

100363 Low Power Dual 8-Input Multiplexer

General Description

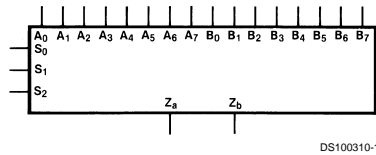
The 100363 is a dual 8-input multiplexer. The Data Select (S_n) inputs determine which bit (A_n and B_n) will be presented at the outputs (Z_a and Z_b , respectively). The same bit (0–7) will be selected for both the Z_a and Z_b output. All inputs have 50 k Ω pulldown resistors.

- 2000V ESD protection
- Pin/function compatible with 100163
- Voltage compensated operating range = -4.2V to -5.7V
- Standard Microcircuit Drawing (SMD) 5962-9165501

Features

- 50% power reduction of the 100163

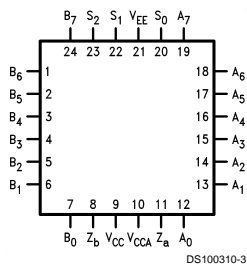
Logic Symbol



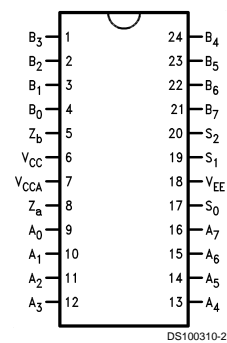
Pin Names	Description
S_0 - S_2	Data Select Inputs
A_0 - A_7	A Data Inputs
B_0 - B_7	B Data Inputs
Z_a , Z_b	Data Outputs

Connection Diagrams

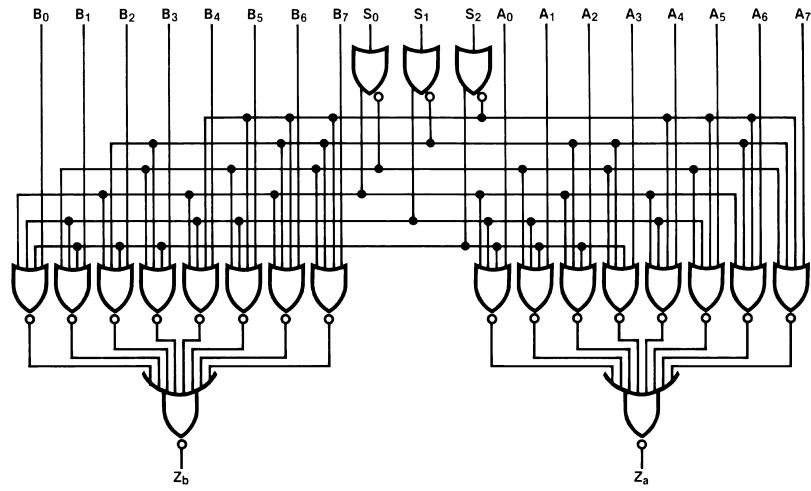
24-Pin Quad Cerpak



24-Pin DIP



Logic Diagram



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Truth Table

Inputs											Outputs	
Select			Data								Z _a	Z _b
S ₂	S ₁	S ₀	A ₇ B ₇	A ₆ B ₆	A ₅ B ₅	A ₄ B ₄	A ₃ B ₃	A ₂ B ₂	A ₁ B ₁	A ₀ B ₀		
L	L	L								L	L	
L	L	L								H	H	
L	L	H							L		L	
L	L	H							H		H	
L	H	L						L			L	
L	H	L						H			H	
L	H	H					L				L	
L	H	H					H				H	
H	L	L				L					L	
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H	H	L		L							L	
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H	H	H	L								L	
H	H	H	H								H	

H = HIGH Voltage Level
 L = LOW Voltage Level
 Blank = 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.

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 $-5.7V$, $V_{CC} = V_{CCA} = GND$, $T_C = -55°C$ to $+125°C$

Symbol	Parameter	Min	Max	Units	T_C	Conditions	Note	
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	(Notes 3, 4, 5)
		-1085	-870	mV	-55°C			
V_{OL}	Output LOW Voltage	-1830	-1620	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)
		-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	$V_{IN} = V_{IH}$ (Min) or V_{IL} (Max)	Loading with 50Ω to -2.0V	(Notes 3, 4, 5)
			-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	S_n	265	μA	0°C to +125°C	$V_{EE} = -5.7V$ $V_{IN} = V_{IH}$ (Max)	(Notes 3, 4, 5)	
			A_n, B_n	340	μA			-55°C
		S_n	385	μA	-55°C			
			A_n, B_n	490	μA			-55°C
I_{EE}	Power Supply Current	-87	-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 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}	Propagation Delay	0.50	2.40	0.60	2.30	0.70	3.00	ns	Figure 1 and Figure 2	(Notes 7, 8, 9)
t_{PHL}	A_0-A_7, B_0-B_7 to Output									
t_{PLH}	Propagation Delay	0.80	3.00	0.90	2.80	0.80	3.40	ns		
t_{PHL}	S_0-S_2 to Output									(Note 10)
t_{TLH}	Transition Time	0.30	1.90	0.30	1.80	0.30	2.10	ns		
t_{THL}	20% to 80%, 80% to 20%									

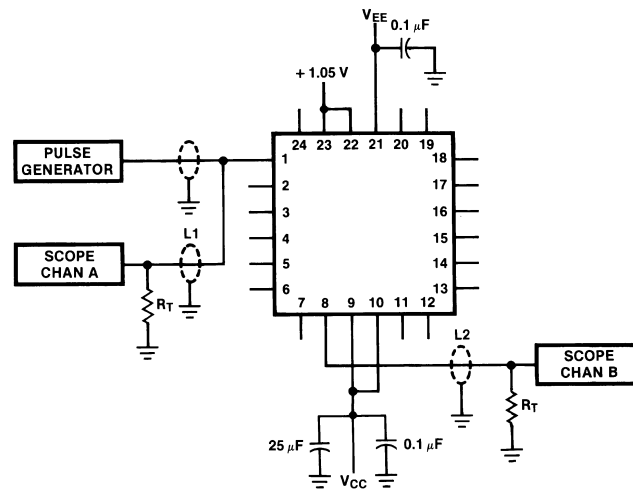
Note 7: F100K 300 Series cold temperature testing is performed by temperature soaking (to guarantee junction temperature equals $-55^\circ C$), then testing immediately after power-up. This provides "cold start" specs which can be considered a worst case condition at cold temperatures.

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 manufactured 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).

Test Circuitry



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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 $0.1 \mu F$ 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

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

FIGURE 1. AC Test Circuit

Switching Waveforms

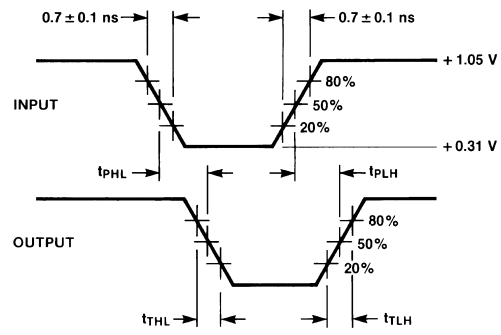


FIGURE 2. Propagation Delay and Transition Times

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