5	V
I <sub>IK</sub>	Input Diode Current	-20	mA
I <sub>OK</sub>	Output Diode Current	±20	mA
I <sub>out</sub>	DC Output Current, per Pin	±25	mA
I <sub>CC</sub>	DC Supply Current, V <sub>CC</sub> and GND Pins	±75	mA
P <sub>D</sub>	Power Dissipation	180	mW
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Min	Max	Unit
V <sub>CC</sub>	DC Supply Voltage	2.0	3.6	V
V <sub>in</sub>	DC Input Voltage	0	5.5	V
V <sub>out</sub>	DC Output Voltage	0	V <sub>CC</sub>	V
T <sub>A</sub>	Operating Temperature, All Package Types	-40	+85	°C
Δt/ΔV	Input Rise and Fall Time	0	100	ns/V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

**DC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Test Conditions	V <sub>CC</sub> V	T <sub>A</sub> = 25°C			T <sub>A</sub> = -40 to 85°C		Unit
				Min	Typ	Max	Min	Max	
V <sub>IH</sub>	High-Level Input Voltage		2.0	1.5			1.5		V
			3.0	2.0			2.0		
			3.6	2.4			2.4		
V <sub>IL</sub>	Low-Level Input Voltage		2.0			0.5		0.5	V
			3.0			0.8		0.8	
			3.6			0.8		0.8	
V <sub>OH</sub>	High-Level Output Voltage (V <sub>in</sub> = V <sub>IH</sub> or V <sub>IL</sub> )	I <sub>OH</sub> = -50 μA I <sub>OH</sub> = -50 μA I <sub>OH</sub> = -4 mA	2.0	1.9	2.0		1.9		V
			3.0	2.9	3.0		2.9		
			3.0	2.58			2.48		
V <sub>OL</sub>	Low-Level Output Voltage (V <sub>in</sub> = V <sub>IH</sub> or V <sub>IL</sub> )	I <sub>OL</sub> = 50 μA I <sub>OL</sub> = 50 μA I <sub>OL</sub> = 4 mA	2.0		0.0	0.1		0.1	V
			3.0		0.0	0.1		0.1	
			3.0			0.36		0.44	
I <sub>in</sub>	Input Leakage Current	V <sub>in</sub> = 5.5 V or GND	3.6			±0.1		±1.0	μA
I <sub>OZ</sub>	Maximum 3-State Leakage Current	V <sub>in</sub> = V <sub>IL</sub> or V <sub>IH</sub> V <sub>out</sub> = V <sub>CC</sub> or GND	3.6			±0.2 5		±2.5	μA
I <sub>CC</sub>	Quiescent Supply Current	V <sub>in</sub> = V <sub>CC</sub> or GND	3.6			4.0		40.0	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

**MC74LVX373****AC ELECTRICAL CHARACTERISTICS** (Input  $t_r = t_f = 3.0\text{ns}$ )

Symbol	Parameter	Test Conditions	$T_A = 25^\circ\text{C}$			$T_A = -40 \text{ to } 85^\circ\text{C}$		Unit
			Min	Typ	Max	Min	Max	
$t_{PLH}$ , $t_{PHL}$	Propagation Delay D to O	$V_{CC} = 2.7\text{ V}$ $C_L = 15\text{ pF}$ $C_L = 50\text{ pF}$		7.5 10.0	14.5 18.0	1.0 1.0	17.5 21.0	ns
		$V_{CC} = 3.3 \pm 0.3\text{ V}$ $C_L = 15\text{ pF}$ $C_L = 50\text{ pF}$		5.8 8.3	9.3 12.8	1.0 1.0	11.0 14.5	
$t_{PLH}$ , $t_{PHL}$	Propagation Delay LE to O	$V_{CC} = 2.7\text{ V}$ $C_L = 15\text{ pF}$ $C_L = 50\text{ pF}$		7.7 10.2	15.0 18.5	1.0 1.0	18.5 22.0	ns
		$V_{CC} = 3.3 \pm 0.3\text{ V}$ $C_L = 15\text{ pF}$ $C_L = 50\text{ pF}$		6.0 8.5	9.7 13.2	1.0 1.0	11.5 15.0	
$t_{PZL}$ , $t_{PZH}$	Output Enable Time OE to O	$V_{CC} = 2.7\text{ V}$ $R_L = 1\text{ k}\Omega$ $C_L = 15\text{ pF}$ $C_L = 50\text{ pF}$		7.7 10.2	15.0 18.5	1.0 1.0	18.5 22.0	ns
		$V_{CC} = 3.3 \pm 0.3\text{ V}$ $R_L = 1\text{ k}\Omega$ $C_L = 15\text{ pF}$ $C_L = 50\text{ pF}$		6.0 8.5	9.7 13.2	1.0 1.0	11.5 15.0	
$t_{PLZ}$ , $t_{PHZ}$	Output Disable Time OE to O	$V_{CC} = 2.7\text{ V}$ $R_L = 1\text{ k}\Omega$ $C_L = 50\text{ pF}$		9.8	18.0	1.0	21.0	ns
		$V_{CC} = 3.3 \pm 0.3\text{ V}$ $R_L = 1\text{ k}\Omega$ $C_L = 50\text{ pF}$		8.2	12.8	1.0	14.5	
$t_{OSHL}$ , $t_{OSLH}$	Output-to-Output Skew (Note 1)	$V_{CC} = 2.7\text{ V}$ $V_{CC} = 3.3 \pm 0.3\text{ V}$ $C_L = 50\text{ pF}$ $C_L = 50\text{ pF}$			1.5 1.5		1.5 1.5	ns

1. Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH-to-LOW ( $t_{OSHL}$ ) or LOW-to-HIGH ( $t_{OSLH}$ ); parameter guaranteed by design.

**CAPACITIVE CHARACTERISTICS**

Symbol	Parameter	$T_A = 25^\circ\text{C}$			$T_A = -40 \text{ to } 85^\circ\text{C}$		Unit
		Min	Typ	Max	Min	Max	
$C_{in}$	Input Capacitance		4	10		10	pF
$C_{out}$	Maximum Three-State Output Capacitance		6				pF
$C_{PD}$	Power Dissipation Capacitance (Note 2)		27				pF

2.  $C_{PD}$  is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation:  $I_{CC(OPR)} = C_{PD} \cdot V_{CC} \cdot f_{in} + I_{CC}/8$  (per latch).  $C_{PD}$  is used to determine the no-load dynamic power consumption;  $P_D = C_{PD} \cdot V_{CC}^2 \cdot f_{in} + I_{CC} \cdot V_{CC}$ .

**NOISE CHARACTERISTICS** (Input  $t_r = t_f = 3.0\text{ns}$ ,  $C_L = 50\text{pF}$ ,  $V_{CC} = 3.3\text{V}$ , Measured in SOIC Package)

Symbol	Characteristic	$T_A = 25^\circ\text{C}$		Unit
		Typ	Max	
$V_{OLP}$	Quiet Output Maximum Dynamic $V_{OL}$	0.5	0.8	V
$V_{OLV}$	Quiet Output Minimum Dynamic $V_{OL}$	-0.5	-0.8	V
$V_{IHD}$	Minimum High Level Dynamic Input Voltage		2.0	V
$V_{ILD}$	Maximum Low Level Dynamic Input Voltage		0.8	V

**TIMING REQUIREMENTS** (Input  $t_r = t_f = 3.0\text{ns}$ )

Symbol	Parameter	Test Conditions	$T_A = 25^\circ\text{C}$		$T_A = -40 \text{ to } 85^\circ\text{C}$	Unit
			Typ	Limit	Limit	
$t_{w(h)}$	Minimum Pulse Width, LE	$V_{CC} = 2.7\text{ V}$ $V_{CC} = 3.3 \pm 0.3\text{ V}$		6.5 5.0	7.5 5.0	ns
$t_{su}$	Minimum Setup Time, D to LE	$V_{CC} = 2.7\text{ V}$ $V_{CC} = 3.3 \pm 0.3\text{ V}$		6.0 4.0	6.0 4.0	ns
$t_h$	Minimum Hold Time, D to LE	$V_{CC} = 2.7\text{ V}$ $V_{CC} = 3.3 \pm 0.3\text{ V}$		1.0 1.0	1.0 1.0	ns

# MC74LVX373

## SWITCHING WAVEFORMS

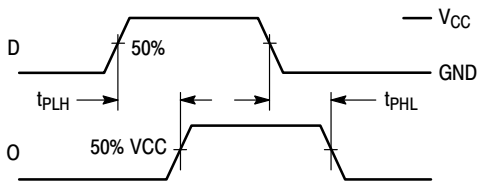


Figure 2.

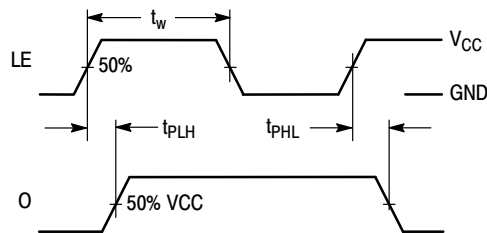


Figure 3.

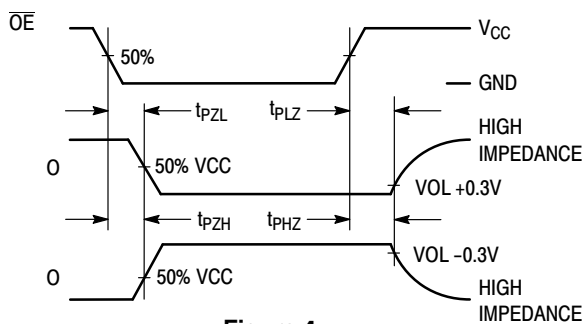


Figure 4.

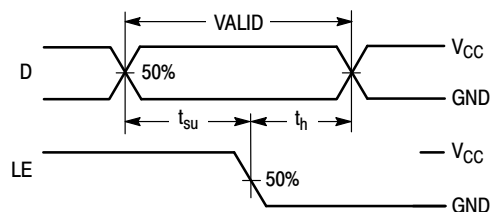
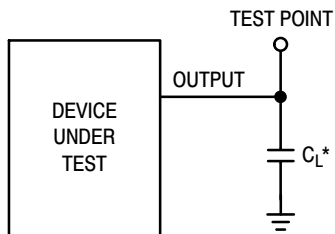


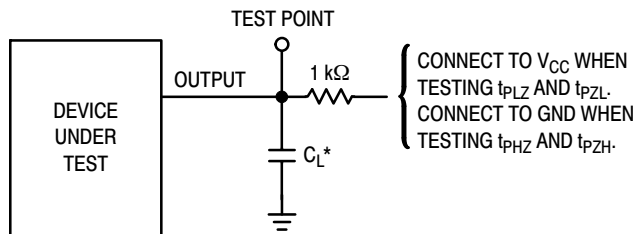
Figure 5.

## TEST CIRCUITS



\*Includes all probe and jig capacitance

Figure 6. Propagation Delay Test Circuit



\*Includes all probe and jig capacitance

Figure 7. Three-State Test Circuit

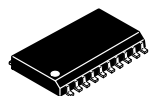
## ORDERING INFORMATION

Device	Package	Shipping†
MC74LVX373DWR2G	SOIC-20 (Pb-Free)	1000 Tape & Reel
MC74LVX373DTR2G	TSSOP-20 (Pb-Free)	2500 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).



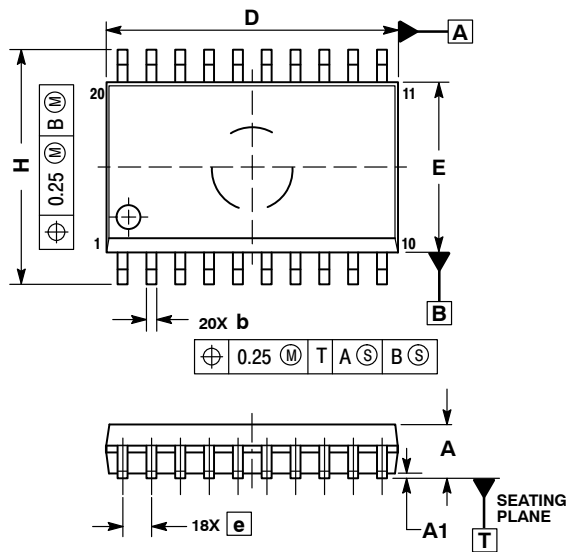
**MECHANICAL CASE OUTLINE  
PACKAGE DIMENSIONS**



SCALE 1:1

**SOIC-20 WB**  
CASE 751D-05  
ISSUE H

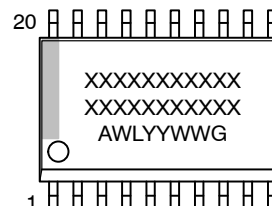
DATE 22 APR 2015



- NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
  2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
  3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
  4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
  5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

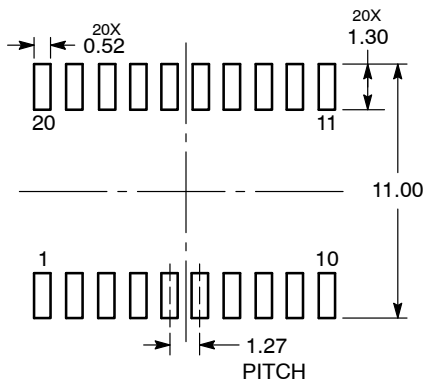
DIM	MILLIMETERS	
	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
b	0.35	0.49
c	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0°	7°

**GENERIC MARKING DIAGRAM\***



- XXXXXX = Specific Device Code
- A = Assembly Location
- WL = Wafer Lot
- YY = Year
- WW = Work Week
- G = Pb-Free Package

**RECOMMENDED SOLDERING FOOTPRINT\***



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

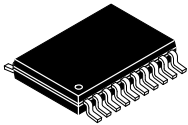
<b>DOCUMENT NUMBER:</b>	<b>98ASB42343B</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SOIC-20 WB</b>	<b>PAGE 1 OF 1</b>

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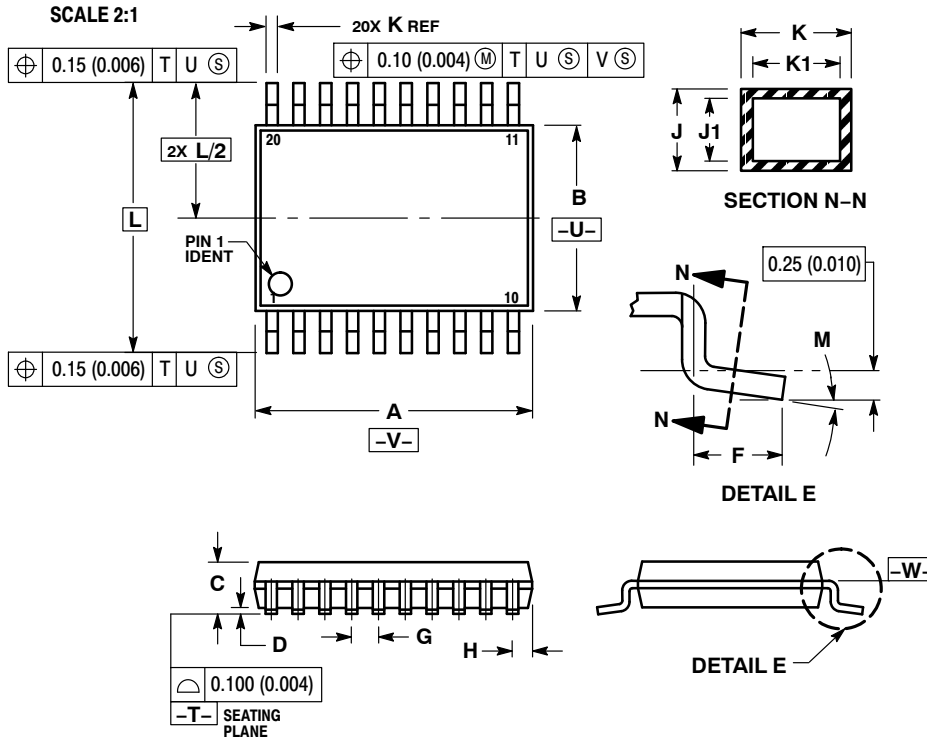


**MECHANICAL CASE OUTLINE  
PACKAGE DIMENSIONS**



**TSSOP-20 WB  
CASE 948E  
ISSUE D**

DATE 17 FEB 2016

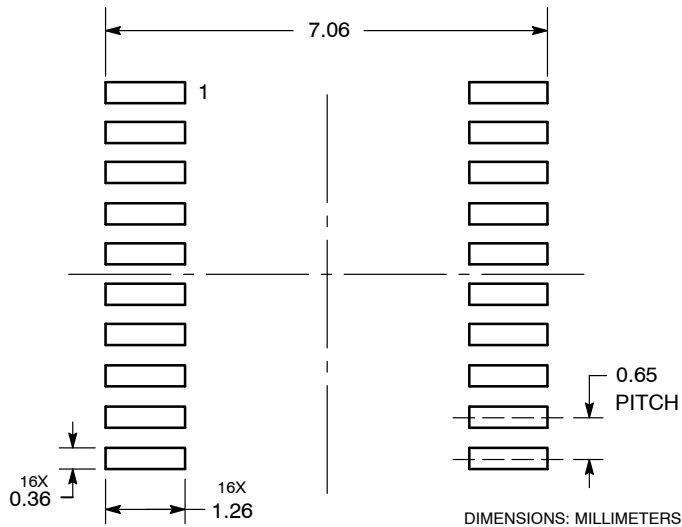


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

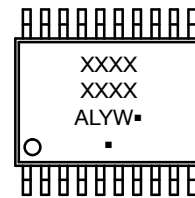
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.40	6.60	0.252	0.260
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

**RECOMMENDED  
SOLDERING FOOTPRINT\***



\*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**GENERIC  
MARKING DIAGRAM\***



- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

<b>DOCUMENT NUMBER:</b>	<b>98ASH70169A</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>TSSOP-20 WB</b>	<b>PAGE 1 OF 1</b>

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