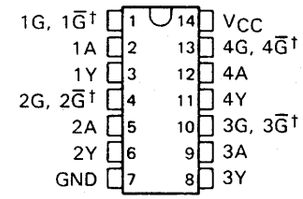
SN54BCT125, SN54BCT126
SN74BCT125, SN74BCT126
QUADRUPLE BUS BUFFER GATES WITH 3-STATE OUTPUTS

D3133, SEPETEMBER 1988—REVISED SEPTEMBER 1989

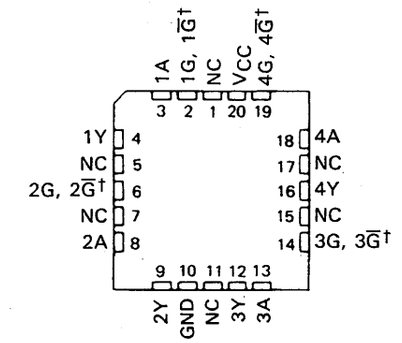
- **State of the Art BiCMOS Design Significantly Reduces I_{CCZ}**
- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **ESD Protection Exceeds 2000 V per MIL-STD-883C Method 3015**
- **Package Options Include Standard Plastic and Ceramic 300-mil DIPs**
- **Dependable Texas Instruments Quality and Reliability**

SN54BCT125, SN54BCT126 . . . J PACKAGE
SN74BCT125, SN74BCT126 . . . N OR NS OR DB PACKAGE
(TOP VIEW)



† $\overline{G}$ on 'BCT125; G on 'BCT126

SN54BCT125, SN54BCT126 . . . FK PACKAGE
(TOP VIEW)



† $\overline{G}$ on 'BCT125; G on 'BCT126
NC—No internal connection

description

These bus buffers feature independent line drivers with three-state outputs. Each 'BCT125 output is disabled when the associated $\overline{G}$ is high, and each 'BCT126 output is disabled when the associated G is low.

The SN54BCT125 and SN54BCT126 are characterized for operation over the full military temperature range of −55°C to 125°C. The SN74BCT125 and SN74BCT126 are characterized for operation from 0°C to 70°C.

FUNCTION TABLES

'BCT125 (EACH BUFFER)

INPUTS		OUTPUT
$\overline{G}$	A	Y
L	H	H
L	L	L
H	X	Z

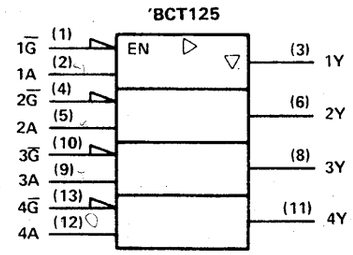
'BCT126 (EACH BUFFER)

INPUTS		OUTPUT
G	A	Y
H	H	H
H	L	L
L	X	Z

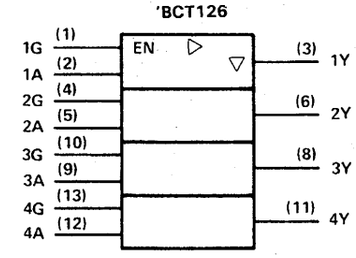
H = high level, L = low level, X = irrelevant

logic symbols‡

'BCT125



'BCT126

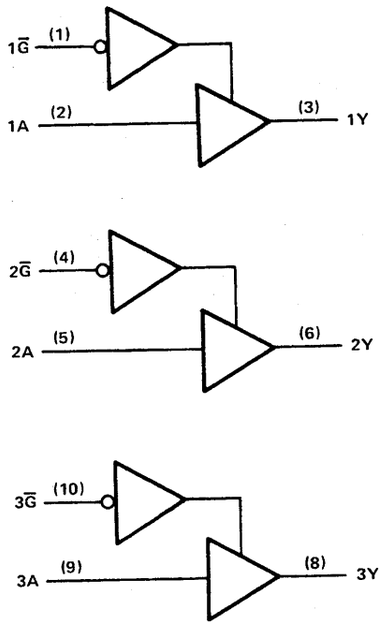


‡These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

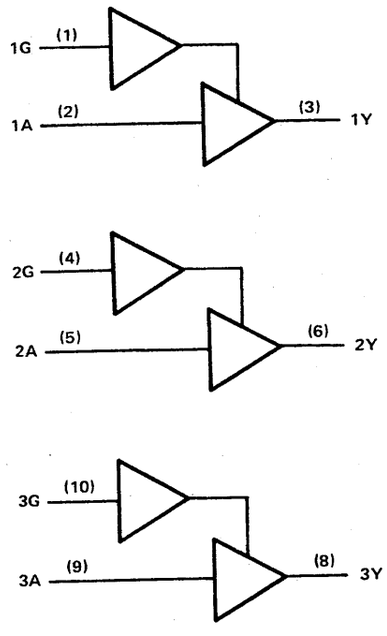
TEXAS INSTRUMENTS

logic diagrams (positive logic)

'BCT125



'BCT126



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

Supply voltage, V_{CC} . . . . . −0.5 V to 7 V
Input voltage . . . . . −0.5 V to 7 V
Voltage applied to any output in the disabled or power-off state . . . . . −0.5 V to 5.5 V
Voltage applied to any output in the high state . . . . . −0.5 V to V_{CC}
Current into any output in the low state: SN54BCT125, SN54BCT126 . . . . . 96 mA
SN74BCT125, SN74BCT126 . . . . . 128 mA
Operating free-air temperature range: SN54BCT125, SN54BCT126 . . . . . −55°C to 125°C
SN74BCT125, SN74BCT126 . . . . . 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.

recommended operating conditions

		SN54BCT125 SN54BCT126			SN74BCT125 SN74BCT126			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			−12			−15	mA
I_{OL}	Low-level output current			48			64	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		SN54BCT125			SN74BCT125			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} = −3 mA	2.4	3.3		2.4	3.3		V
		I_{OH} = −12 mA	2	3.2					
		I_{OH} = −15 mA				2	3.1		
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 48 mA		0.38	0.55				V
		I_{OL} = 64 mA					0.42	0.55	
I_I	V_{CC} = 0 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			35			25	μA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.5 V			−20			−20	μA
I_{OZH}	V_{CC} = 5.5 V,	V_O = 2.7 V			50			50	μA
I_{OZL}	V_{CC} = 5.5 V,	V_O = 0.5 V			−50			−50	μA
I_{OS}‡	V_{CC} = 5.5 V,	V_O = 0	−100		−225	−100		−225	mA
I_{CCH}	V_{CC} = 5.5 V,	Outputs open		19	31		19	31	mA
I_{CCL}				46	49		46	49	
I_{CCZ}				6	12		6	12	
C_i	V_{CC} = 5 V,	V_I = 2.5 V or 0.5 V		4			4		pF
C_o	V_{CC} = 5 V,	V_O = 2.5 V or 0.5 V		9			9		

†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.

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

PARAMETER	TEST CONDITIONS		SN54BCT126			SN74BCT126			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} = −3 mA	2.4	3.3		2.4	3.3		V
		I_{OH} = −12 mA	2	3.2					
		I_{OH} = −15 mA				2	3.1		
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 48 mA		0.38	0.55				V
		I_{OL} = 64 mA					0.42	0.55	
I_I	V_{CC} = 0 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			35			25	μA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.5 V			−20			−20	μA
I_{OZH}	V_{CC} = 5.5 V,	V_O = 2.7 V			50			50	μA
I_{OZL}	V_{CC} = 5.5 V,	V_O = 0.5 V			−50			−50	μA
I_{OS}‡	V_{CC} = 5.5 V,	V_O = 0	−100		−225	−100		−225	mA
I_{CCH}	V_{CC} = 5.5 V,	Outputs open		21	33		21	33	mA
I_{CCL}				35	51		35	51	
I_{CCZ}				5	8		5	8	
C_i	V_{CC} = 5 V,	V_I = 2.5 V or 0.5 V		4			4		pF
C_o	V_{CC} = 5 V,	V_O = 2.5 V or 0.5 V		9			9		

†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.

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'BCT125 switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX†				UNIT
			'BCT125			SN54BCT125		SN74BCT125		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.6	3.5	5.2	1.6	6	1.6	5.7	ns
t_{PHL}			2.7	5	6.9	2.7	8	2.7	7.7	
t_{PZH}	$\overline{G}$	Y	3.4	6.7	9	3.4	11.1	3.4	10.3	ns
t_{PZL}			5	8.2	10.4	5	12.8	5	11.7	
t_{PHZ}	$\overline{G}$	Y	3	5.8	7.4	3	9.4	3	8.9	ns
t_{PLZ}			2.8	5.5	7.3	2.8	9.9	2.8	8.6	

'BCT126 switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX†				UNIT
			'BCT126			SN54BCT126		SN74BCT126		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.5	3.6	4.9	1.5	5.6	1.5	5.4	ns
t_{PHL}			2.7	5.3	6.9	2.7	7.7	2.7	7.4	
t_{PZH}	G	Y	2.6	4.8	6.4	2.6	7.2	2.6	7	ns
t_{PZL}			3.7	6.4	8.3	3.7	10.5	3.7	10	
t_{PHZ}	G	Y	3.2	6.6	8.2	3.2	9.6	3.2	9.1	ns
t_{PLZ}			3.4	6.5	8	3.4	12.3	3.4	10.7	

†For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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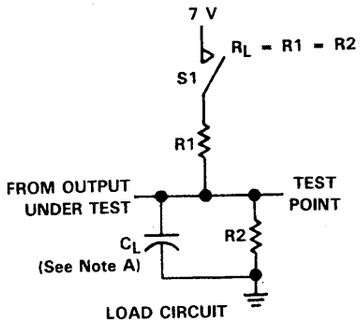
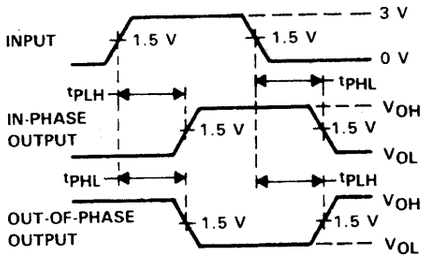
PARAMETER MEASUREMENT INFORMATION

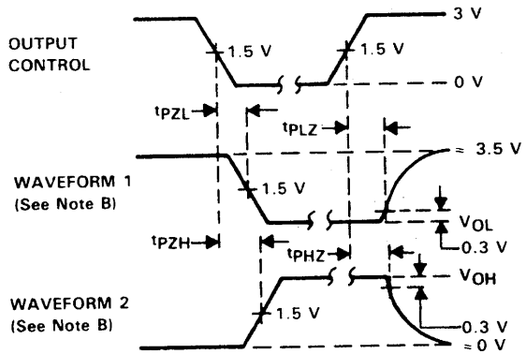


SWITCH POSITION TABLE

TEST	S1
t_{PLH}	Open
t_{PHL}	Open
t_{PZH}	Open
t_{PZL}	Closed
t_{PHZ}	Open
t_{PLZ}	Closed



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, THREE-STATE OUTPUTS

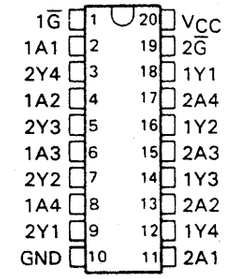
NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: PRR ≥ 10 MHz, Z_O = 50 Ω, t_r = 2.5 ns, t_f = 2.5 ns.
C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
D. The outputs are measured one at a time with one input transition per measurement.

FIGURE 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS

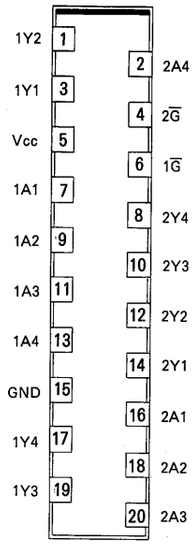
D3057, OCTOBER 1987—REVISED AUGUST 1989

- State of the Art BiCMOS Design Significantly Reduces ICCZ
- Comparable Speed and Improved Power Performance Relative to 54F/74F240
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- ESD Protection Exceeds 2000 V per MIL-STD-883C, Method 3015
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54BCT240 . . . J PACKAGE
SN74BCT240 . . . N OR NS OR DB PACKAGE
(TOP VIEW)



SN74BCT240 ... SD PACKAGE
(TOP VIEW)



description

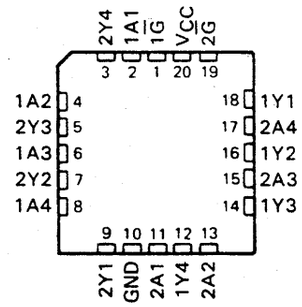
These octal buffers and line drivers are designed specifically to improve both the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the 'BCT241 and 'BCT244, these devices provide a choice of selected combinations of inverting and non-inverting outputs, symmetrical $\overline{G}$ (active-low output control) inputs, and complementary G and $\overline{G}$ inputs. These devices feature high fan-out and improved fan-in.

The SN54' family is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74' family is characterized for operation from 0°C to 70°C.

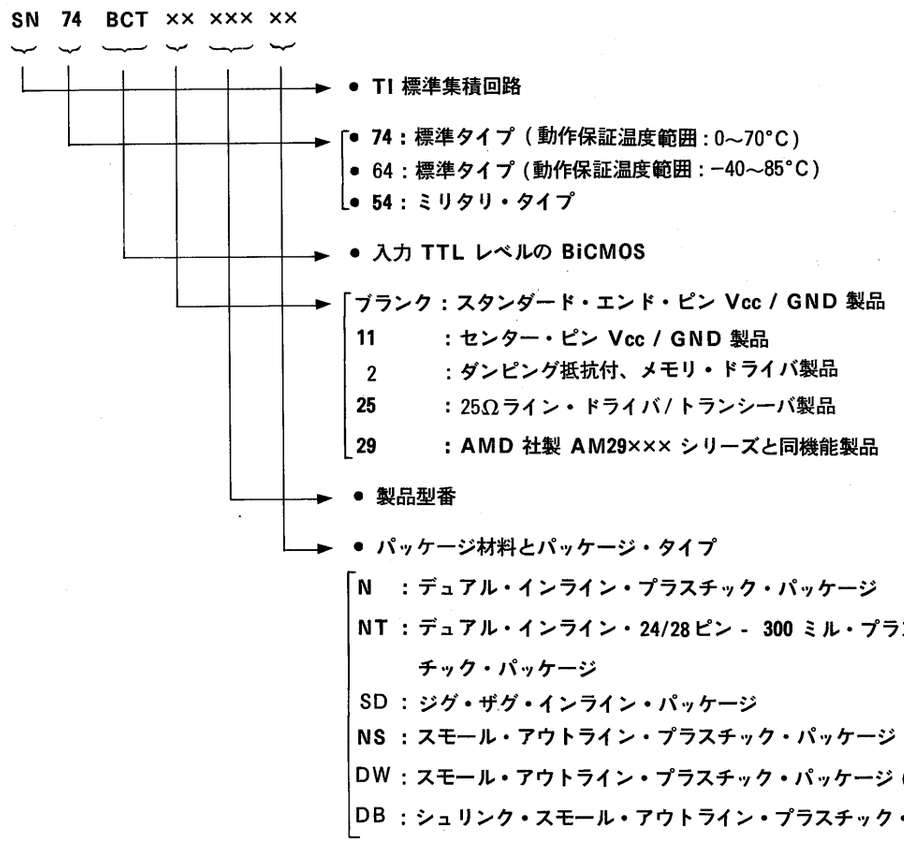
FUNCTION TABLE
(each buffer)

INPUTS		OUTPUT
$\overline{G}$	A	Y
L	H	L
L	L	H
H	X	Z

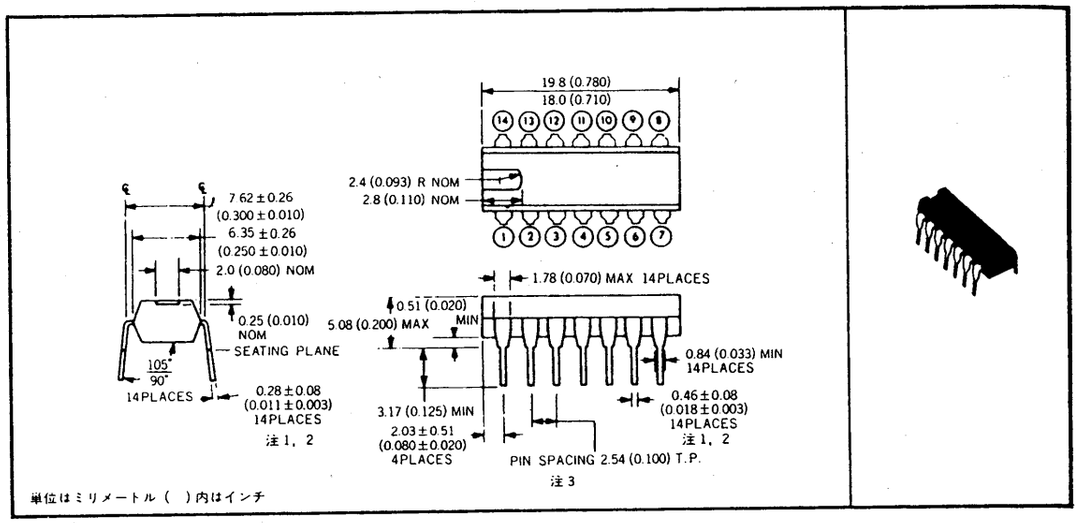
SN54BCT240 . . . FK PACKAGE
(TOP VIEW)



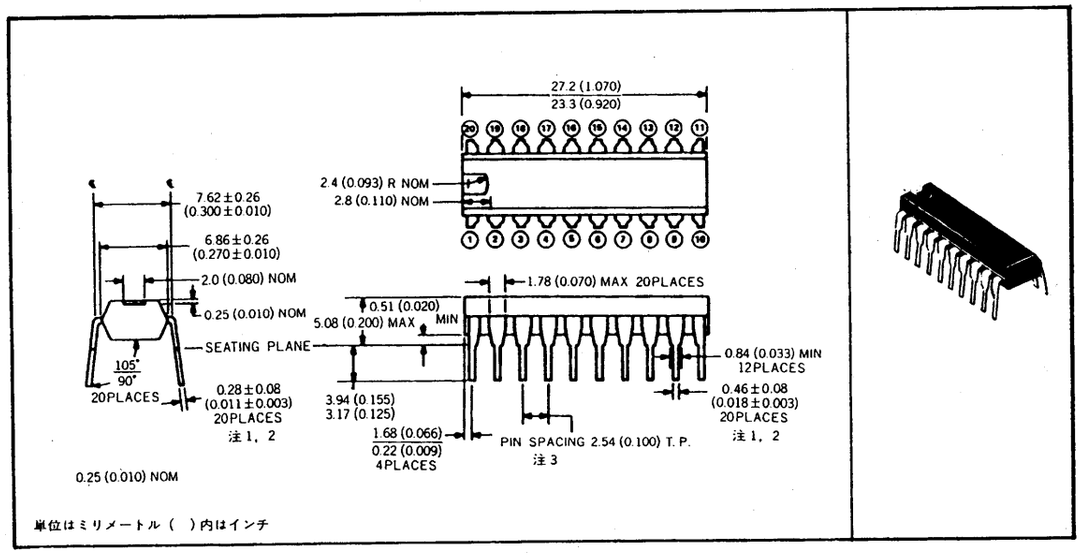
製品の型名は、


SN 74 BCT ×× ××× ××
• TI 標準集積回路
• 74：標準タイプ（動作保証温度範囲：0～70°C）
• 64：標準タイプ（動作保証温度範囲：−40～85°C）
• 54：ミリタリ・タイプ
• 入力 TTL レベルの BiCMOS
ブランク：スタンダード・エンド・ピン Vcc / GND 製品
11 ：センター・ピン Vcc / GND 製品
2 ：ダンピング抵抗付、メモリ・ドライバ製品
25 ：25Ωライン・ドライバ/トランシーバ製品
29 ：AMD 社製 AM29××× シリーズと同機能製品
• 製品型番
• パッケージ材料とパッケージ・タイプ
N ：デュアル・インライン・プラスチック・パッケージ
NT ：デュアル・インライン・24/28ピン - 300 ミル・プラス
チック・パッケージ
SD ：ジグ・ザグ・インライン・パッケージ
NS ：スモール・アウトライン・プラスチック・パッケージ (EIAJ)
DW：スモール・アウトライン・プラスチック・パッケージ (JEDEC 375 ミル)
DB ：シュリンク・スモール・アウトライン・プラスチック・パッケージ

■14ピン N プラスチック・パッケージ (＊DIP014-P-0300)

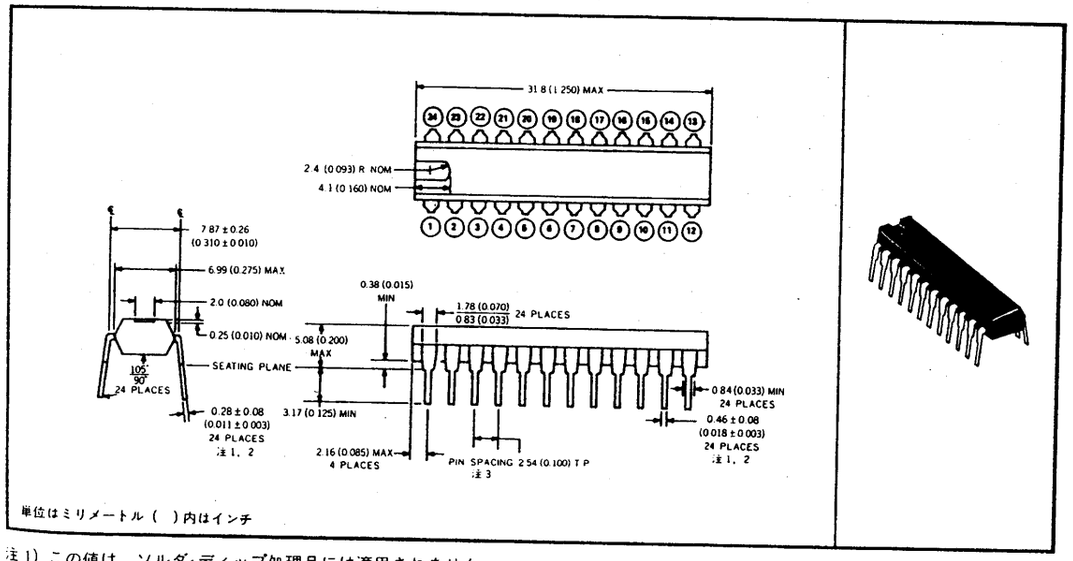


■20ピン N プラスチック・パッケージ (＊DIP020-P-0300)



注1) この値は，ソルダ·ディップ処理品には適用されません。
2) ソルダ·ディップ処理品において，ディップ処理長はリード先端からSEATING PLANEの上0.51ミリ(0.020インチ)以上です。
3) 各ピンの中心線誤差0.26ミリ(0.010インチ)以内です。

■24ピン NT プラスチック・パッケージ (＊DIP024-P-0300)



注1) この値は，ソルダ·ディップ処理品には適用されません。
2) ソルダ·ディップ処理品において，ディップ処理長はリード先端からSEATING PLANEの上0.51ミリ(0.020インチ)以上です。
3) 各ピンの中心線誤差0.26ミリ(0.010インチ)以内です。