

SN54CBT3383, SN74CBT3383 10-BIT FET BUS-EXCHANGE SWITCHES

SCDS003N – NOVEMBER 1992 – REVISED JANUARY 2004

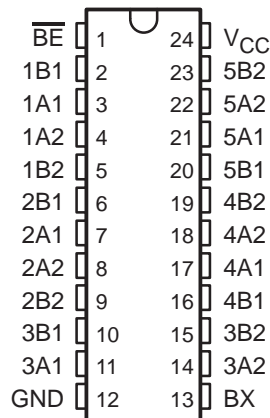
- 5-Ω Switch Connection Between Two Ports
- TTL-Compatible Input Levels

SN54CBT3383 . . . JT OR W PACKAGE
SN74CBT3383 . . . DB, DBQ, DGV, DW, OR PW PACKAGE
(TOP VIEW)

description/ordering information

The 'CBT3383 devices provide ten bits of high-speed TTL-compatible bus switching or exchanging. The low on-state resistance of the switch allows connections to be made with minimal propagation delay.

The devices operate as a 10-bit bus switch or a 5-bit bus exchanger, which provides swapping of the A and B pairs of signals. The bus-exchange function is selected when BX is high. The switches are connected when \overline{BE} is low.



ORDERING INFORMATION

TA	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	SOIC – DW	Tube	SN74CBT3383DW	CBT3383
		Tape and reel	SN74CBT3383DWR	
	SSOP – DB	Tape and reel	SN74CBT3383DBR	CU383
	SSOP (QSOP) – DBQ	Tape and reel	SN74CBT3383DBQR	CBT3383
	TSSOP – PW	Tube	SN74CBT3383PW	CU383
Tape and reel		SN74CBT3383PWR		
-55°C to 125°C	TVSOP – DGV	Tape and reel	SN74CBT3383DGV	CU383
	CDIP – JT	Tube	SNJ54CBT3383JT	SNJ54CBT3383JT
	CFP – W	Tube	SNJ54CBT3383W	SNJ54CBT3383W

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

FUNCTION TABLE

INPUTS		INPUTS/OUTPUTS	
\overline{BE}	BX	1A1–5A1	1A2–5A2
L	L	1B1–5B1	1B2–5B2
L	H	1B2–5B2	1B1–5B1
H	X	Z	Z



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS
INSTRUMENTS**

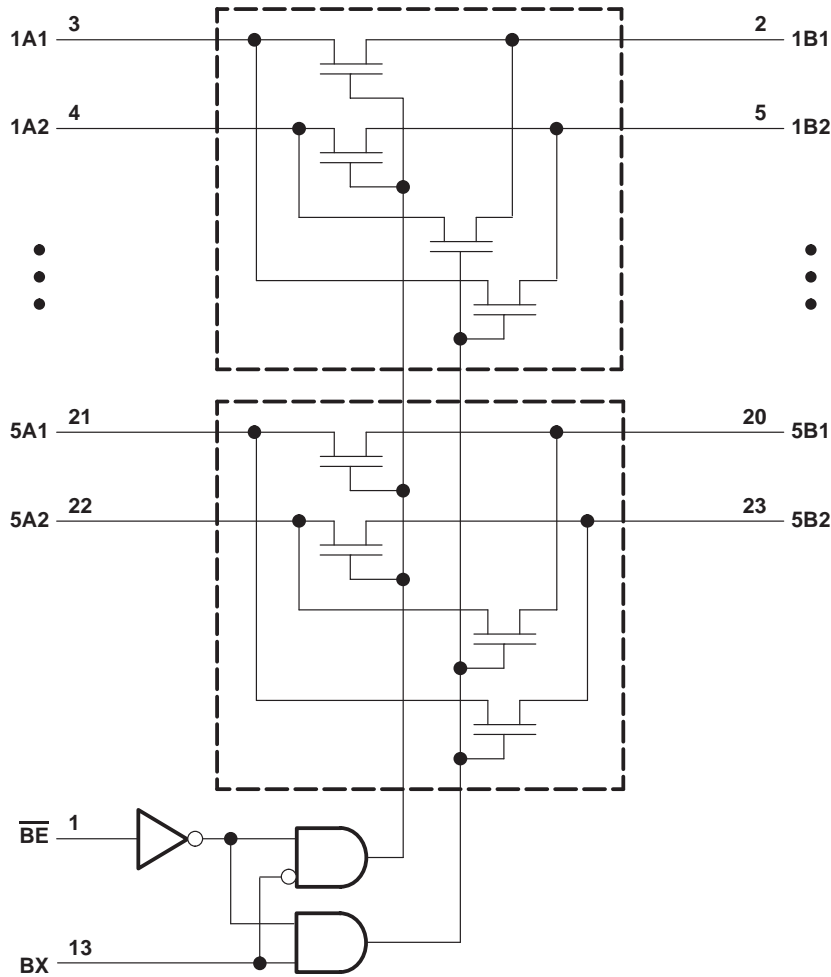
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2004, Texas Instruments Incorporated
On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

SN54CBT3383, SN74CBT3383 10-BIT FET BUS-EXCHANGE SWITCHES

SCDS003N – NOVEMBER 1992 – REVISED JANUARY 2004

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 7 V
Continuous channel current	128 mA
Input clamp current, I_{IK} ($V_{I/O} < 0$)	-50 mA
Package thermal impedance, θ_{JA} (see Note 2):	
DB package	63°C/W
DBQ package	61°C/W
DGV package	86°C/W
DW package	46°C/W
PW package	88°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.

SN54CBT3383, SN74CBT3383 10-BIT FET BUS-EXCHANGE SWITCHES

SCDS003N – NOVEMBER 1992 – REVISED JANUARY 2004

recommended operating conditions (see Note 3)

		SN54CBT3383		SN74CBT3383		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V_{IH}	High-level control input voltage	2		2		V
V_{IL}	Low-level control input voltage		0.8		0.8	V
T_A	Operating free-air temperature	-55	125	0	70	°C

NOTE 3: 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	SN54CBT3383		SN74CBT3383		UNIT		
		MIN	TYP†	MAX	MIN		TYP†	MAX
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.2		-1.2	V	
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 5.5\text{ V}$ or GND			±5		±1	μA	
I_{CC}	$V_{CC} = 5.5\text{ V}$, $I_O = 0$, $V_I = V_{CC}$ or GND			50		50	μA	
$\Delta I_{CC}‡$	Control inputs $V_{CC} = 5.5\text{ V}$, One input at 3.4 V, Other inputs at V_{CC} or GND			2.5		2.5	mA	
C_i	Control inputs $V_I = 3\text{ V}$ or 0					3	pF	
	$V_I = 2.5\text{ V}$			5				
$C_{iO}(\text{OFF})$	$V_O = 3\text{ V}$ or 0, $\overline{BE} = V_{CC}$					6	pF	
	$V_O = 2.5\text{ V}$, $\overline{BE} = V_{CC}$			6				
$r_{on}§$	$V_{CC} = 4.5\text{ V}$	$V_I = 0$	$I_I = 64\text{ mA}$	5	9.2	5	7	Ω
			$I_I = 30\text{ mA}$			5	7	
		$V_I = 2.4\text{ V}$, $I_I = 15\text{ mA}$	10	17	10	15		

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

‡ 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 input terminal and the output terminal at the indicated current through the switch. On-state resistance is determined by the lowest voltage of the two (A or B) terminals.

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN54CBT3383		SN74CBT3383		UNIT
			MIN	MAX	MIN	MAX	
$t_{pd}¶$	A or B	B or A		1.5		0.25	ns
t_{pd}	BX	A or B	1	10.2	1	9.2	ns
t_{en}	\overline{BE}	A or B	1	10.8	1	8.6	ns
t_{dis}	\overline{BE}	A or B	1	8.2	1	7.5	ns

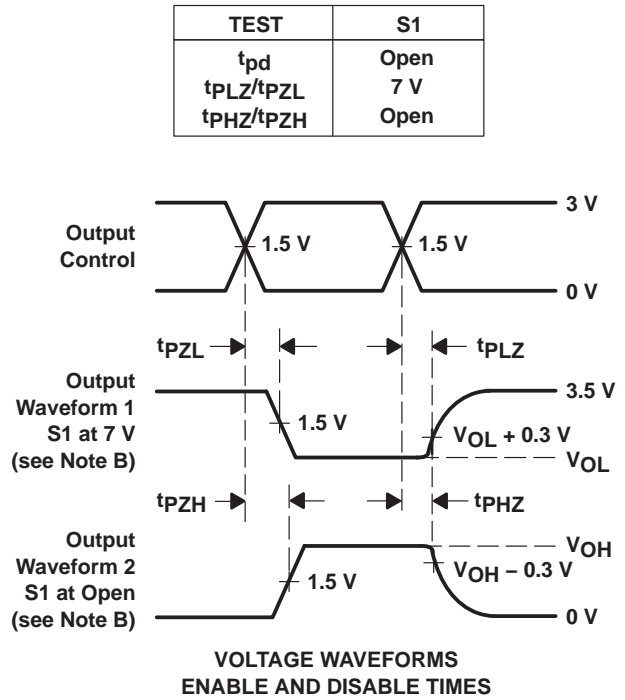
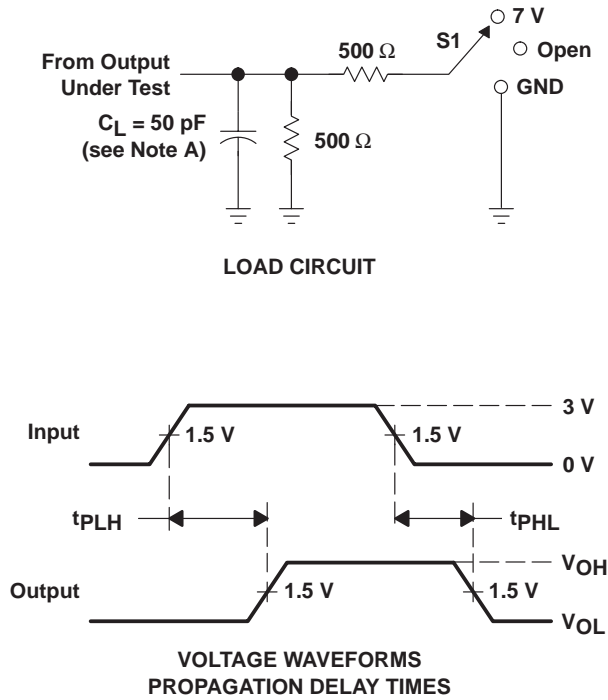
¶ The propagation delay is the calculated RC time constant of the typical on-state resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).



SN54CBT3383, SN74CBT3383 10-BIT FET BUS-EXCHANGE SWITCHES

SCDS003N – NOVEMBER 1992 – REVISED JANUARY 2004

PARAMETER MEASUREMENT INFORMATION



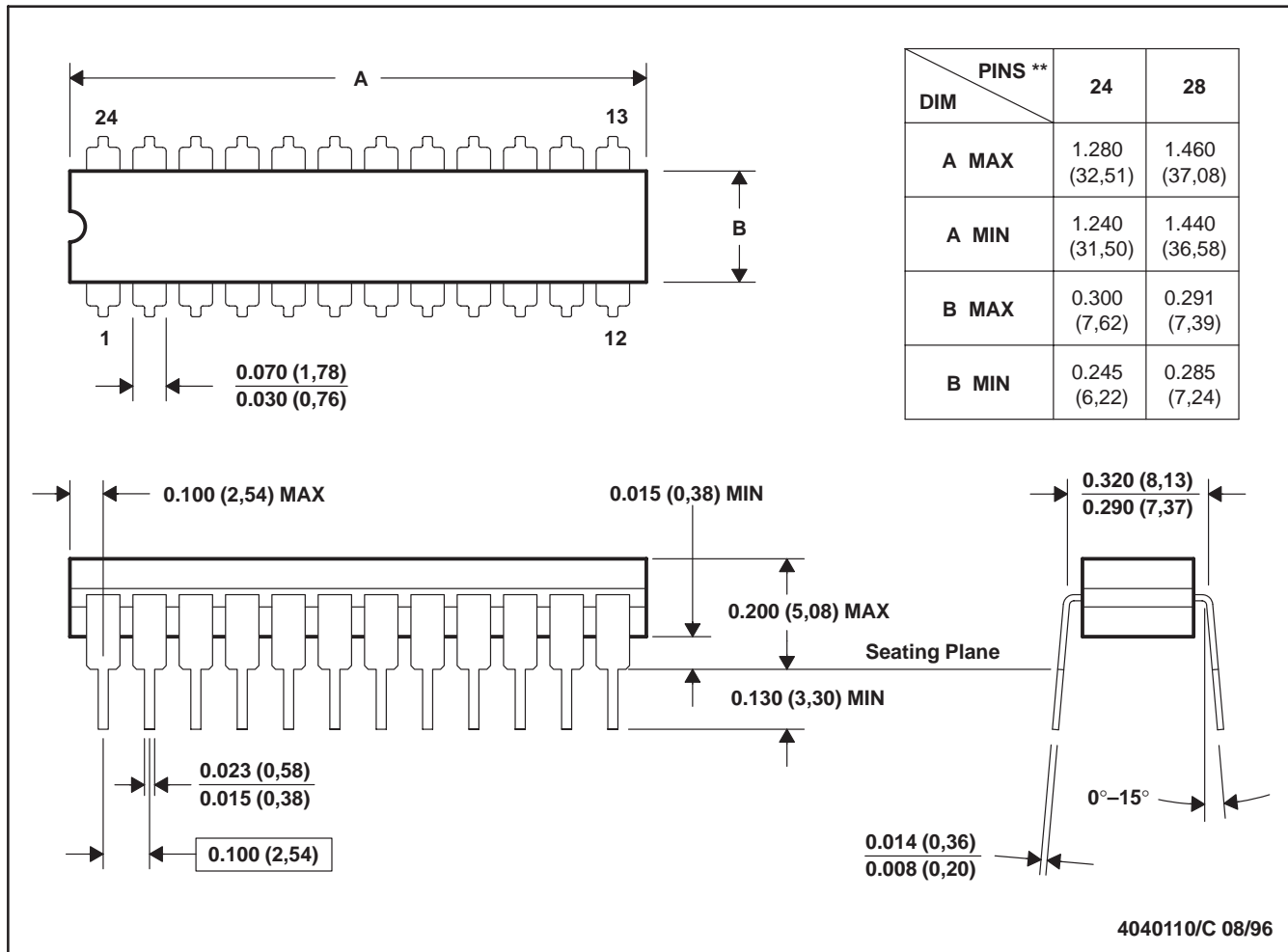
- NOTES:
- A. C_L includes probe and jig capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output 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_{PZL} 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}.

Figure 1. Load Circuit and Voltage Waveforms

JT (R-GDIP-T**)

CERAMIC DUAL-IN-LINE

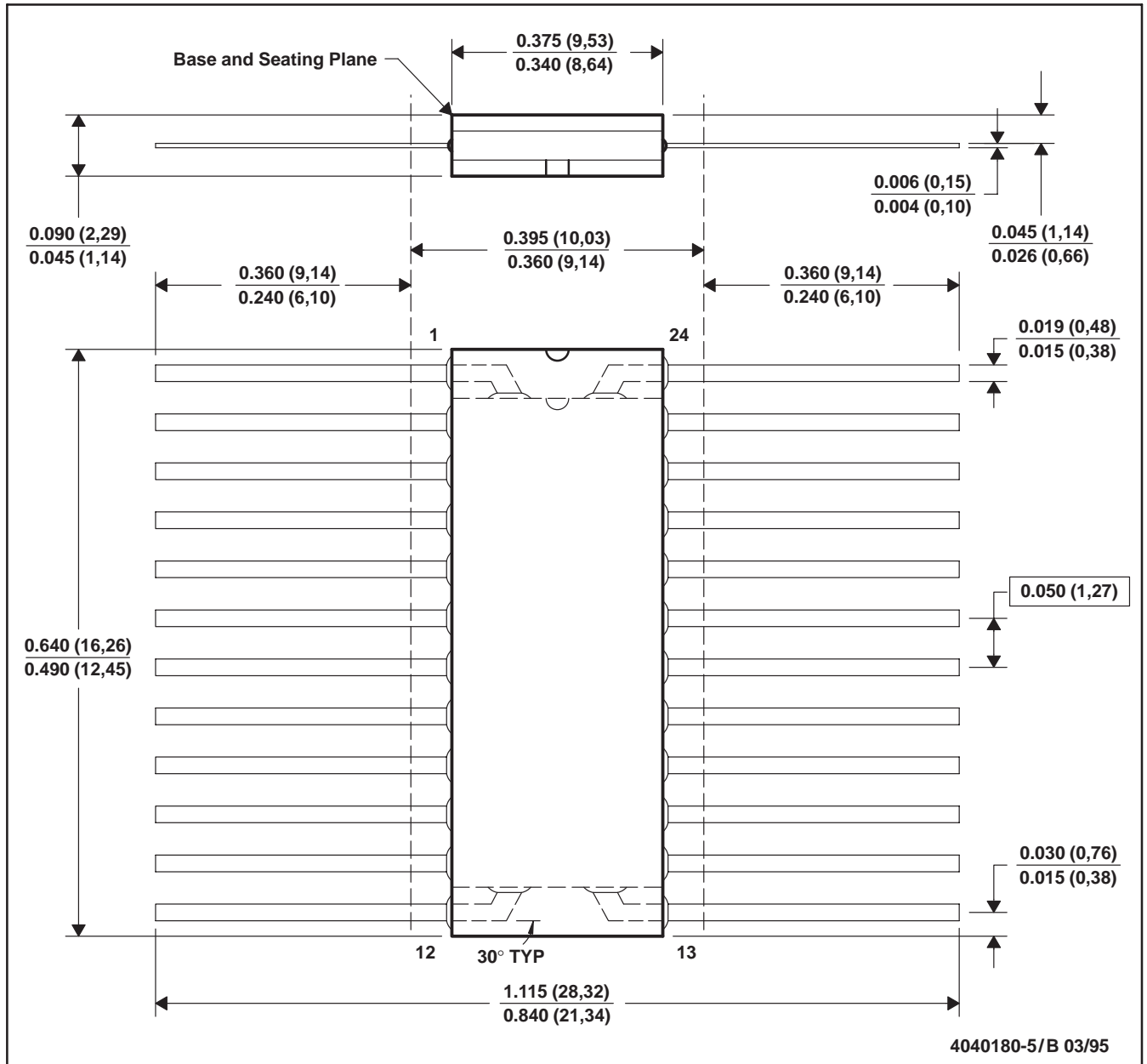
24 LEADS SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. This package can be hermetically sealed with a ceramic lid using glass frit.
 D. Index point is provided on cap for terminal identification.
 E. Falls within MIL STD 1835 GDIP3-T24, GDIP4-T28, and JEDEC MO-058 AA, MO-058 AB

W (R-GDFP-F24)

CERAMIC DUAL FLATPACK

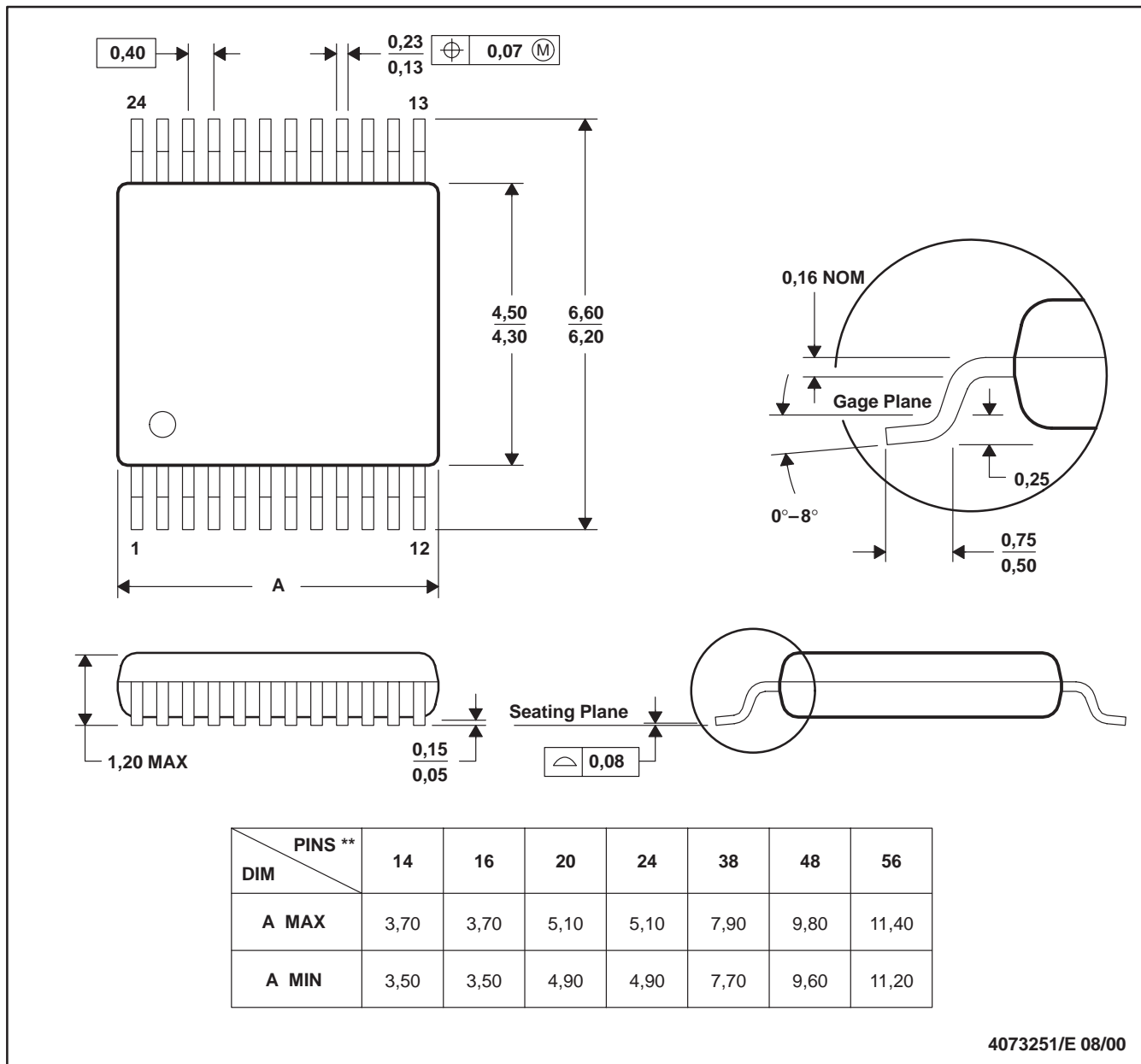


- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Falls within MIL-STD-1835 GDFP2-F24 and JEDEC MO-070AD
 - E. Index point is provided on cap for terminal identification only.

DGV (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN

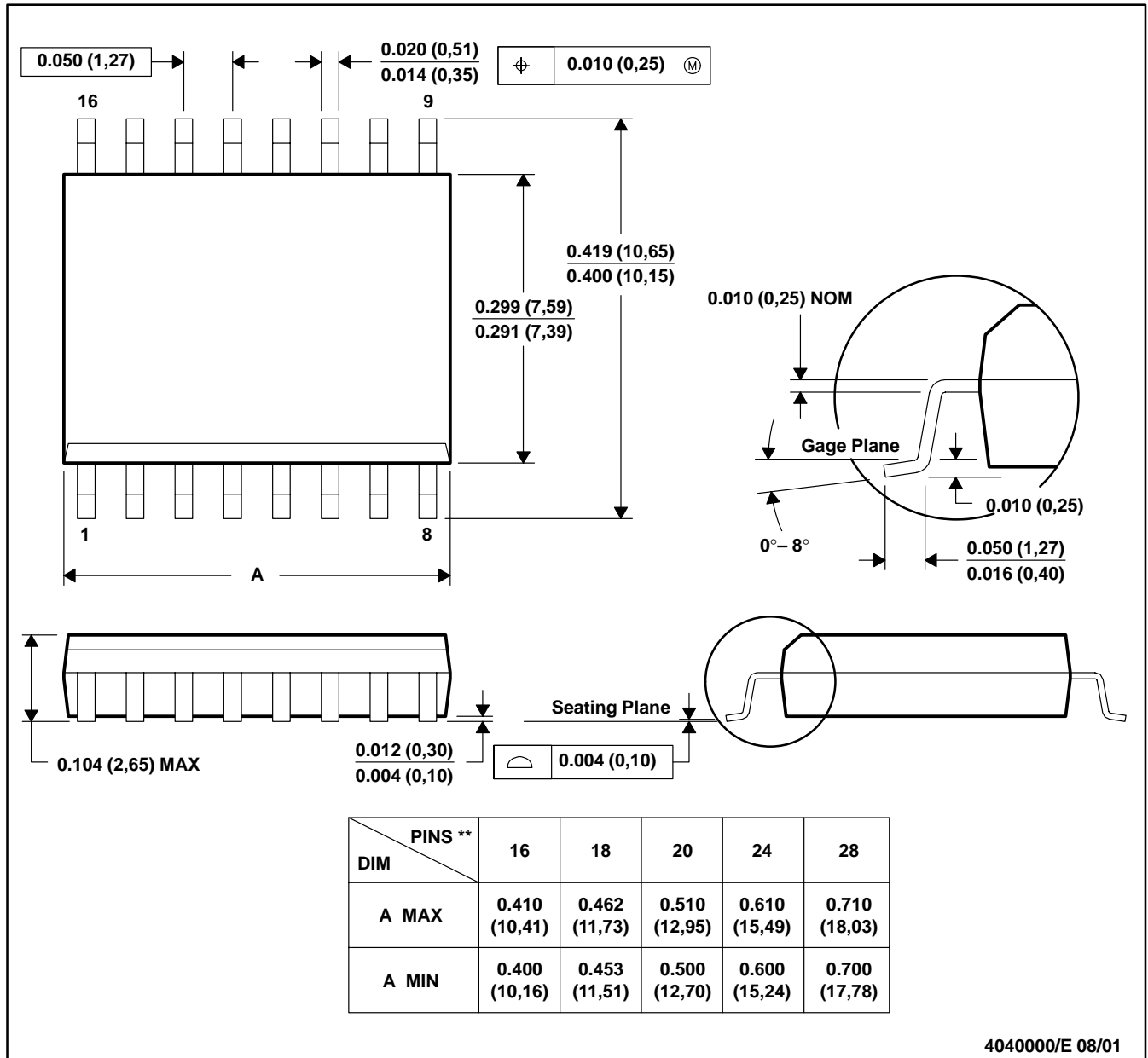


- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15 per side.
 D. Falls within JEDEC: 24/48 Pins – MO-153
 14/16/20/56 Pins – MO-194

DW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

16 PINS SHOWN



4040000/E 08/01

- 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-013

DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



- 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



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

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265