● **5-Ω Switch Connection Between Two Ports**

● **TTL-Compatible Input Levels**

D, DB, DBQ, OR PW PACKAGE
(TOP VIEW)

B4	1	16	V_{CC}
B3	2	15	B5
B2	3	14	B6
B1	4	13	B7
A	5	12	B8
NC	6	11	S0
$\overline{OE}$	7	10	S1
GND	8	9	S2

NC – No internal connection

RGY PACKAGE
(TOP VIEW)

B4 1 / V_{CC} 16

B3	2	15	B5
B2	3	14	B6
B1	4	13	B7
A	5	12	B8
NC	6	11	S0
$\overline{OE}$	7	10	S1

GND 8 / S2 9
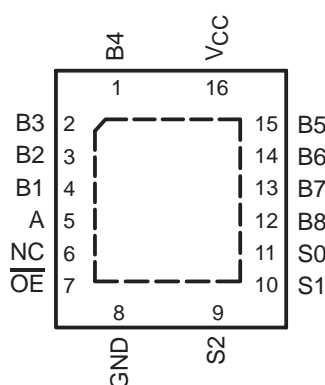
NC – No internal connection

description/ordering information

The SN74CBT3251 is a 1-of-8 high-speed TTL-compatible FET multiplexer/demultiplexer. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

When output enable ($\overline{OE}$) is low, the SN74CBT3251 is enabled. S0, S1, and S2 select one of the B outputs for the A-input data.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
−40°C to 85°C	QFN – RGY	Tape and reel	SN74CBT3251RGYR	CU251
	SOIC – D	Tube	SN74CBT3251D	CBT3251
		Tape and reel	SN74CBT3251DR	
	SSOP – DB	Tape and reel	SN74CBT3251DBR	CU251
	SSOP (QSOP) – DBQ	Tape and reel	SN74CBT3251DBQR	CU251
	TSSOP – PW	Tube	SN74CBT3251PW	CU251
		Tape and reel	SN74CBT3251PWR	

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

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TEXAS INSTRUMENTS

FUNCTION TABLE
(each multiplexer/demultiplexer)

INPUTS				FUNCTION
$\overline{OE}$	S2	S1	S0	
L	L	L	L	A port = B1 port
L	L	L	H	A port = B2 port
L	L	H	L	A port = B3 port
L	L	H	H	A port = B4 port
L	H	L	L	A port = B5 port
L	H	L	H	A port = B6 port
L	H	H	L	A port = B7 port
L	H	H	H	A port = B8 port
H	X	X	X	Disconnect

logic diagram (positive logic)
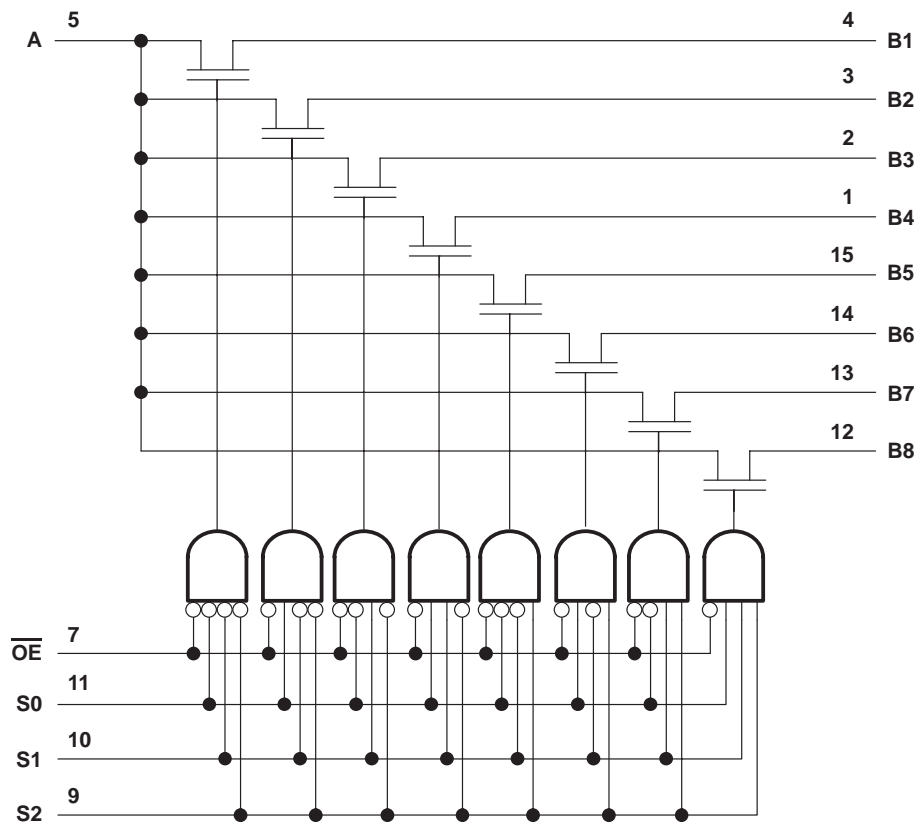
POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

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 7 V
Continuous channel current .... 128 mA
Input clamp current, I_K ($V_{I/O} < 0$) .... –50 mA
Package thermal impedance, θ_{JA} (see Note 2): D package .... 73°C/W
(see Note 2): DB package .... 82°C/W
(see Note 2): DBQ package .... 90°C/W
(see Note 2): PW package .... 108°C/W
(see Note 3): RGY package .... 39°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 negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51-7.
3. The package thermal impedance is calculated in accordance with JESD 51-5.

recommended operating conditions (see Note 4)

		MIN	MAX	UNIT
V_{CC}	Supply voltage	4	5.5	V
V_{IH}	High-level control input voltage	2		V
V_{IL}	Low-level control input voltage		0.8	V
T_A	Operating free-air temperature	–40	85	°C

NOTE 4: All unused control 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			MIN	TYP‡	MAX	UNIT
V_{IK}		V_{CC} = 4.5 V,	I_I = –18 mA				–1.2	V
I_I		V_{CC} = 5.5 V,	V_I = 5.5 V or GND				±1	µA
I_{CC}		V_{CC} = 5.5 V,	I_O = 0,	V_I = V_{CC} or GND			3	µA
ΔI_{CC}§	Control inputs	V_{CC} = 5.5 V,	One input at 3.4 V,	Other inputs at V_{CC} or GND			2.5	mA
C_i	Control inputs	V_I = 3 V or 0				3.5		pF
$C_{io(OFF)}$	A port	V_O = 3 V or 0,	$\overline{OE}$ = V_{CC}			17.5		pF
	B port					4		
r_{on}¶		V_{CC} = 4 V, TYP at V_{CC} = 4 V	V_I = 2.4 V,	I_I = 15 mA		14	20	Ω
		V_{CC} = 4.5 V	V_I = 0	I_I = 64 mA		5	7	
				I_I = 30 mA		5	7	
			V_I = 2.4 V,	I_I = 15 mA		10	15	

‡ All typical values are at V_{CC} = 5 V (unless otherwise noted), T_A = 25°C.
§ This is the increase in supply current for each input that is at the specified TTL voltage level, rather than V_{CC} or GND.
¶ Measured by the voltage drop between the A and the B terminals at the indicated current through the switch. On-state resistance is determined by the lower of the voltages of the two (A or B) terminals.

TEXAS INSTRUMENTS

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switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4 V		V_{CC} = 5 V $\pm$ 0.5 V		UNIT
			MIN	MAX	MIN	MAX	
t_{pd}†	A or B	B or A		0.35		0.25	ns
t_{pd}	S	A		6	2	5.5	ns
t_{en}	S	B		6.4	1.5	5.6	ns
	$\overline{OE}$	A or B		6.4	1.6	5.8	
t_{dis}	S	B		6.8	1.9	6.4	ns
	$\overline{OE}$	A or B		6	2.3	6.2	

† The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).

PARAMETER MEASUREMENT INFORMATION
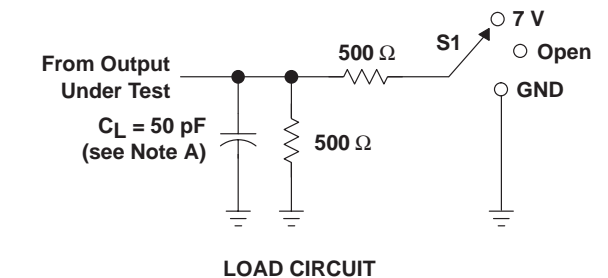
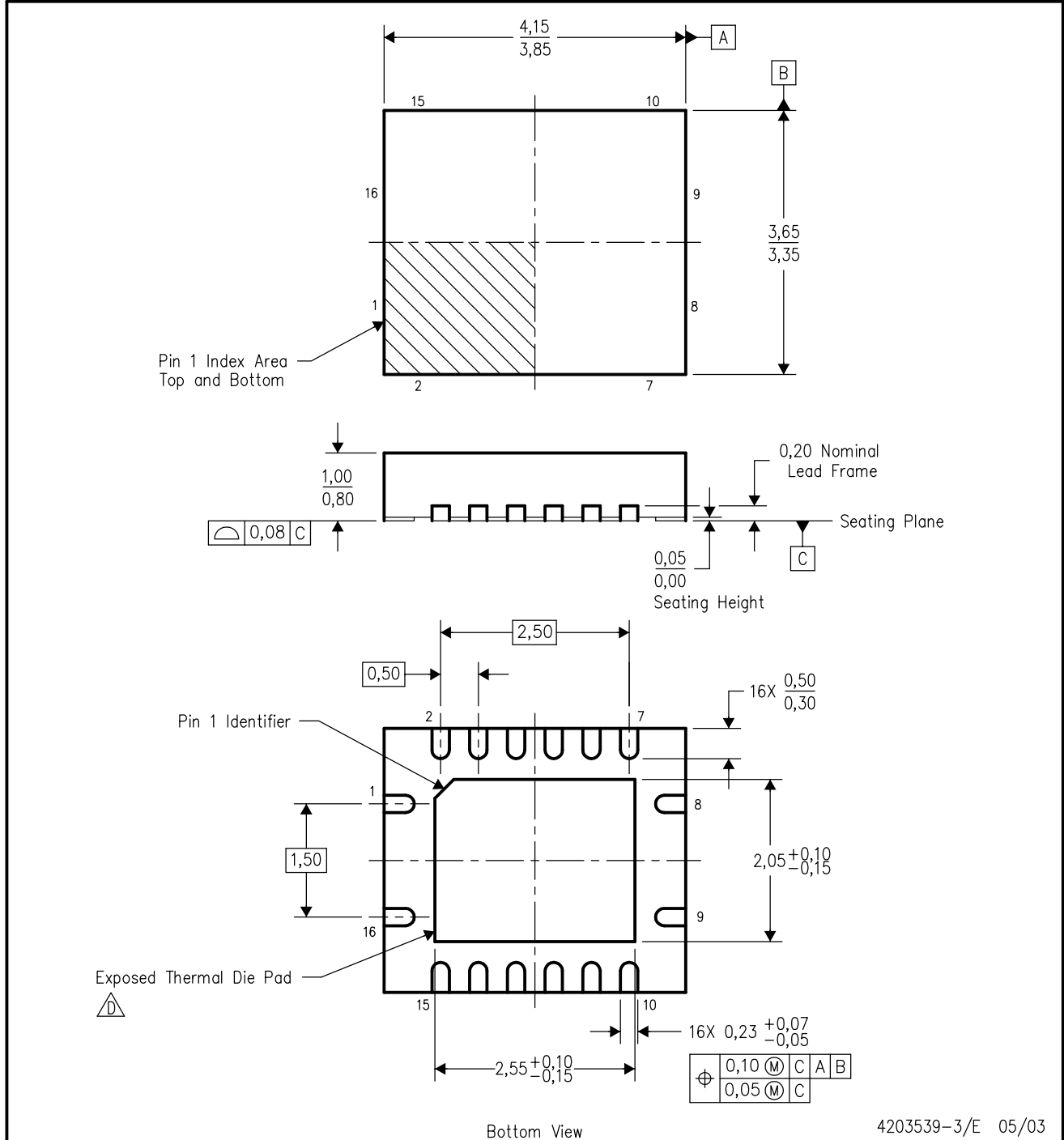| TEST	S1
t_{pd}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

Figure 1. Load Circuit and Voltage Waveforms
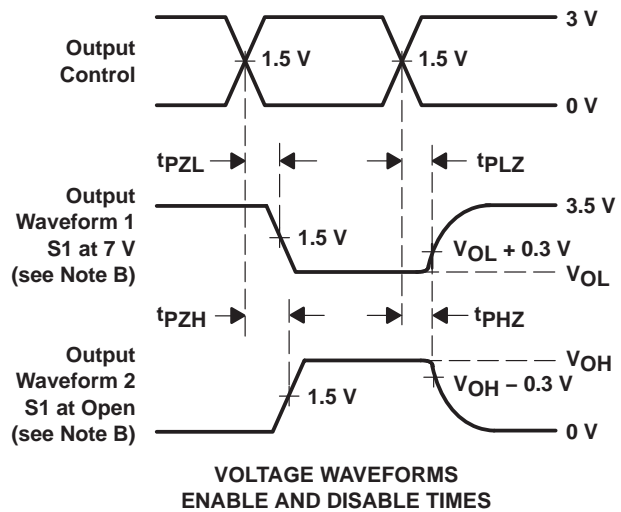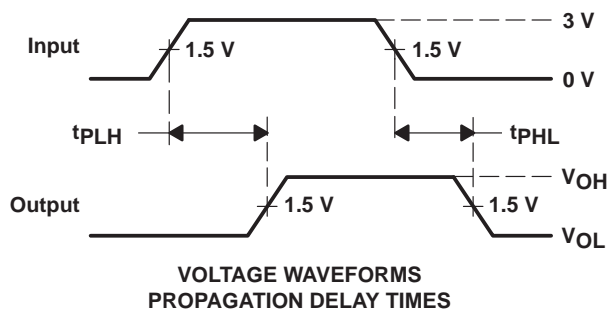
NOTES: A. C_L includes probe and jig capacitance.
  B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
  C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
  D. The outputs are measured one at a time with one transition per measurement.
  E. t_{PLZ} and t_{PHZ} are the same as t_{dis}.
  F. t_{PZL} and t_{PZH} are the same as t_{en}.
  G. t_{PLH} and t_{PHL} are the same as t_{pd}.
  H. All parameters and waveforms are not applicable to all devices.

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RGY (R−PQFP−N16)   **PLASTIC QUAD FLATPACK**

$\dfrac{4,15}{3,85}$ A

B

15   10

16   9

$\dfrac{3,65}{3,35}$

1   8

Pin 1 Index Area
Top and Bottom

2   7

$\dfrac{1,00}{0,80}$

0,20 Nominal
Lead Frame

0,08   C

Seating Plane

$\dfrac{0,05}{0,00}$
Seating Height

C

2,50

0,50

$16X \dfrac{0,50}{0,30}$

Pin 1 Identifier

2

7

1

8

1,50

$2,05 \, {}^{+0,10}_{-0,15}$

16

9

Exposed Thermal Die Pad

D

15   10

$16X \; 0,23 \, {}^{+0,07}_{-0,05}$

$2,55 \, {}^{+0,10}_{-0,15}$

⊕	0,10 Ⓜ	C	A	B
	0,05 Ⓜ	C		

Bottom View

4203539−3/E   05/03

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. QFN (Quad Flatpack No−Lead) package configuration.
D. The package thermal performance may be enhanced by bonding the thermal die pad to an external thermal plane. This pad is electrically and thermally connected to the backside of the die and possibly selected ground leads.
E. Package complies to JEDEC MO−241 variation BB.

D (R-PDSO-G**)   **PLASTIC SMALL-OUTLINE PACKAGE**

8 PINS SHOWN

| 0.050 (1,27) | | 0.020 (0,51) / 0.014 (0,35) | ⊕ | 0.010 (0,25) Ⓜ |

8   5

0.244 (6,20) / 0.228 (5,80)

0.157 (4,00) / 0.150 (3,81)

1   4

A

0.008 (0,20) NOM

Gage Plane

0.010 (0,25)

0°– 8°

0.044 (1,12) / 0.016 (0,40)

0.069 (1,75) MAX

0.010 (0,25) / 0.004 (0,10)

Seating Plane

| ◠ | 0.004 (0,10) |

DIM \ PINS **	8	14	16
A MAX	0.197 (5,00)	0.344 (8,75)	0.394 (10,00)
A MIN	0.189 (4,80)	0.337 (8,55)	0.386 (9,80)

4040047/E 09/01
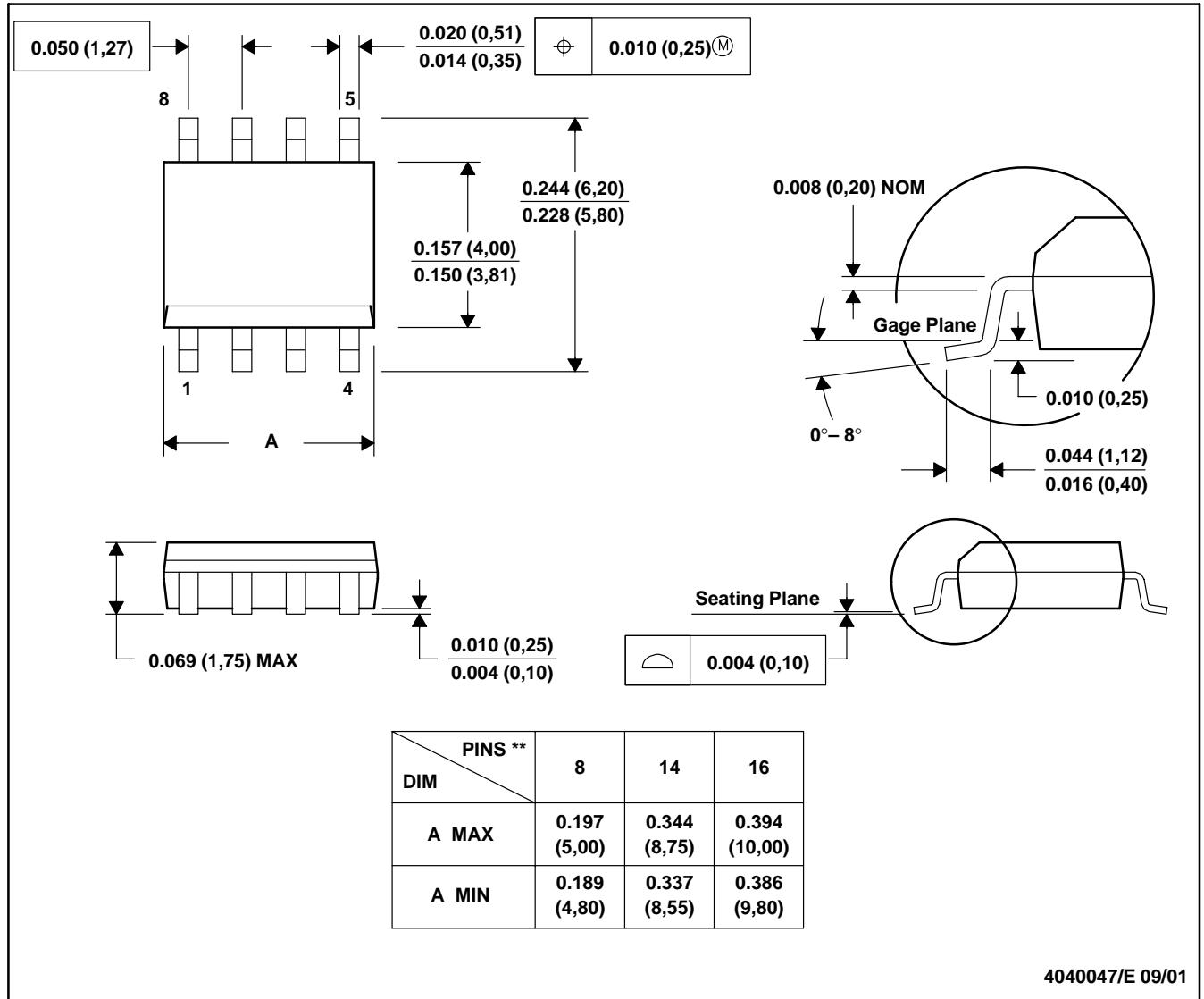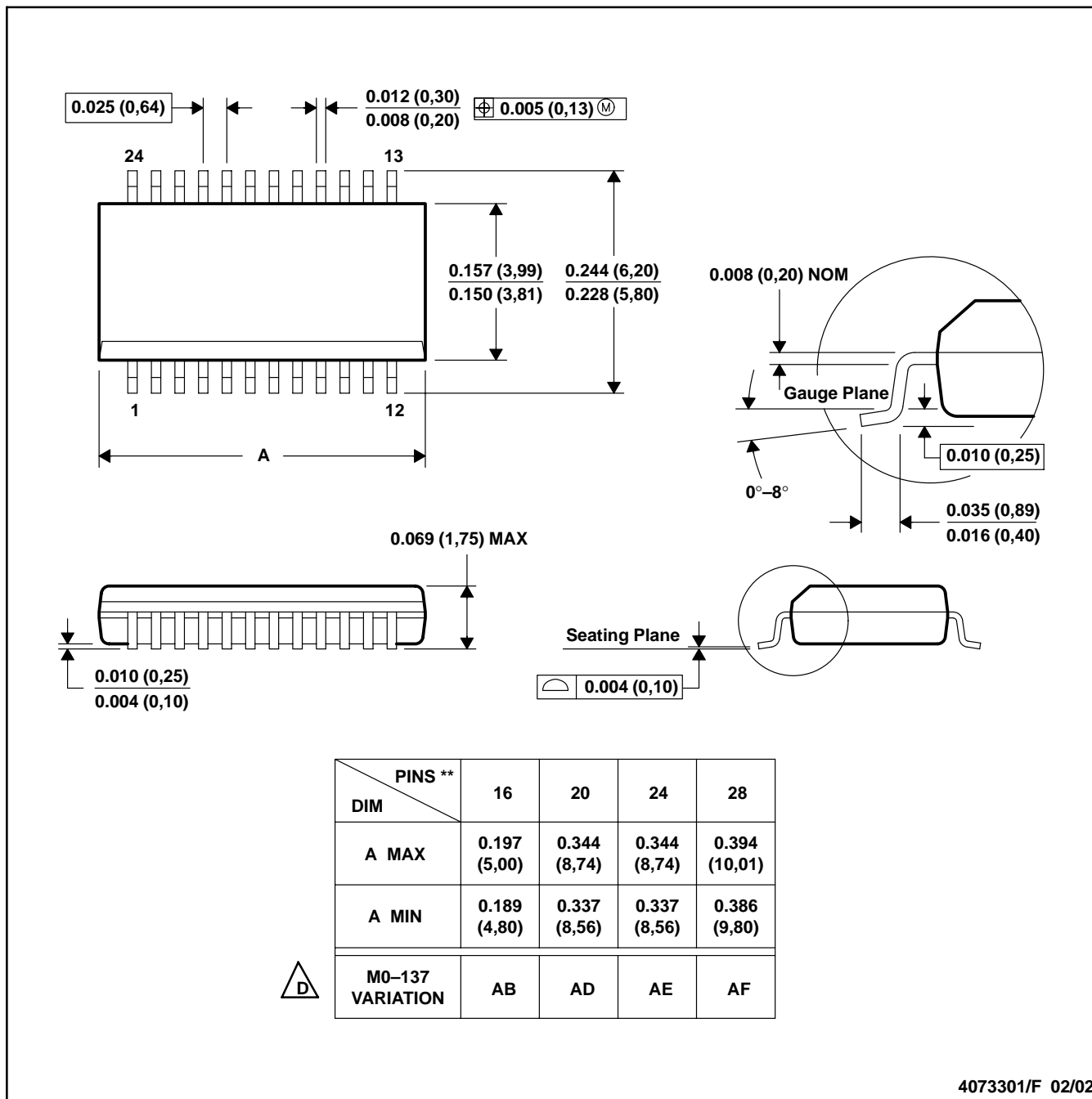
NOTES: A. All linear dimensions are in inches (millimeters).
      B. This drawing is subject to change without notice.
      C. Body dimensions do not include mold flash or protrusion, not to exceed 0.006 (0,15).
      D. Falls within JEDEC MS-012

DBQ (R–PDSO–G**)   **PLASTIC SMALL–OUTLINE PACKAGE**

0.025 (0,64)

0.012 (0,30)
0.008 (0,20)

⊕ 0.005 (0,13) Ⓜ

24   13

0.157 (3,99)   0.244 (6,20)
0.150 (3,81)   0.228 (5,80)

0.008 (0,20) NOM

Gauge Plane

1   12

0.010 (0,25)

A

0°–8°

0.035 (0,89)
0.016 (0,40)

0.069 (1,75) MAX

Seating Plane

0.010 (0,25)
0.004 (0,10)

△ 0.004 (0,10)

PINS ****** DIM	16	20	24	28
A MAX	0.197 (5,00)	0.344 (8,74)	0.344 (8,74)	0.394 (10,01)
A MIN	0.189 (4,80)	0.337 (8,56)	0.337 (8,56)	0.386 (9,80)
△D MO–137 VARIATION	AB	AD	AE	AF

4073301/F 02/02

NOTES: A.   All linear dimensions are in 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–137.

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MECHANICAL DATA

DB (R-PDSO-G)**   **PLASTIC SMALL-OUTLINE**

28 PINS SHOWN

PINS ** DIM	14	16	20	24	28	30	38
A MAX	6,50	6,50	7,50	8,50	10,50	10,50	12,90
A MIN	5,90	5,90	6,90	7,90	9,90	9,90	12,30

4040065 /E 12/01

NOTES: A. All linear dimensions are in millimeters.
          B. This drawing is subject to change without notice.
          C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
          D. Falls within JEDEC MO-150

PW (R-PDSO-G**)   **PLASTIC SMALL-OUTLINE PACKAGE**

14 PINS SHOWN

0,65

0,30
0,19

⊕ 0,10 Ⓜ

14   8

4,50
4,30

6,60
6,20

1   7

A

0,15 NOM

Gage Plane

0°−8°

0,25

0,75
0,50

1,20 MAX

0,15
0,05

Seating Plane

⌒ 0,10

DIM \ PINS **	8	14	16	20	24	28
A MAX	3,10	5,10	5,10	6,60	7,90	9,80
A MIN	2,90	4,90	4,90	6,40	7,70	9,60

4040064/F 01/97

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
D. Falls within JEDEC MO-153

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Mailing Address: Texas Instruments

Post Office Box 655303 Dallas, Texas 75265

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