

# 100371

## Low Power Triple 4-Input Multiplexer with Enable

### General Description

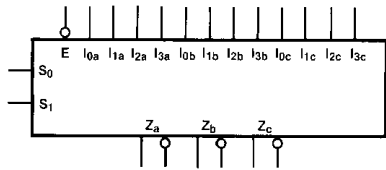
The 100371 contains three 4-input multiplexers which share a common decoder (inputs  $S_0$  and  $S_1$ ). Output buffer gates provide true and complement outputs. A HIGH on the Enable input ( $\bar{E}$ ) forces all true outputs LOW (see Truth Table). All inputs have 50 k $\Omega$  pull-down resistors.

- 2000V ESD protection
- Pin/function compatible with 100171
- Voltage compensated operating range = -4.2V to -5.7V
- Available to MIL-STD-883

### Features

- 35% power reduction of the 100171

### Logic Symbol

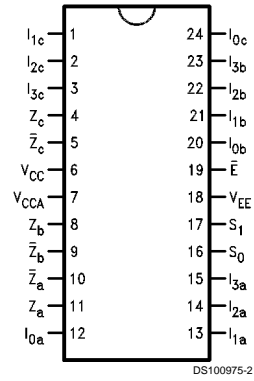


DS100975-1

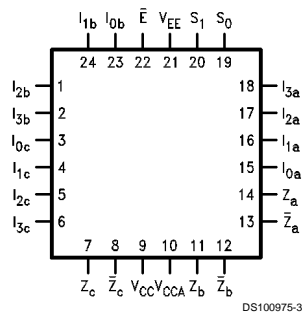
Pin Names	Description
$I_{0x}-I_{3x}$	Data Inputs
$S_0, S_1$	Select Inputs
$\bar{E}$	Enable Input (Active LOW)
$Z_a-Z_c$	Data Outputs
$\bar{Z}_a-\bar{Z}_c$	Complementary Data Outputs

## Connection Diagrams

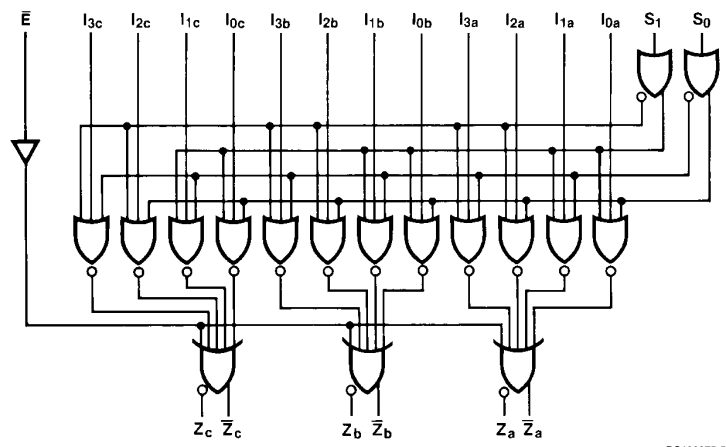
24-Pin DIP



24-Pin Quad Cerpak



## Logic Diagram



## Truth Table

Inputs			Outputs
$\bar{E}$	$S_0$	$S_1$	$Z_n$
L	L	L	$I_{0x}$
L	H	L	$I_{1x}$
L	L	H	$I_{2x}$
L	H	H	$I_{3x}$
H	X	X	L

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Don't Care

## Absolute Maximum Ratings (Note 1)

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

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

## Military Version DC Electrical Characteristics

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

## 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.

Symbol	Parameter	Min	Max	Units	$T_C$	Conditions	Notes	
$V_{OH}$	Output HIGH Voltage	-1025	-870	mV	0°C to +125°C	$V_{IN} = V$ (Max) or $V_{IL}$ (Min)	Loading with 50Ω to -2.0V	(Notes 3, 4, 5)
		-1085	-870	mV	-55°C			
$V_{OL}$	Output LOW Voltage	-1830	-1620	mV	0°C to +125°C			
		-1830	-1555	mV	-55°C			
$V_{OHC}$	Output HIGH Voltage	-1035		mV	0°C to +125°C	$V_{IN} = V_{IH}$ (Min) or $V_{IL}$ (Max)	Loading with 50Ω to -2.0V	(Notes 3, 4, 5)
		-1085		mV	-55°C			
$V_{OLC}$	Output LOW Voltage		-1610	mV	0°C to +125°C			
			-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 LOW 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°C	$V_{EE} = -4.2V$ $V_{IN} = V_{IL}$ (Min)	(Notes 3, 4, 5)	
$I_{IH}$	Input HIGH Current $I_{0X}-I_{3X}$ $S_0, S_1, \bar{E}$		340	μA	0°C to +125°C	$V_{EE} = -5.7V$ $V_{IN} = V_{IH}$ (Max)	(Notes 3, 4, 5)	
			490	μA	-55°C			
$I_{EE}$	Power Supply Current	-80	-30	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 1, 2, 3, 7, and 8.

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

## Military Version 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			
$t_{PLH}$	Propagation Delay	0.10	1.90	0.20	1.70	0.20	2.00	ns	Figures 1, 2	(Notes 7, 8, 9, 11)
$t_{PHL}$	$I_{0x}-I_{3x}$ to Output									
$t_{PLH}$	Propagation Delay	0.40	2.70	0.60	2.40	0.50	2.90	ns		
$t_{PHL}$	$S_0, S_1$ to Output									
$t_{PLH}$	Propagation Delay	0.50	2.70	0.60	2.40	0.50	2.90	ns		
$t_{PHL}$	$\bar{E}$ to Output									
$t_{TLH}$	Transition Time	0.20	1.60	0.30	1.50	0.20	1.60	ns		(Note 10)
$t_{THL}$	20% to 80%, 80% to 20%									

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

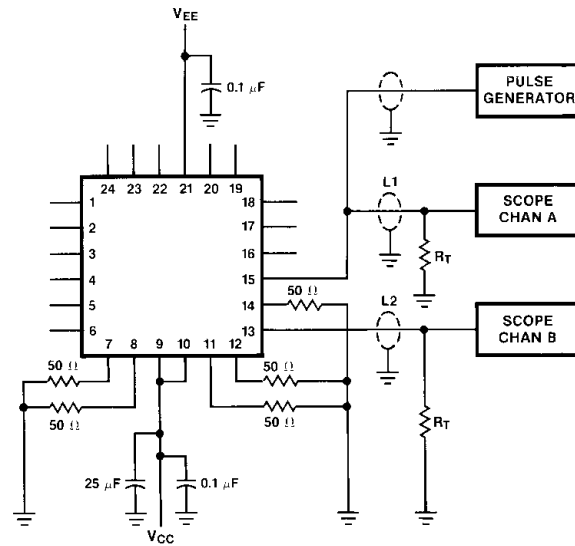
**Note 8:** Screen tested 100% on each device at  $+25^\circ C$  temperature only, Subgroup A9.

**Note 9:** Sample tested (Method 5005, Table I) on each mfg. lot at  $+25^\circ C$ , Subgroup A9, and at  $+125^\circ C$  and  $-55^\circ C$  temperatures, Subgroups A10 and A11.

**Note 10:** Not tested at  $+25^\circ C$ ,  $+125^\circ C$  and  $-55^\circ C$  temperature (design characterization data).

**Note 11:** The propagation delay specified is for single output switching. Delays may vary up to 300 ps with multiple outputs switching.

## Test Circuitry



DS100975-6

### 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  $\leq 3$  pF

Pin numbers shown are for flatpak; for DIP see logic symbol

FIGURE 1. AC Test Circuit

## Switching Waveforms

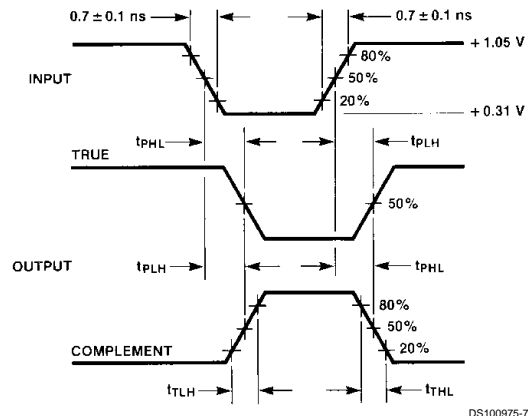
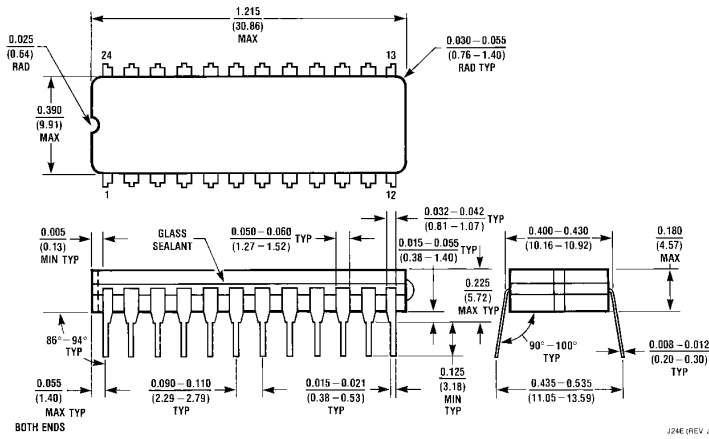
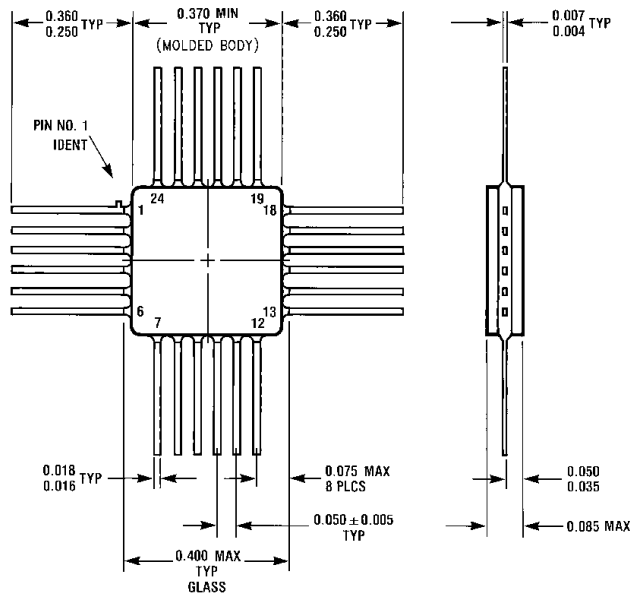


FIGURE 2. Propagation Delay and Transition Times

**Physical Dimensions** inches (millimeters) unless otherwise noted



**24-Lead Ceramic Dual-In-Line Package (D)**  
Package Number J24E



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

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## 100371 Low Power Triple 4-Input Multiplexer with Enable

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## General Description




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## Features



- 35% power reduction of the 100171
  - 2000V ESD protection
  - Pin/function compatible with 100171
  - Voltage compensated operating range = -4.2V to -5.7V
  - Available to MIL-STD-883
- 

## Datasheet

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100371 Low Power Triple 4-Input Multiplexer with Enable	123 Kbytes	23- Sep- 98	<a href="#">View Online</a>	<a href="#">Download</a>	<a href="#">Receive via Email</a>
100371 Mil-Aero Datasheet MN100371-X	106 Kbytes		<a href="#">View Online</a>	<a href="#">Download</a>	<a href="#">Receive via Email</a>

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## Package Availability, Models, Samples & Pricing

Part Number	Package		Status	Models		Samples & Electronic Orders	Budgetary Price	
	Type	# pins		SPI	ICE		Quantity	\$US €
100371DMQB	Cerdip	24	Full production	N/A	N/A	 Order	50+	\$38.8
100371FMQB	Cerpack	24	Full production	N/A	N/A	 Order	50+	\$41.2
100371DM-MLS	Cerdip	24	Full production	N/A	N/A	.	50+	\$280.0
100371FM-MLS	Cerpack	24	Full production	N/A	N/A	.	50+	\$280.0
100371 MD8	die		Full production	N/A	N/A	.		
100371 MW8	wafer		Full production	N/A	N/A	.		

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