

100322 Low Power 9-Bit Buffer

General Description

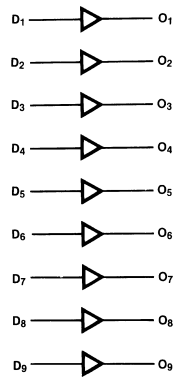
The 100322 is a monolithic 9-bit buffer. The device contains nine non-inverting buffer gates with single input and output. All inputs have 50 k Ω pull-down resistors and all outputs are buffered.

- 2000V ESD protection
- Pin/function compatible with 100122
- Voltage compensated operating range = -4.2V to -5.7V
- Available to MIL-STD-883

Features

- 30% power reduction of the 100122

Logic Symbol

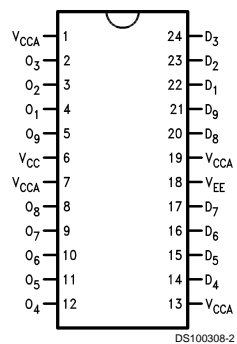


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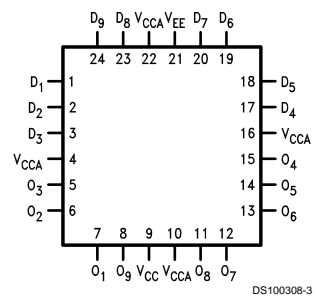
Pin Names	Description
D ₁ , D ₉	Data Inputs
O ₁ , O ₉	Data Outputs

Connection Diagrams

24-Pin DIP



24-Pin Quad Cerpak



Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Above which the useful life may be impaired.

Storage Temperature (T_{STG})	–65°C to +150°C
Maximum Junction Temperature (T_J)	
Ceramic	+175°C
V_{EE} Pin Potential to Ground Pin	–7.0V to +0.5V
Input Voltage (DC)	V_{EE} to +0.5V
Output Current (DC Output HIGH)	–50 mA

ESD (Note 2)

≥2000V

Recommended Operating Conditions

Case Temperature (T_C)

Military

–55°C to +125°C

Supply Voltage (V_{EE})

–5.7V to –4.2V

Note 1: Absolute maximum ratings are those values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: ESD testing conforms to MIL-STD-883, Method 3015.

Military Version

DC Electrical Characteristics

$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = V_{CCA} = GND$, $T_C = -55^\circ C$ to $+125^\circ C$

Symbol	Parameter	Min	Max	Units	T_C	Conditions	Notes
V_{OH}	Output HIGH Voltage	–1025	–870	mV	0°C to +125°C	$V_{IN} = V_{IH (Max)}$ or $V_{IL (Min)}$	Loading with 50Ω to –2.0V
		–1085	–870	mV	–55°C		
V_{OL}	Output LOW Voltage	–1830	–1620	mV	0°C to +125°C	$V_{IN} = V_{IH (Max)}$ or $V_{IL (Min)}$	Loading with 50Ω to –2.0V
		–1830	–1555	mV	–55°C		
V_{OHC}	Output HIGH Voltage	–1035		mV	0°C to +125°C	$V_{IN} = V_{IH (Max)}$ or $V_{IL (Min)}$	Loading with 50Ω to –2.0V
		–1085		mV	–55°C		
V_{OLC}	Output LOW Voltage		–1610	mV	0°C to +125°C	$V_{IN} = V_{IH (Max)}$ or $V_{IL (Min)}$	Loading with 50Ω to –2.0V
			–1555	mV	–55°C		
V_{IH}	Input HIGH Voltage	–1165	–870	mV	–55°C to +125°C	Guaranteed HIGH Signal for All Inputs	(Notes 3, 4, 5, 6)
V_{IL}	Input HIGH Voltage	–1830	–1475	mV	–55°C to +125°C	Guaranteed LOW Signal for All Inputs	(Notes 3, 4, 5, 6)
I_{IL}	Input LOW Current	0.50		μA	–55°C to +125°	$V_{EE} = -4.2V$ $V_{IN} = V_{IL (Min)}$	(Notes 3, 4, 5)
I_{IH}	Input HIGH Current		240	μA	0°C to +125°C	$V_{EE} = -5.7V$	(Notes 3, 4, 5)
			340	μA	–55°C	$V_{IN} = V_{IH (Max)}$	
I_{EE}	Power Supply Current	–70	–25	mA	–55°C to +125°C	Inputs Open	(Notes 3, 4, 5)

Note 3: F100K 300 Series cold temperature testing is performed by temperature soaking (to guarantee junction temperature equals –55°C), then testing immediately without allowing for the junction temperature to stabilize due to heat dissipation after power-up. This provides “cold start” specs which can be considered a worst case condition at cold temperatures.

Note 4: Screen tested 100% on each device at –55°C, +25°C, and +125°C, Subgroups 1, 2, 3, 7, and 8.

Note 5: Sample tested (Method 5005, Table I) on each manufactured lot at –55°C, +25°C, and +125°C, Subgroups A1, 2, 3, 7, and 8.

Note 6: Guaranteed by applying specified input condition and testing V_{OH}/V_{OL} .

AC Electrical Characteristics

$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = V_{CCA} = GND$

Symbol	Parameter	$T_C = -55^\circ C$		$T_C = +25^\circ C$		$T_C = +125^\circ C$		Units	Conditions	Notes
		Min	Max	Min	Max	Min	Max			
t_{PLH} t_{PHL}	Propagation Delay Data to Output	0.30	1.80	0.40	1.60	0.40	1.80	ns	Figures 1, 2	(Notes 7, 8, 9, 11)
t_{TLH} t_{THL}	Transition Time 20% to 80%, 80% to 20%	0.30	1.20	0.30	1.20	0.30	1.20	ns		(Note 10)

Note 7: F100K 300 Series cold temperature testing is performed by temperature soaking (to guarantee junction temperature equals –55°C), then testing immediately after power-up. This provides “cold start” specs which can be considered a worst case condition at cold temperatures.

Note 8: Screen tested 100% on each device at +25°C, only Subgroup A9.

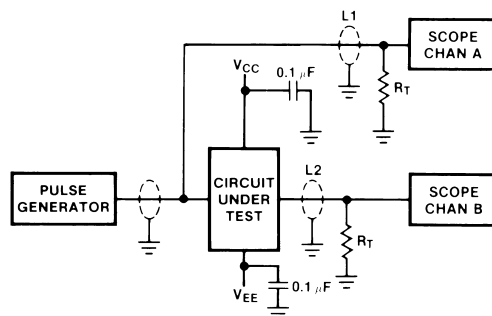
Note 9: Sample tested (Method 5005, Table I) on each manufactured lot at +25°C, Subgroup A9, and at +125°C and –55°C temperatures, Subgroups A10 and A11.

AC Electrical Characteristics (Continued)

Note 10: Not tested at +25°C, +125°C, and –55°C temperature (design characterization data).

Note 11: The propagation delay specified is for single output switching. Delays may vary up to 200 ps with multiple outputs switching.

Test Circuit



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Notes:

$V_{CC}, V_{CCA} = +2V, V_{EE} = -2.5V$

$L1$ and $L2$ = equal length 50Ω impedance lines

$R_T = 50\Omega$ terminator internal to scope

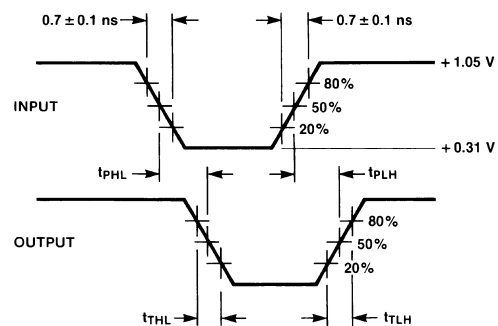
Decoupling 0.1 μF from GND to V_{CC} and V_{EE}

All unused outputs are loaded with 50Ω to GND

C_L = Fixture and stray capacitance ≤ 3 pF

FIGURE 1. AC Test Circuit

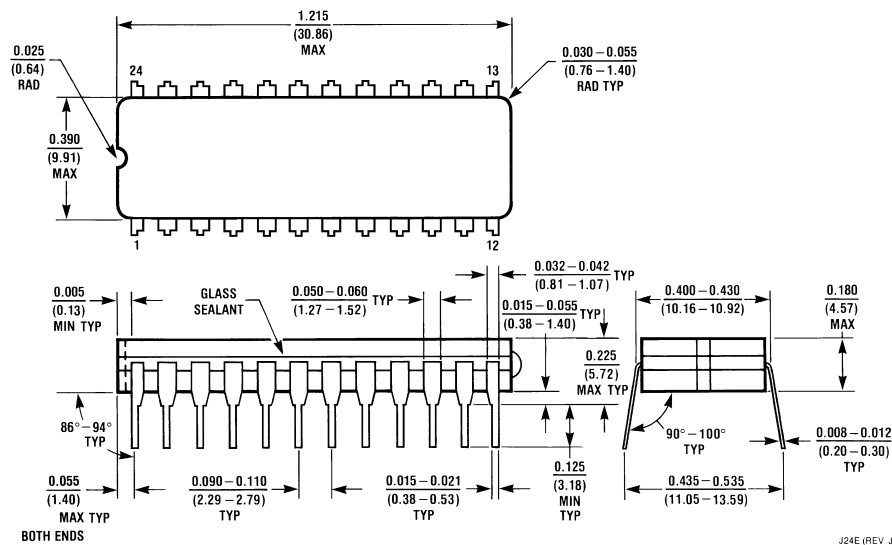
Switching Waveforms



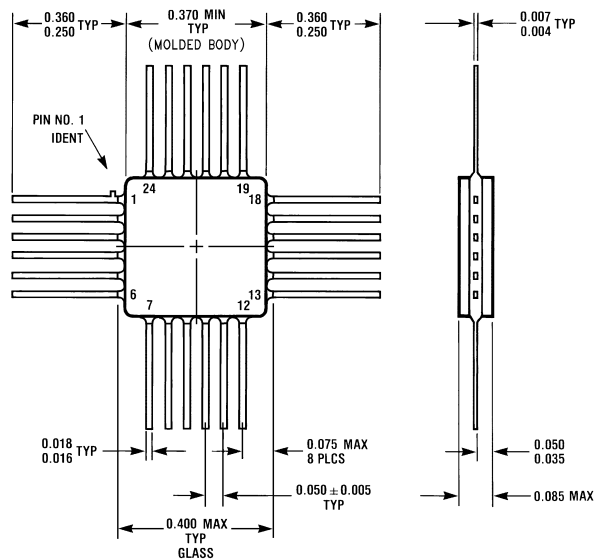
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FIGURE 2. Propagation Delay and Transition Times

Physical Dimensions inches (millimeters) unless otherwise noted



24-Lead Ceramic Dual-In-Line Package (0.400" Wide) (D)
NS Package Number J24E



24-Lead Ceramic Flatpak (F)
NS Package Number W24B

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