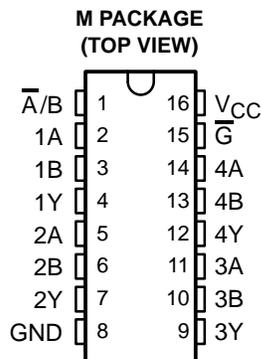


# CD74AC158

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

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- **AC Types Feature 1.5-V to 5.5-V Operation and Balanced Noise Immunity at 30% of the Supply Voltage**
- **Speed of Bipolar F, AS, and S, With Significantly Reduced Power Consumption**
- **Balanced Propagation Delays**
- **$\pm 24$ -mA Output Drive Current**  
– Fanout to 15 F Devices
- **SCR-Latchup-Resistant CMOS Process and Circuit Design**
- **Exceeds 2-kV ESD Protection Per MIL-STD-883, Method 3015**



### description/ordering information

This quadruple 2-line to 1-line data selector/multiplexer is designed for 1.5-V to 5.5-V  $V_{CC}$  operation.

The CD74AC158 features a common strobe ( $\overline{G}$ ) input. When the strobe is high, all outputs are high. When the strobe is low, a 4-bit word is selected from one of two sources and is routed to the four outputs. This device provides inverted data.

### ORDERING INFORMATION

T <sub>A</sub>	PACKAGE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
-55°C to 125°C	SOIC – M     Tube	CD74AC158M	AC158M

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

**FUNCTION TABLE**  
(each data selector/multiplexer)

INPUTS				OUTPUT Y
$\overline{G}$	$\overline{A/B}$	A	B	
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L



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**TEXAS  
INSTRUMENTS**

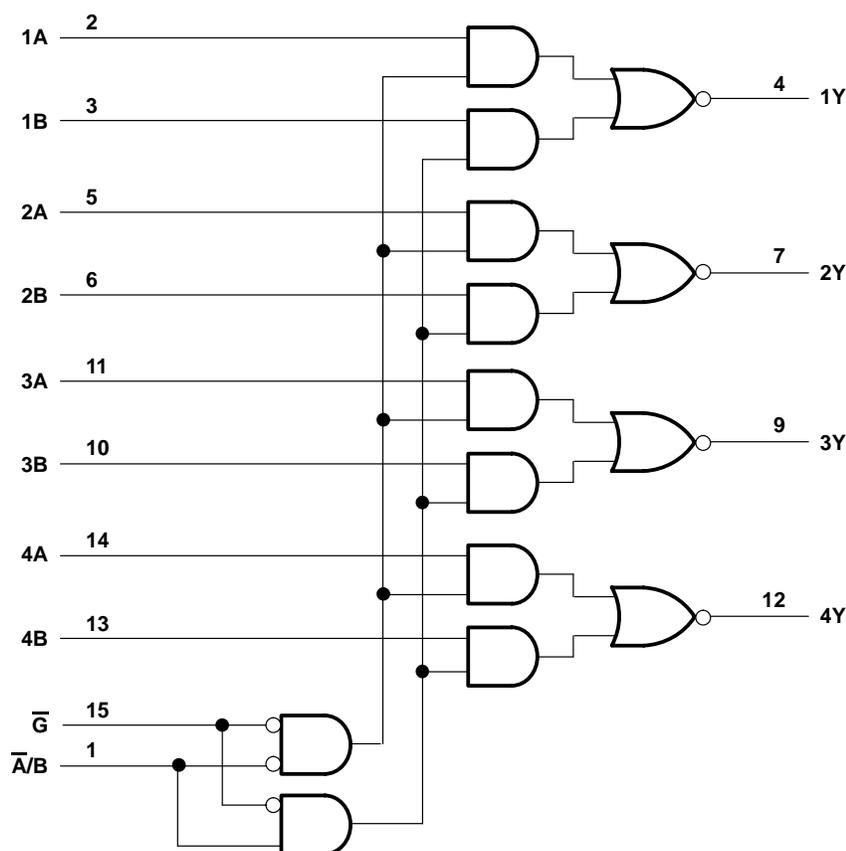
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# CD74AC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

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## logic diagram (positive logic)



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

Supply voltage range, $V_{CC}$ .....	-0.5 V to 6 V
Input clamp current, $I_{IK}$ ( $V_I < 0$ V or $V_I > V_{CC}$ ) (see Note 1) .....	$\pm 20$ mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ V or $V_O > V_{CC}$ ) (see Note 1) .....	$\pm 50$ mA
Continuous output current, $I_O$ ( $V_O > 0$ V or $V_O < V_{CC}$ ) .....	$\pm 50$ mA
Continuous current through $V_{CC}$ or GND .....	$\pm 100$ mA
Package thermal impedance, $\theta_{JA}$ (see Note 2) .....	73°C/W
Storage temperature range, $T_{stg}$ .....	-65°C to 150°C

† 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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
2. The package thermal impedance is calculated in accordance with JESD 51-7.

# CD74AC158

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

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### recommended operating conditions (see Note 3)

		$T_A = 25^\circ\text{C}$		$-55^\circ\text{C to } 125^\circ\text{C}$		$-40^\circ\text{C to } 85^\circ\text{C}$		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
$V_{CC}$	Supply voltage	1.5	5.5	1.5	5.5	1.5	5.5	V
$V_{IH}$	High-level input voltage	$V_{CC} = 1.5\text{ V}$	1.2	1.2	1.2	1.2		V
		$V_{CC} = 3\text{ V}$	2.1	2.1	2.1			
		$V_{CC} = 5.5\text{ V}$	3.85	3.85	3.85			
$V_{IL}$	Low-level input voltage	$V_{CC} = 1.5\text{ V}$		0.3	0.3	0.3		V
		$V_{CC} = 3\text{ V}$		0.9	0.9	0.9		
		$V_{CC} = 5.5\text{ V}$		1.65	1.65	1.65		
$V_I$	Input voltage	0	$V_{CC}$	0	$V_{CC}$	0	$V_{CC}$	V
$V_O$	Output voltage	0	$V_{CC}$	0	$V_{CC}$	0	$V_{CC}$	V
$I_{OH}$	High-level output current	$V_{CC} = 4.5\text{ V to } 5.5\text{ V}$		-24	-24	-24		mA
$I_{OL}$	Low-level output current	$V_{CC} = 4.5\text{ V to } 5.5\text{ V}$		24	24	24		mA
$\Delta t/\Delta v$	Input transition rise or fall rate	$V_{CC} = 1.5\text{ V to } 3\text{ V}$		50	50	50		ns/V
		$V_{CC} = 3.6\text{ V to } 5.5\text{ V}$		20	20	20		

NOTE 3: 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)

PARAMETER	TEST CONDITIONS	$V_{CC}$	$T_A = 25^\circ\text{C}$		$-55^\circ\text{C to } 125^\circ\text{C}$		$-40^\circ\text{C to } 85^\circ\text{C}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
$V_{OH}$	$V_I = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -50\ \mu\text{A}$	1.5 V	1.4	1.4	1.4		V	
			3 V	2.9	2.9	2.9			
			4.5 V	4.4	4.4	4.4			
		$I_{OH} = -4\ \text{mA}$	3 V	2.58	2.4	2.48			
		$I_{OH} = -24\ \text{mA}$	4.5 V	3.94	3.7	3.8			
		$I_{OH} = -50\ \text{mA}^\dagger$	5.5 V		3.85				
$V_{OL}$	$V_I = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 50\ \mu\text{A}$	1.5 V		0.1	0.1	0.1	V	
			3 V		0.1	0.1	0.1		
			4.5 V		0.1	0.1	0.1		
		$I_{OL} = 12\ \text{mA}$	3 V		0.36	0.5	0.44		
		$I_{OL} = 24\ \text{mA}$	4.5 V		0.36	0.5	0.44		
		$I_{OL} = 50\ \text{mA}^\dagger$	5.5 V			1.65			
$I_I$	$V_I = V_{CC} \text{ or } \text{GND}$	5.5 V		$\pm 0.1$	$\pm 1$	$\pm 1$	$\mu\text{A}$		
$I_{CC}$	$V_I = V_{CC} \text{ or } \text{GND}, I_O = 0$	5.5 V		8	160	80	$\mu\text{A}$		
$C_i$				10	10	10	pF		

<sup>†</sup> Test one output at a time, not exceeding 1-second duration. Measurement is made by forcing indicated current and measuring voltage to minimize power dissipation. Test verifies a minimum 50- $\Omega$  transmission-line drive capability at 85°C and 75- $\Omega$  transmission-line drive capability at 125°C.



# CD74AC158

## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

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switching characteristics over recommended operating free-air temperature range,  
 $V_{CC} = 1.5\text{ V}$ ,  $C_L = 50\text{ pF}$  (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	-55°C to 125°C		-40°C to 85°C		UNIT
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Any Y	100		91		ns
t <sub>PHL</sub>			100		91		
t <sub>PLH</sub>	$\bar{A}/B$	Any Y	161		147		ns
t <sub>PHL</sub>			161		147		
t <sub>PLH</sub>	$\bar{G}$	Any Y	149		135		ns
t <sub>PHL</sub>			149		135		

switching characteristics over recommended operating free-air temperature range,  
 $V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$  (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	-55°C to 125°C		-40°C to 85°C		UNIT
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Any Y	2.8	11.2	3	12.8	ns
t <sub>PHL</sub>			2.8	11.2	3	12.8	
t <sub>PLH</sub>	$\bar{A}/B$	Any Y	4.5	18.1	4.9	16.5	ns
t <sub>PHL</sub>			4.5	18.1	4.9	16.5	
t <sub>PLH</sub>	$\bar{G}$	Any Y	4.2	16.7	4.5	15.2	ns
t <sub>PHL</sub>			4.2	16.7	4.5	15.2	

switching characteristics over recommended operating free-air temperature range,  
 $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ ,  $C_L = 50\text{ pF}$  (unless otherwise noted) (see Figure 1)

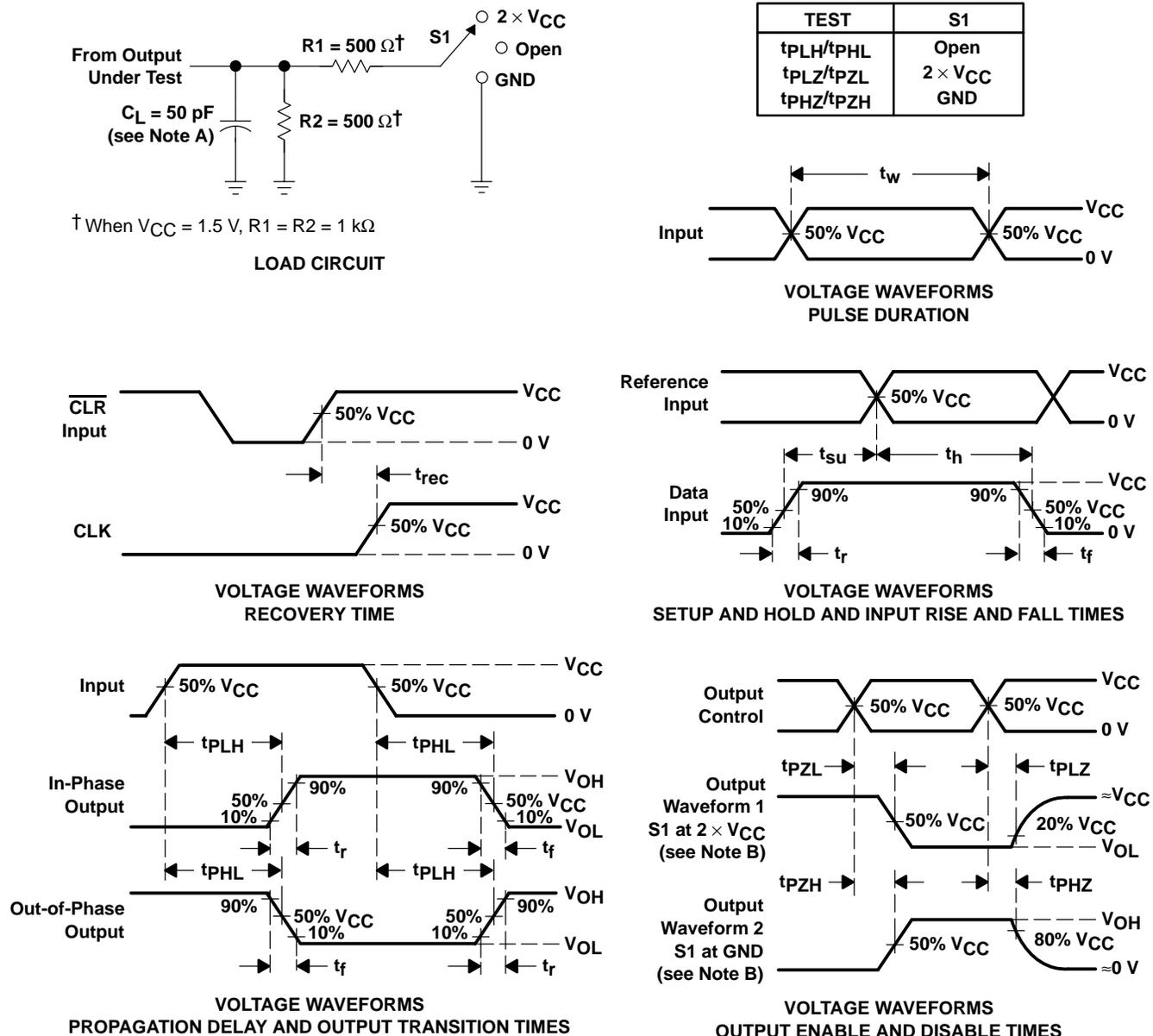
PARAMETER	FROM (INPUT)	TO (OUTPUT)	-55°C to 125°C		-40°C to 85°C		UNIT
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Any Y	2	8	2.2	7.3	ns
t <sub>PHL</sub>			2	8	2.2	7.3	
t <sub>PLH</sub>	$\bar{A}/B$	Any Y	3.2	12.9	3.5	11.7	ns
t <sub>PHL</sub>			3.2	12.9	3.5	11.7	
t <sub>PLH</sub>	$\bar{G}$	Any Y	3	11.9	3.2	10.8	ns
t <sub>PHL</sub>			3	11.9	3.2	10.8	

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

PARAMETER	TYP	UNIT
C <sub>pd</sub> Power dissipation capacitance	149	pF



**PARAMETER MEASUREMENT INFORMATION**



- NOTES: A.  $C_L$  includes probe and test-fixture capacitance.  
 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.  
 C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1\text{ MHz}$ ,  $Z_O = 50\ \Omega$ ,  $t_r = 3\text{ ns}$ ,  $t_f = 3\text{ ns}$ . Phase relationships between waveforms are arbitrary.  
 D. For clock inputs,  $f_{max}$  is measured with the input duty cycle at 50%.  
 E. The outputs are measured one at a time with one input transition per measurement.  
 F.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .  
 G.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .  
 H.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .  
 I. All parameters and waveforms are not applicable to all devices.

**Figure 1. Load Circuit and Voltage Waveforms**

**PACKAGING INFORMATION**

Orderable part number	Status (1)	Material type (2)	Package   Pins	Package qty   Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
<a href="#">CD74AC158M</a>	Active	Production	SOIC (D)   16	40   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC158M
CD74AC158M.A	Active	Production	SOIC (D)   16	40   TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	AC158M

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

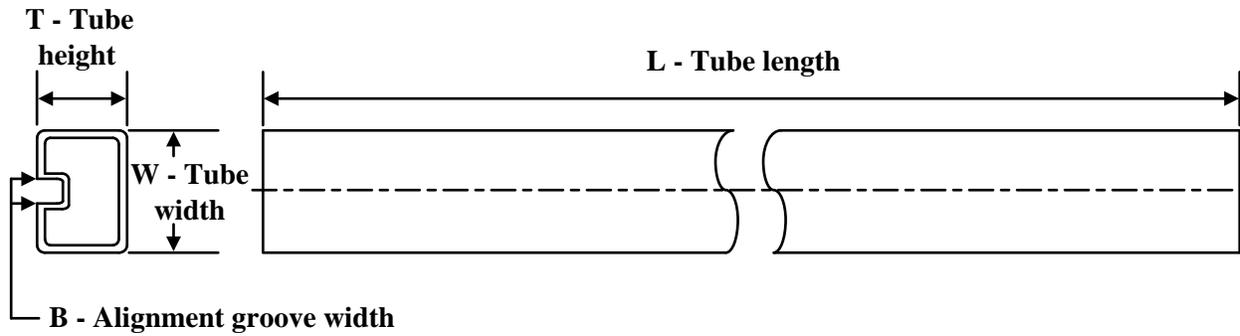
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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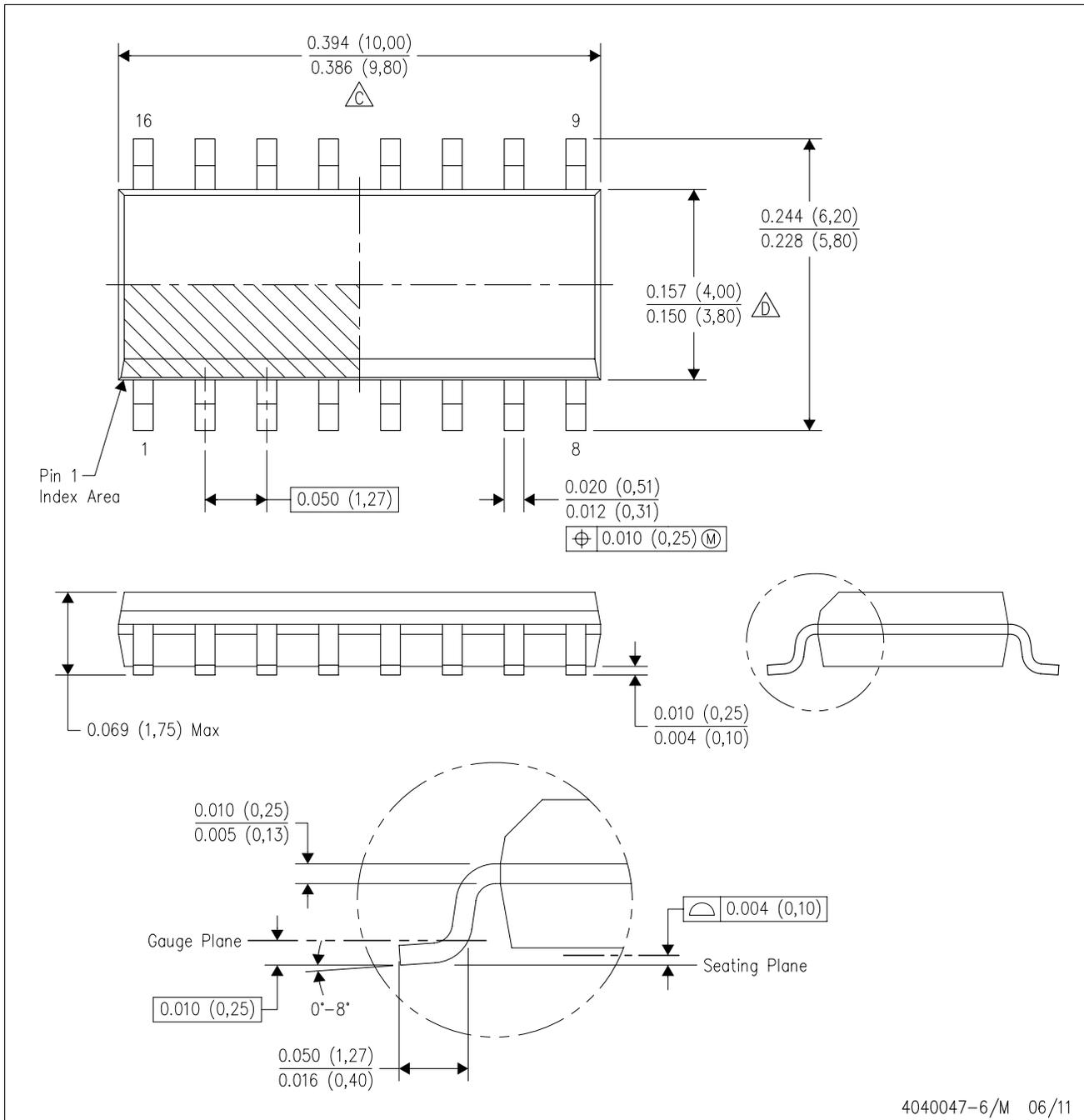
**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
CD74AC158M	D	SOIC	16	40	507	8	3940	4.32
CD74AC158M.A	D	SOIC	16	40	507	8	3940	4.32

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
  - D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
  - E. Reference JEDEC MS-012 variation AC.

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