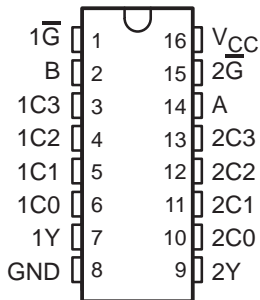


SN54HC153, SN74HC153 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

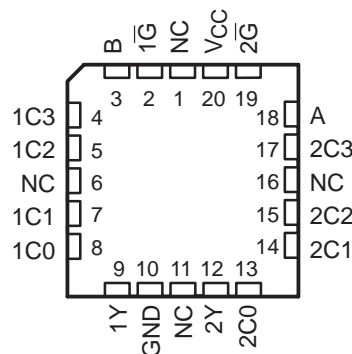
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- Wide Operating Voltage Range of 2 V to 6 V
- Outputs Can Drive Up To 15 LSTTL Loads
- Low Power Consumption, 80- μ A Max I_{CC}
- Typical $t_{pd} = 9$ ns
- ± 6 -mA Output Drive at 5 V
- Low Input Current of 1 μ A Max
- Permit Multiplexing from n Lines to One Line
- Perform Parallel-to-Serial Conversion
- Strobe (Enable) Line Provided for Cascading (N Lines to n Lines)

SN54HC153 . . . J OR W PACKAGE
SN74HC153 . . . D, N, NS, OR PW PACKAGE
(TOP VIEW)



SN54HC153 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

description/ordering information

Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate strobe (\bar{G}) inputs are provided for each of the two 4-line sections.

ORDERING INFORMATION

T _A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	PDIP – N	Tube of 25	SN74HC153N	SN74HC153N
	SOIC – D	Tube of 40	SN74HC153D	HC153
		Reel of 2500	SN74HC153DR	
		Reel of 250	SN74HC153DT	
	SOP – NS	Reel of 2000	SN74HC153NSR	HC153
	TSSOP – PW	Tube of 90	SN74HC153PW	HC153
Reel of 2000		SN74HC153PWR		
Reel of 250		SN74HC153PWT		
-55°C to 125°C	CDIP – J	Tube of 25	SNJ54HC153J	SNJ54HC153J
	CFP – W	Tube of 150	SNJ54HC153W	SNJ54HC153W
	LCCC – FK	Tube of 55	SNJ54HC153FK	SNJ54HC153FK

† 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**

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SN54HC153, SN74HC153 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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FUNCTION TABLE

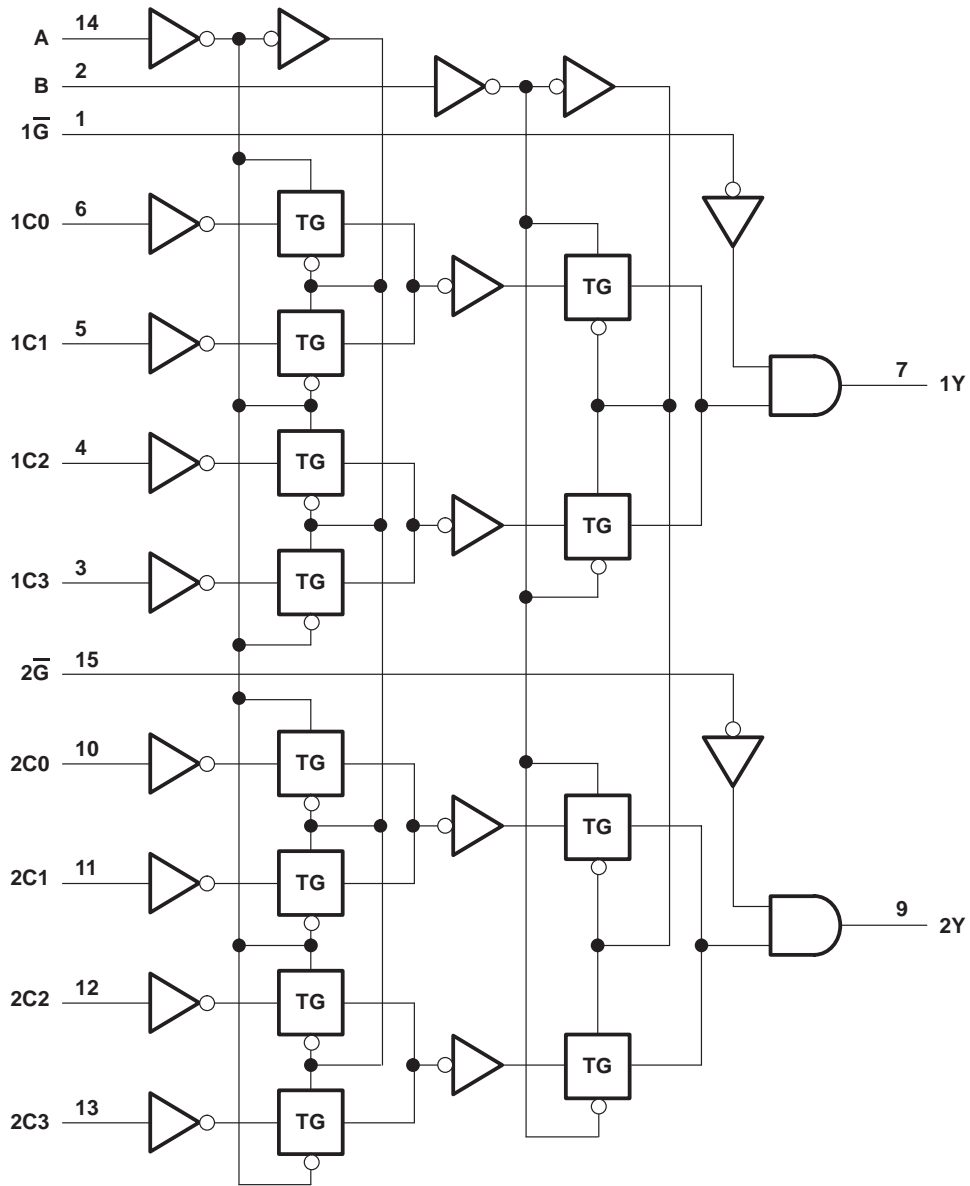
SELECT†		DATA				\bar{G}	OUTPUT Y
B	A	C0	C1	C2	C3		
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

† Select inputs A and B are common to both sections.

SN54HC153, SN74HC153 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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logic diagram (positive logic)



Pin numbers shown are for the D, J, N, NS, PW, and W packages.

SN54HC153, SN74HC153

DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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

Supply voltage range, V_{CC}	-0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see Note 1)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) (see Note 1)	± 20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 35 mA
Continuous current through V_{CC} or GND	± 70 mA
Package thermal impedance, θ_{JA} (see Note 2): D package	73°C/W
N package	67°C/W
NS package	64°C/W
PW package	108°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.

recommended operating conditions (see Note 3)

		SN54HC153			SN74HC153			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	2	5	6	2	5	6	V
V_{IH}	High-level input voltage	$V_{CC} = 2$ V		1.5	1.5		V	
		$V_{CC} = 4.5$ V		3.15	3.15			
		$V_{CC} = 6$ V		4.2	4.2			
V_{IL}	Low-level input voltage	$V_{CC} = 2$ V			0.5	0.5	V	
		$V_{CC} = 4.5$ V			1.35	1.35		
		$V_{CC} = 6$ V			1.8	1.8		
V_I	Input voltage	0		V_{CC}	0	V_{CC}	V	
V_O	Output voltage	0		V_{CC}	0	V_{CC}	V	
$\Delta t/\Delta v$	Input transition rise/fall time	$V_{CC} = 2$ V			1000	1000	ns	
		$V_{CC} = 4.5$ V			500	500		
		$V_{CC} = 6$ V			400	400		
T_A	Operating free-air temperature	-55		125	-40	85	°C	

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.



SN54HC153, SN74HC153 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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

PARAMETER	TEST CONDITIONS		V _{CC}	T _A = 25°C			SN54HC153		SN74HC153		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	V _I = V _{IH} or V _{IL}	I _{OH} = -20 μA	2 V	1.9	1.998		1.9		1.9	V	
			4.5 V	4.4	4.499		4.4		4.4		
			6 V	5.9	5.999		5.9		5.9		
		I _{OH} = -6 mA	4.5 V	3.98	4.3		3.7		3.84		
		I _{OH} = -7.8 mA	6 V	5.48	5.8		5.2		5.34		
V _{OL}	V _I = V _{IH} or V _{IL}	I _{OL} = 20 μA	2 V		0.002	0.1		0.1		0.1	V
			4.5 V		0.001	0.1		0.1		0.1	
			6 V		0.001	0.1		0.1		0.1	
		I _{OL} = 6 mA	4.5 V		0.17	0.26		0.4		0.33	
		I _{OL} = 7.8 mA	6 V		0.15	0.26		0.4		0.33	
I _I	V _I = V _{CC} or 0		6 V		±0.1	±100		±1000		±1000	nA
I _{CC}	V _I = V _{CC} or 0, I _O = 0		6 V			8		160		80	μA
C _i			2 V to 6 V		3	10		10		10	pF

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}	T _A = 25°C			SN54HC153		SN74HC153		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	Y	2 V		90	150		225		190	ns
			4.5 V		21	30		45		38	
			6 V		17	26		38		32	
	Data (Any C)	Y	2 V		73	126		189		158	
			4.5 V		17	28		42		35	
			6 V		14	23		35		29	
	\bar{G}	Y	2 V		38	95		150		125	
			4.5 V		11	19		28		24	
			6 V		9	16		24		20	
t _t		Y	2 V		20	60		90		75	ns
			4.5 V		8	12		18		15	
			6 V		6	10		15		13	



SN54HC153, SN74HC153 DUAL 4-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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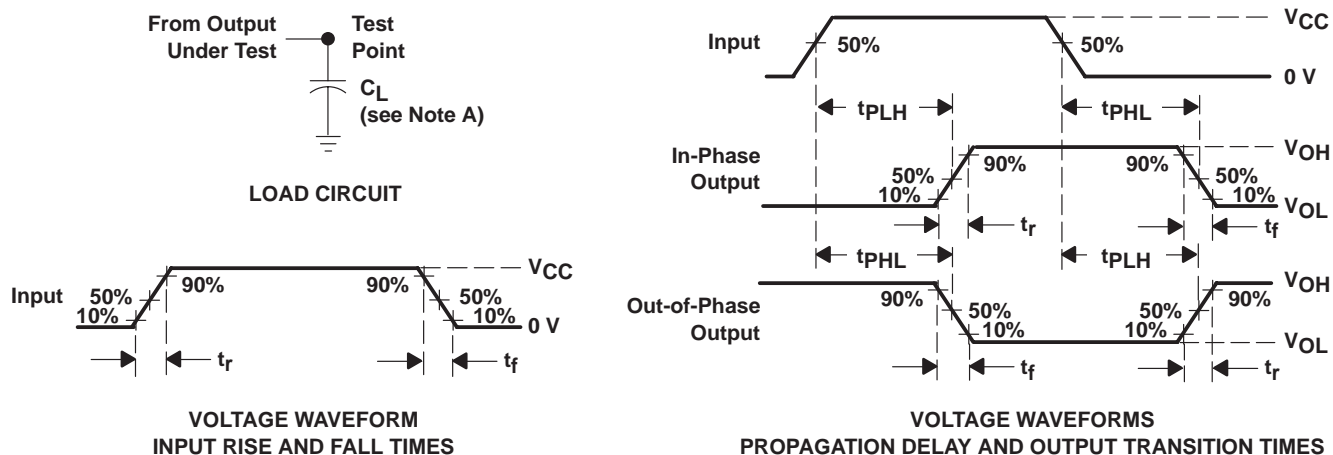
switching characteristics over recommended operating free-air temperature range, $C_L = 150$ pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC}	$T_A = 25^\circ\text{C}$			SN54HC153		SN74HC153		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A or B	Y	2 V		105	235		355		295	ns
			4.5 V		27	47		71		59	
			6 V		21	41		60		51	
	Data (Any C)	Y	2 V		93	220		335		274	
			4.5 V		23	44		67		55	
			6 V		19	38		57		48	
	\bar{G}	Y	2 V		60	185		280		230	
			4.5 V		17	37		56		46	
			6 V		14	32		48		40	
t_t		Y	2 V		45	210		315		265	ns
			4.5 V		17	42		63		53	
			6 V		13	36		53		45	

operating characteristics, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
C_{pd} Power dissipation capacitance per multiplexer	No load	40	pF

PARAMETER MEASUREMENT INFORMATION



- NOTES:
- A. C_L includes probe and test-fixture capacitance.
 - B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O = 50 \Omega$, $t_r = 6$ ns, $t_f = 6$ ns.
 - C. The outputs are measured one at a time with one input transition per measurement.
 - D. t_{PLH} and t_{PHL} are the same as t_{pd} .

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
84093012A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
8409301EA	ACTIVE	CDIP	J	16	1	None	Call TI	Level-NC-NC-NC
8409301FA	ACTIVE	CFP	W	16	1	None	Call TI	Level-NC-NC-NC
SN54HC153J	ACTIVE	CDIP	J	16	1	None	Call TI	Level-NC-NC-NC
SN74HC153D	ACTIVE	SOIC	D	16	40	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74HC153DR	ACTIVE	SOIC	D	16	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74HC153DT	ACTIVE	SOIC	D	16	250	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74HC153N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74HC153NSR	ACTIVE	SO	NS	16	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74HC153PW	ACTIVE	TSSOP	PW	16	90	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HC153PWLE	OBSOLETE	TSSOP	PW	16		None	Call TI	Call TI
SN74HC153PWR	ACTIVE	TSSOP	PW	16	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HC153PWT	ACTIVE	TSSOP	PW	16	250	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SNJ54HC153FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54HC153J	ACTIVE	CDIP	J	16	1	None	Call TI	Level-NC-NC-NC
SNJ54HC153W	ACTIVE	CFP	W	16	1	None	Call TI	Level-NC-NC-NC

⁽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⁾ Eco Plan - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

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Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

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

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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)

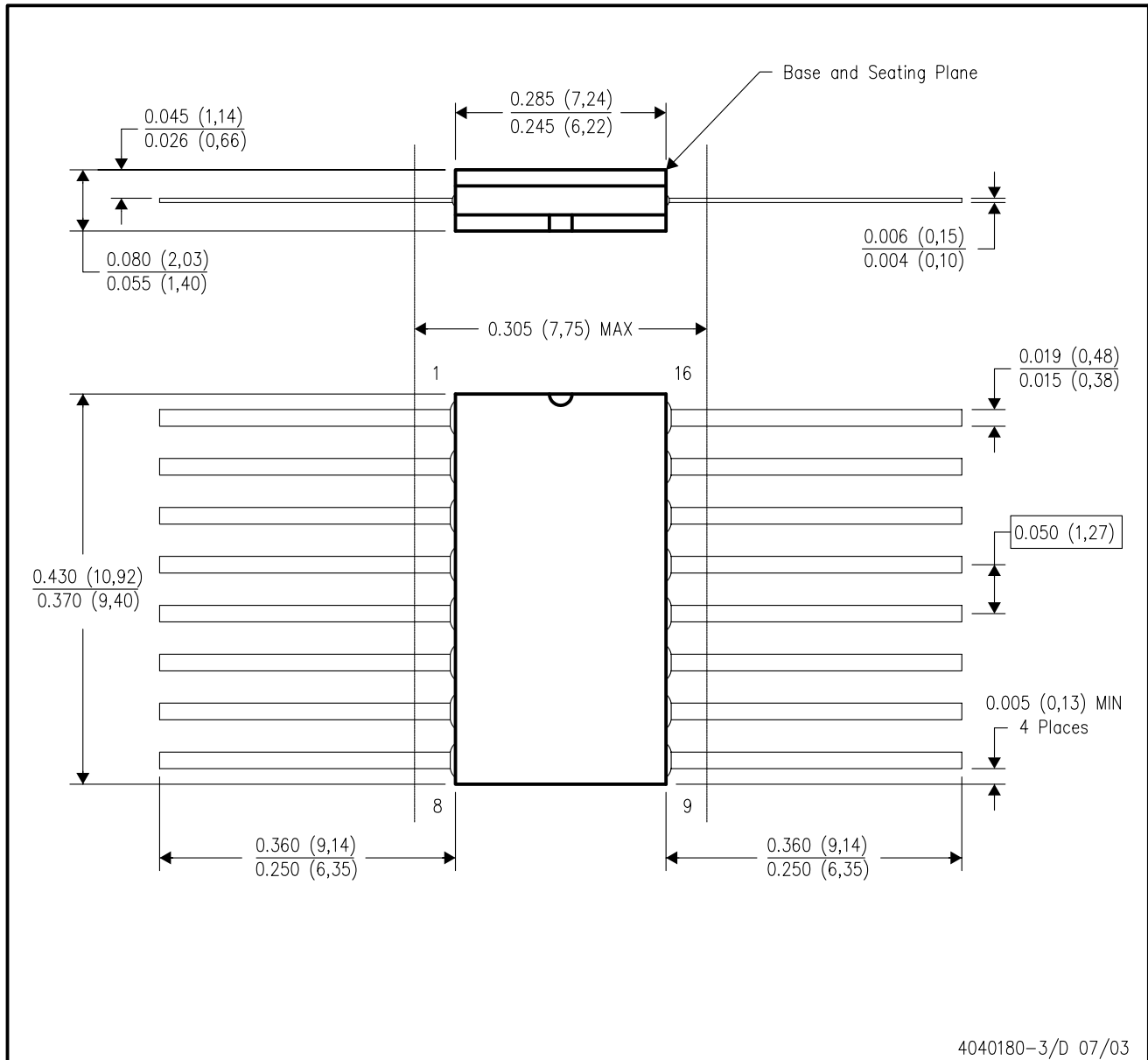


4040083/F 03/03

- 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.

W (R-GDFP-F16)

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-F16 and JEDEC MO-092AC

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

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

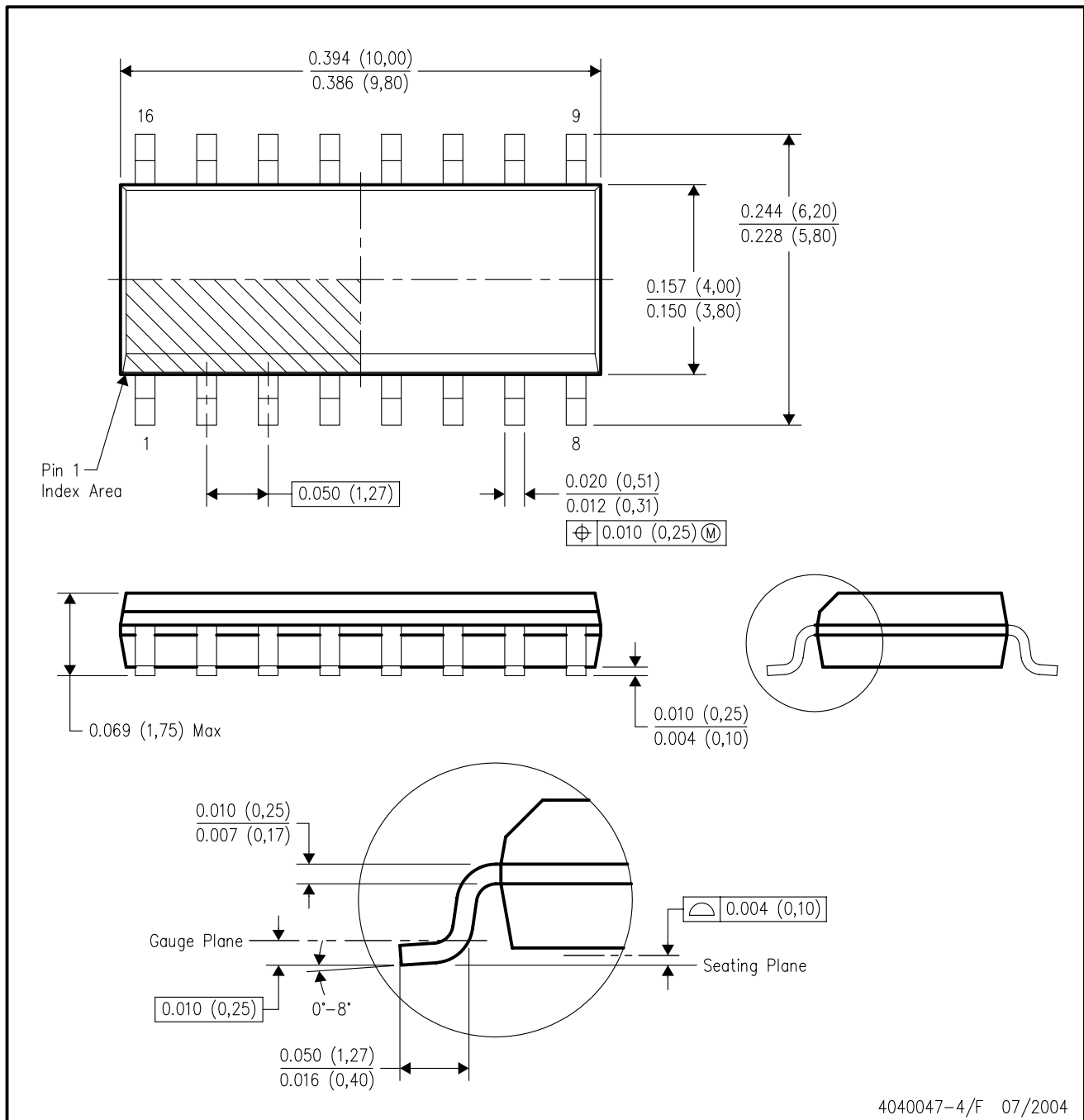
16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - $\triangle C$ Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - $\triangle D$ The 20 pin end lead shoulder width is a vendor option, either half or full width.

D (R-PDSO-G16)

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 MS-012 variation AC.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-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.

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

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