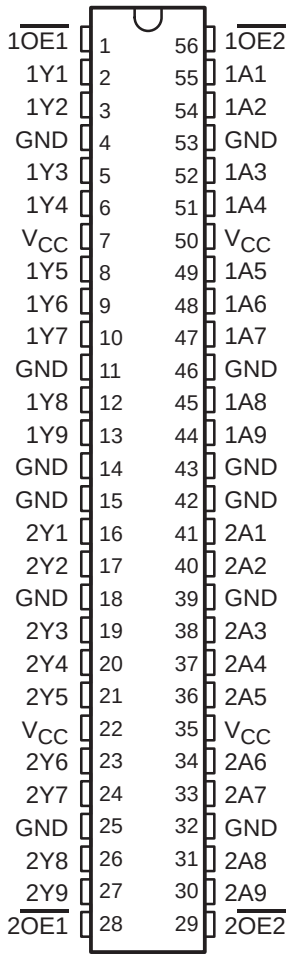
- **Members of the Texas Instruments *Widebus*™ Family**
- **Inputs Are TTL-Voltage Compatible**
- **Provide Extra Data Width Necessary for Wider Address/Data Paths or Buses With Parity**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Distributed V_{CC} and GND Pin Configuration Minimizes High-Speed Switching Noise**
- ***EPIC*™ (Enhanced-Performance Implanted CMOS) 1-μm Process**
- **Package Options Include Plastic 300-mil Shrink Small-Outline (DL) Packages Using 25-mil Center-to-Center Pin Spacings and 380-mil Fine-Pitch Ceramic Flat (WD) Packages Using 25-mil Center-to-Center Spacings**

54ACT16825 . . . DW PACKAGE
74ACT16825 . . . DL PACKAGE
(TOP VIEW)



description

The ’ACT16825 18-bit buffers/drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

The ’ACT16825 can be used as two 9-bit buffers or one 18-bit buffer. They provide true data from A to Y.

The 3-state control gate is a 2-input NOR gate; therefore, if either output-enable ($\overline{OE1}$ or $\overline{OE2}$) input is high, all nine affected outputs are in the high-impedance state.

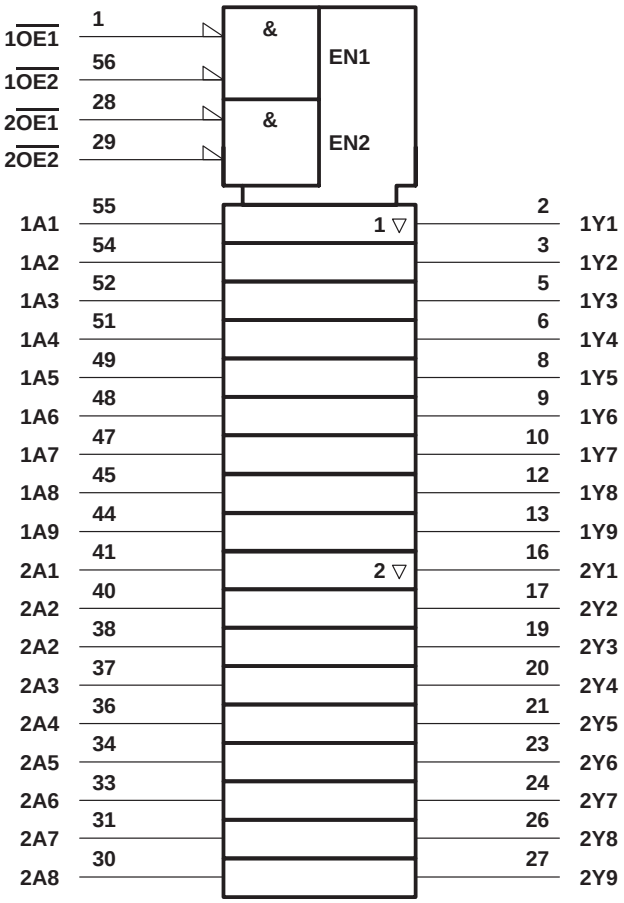
The 74ACT16825 is packaged in TI’s shrink small-outline package, which provides twice the I/O pin count and functionality of standard small-outline packages in the same printed-circuit-board area.

The 54ACT16825 is characterized for operation over the full military temperature range of –55°C to 125°C. The 74ACT16825 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE
(each 9-bit section)

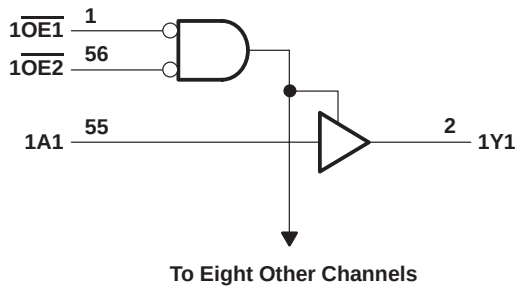
INPUTS			OUTPUT
$\overline{OE1}$	$\overline{OE2}$	A	Y
L	L	L	L
L	L	H	H
H	X	X	Z
X	H	X	Z

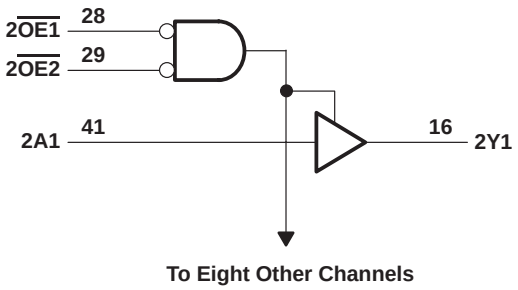
logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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 7 V
Input voltage range, V_I (see Note 1) . . . . . –0.5 V to V_{CC} + 0.5 V
Output voltage range, V_O (see Note 1) . . . . . –0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} (V_I < 0 or V_I > V_{CC}) . . . . . ±20 mA
Output clamp current, I_{OK} (V_O < 0 or V_O > V_{CC}) . . . . . ±50 mA
Continuous output current, I_O (V_O = 0 to V_{CC}) . . . . . ±50 mA
Continuous current through V_{CC} or GND . . . . . ±450 mA
Maximum package power dissipation at T_A = 55°C (in still air) (see Note 2): DL package . . . . . 1.4 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 maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils.

recommended operating conditions (see Note 3)

		54ACT16825			74ACT16825			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
V_I	Input voltage	0		V_{CC}	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	0		V_{CC}	V
I_{OH}	High-level output current			–24			–24	mA
I_{OL}	Low-level output current			24			24	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0		10	0		10	ns/V
T_A	Operating free-air temperature	–55		125	–40		85	°C

NOTE 3: Unused inputs must be held high or low to prevent them from floating.

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

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			54ACT16825		74ACT16825		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	I_{OH} = –50 μA	4.5 V	4.4			4.4		4.4		V
		5.5 V	5.4			5.4		5.4		
	I_{OH} = –24 mA	4.5 V	3.94			3.8		3.8		
		5.5 V	4.94			4.8		4.8		
	I_{OH} = –75 mA†	5.5 V				3.85		3.85		
V_{OL}	I_{OL} = 50 μA	4.5 V			0.1		0.1		0.1	V
		5.5 V			0.1		0.1		0.1	
	I_{OL} = 24 mA	4.5 V			0.36		0.44		0.44	
		5.5 V			0.36		0.44		0.44	
	I_{OL} = 75 mA†	5.5 V					1.65		1.65	
I_I	V_I = V_{CC} or GND	5.5 V			±0.1		±1		±1	μA
I_{OZ}	V_O = V_{CC} or GND	5.5 V			±0.5		±5		±5	μA
I_{CC}	V_I = V_{CC} or GND, I_O = 0	5.5 V			8		80		80	μA
ΔI_{CC}‡	One input at 3.4 V, Other inputs at V_{CC} or GND	5.5 V			0.9		1		1	mA
C_i	V_I = V_{CC} or GND	5 V		4						pF
C_o	V_O = V_{CC} or GND	5 V		16						pF

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.
‡ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V_{CC}.

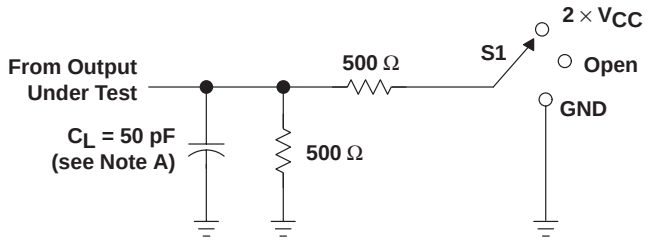
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			54ACT16825		74ACT16825		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	4.1	7.5	9.3	4.1	10.5	4.1	10.5	ns
t_{PHL}			3.1	7.5	9.6	3.1	10.3	3.1	10.3	
t_{PZH}	$\overline{OE}$	Y	3.3	7.9	9.9	3.3	11	3.3	11	ns
t_{PZL}			4.1	9.5	12.1	4.1	13.2	4.1	13.2	
t_{PHZ}	$\overline{OE}$	Y	5.7	9	10.8	5.7	11.5	5.7	11.5	ns
t_{PLZ}			5.5	8.5	10	5.5	10.6	5.5	10.6	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

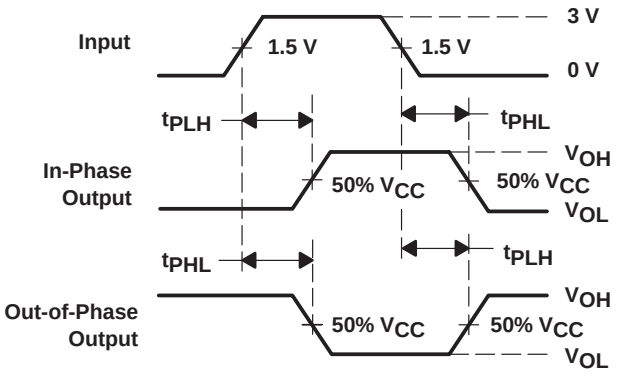
PARAMETER			TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance	Outputs enabled	C_L = 50 pF,	f = 1 MHz	42	pF
		Outputs disabled			12	

PARAMETER MEASUREMENT INFORMATION

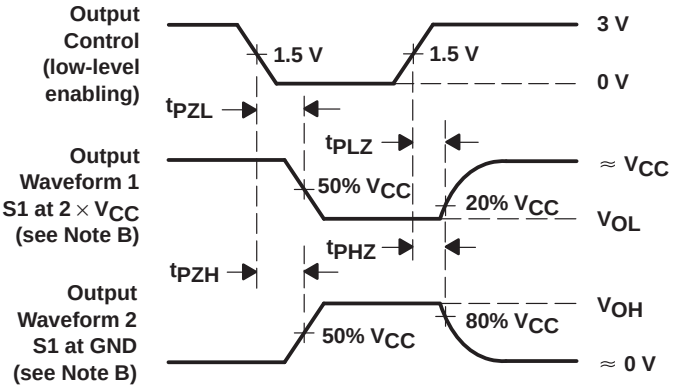


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 × V_{CC}
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT



VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig 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 ≤ 1 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
74ACT16825DL	LIFEBUY	SSOP	DL	56	20	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT16825	
74ACT16825DLR	ACTIVE	SSOP	DL	56	1000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ACT16825	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

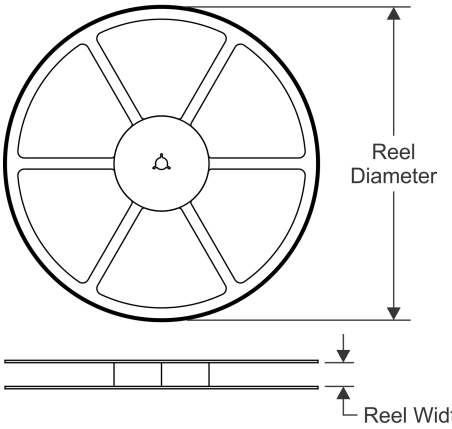
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

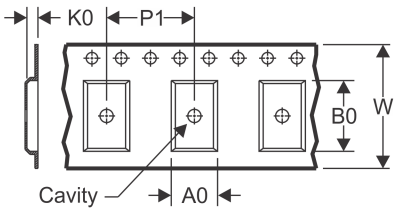
(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

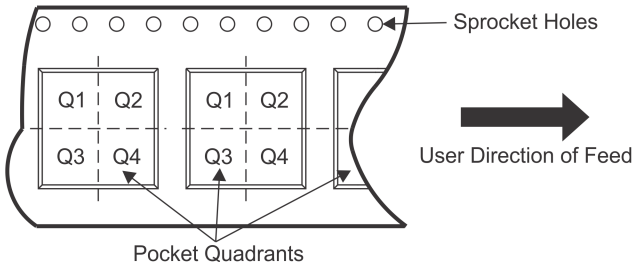


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

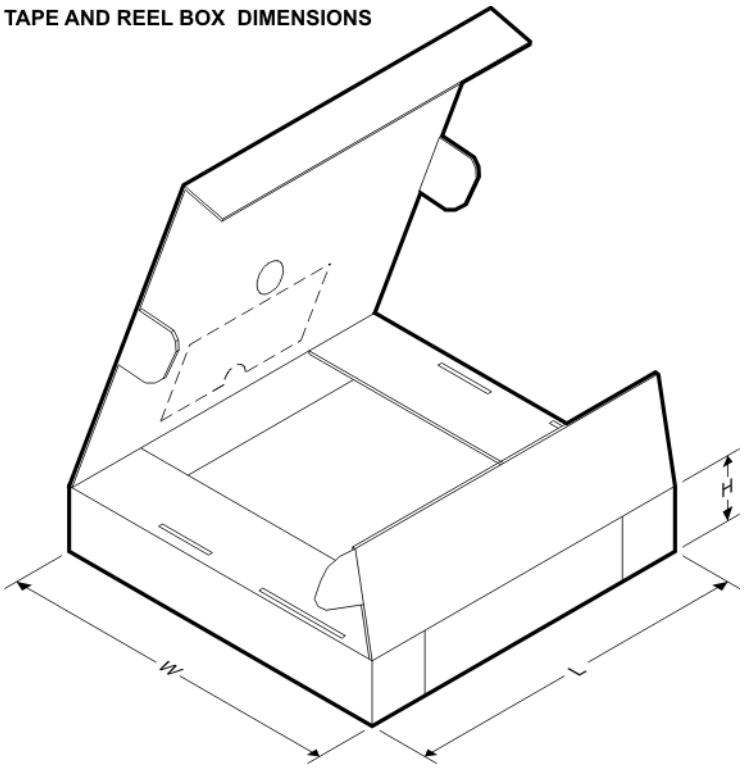
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
74ACT16825DLR	SSOP	DL	56	1000	330.0	32.4	11.35	18.67	3.1	16.0	32.0	Q1

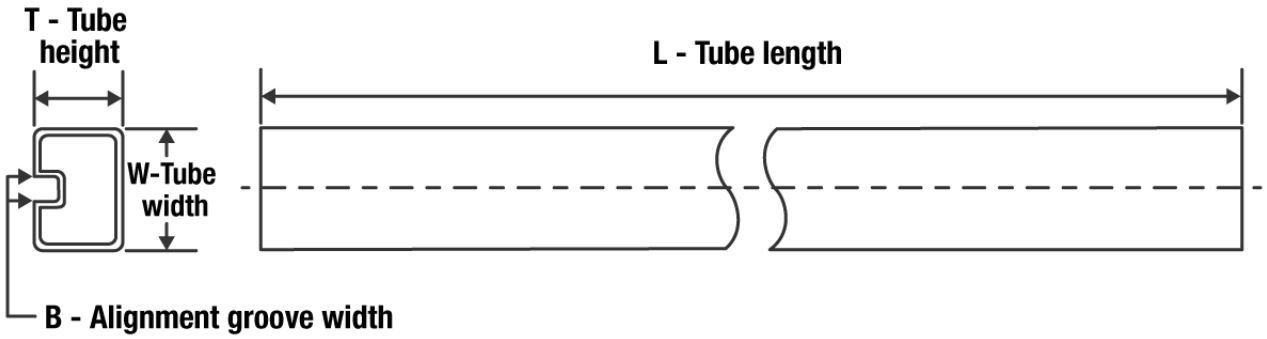
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
74ACT16825DLR	SSOP	DL	56	1000	367.0	367.0	55.0

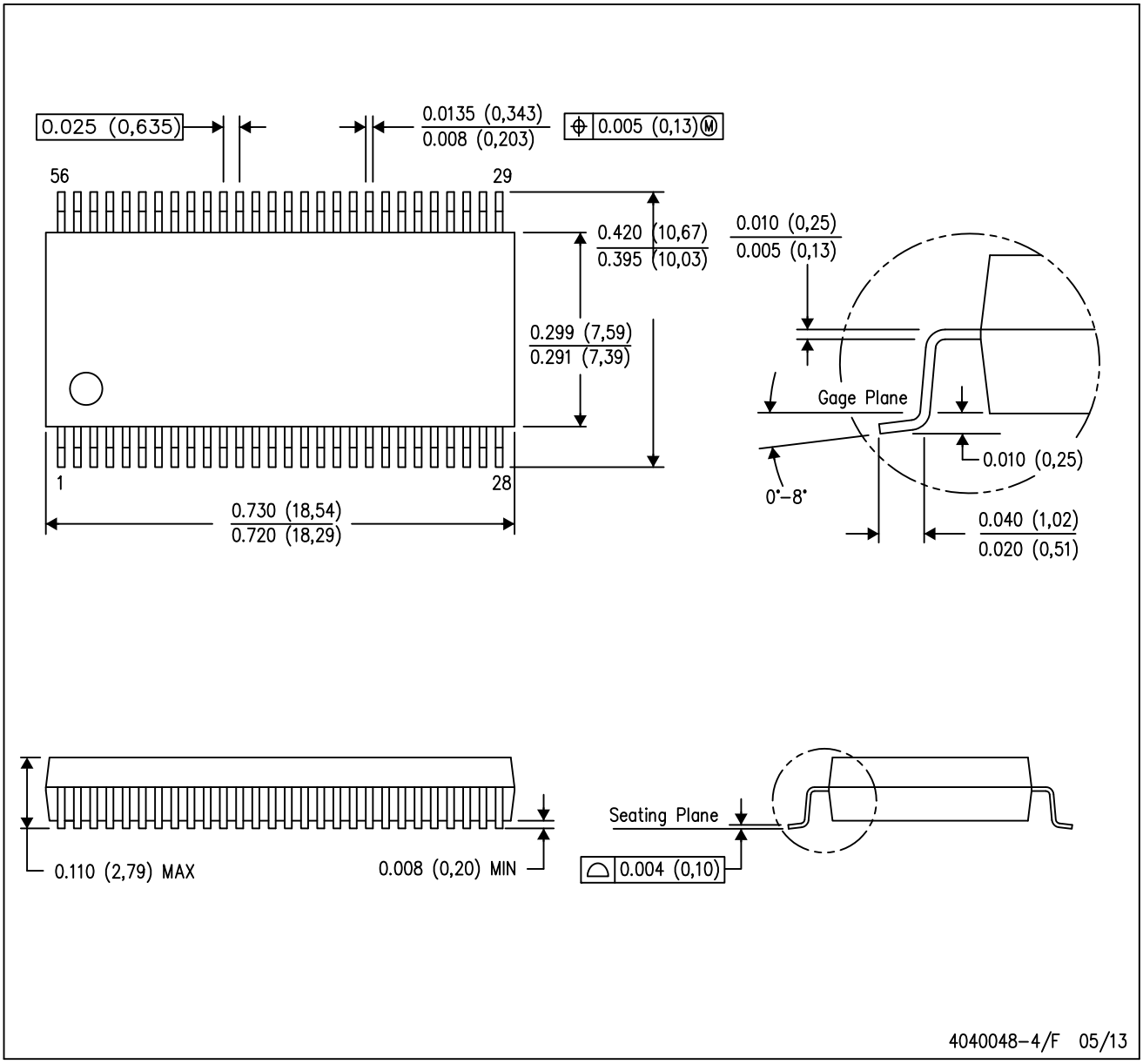
TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
74ACT16825DL	DL	SSOP	56	20	473.7	14.24	5110	7.87

DL (R–PDSO–G56) PLASTIC SMALL–OUTLINE PACKAGE



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
D. Falls within JEDEC MO–118

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