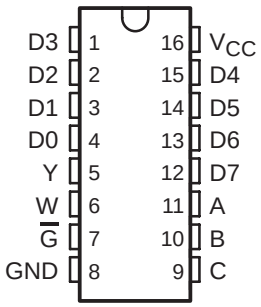
- **8-Line to 1-Line Multiplexers Can Perform as:**
  - **Boolean Function Generators**
  - **Parallel-to-Serial Converters**
  - **Data Source Selectors**
- **Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**

description

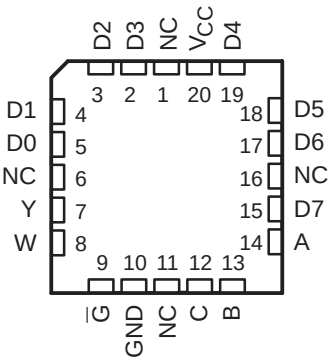
These monolithic data selectors/multiplexers provide full binary decoding to select one of eight data sources. The strobe ($\overline{G}$) input must be at a low logic level to enable the data selection/multiplexing function. A high level at the strobe terminal forces the W output high and the Y output low.

The SN54F151B is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74F151B is characterized for operation from 0°C to 70°C.

SN54F151B . . . J PACKAGE
SN74F151B . . . D OR N PACKAGE
(TOP VIEW)



SN54F151B . . . FK PACKAGE
(TOP VIEW)



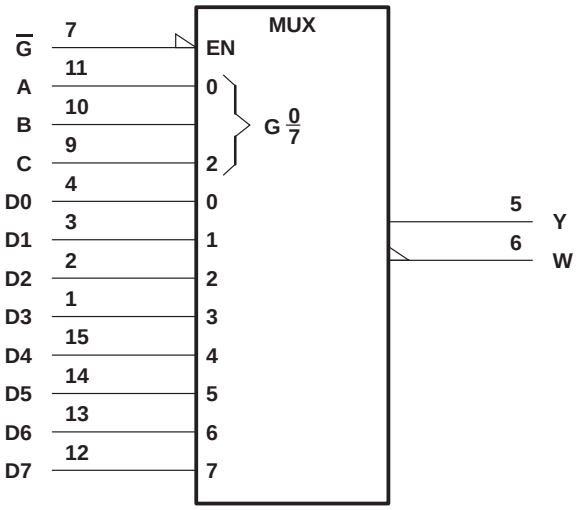
NC − No internal connection

FUNCTION TABLE

INPUTS				OUTPUTS	
SELECT			STROBE $\overline{G}$		
C	B	A		Y	W
X	X	X	H	L	H
L	L	L	L	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$

D0, D1, . . . D7 = the level of the respective D input.

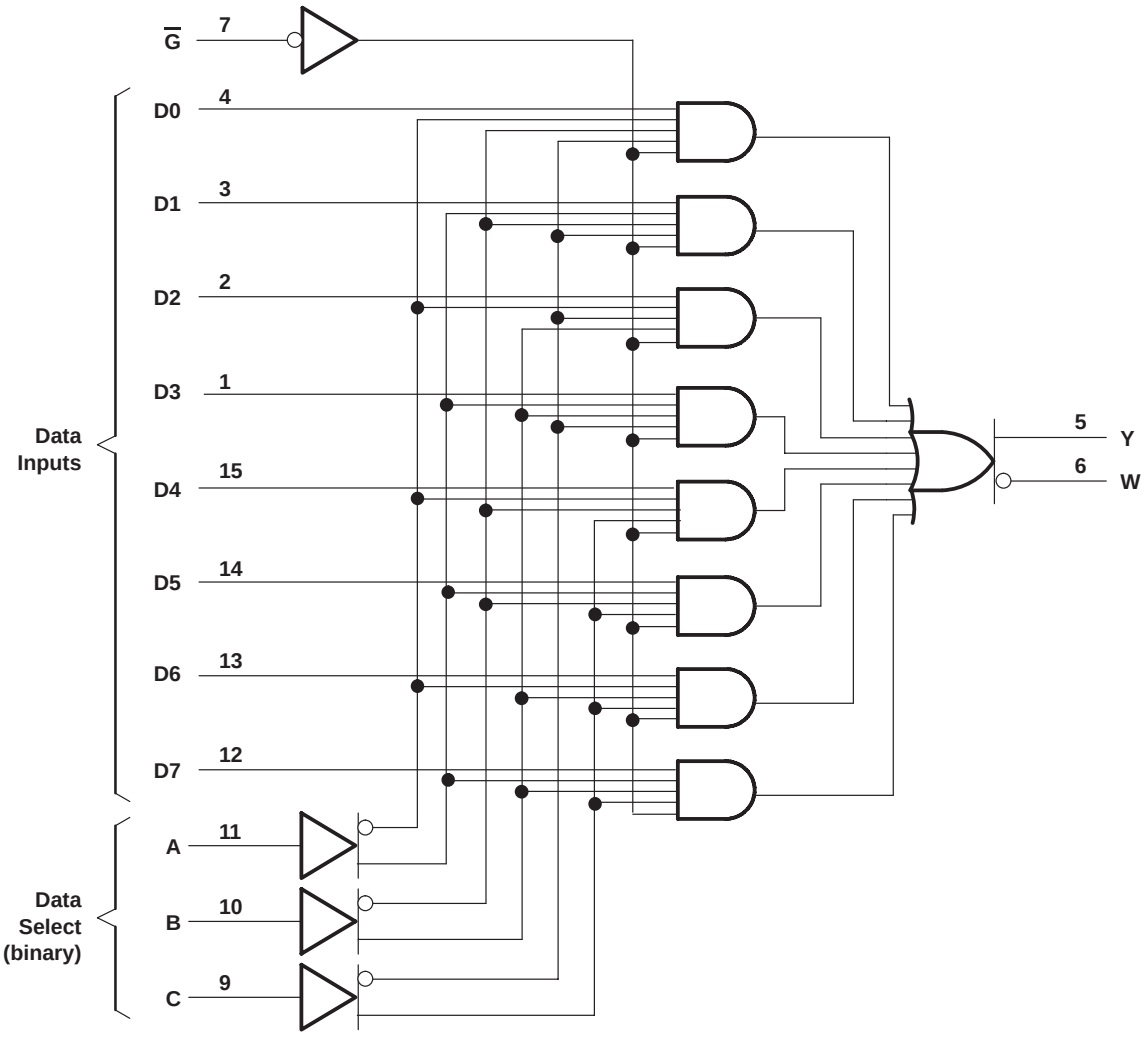
logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the D, J, and N packages.

TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265
POST OFFICE BOX 1443 • HOUSTON, TEXAS 77251–1443

logic diagram (positive logic)



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

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 (see Note 1) . . . . . −1.2 V to 7 V
Input current range . . . . . −30 mA to 5 mA
Voltage range applied to any output in the high state . . . . . −0.5 V to V_{CC}
Current into any output in the low state: SN54F151B . . . . . 40 mA
SN74F151B . . . . . 48 mA
Operating free-air temperature range: SN54F151B . . . . . −55°C to 125°C
SN74F151B . . . . . 0°C to 70°C
Storage temperature range . . . . . −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.

NOTE 1: The input voltage rating may be exceeded provided that the input current rating is observed.

recommended operating conditions

		SN54F151B			SN74F151B			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
I_{IK}	Input clamp current			−18			−18	mA
I_{OH}	High-level output current			− 1			− 1	mA
I_{OL}	Low-level output current			20			24	mA
T_A	Operating free-air temperature	−55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS		SN54F151B			SN74F151B			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = −18 mA			−1.2			−1.2	V
V_{OH}	V_{CC} = 4.5 V,	I_{OH} = − 1 mA	2.5	3.4		2.5	3.4		V
	V_{CC} = 4.75 V,	I_{OH} = − 1 mA				2.7			
V_{OL}	V_{CC} = 4.5 V,	I_{OL} = 20 mA		0.3	0.5		0.3	0.5	V
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.5 V			− 0.6			− 0.6	mA
I_{OS}‡	V_{CC} = 5.5 V,	V_O = 0	−60		−150	−60		−150	mA
I_{CC}	V_{CC} = 5.5 V,	V_I = 4.5 V		13.5	21		13.5	21	mA

† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R_L = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX§				UNIT
			′F151B			SN54F151B		SN74F151B		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A, B, or C	W	3.8	5.2	9	2	11.5	3.5	9.5	ns
t_{PHL}			2.9	4.3	7.5	2.6	8	2.7	7.5	
t_{PLH}	A, B, or C	Y	4.5	6	10.5	4	13.5	4	12	ns
t_{PHL}			4	5.6	9	3.6	9.5	3.6	9	
t_{PLH}	$\overline{G}$	W	3	4.1	6.1	3	7.5	3	7	ns
t_{PHL}			2.8	3.5	6	2.5	6.5	2.5	6	
t_{PLH}	$\overline{G}$	Y	4.4	5.3	9.5	3.8	12	3.8	10.5	ns
t_{PHL}			3.5	4.5	7	3	8	3	7.5	
t_{PLH}	Data (any D)	W	2.7	3.6	6.5	1.8	7.5	2.3	7	ns
t_{PHL}			1.2	1.9	4	1	6	1	5	
t_{PLH}	Data (any D)	Y	2.9	3.7	6.5	2.4	8.5	2.5	7.5	ns
t_{PHL}			3.3	4.2	7	2.1	9	2.6	7.5	

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
NOTE 2: Load circuits and waveforms are shown in Section 1.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74F151BD	Obsolete	Production	SOIC (D) | 16	-	-	Call TI	Call TI	0 to 70	F151B
SN74F151BDR	Active	Production	SOIC (D) | 16	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F151B
SN74F151BDR.A	Active	Production	SOIC (D) | 16	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F151B
SN74F151BN	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74F151BN
SN74F151BN.A	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74F151BN
SN74F151BNE4	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74F151BN
SN74F151BNSR	Active	Production	SOP (NS) | 16	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	74F151B
SN74F151BNSR.A	Active	Production	SOP (NS) | 16	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	74F151B

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts 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.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

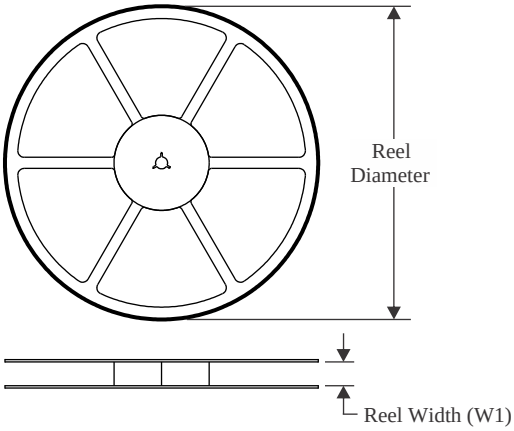
(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

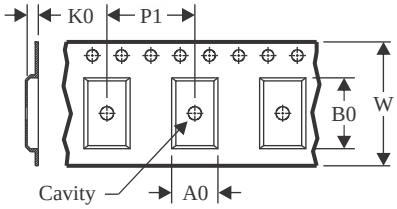
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

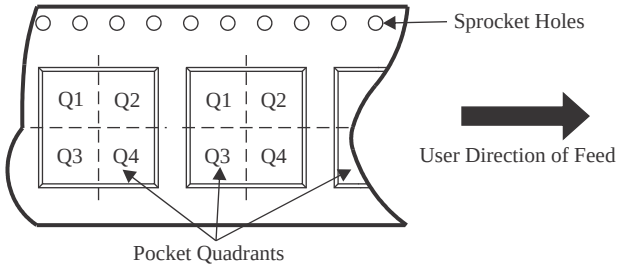


TAPE DIMENSIONS



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

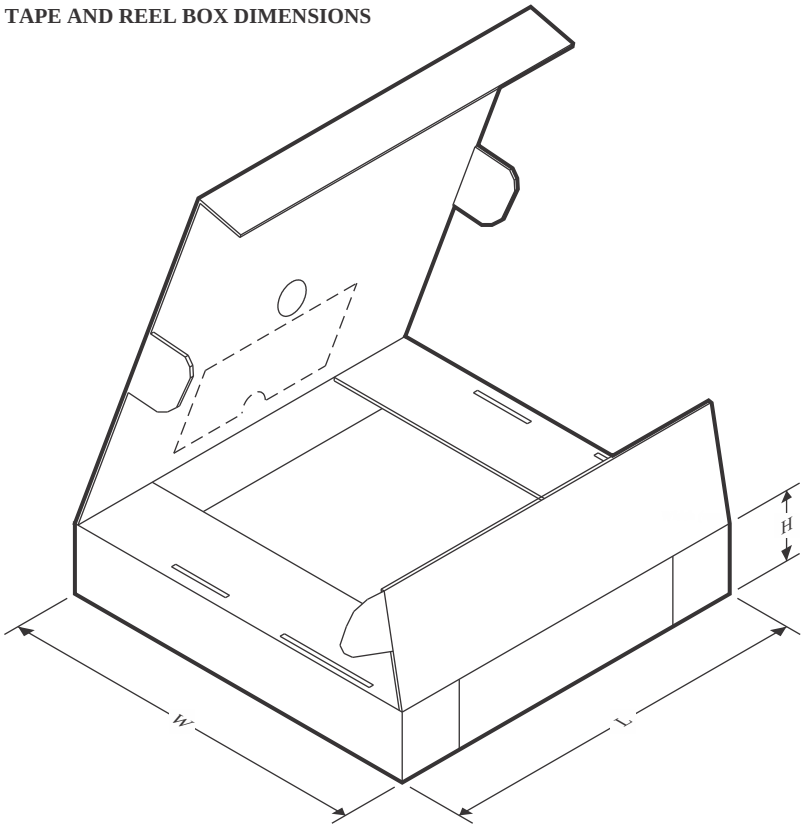
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
SN74F151BDR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74F151BNSR	SOP	NS	16	2000	330.0	16.4	8.1	10.4	2.5	12.0	16.0	Q1

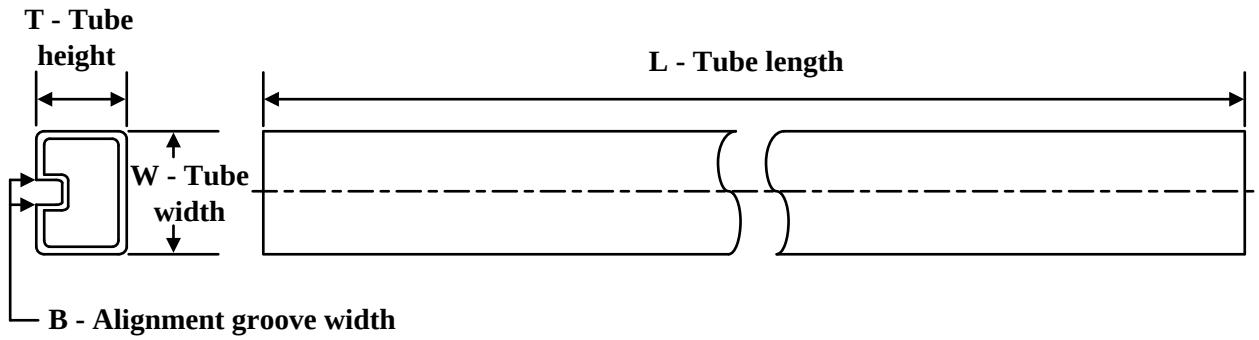
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74F151BDR	SOIC	D	16	2500	340.5	336.1	32.0
SN74F151BNSR	SOP	NS	16	2000	353.0	353.0	32.0

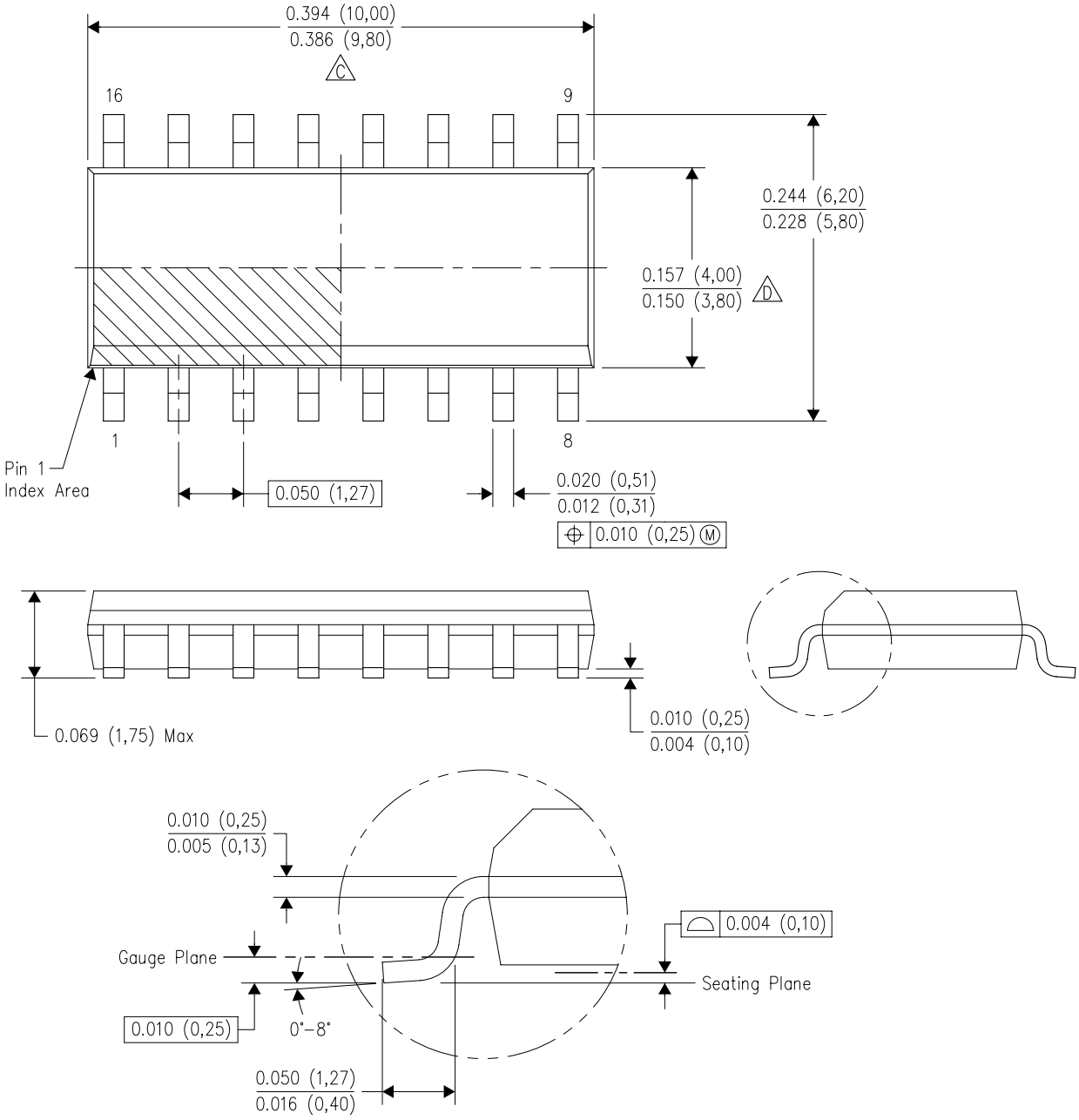
TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN74F151BN	N	PDIP	16	25	506	13.97	11230	4.32
SN74F151BN	N	PDIP	16	25	506	13.97	11230	4.32
SN74F151BN.A	N	PDIP	16	25	506	13.97	11230	4.32
SN74F151BN.A	N	PDIP	16	25	506	13.97	11230	4.32
SN74F151BNE4	N	PDIP	16	25	506	13.97	11230	4.32
SN74F151BNE4	N	PDIP	16	25	506	13.97	11230	4.32

D (R–PDSO–G16) PLASTIC SMALL OUTLINE

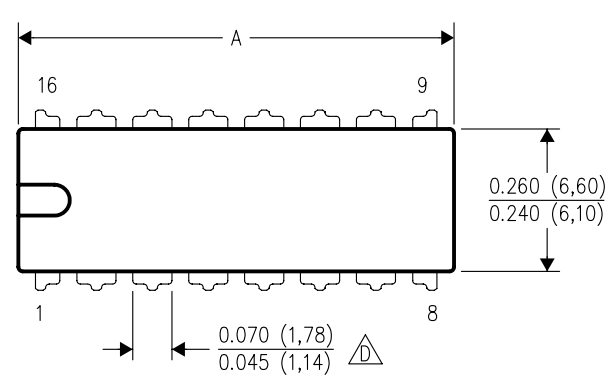


NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
E. Reference JEDEC MS–012 variation AC.

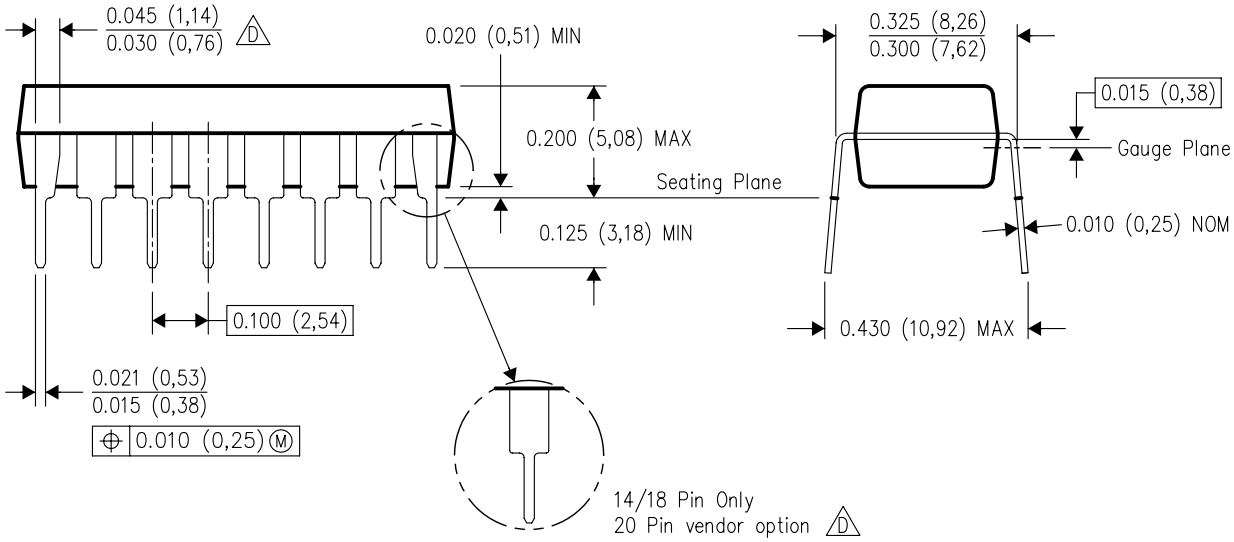
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN

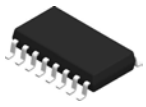


DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



4040049/E 12/2002

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

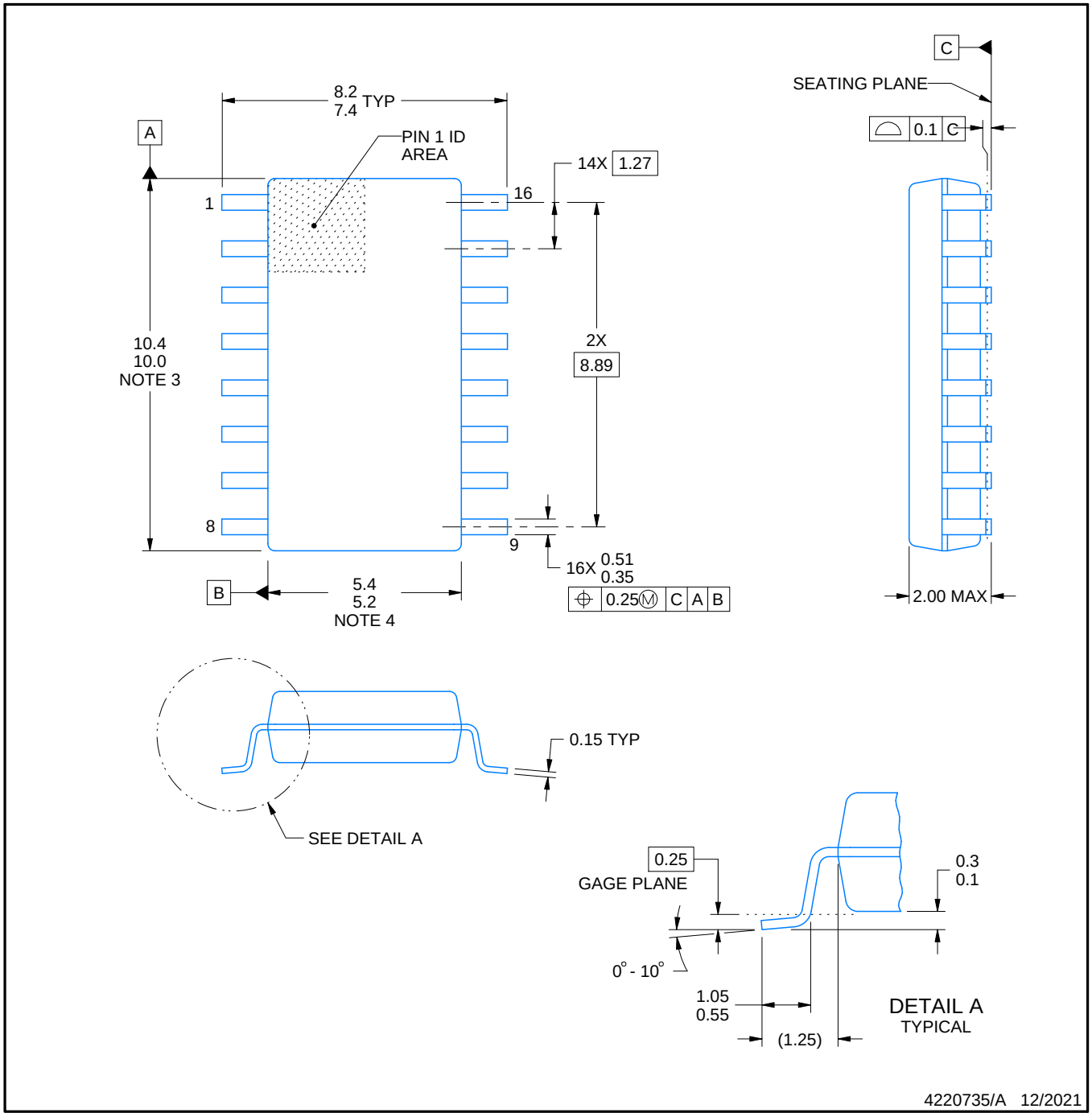


PACKAGE OUTLINE

NS0016A

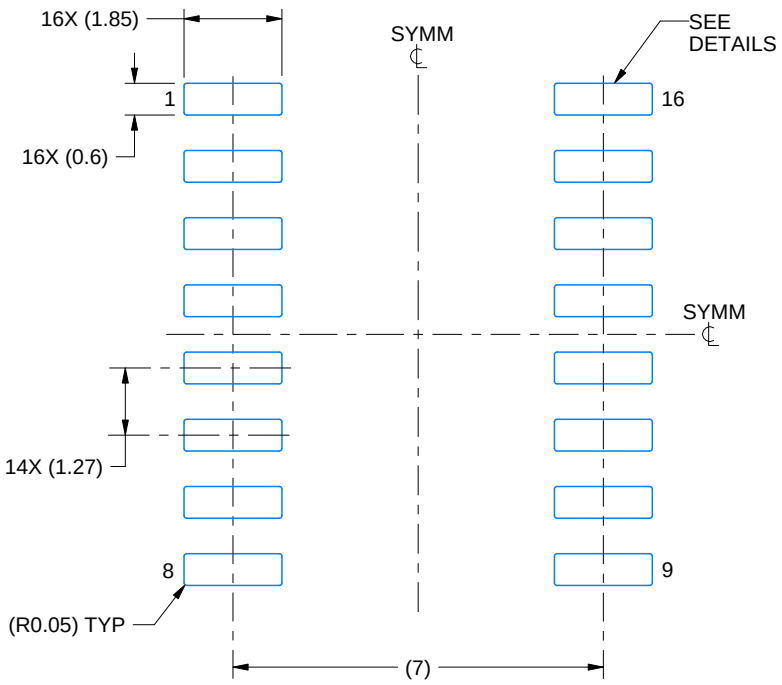
SOP - 2.00 mm max height

SOP

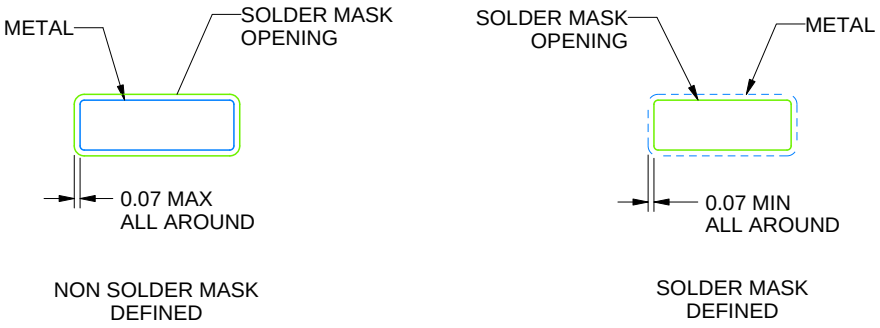


NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm, per side.



LAND PATTERN EXAMPLE
SCALE:7X



NON SOLDER MASK
DEFINED

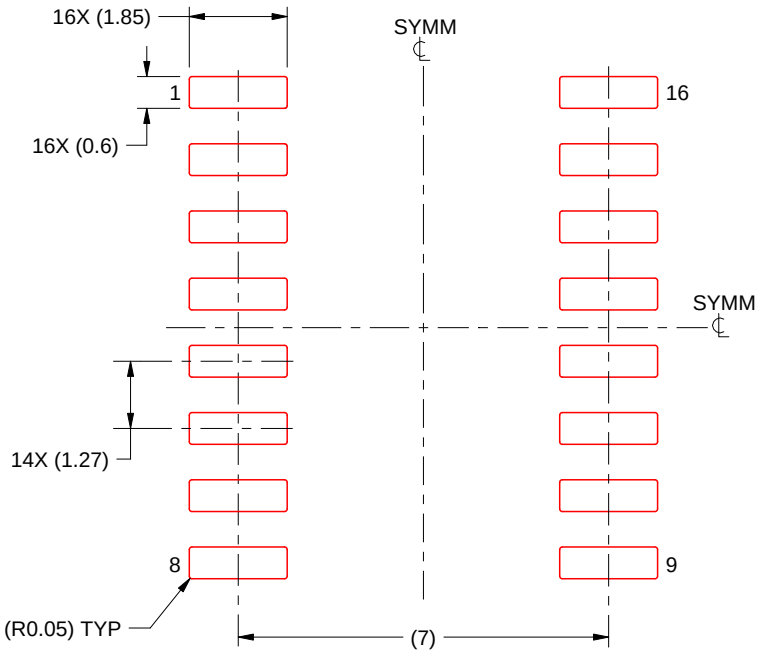
SOLDER MASK
DEFINED

SOLDER MASK DETAILS

4220735/A 12/2021

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:7X

4220735/A 12/2021

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

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