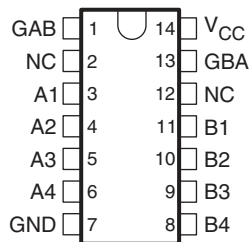


## QUADRUPLE BUS TRANSCEIVERS

### FEATURES

- Two-Way Asynchronous Communication Between Data Buses
- PNP Inputs Reduce D-C Loading
- Hysteresis (Typically 400 mV) at Inputs Improves Noise Margin

SN54LS243 . . . J OR W PACKAGE  
SN74LS243 . . . D, N, OR NS PACKAGE  
(TOP VIEW)



**FUNCTION TABLE  
(EACH TRANSCEIVER)**

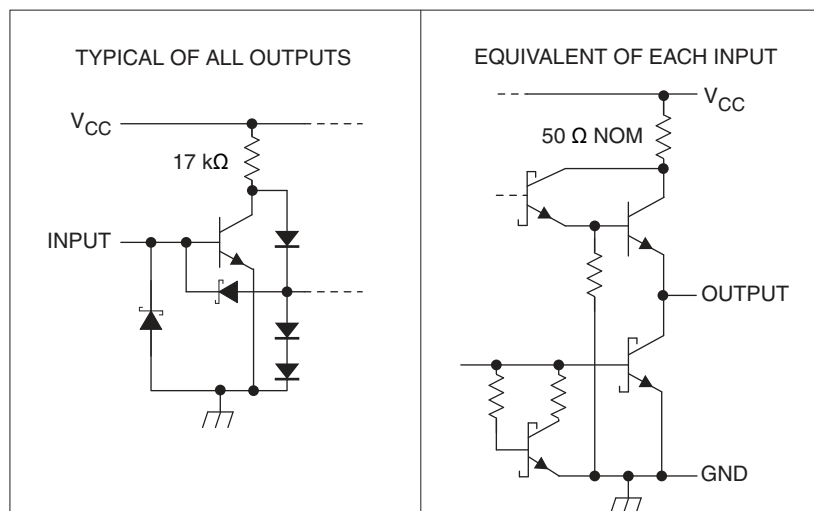
INPUTS		SNxxLS243
$\overline{\text{GAB}}$	GBA	
L	L	A to B
H	H	B to A
H	L	Isolation
L	H	Latch A and B (A = B)

### DESCRIPTION

These four-data-line transceivers are designed for asynchronous two-way communications between data buses. SN74LS243 can be used to drive terminated lines down to 133  $\Omega$ .

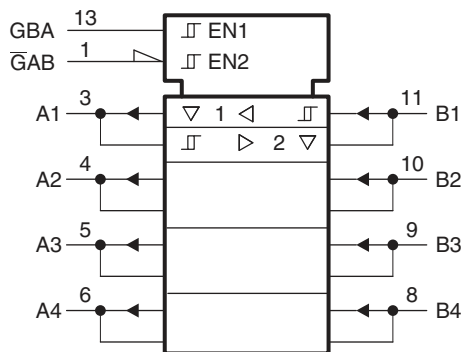
SN54LS243 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . SN74LS243 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

### SCHEMATICS OF INPUTS AND OUTPUTS



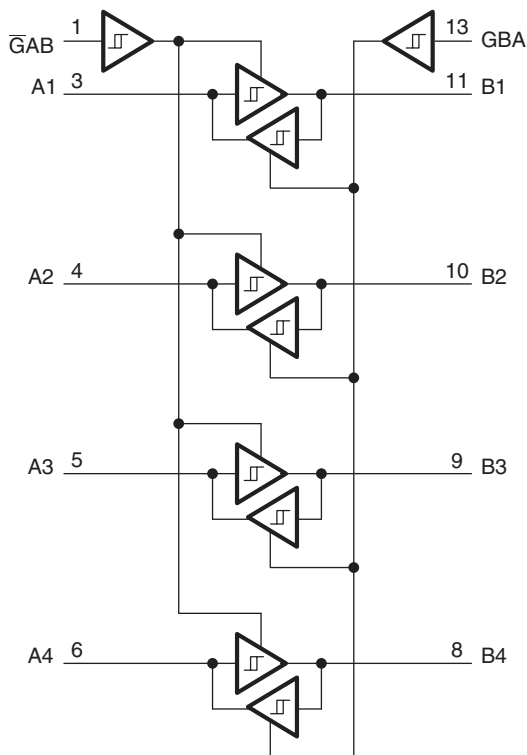
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**LOGIC SYMBOL**



A. These symbols are in accordance with ANSI/EEE Std. 91-1984 and IEC Publication 617-12.

**LOGIC DIAGRAM (POSITIVE LOGIC)**



**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

			MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage <sup>(2)</sup>			7	V
V <sub>IN</sub>	Input voltage			7	V
	OFF-state output voltage			5.5	V
T <sub>A</sub>	Operating free-air temperature range	SN54LS243	–55	125	°C
		SN74LS243	0	70	
T <sub>stg</sub>	Storage temperature range		–65	150	°C

- (1) 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.
- (2) Voltage values are with respect to network ground terminal.

**RECOMMENDED OPERATING CONDITIONS**

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

		SN54LS243			SN74LS243			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage <sup>(1)</sup>	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage			0.7			0.8	V
I <sub>OH</sub>	High-level output voltage			–12			–15	mA
I <sub>OL</sub>	Low-level output voltage			12			24	mA
T <sub>A</sub>	Operating free-air temperature	–55		125	0		70	°C

- (1) Voltage values are with respect to network ground terminal.

### ELECTRICAL CHARACTERISTICS

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

PARAMETER		TEST CONDITIONS <sup>(1)</sup>		SN54LS243			SN74LS243			UNIT
				MIN	TYP <sup>(2)</sup>	MAX	MIN	TYP <sup>(2)</sup>	MAX	
V <sub>IK</sub>	A or B	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA		-1.5			-1.5			V
Hysteresis (V <sub>T+</sub> - V <sub>T-</sub> )		V <sub>CC</sub> = MIN,		0.2	0.4		0.2	0.4		V
V <sub>OH</sub>		V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V,	V <sub>IL</sub> = MAX, I <sub>OH</sub> = -3 mA	2.4	3.1		2.4	3.1		V
			V <sub>IL</sub> = 0.5 V, I <sub>OH</sub> = MAX	2		2				
V <sub>OL</sub>		V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX	I <sub>OL</sub> = 12 mA	0.25 0.4		0.25 0.4				V
			I <sub>OL</sub> = 24 mA			0.35 0.5				
I <sub>OZH</sub>		V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX,	V <sub>O</sub> = 2.7 V		40			40		μA
I <sub>OZL</sub>		V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = MAX,	V <sub>O</sub> = 0.4 V		-200			-200		μA
I <sub>I</sub>	A or B	V <sub>CC</sub> = MAX,	V <sub>I</sub> = 5.5 V		0.1			0.1		mA
	$\overline{\text{GAB}}$ or GBA		V <sub>I</sub> = 7 V		0.1			0.1		
I <sub>IH</sub>		V <sub>CC</sub> = MAX,		20			20		μA	
I <sub>IL</sub>	A inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V, GAB and GBA at 0 V		-0.2			-0.2		mA	
	B inputs	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V, GAB and GBA at 4.5 V		-0.2			-0.2			
	$\overline{\text{GAB}}$ or GBA	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V,		-0.2			-0.2			
I <sub>OS</sub>		V <sub>CC</sub> = MAX		-40	-225		-40	-225		mA
I <sub>CC</sub>	Outputs high	V <sub>CC</sub> <sup>(3)</sup> = MAX,	Outputs open,		22	38		22	38	mA
	Outputs low				29	50		29	50	
	All outputs disabled				32	54		32	54	

- (1) For conditions shown as MIN or MAX, use the appropriate value specified under "recommended operating conditions."
- (2) All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.
- (3) I<sub>CC</sub> is measured with transceivers enabled in one direction only, or with all transceivers disabled.

### SWITCHING CHARACTERISTICS

V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C

PARAMETER	TEST CONDITIONS		SN54LS243			SN74LS243			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
t <sub>PLH</sub>	R <sub>L</sub> = 667 Ω, C <sub>L</sub> = 45 pF		9	14		12	18		ns
t <sub>PHL</sub>			12	18		12	18		ns
t <sub>PZL</sub>			20	30		20	30		ns
t <sub>PZH</sub>			15	23		15	23		ns
t <sub>PLZ</sub>	R <sub>L</sub> = 667 Ω, C <sub>L</sub> = 5 pF		10	20		10	20		ns
t <sub>PHZ</sub>			15	25		15	25		ns

PACKAGING INFORMATION

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
80020012A	OBSOLETE	LCCC	FK	20		TBD	Call TI	Call TI
8002001CA	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI
8002001DA	OBSOLETE	CFP	W	14		TBD	Call TI	Call TI
80020022A	OBSOLETE			20		TBD	Call TI	Call TI
8002002CA	ACTIVE	CDIP	J	14	1	TBD	A42 SNPB	N / A for Pkg Type
8002002DA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type
SN54LS243J	ACTIVE	CDIP	J	14	1	TBD	A42 SNPB	N / A for Pkg Type
SN74LS242D	OBSOLETE	SOIC	D	14		TBD	Call TI	Call TI
SN74LS242DR	OBSOLETE	SOIC	D	14		TBD	Call TI	Call TI
SN74LS242N	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN74LS243D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS243DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS243DG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS243DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS243DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS243DRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS243J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI
SN74LS243N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS243N3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN74LS243NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SNJ54LS243FK	OBSOLETE			20		TBD	Call TI	Call TI
SNJ54LS243J	ACTIVE	CDIP	J	14	1	TBD	A42 SNPB	N / A for Pkg Type
SNJ54LS243W	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type

<sup>(1)</sup> 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.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame

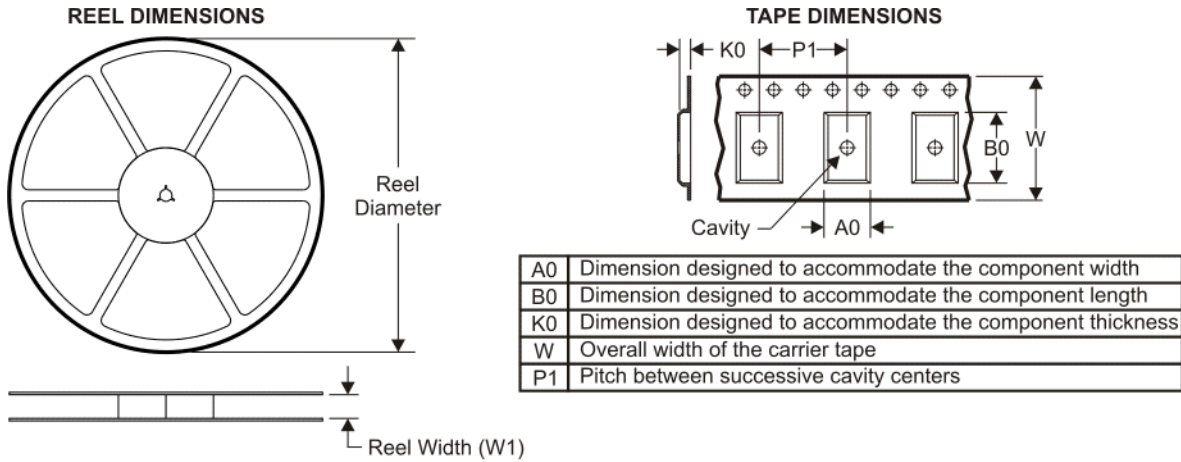
retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

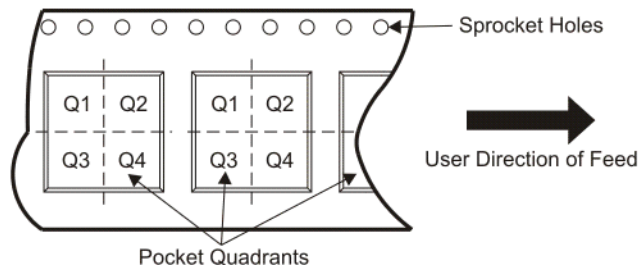
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**TAPE AND REEL INFORMATION**



**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
SN74LS243DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1

**TAPE AND REEL BOX DIMENSIONS**



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LS243DR	SOIC	D	14	2500	346.0	346.0	33.0



# J (R-GDIP-T\*\*)

14 LEADS SHOWN

# CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



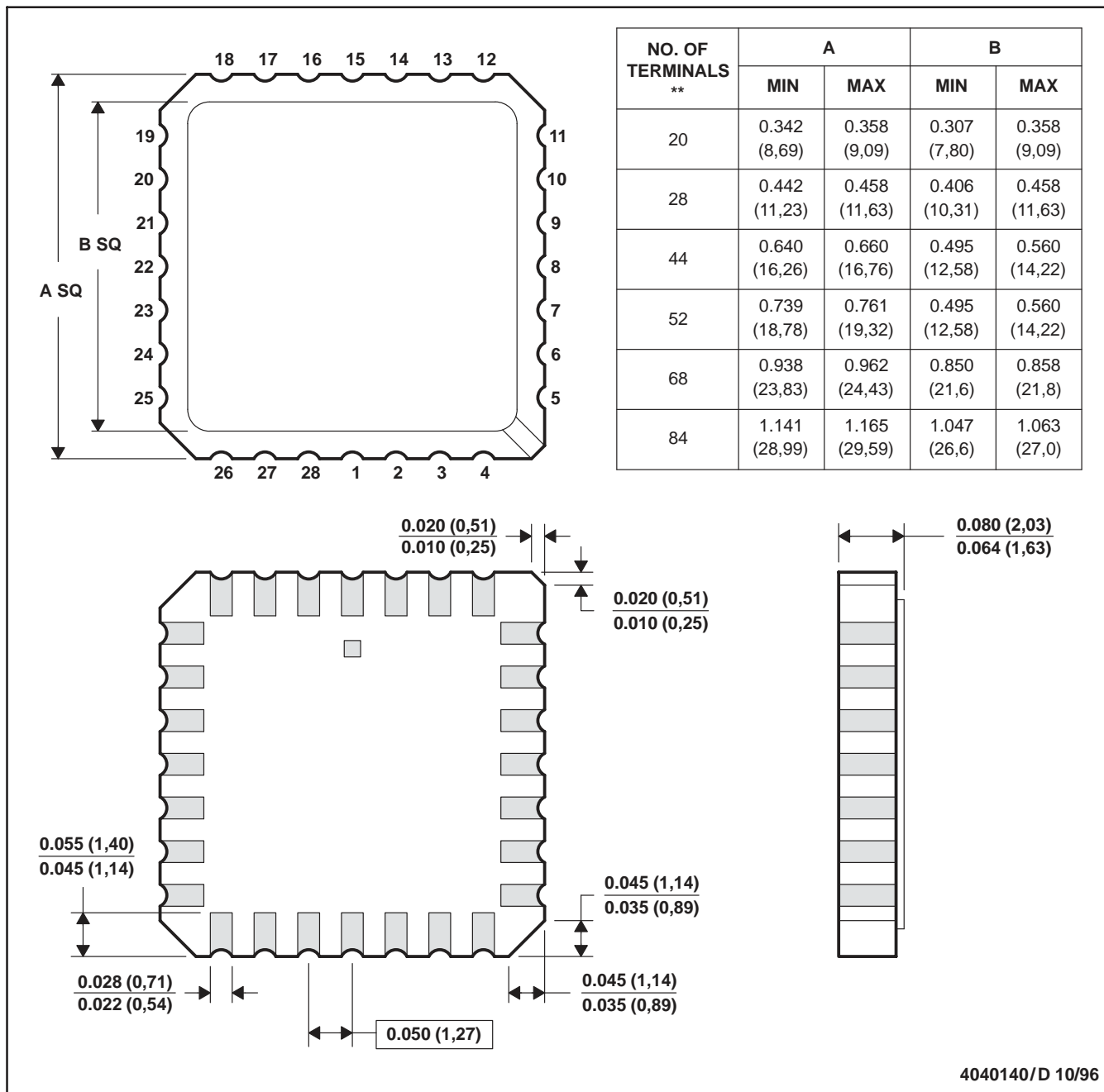
4040083/F 03/03

- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package is hermetically sealed with a ceramic lid using glass frit.
  - Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

FK (S-CQCC-N\*\*)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN

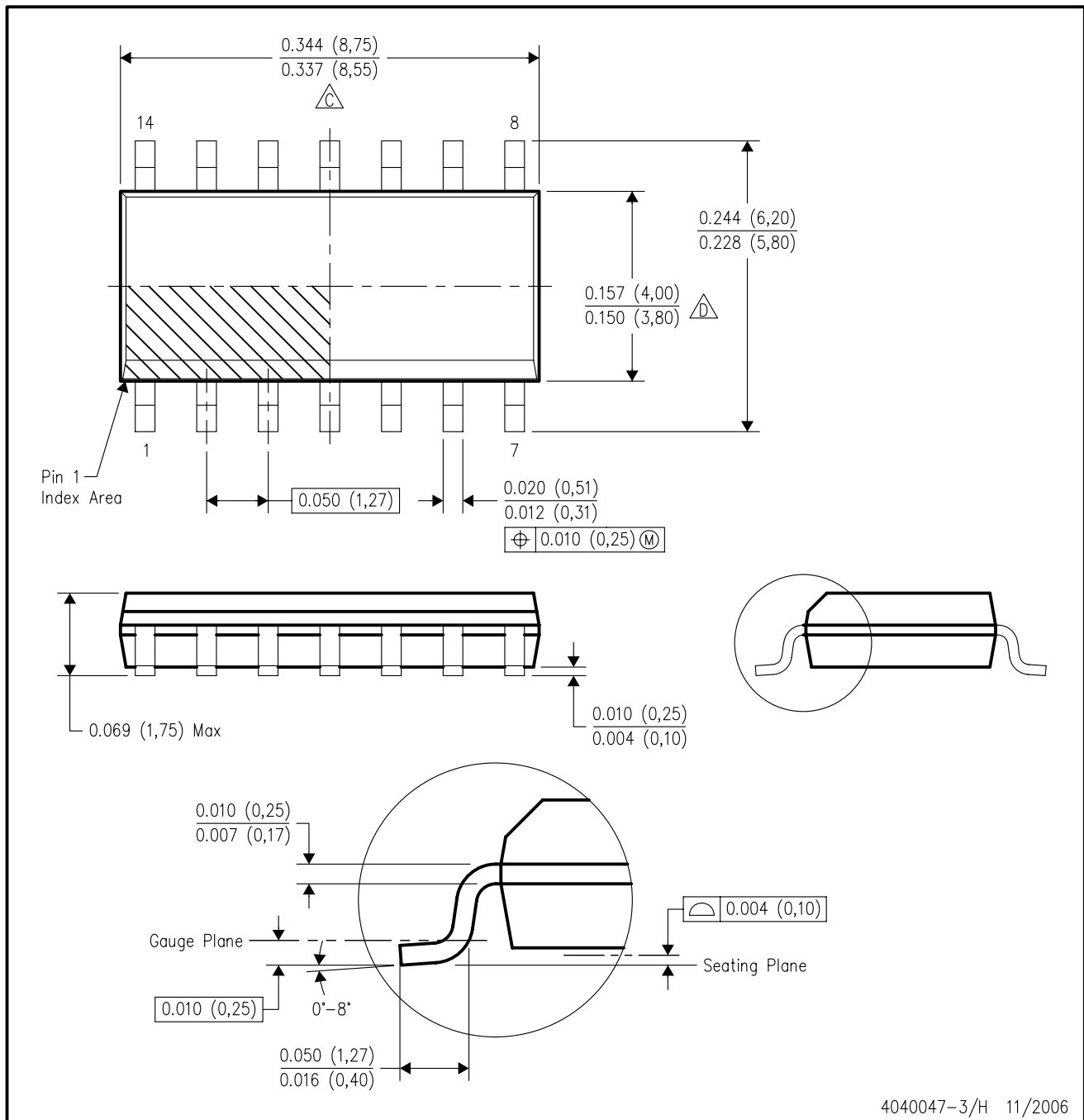


4040140/D 10/96

- 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 metal lid.
  - D. The terminals are gold plated.
  - E. Falls within JEDEC MS-004

D (R-PDSO-G14)

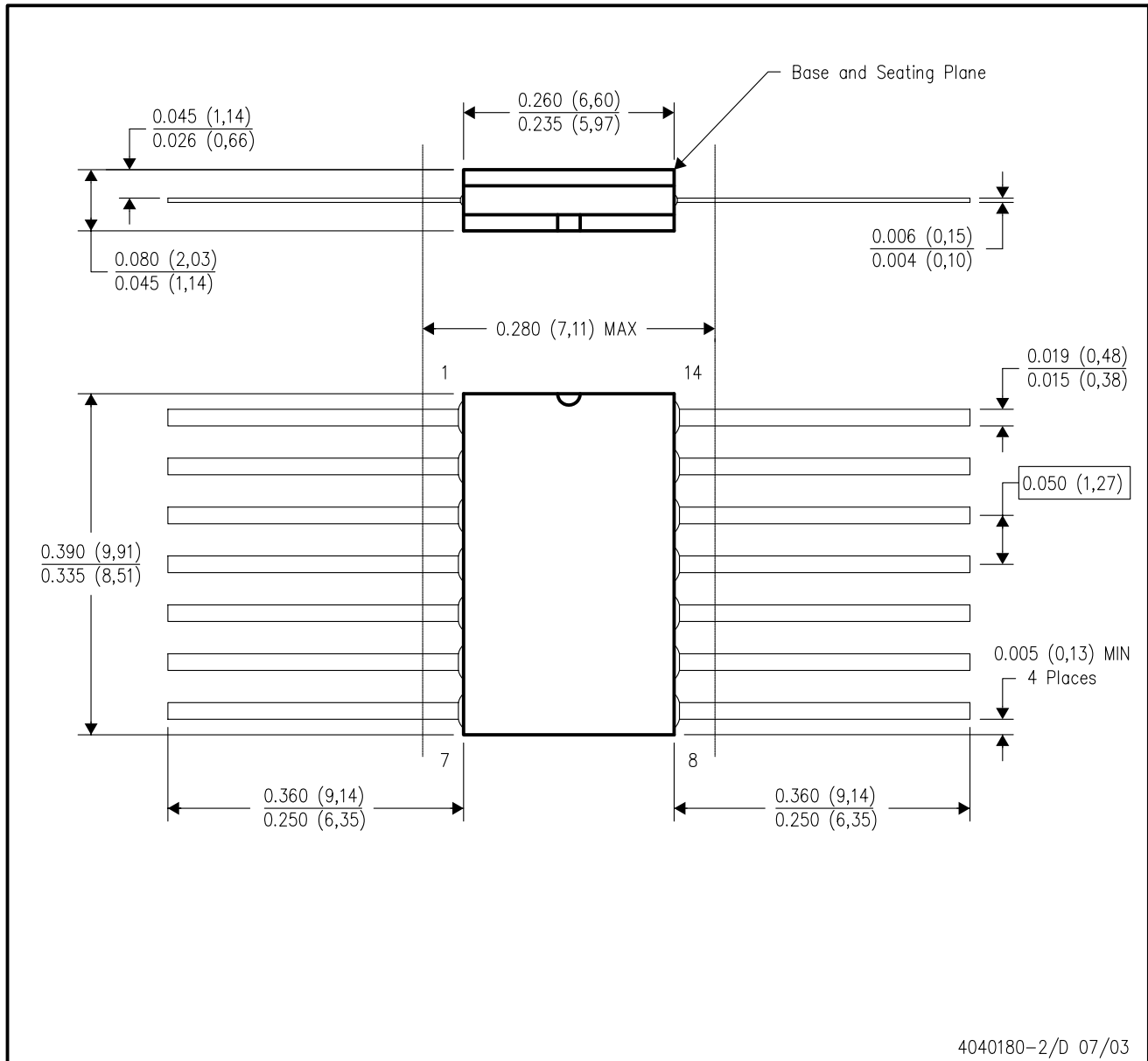
PLASTIC SMALL-OUTLINE PACKAGE



- 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 .006 (0,15) per end.
  - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
  - E. Reference JEDEC MS-012 variation AB.

W (R-GDFP-F14)

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. Index point is provided on cap for terminal identification only.
  - E. Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB

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