

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 pull-down resistors.

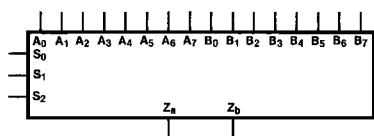
- 2000V ESD protection
- Pin/function compatible with 100163
- Voltage compensated operating range = -4.2V to -5.7V
- Available to MIL-STD-883
- Available to industrial grade temperature range

Features

- 50% power reduction of the 100163

Ordering Code:

Logic Symbol

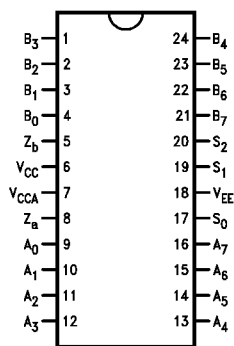


DS010612-1

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

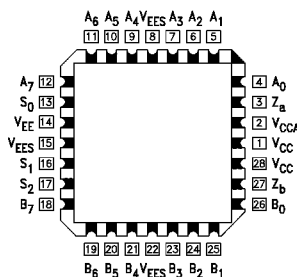
Connection Diagrams

24-Pin DIP



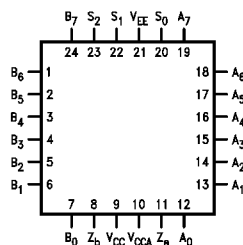
DS010612-2

28-Pin PCC



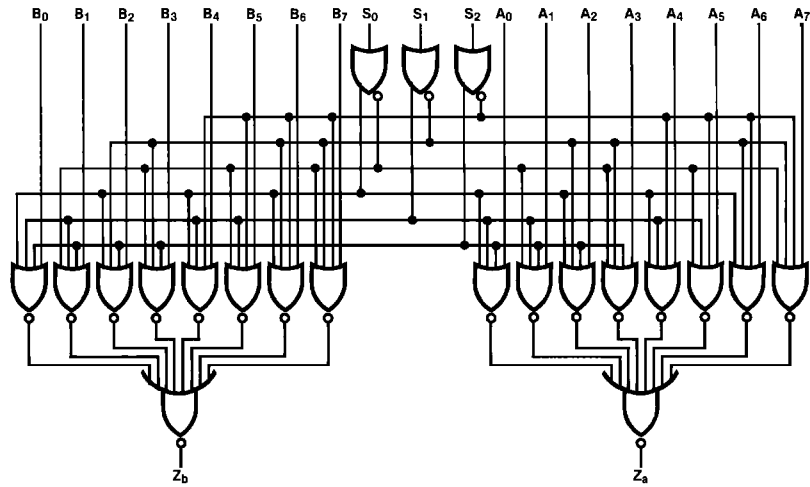
DS010612-4

24-Pin Quad Cerpak



DS010612-3

Logic Diagram



DS010612-5

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	Z _a	Z _b
L	L	L								L	L	L
L	L	L								H	L	H
L	L	H							L		L	L
L	L	H							H		L	H
L	H	L						L			L	L
L	H	L						H			L	H
L	H	H					L				L	L
L	H	H					H				L	H
H	L	L				L					L	L
H	L	L				H					L	H
H	L	H			L						L	L
H	L	H			H						L	H
H	H	L		L							L	L
H	H	L		H							L	H
H	H	H	L								L	L
H	H	H	H								L	H

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

Absolute Maximum Ratings (Note 1)

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
Plastic	+150°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)	
Commercial	0°C to +85°C
Industrial	-40°C to +85°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.

Commercial Version DC Electrical Characteristics

$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = V_{CCA} = GND$, $T_C = 0^\circ C$ to $+85^\circ C$ (Note 3)

Symbol	Parameter	Min	Typ	Max	Units	Conditions	
V_{OH}	Output HIGH Voltage	-1025	-955	-870	mV	$V_{IN} = V_{IH}$ (Max) or V_{IL} (Min)	Loading with 50Ω to -2.0V
V_{OL}	Output LOW Voltage	-1830	-1705	-1620	mV		
V_{OHC}	Output HIGH Voltage	-1035			mV	$V_{IN} = V_{IH}$ (Min) or V_{IL} (Max)	Loading with 50Ω to -2.0V
V_{OLC}	Output LOW Voltage			-1610	mV		
V_{IH}	Input HIGH Voltage	-1165		-870	mV	Guaranteed HIGH Signal for All Inputs	
V_{IL}	Input LOW Voltage	-1830		-1475	mV	Guaranteed LOW Signal for All Inputs	
I_{IL}	Input LOW Current	0.50			μA	$V_{IN} = V_{IL}$ (Min)	
I_{IH}	Input HIGH Current				μA	$V_{IN} = V_{IH}$ (Max)	
	S_n			265			
	A_n, B_n			340			
I_{EE}	Power Supply Current	-80		-40	mA	Inputs Open	

Note 3: The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

DIP AC Electrical Characteristics

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

Symbol	Parameter	$T_C = 0^\circ C$		$T_C = +25^\circ C$		$T_C = +85^\circ C$		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay	0.70	1.65	0.80	1.70	0.80	1.80	ns	Figure 1 and Figure 2
t_{PHL}	A_0-A_7, B_0-B_7 to Output								
t_{PLH}	Propagation Delay	1.30	2.60	1.40	2.70	1.40	2.70	ns	
t_{PHL}	S_0-S_2 to Output								
t_{TLH}	Transition Time	0.45	1.30	0.45	1.30	0.45	1.30	ns	
t_{THL}	20% to 80%, 80% to 20%								

PCC and Cerpak AC Electrical Characteristics

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

Symbol	Parameter	$T_C = 0^\circ C$		$T_C = +25^\circ C$		$T_C = +85^\circ C$		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay	0.70	1.65	0.80	1.70	0.80	1.80	ns	Figure 1 and Figure 2
t_{PHL}	A_0-A_7, B_0-B_7 to Output								
t_{PLH}	Propagation Delay	1.30	2.60	1.40	2.70	1.40	2.70	ns	
t_{PHL}	S_0-S_2 to Output								
t_{TLH}	Transition Time	0.45	1.30	0.45	1.30	0.45	1.30	ns	
t_{THL}	20% to 80%, 80% to 20%								

Industrial Version DC Electrical Characteristics

$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = V_{CCA} = GND$, $T_C = -40^{\circ}C$ to $+85^{\circ}C$ (Note 4)

Symbol	Parameter	$T_C = -40^{\circ}C$		$T_C = 0^{\circ}C$ to $+85^{\circ}C$		Units	Conditions	
		Min	Max	Min	Max			
V_{OH}	Output HIGH Voltage	-1085	-870	-1025	-870	mV	$V_{IN} = V_{IH}$ (max)	Loading with 50Ω to -2.0V
V_{OL}	Output LOW Voltage	-1830	-1575	-1830	-1620	mV	or V_{IL} (min)	
V_{OHC}	Output HIGH Voltage	-1095		-1035		mV	$V_{IN} = V_{IH}$ (min)	Loading with 50Ω to -2.0V
V_{OLC}	Output LOW Voltage		-1565		-1610	mV	or V_{IL} (max)	
V_{IH}	Input HIGH Voltage	-1170	-870	-1165	-870	mV	Guaranteed HIGH Signal for All Inputs	
V_{IL}	Input LOW Voltage	-1830	-1480	-1830	-1475	mV	Guaranteed LOW Signal for All Inputs	
I_{IL}	Input LOW Current	0.50		0.50		μA	$V_{IN} = V_{IL}$ (min)	
I_{IH}	Input HIGH Current					μA	$V_{IN} = V_{IH}$ (Max)	
	S_n	265		265				
	A_m, B_n	380		340				
I_{EE}	Power Supply Current	-80	-35	-80	-40	mA	Inputs Open	

Note 4: The specified limits represent the "worst case" value for the parameter. Since these values normally occur at the temperature extremes, additional noise immunity and guardbanding can be achieved by decreasing the allowable system operating ranges. Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

AC Electrical Characteristics

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

Symbol	Parameter	$T_C = -40^{\circ}C$		$T_C = +25^{\circ}C$		$T_C = +85^{\circ}C$		Units	Conditions
		Min	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay	0.60	1.65	0.80	1.70	0.80	1.80	ns	Figure 1 and Figure 2
t_{PHL}	A_0-A_7, B_0-B_7 to Output								
t_{PLH}	Propagation Delay	1.20	2.60	1.40	2.70	1.40	2.70	ns	
t_{PHL}	S_0-S_2 to Output								
t_{TLH}	Transition Time	0.30	1.90	0.45	1.30	0.45	1.30	ns	
t_{THL}	20% to 80%, 80% to 20%								

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	Note	
V_{OH}	Output HIGH Voltage	-1025	-870	mV	$0^\circ C$ to $+125^\circ C$	$V_{IN} = V_{IH}$ (Max) or V_{IL} (Min)	Loading with 50Ω to $-2.0V$	(Notes 5, 6, 7)
		-1085	-870	mV	$-55^\circ C$			
V_{OL}	Output LOW Voltage	-1830	-1620	mV	$0^\circ C$ to $+125^\circ C$	$V_{IN} = V_{IH}$ (Min) or V_{IL} (Max)	Loading with 50Ω to $-2.0V$	(Notes 5, 6, 7)
		-1830	-1555	mV	$-55^\circ C$			
V_{OHC}	Output HIGH Voltage	-1035		mV	$0^\circ C$ to $+125^\circ C$	$V_{IN} = V_{IH}$ (Min) or V_{IL} (Max)	Loading with 50Ω to $-2.0V$	(Notes 5, 6, 7)
		-1085		mV	$-55^\circ C$			
V_{OLC}	Output LOW Voltage		-1610	mV	$0^\circ C$ to $+125^\circ C$	$V_{IN} = V_{IH}$ (Min) or V_{IL} (Max)	Loading with 50Ω to $-2.0V$	(Notes 5, 6, 7)
			-1555	mV	$-55^\circ C$			
V_{IH}	Input HIGH Voltage	-1165	-870	mV	$-55^\circ C$ to $+125^\circ C$	Guaranteed HIGH Signal for All Inputs	(Notes 5, 6, 7, 8)	
V_{IL}	Input LOW Voltage	-1830	-1475	mV	$-55^\circ C$ to $+125^\circ C$	Guaranteed LOW Signal for All Inputs	(Notes 5, 6, 7, 8)	
I_{IL}	Input LOW Current	0.50		μA	$-55^\circ C$ to $+125^\circ C$	$V_{EE} = -4.2V$ $V_{IN} = V_{IL}$ (Min)	(Notes 5, 6, 7)	
I_{IH}	Input HIGH Current S_n A_n, B_n		265	μA	$0^\circ C$ to $+125^\circ C$	$V_{EE} = -5.7V$ $V_{IN} = V_{IH}$ (Max)	(Notes 5, 6, 7)	
			340	μA	$-55^\circ C$			
I_{IE}	Power Supply Current S_n A_n, B_n		385	μA	$-55^\circ C$	Inputs Open	(Notes 5, 6, 7)	
			490	μA	$-55^\circ C$			
I_{EE}	Power Supply Current	-87	-30	mA	$-55^\circ C$ to $+125^\circ C$	Inputs Open	(Notes 5, 6, 7)	

Note 5: F100K 300 Series cold temperature testing is performed by temperature soaking (to guarantee junction temperature equals $-55^\circ C$), 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 6: Screen tested 100% on each device at $-55^\circ C$, $+25^\circ C$, and $+125^\circ C$, Subgroups 1, 2, 3, 7, and 8.

Note 7: Sample tested (Method 5005, Table I) on each manufactured lot at $-55^\circ C$, $+25^\circ C$, and $+125^\circ C$, Subgroups A1, 2, 3, 7, and 8.

Note 8: 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 9, 10, 11)
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									
t_{TLH}	Transition Time	0.30	1.90	0.40	1.80	0.30	2.10	ns		(Note 12)
t_{THL}	20% to 80%, 80% to 20%									

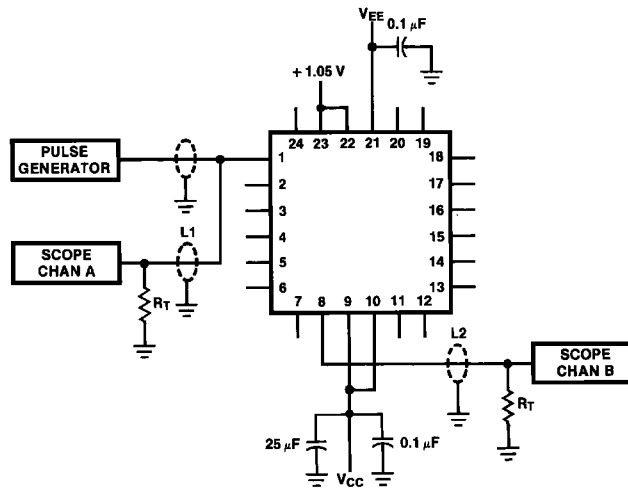
Note 9: F100K 300 Series cold temperature testing is performed by temperature soaking (to guarantee junction temperature equals $-55^\circ C$), then testing immediately after power-up. This provides "cold start" specs which can be considered a worst case condition at cold temperatures.

Note 10: Screen tested 100% on each device at $+25^\circ C$ temperature only, Subgroup A9.

Note 11: 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 12: Not tested at $+25^\circ C$, $+125^\circ C$, and $-55^\circ C$ temperature (design characterization data).

Test Circuitry



DS010612-6

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}

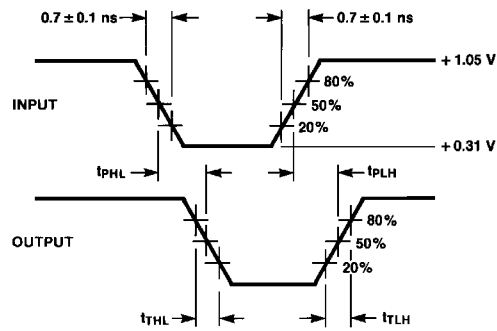
All unused outputs are loaded with 50Ω to GND

C_L = Fixture and stray capacitance ≤ 3 pF

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

FIGURE 1. AC Test Circuit

Switching Waveforms

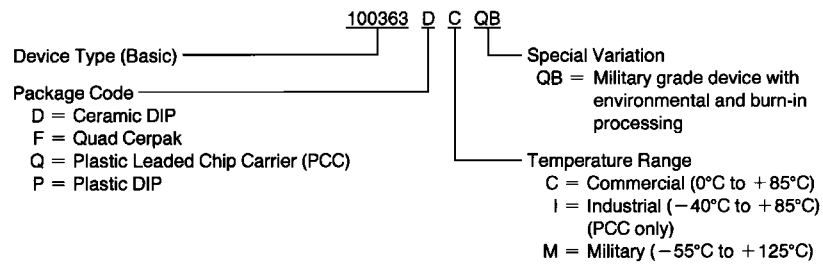


DS010612-7

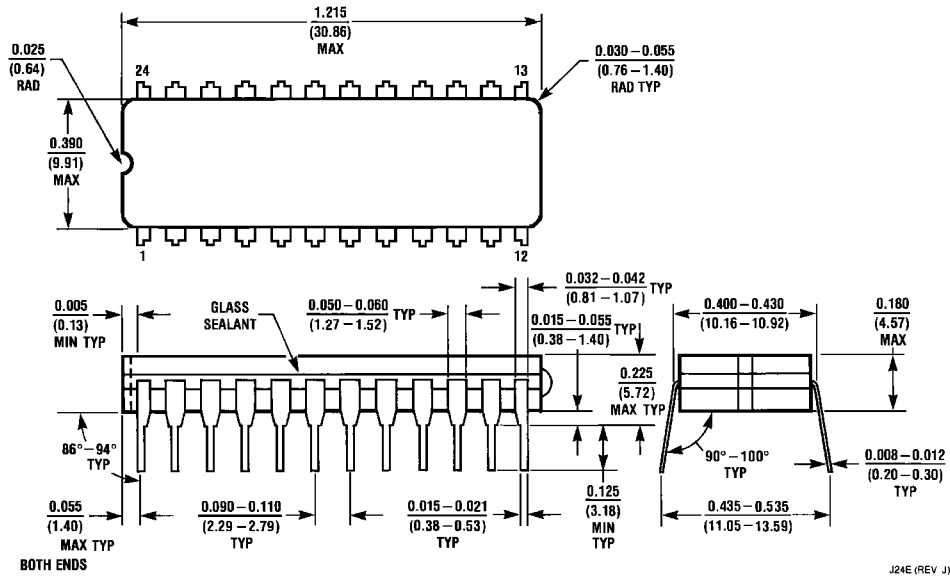
FIGURE 2. Propagation Delay and Transition Times

Ordering Information

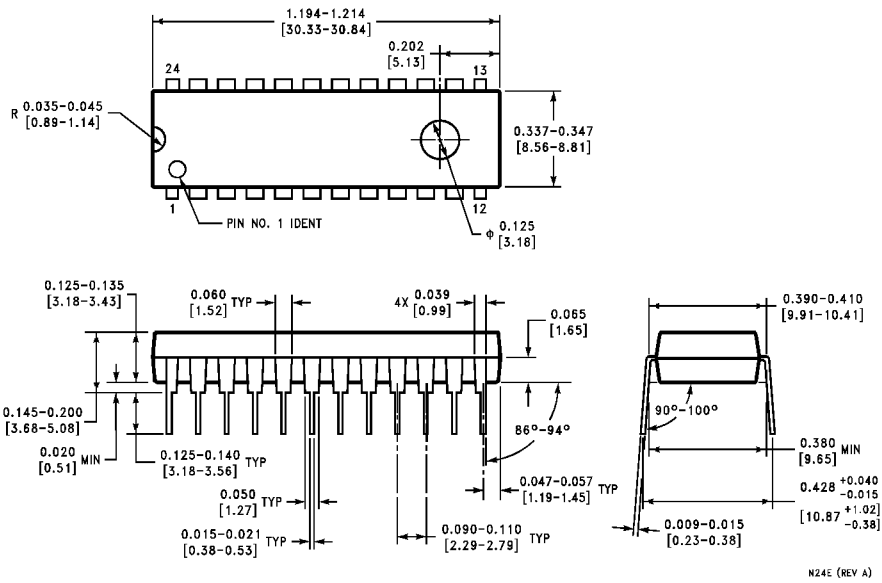
The device number is used to form part of a simplified purchasing code where a package type and temperature range are defined as follows:



Physical Dimensions inches (millimeters) unless otherwise noted

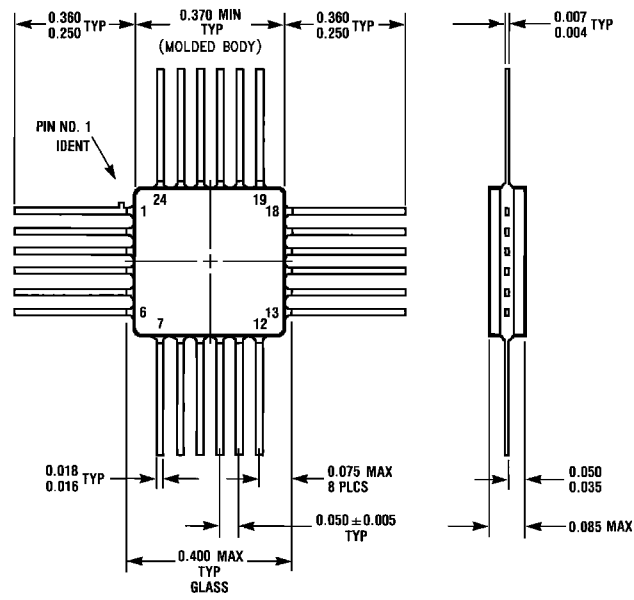


24-Pin Ceramic Dual-In-Line Package (D)
Package Number J24E



24-Lead Plastic Dual-In-Line Package (P)
Package Number N24E

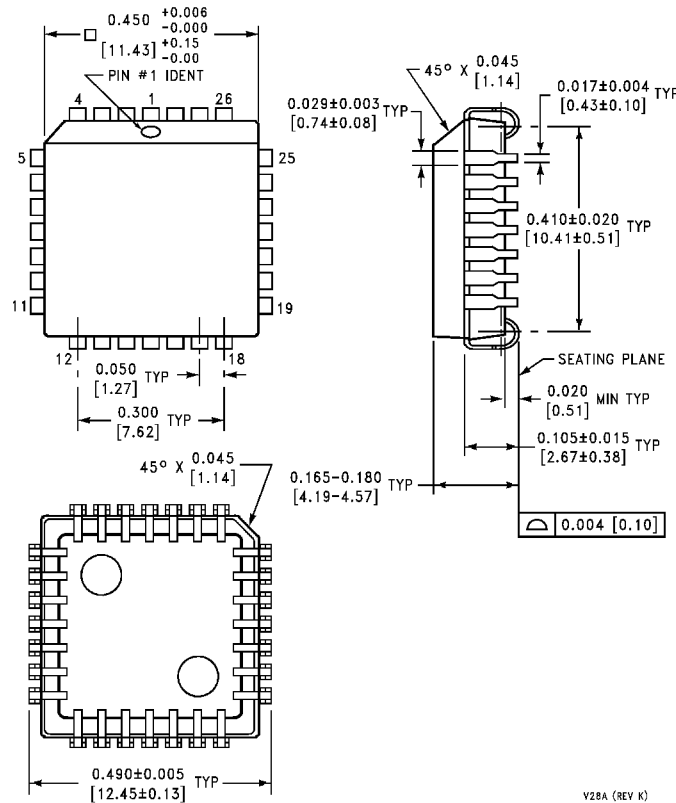
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



W24B (REV D)

**24-Pin Quad Cerpak (F)
Package Number W24B**

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



**28-Pin Plastic Leaded Chip Carrier (Q)
Package Number V28A**

V28A (REV K)

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