

100323

Low Power Hex Bus Driver

General Description

The 100323 is a monolithic device containing six bus drivers capable of driving terminated lines with terminations as low as 25Ω. To reduce crosstalk, each output has its own respective ground connection. Transition times were designed to be longer than on other F100K devices. The driver itself performs the positive logic AND of a data input (D₁–D₆) and the OR of two select inputs (E and either DE₁, DE₂, or DE₃).

Enabling of data is possible in multiples of two, i.e., 2, 4 or all 6 paths. All inputs have 50 kΩ pull-down resistors.

The output voltage LOW level is designed to be more negative than normal ECL outputs (cut off state). This allows an

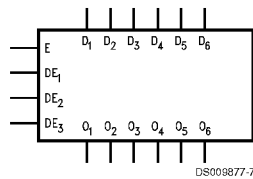
emitter-follower output transistor to turn off when the termination supply is –2.0V and thus present a high impedance to the data bus.

Features

- 50% power reduction of the 100123
- 2000V ESD protection
- –4.2V to –5.7V operating range
- Drives 25Ω load

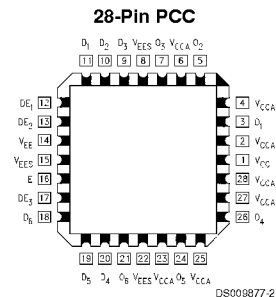
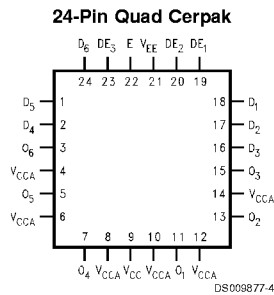
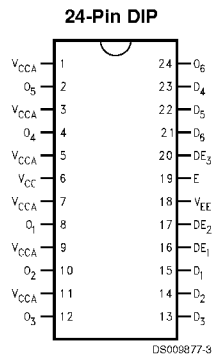
Ordering Code:

Logic Symbol

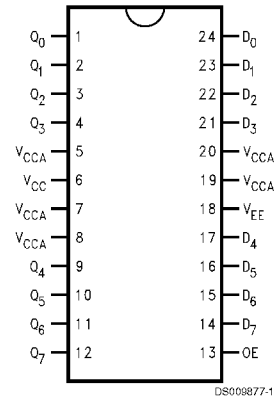


| Pin Names | Description |
|----------------------------------|---------------------|
| D ₁ –D ₆ | Data Inputs |
| DE ₁ –DE ₃ | Dual Enable Inputs |
| E | Common Enable Input |
| O ₁ –O ₆ | Data Outputs |

Connection Diagrams



Logic Diagram



Truth Table

| E | DE _n | D _n | D _{n+1} | O _n | O _{n+1} |
|---|-----------------|----------------|------------------|----------------|------------------|
| L | L | X | X | Cutoff | Cutoff |
| X | H | L | L | Cutoff | Cutoff |
| X | H | L | H | Cutoff | H |
| X | H | H | L | H | Cutoff |
| X | H | H | H | H | H |
| H | X | L | L | Cutoff | Cutoff |
| H | X | L | H | Cutoff | H |
| H | X | H | L | H | Cutoff |
| H | X | H | H | H | H |

H = High
 Cutoff = Lower-than-LOW state
 L = Low
 X = Don't Care

Absolute Maximum Ratings (Note 1)

| | |
|---|--------------------------|
| Storage Temperature | -65°C to +150°C |
| Maximum Junction Temperature | |
| 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 | ≥2000V |

Recommended Operating Conditions

| | |
|-----------------------------------|-----------------|
| Case Temperature | |
| Commercial | 0°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 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°C to +85°C (Note 3)

| Symbol | Parameter | Min | Typ | Max | Units | Conditions | |
|------------------|----------------------|-------|------|-------|-------|--|---------------------------|
| 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 | |
| V _{OH} | Output HIGH Voltage | -1025 | -955 | -870 | mV | V _{IN} = V _{IH (max)} or V _{IL (min)} | Loading with 25Ω to -2.0V |
| V _{OHc} | Output HIGH Voltage | -1035 | | | mV | V _{IN} = V _{IH (min)} or V _{IL (max)} | Loading with 25Ω to -2.0V |
| V _{OLZ} | Cut-Off LOW Voltage | | | -1950 | mV | V _{IN} = V _{IH (min)} or V _{IL (max)} | Loading with 25Ω to -2.0V |
| I _{IL} | Input LOW Current | 0.50 | | | μA | V _{IN} = V _{IL (min)} | |
| I _{IH} | Input HIGH Current | | | 240 | μA | V _{IN} = V _{IH (max)} | |
| I _{EE} | Power Supply Current | -121 | -91 | -57 | mA | Inputs Open | |

Note 3: The specified limits represent "worst case" values 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°C | | T _C = +25°C | | T _C = +85°C | | Units | Conditions |
|------------------|-------------------------|----------------------|------|------------------------|------|------------------------|------|-------|--------------|
| | | Min | Max | Min | Max | Min | Max | | |
| t _{PZH} | Propagation Delay | 1.90 | 3.60 | 1.90 | 3.60 | 2.00 | 3.80 | ns | Figures 1, 2 |
| t _{PHZ} | Data to Output | 1.30 | 2.70 | 1.30 | 2.70 | 1.50 | 2.70 | | |
| t _{PZH} | Propagation Delay | 1.90 | 3.60 | 1.90 | 3.60 | 2.00 | 3.90 | ns | |
| t _{PHZ} | Dual Enable to Output | 1.60 | 3.00 | 1.60 | 3.00 | 1.70 | 3.40 | | |
| t _{PZH} | Propagation Delay | 1.80 | 3.50 | 1.80 | 3.50 | 2.00 | 3.80 | ns | |
| t _{PHZ} | Common Enable to Output | 1.50 | 2.90 | 1.50 | 2.90 | 1.60 | 3.00 | | |
| t _{TZH} | Transition Time | 0.50 | 1.80 | 0.50 | 1.80 | 0.50 | 1.80 | ns | |
| t _{THZ} | 20% to 80%, 80% to 20% | 0.35 | 1.40 | 0.35 | 1.40 | 0.35 | 1.40 | | |

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_{PZH} | Propagation Delay | 1.90 | 3.40 | 1.90 | 3.40 | 2.00 | 3.60 | ns | Figures 1, 2 |
| t_{PHZ} | Data to Output | 1.30 | 2.50 | 1.30 | 2.50 | 1.50 | 2.70 | ns | |
| t_{PZH} | Propagation Delay | 1.90 | 3.40 | 1.90 | 3.40 | 2.00 | 3.70 | ns | |
| t_{PHZ} | Dual Enable to Output | 1.60 | 2.80 | 1.60 | 2.80 | 1.70 | 3.00 | ns | |
| t_{PZH} | Propagation Delay | 1.80 | 3.30 | 1.80 | 3.30 | 2.00 | 3.60 | ns | |
| t_{PHZ} | Common Enable to Output | 1.50 | 2.70 | 1.50 | 2.70 | 1.60 | 2.80 | ns | |
| t_{TZH} | Transition Time | 0.50 | 1.70 | 0.50 | 1.70 | 0.50 | 1.70 | ns | |
| t_{THZ} | 20% to 80%, 80% to 20% | 0.35 | 1.30 | 0.35 | 1.20 | 0.35 | 1.30 | ns | |

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 guard banding 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.

Military Version—Preliminary

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 | $0^\circ C$ to $+125^\circ C$ | $V_{IN} = V_{IH(max)}$ or $V_{IL(min)}$ | Loading with 25Ω to $-2.0V$ | (Notes 5, 6, 7) |
| | | -1085 | -870 | 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 25Ω to $-2.0V$ | (Notes 5, 6, 7) |
| | | -1085 | | mV | $-55^\circ C$ | | | |
| V_{OLC} | Output LOW Voltage | | -1610 | mV | $0^\circ C$ to $+125^\circ C$ | | | |
| | | | -1555 | MV | $-55^\circ C$ | | | |
| V_{OLZ} | Cut-Off LOW Voltage | | -1950 | mV | $0^\circ C$ to $+125^\circ C$ | $V_{IN} = V_{IH(min)}$ or $V_{IL(max)}$ | Loading with 25Ω to $-2.0V$ | (Notes 5, 6, 7) |
| | | | -1850 | 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 | | 240 | 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_{EE} | Power Supply Current | -145 -150 | -55 | mA | $-55^\circ C$ to $+125^\circ C$ | Inputs Open $V_{EE} = -4.2V$ to $-4.8V$ $V_{EE} = -4.2V$ to $-5.7V$ | | (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—All Packages

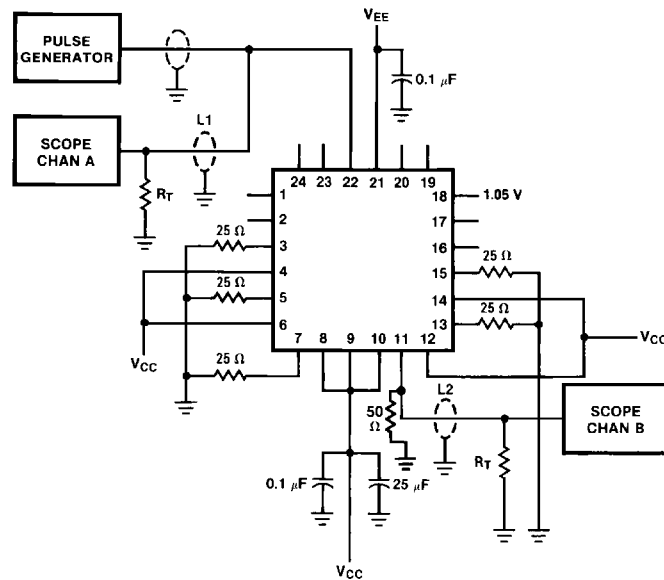
$V_{EE} = -4.2V$ to $-5.7V$, $V_{CC} = V_{CCA} = GND$

| Symbol | Parameter | $T_C = -55^\circ C$ | | $T_C = +25^\circ C$ | | $T_C = +125^\circ C$ | | Units | Conditions |
|-----------|-------------------------|---------------------|------|---------------------|------|----------------------|------|-------|--------------|
| | | Min | Max | Min | Max | Min | Max | | |
| t_{PZH} | Propagation Delay | 1.70 | 4.00 | 1.70 | 4.00 | 1.80 | 4.20 | ns | Figures 1, 2 |
| t_{PHZ} | Data to Output | 1.10 | 3.10 | 1.10 | 3.10 | 1.30 | 3.10 | | |
| t_{PZH} | Propagation Delay | 1.70 | 4.00 | 1.70 | 4.00 | 1.80 | 4.30 | ns | |
| t_{PHZ} | Data Enable to Output | 1.40 | 3.40 | 1.40 | 3.40 | 1.50 | 3.80 | | |
| t_{PZH} | Propagation Delay | 1.60 | 3.90 | 1.60 | 3.90 | 1.80 | 4.20 | ns | |
| t_{PHZ} | Common Enable to Output | 1.30 | 3.30 | 1.30 | 3.30 | 1.40 | 3.40 | | |
| t_{TZH} | Transition Time | 0.40 | 2.20 | 0.40 | 2.20 | 0.40 | 2.20 | ns | |
| t_{THZ} | 20% to 80%, 80% to 20% | 0.25 | 1.80 | 0.25 | 1.80 | 0.25 | 1.80 | | |

Note 9: The specified limits represent the "worst case" value for the parameter. Since these "worst case" values normally occur at the temperature extremes, additional noise immunity and guard banding can be achieved by decreasing the allowable system operating ranges.

Note 10: Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

Test Circuitry



DS00877-5

Notes:

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

L1 and L2 = equal length 50Ω impedance lines

R_T = 50Ω terminator internal to scope

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

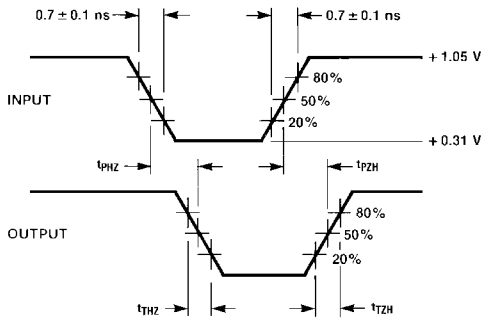
All unused outputs are loaded with 25Ω to GND

C_L = Fixture and stray capacitance ≤ 3 pF

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

FIGURE 1. AC Test Circuit

Timing Waveform

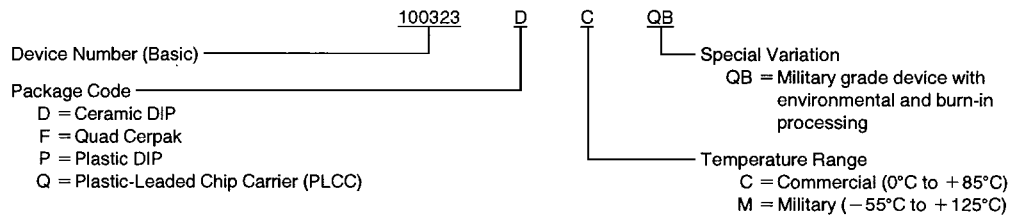


DS009877-6

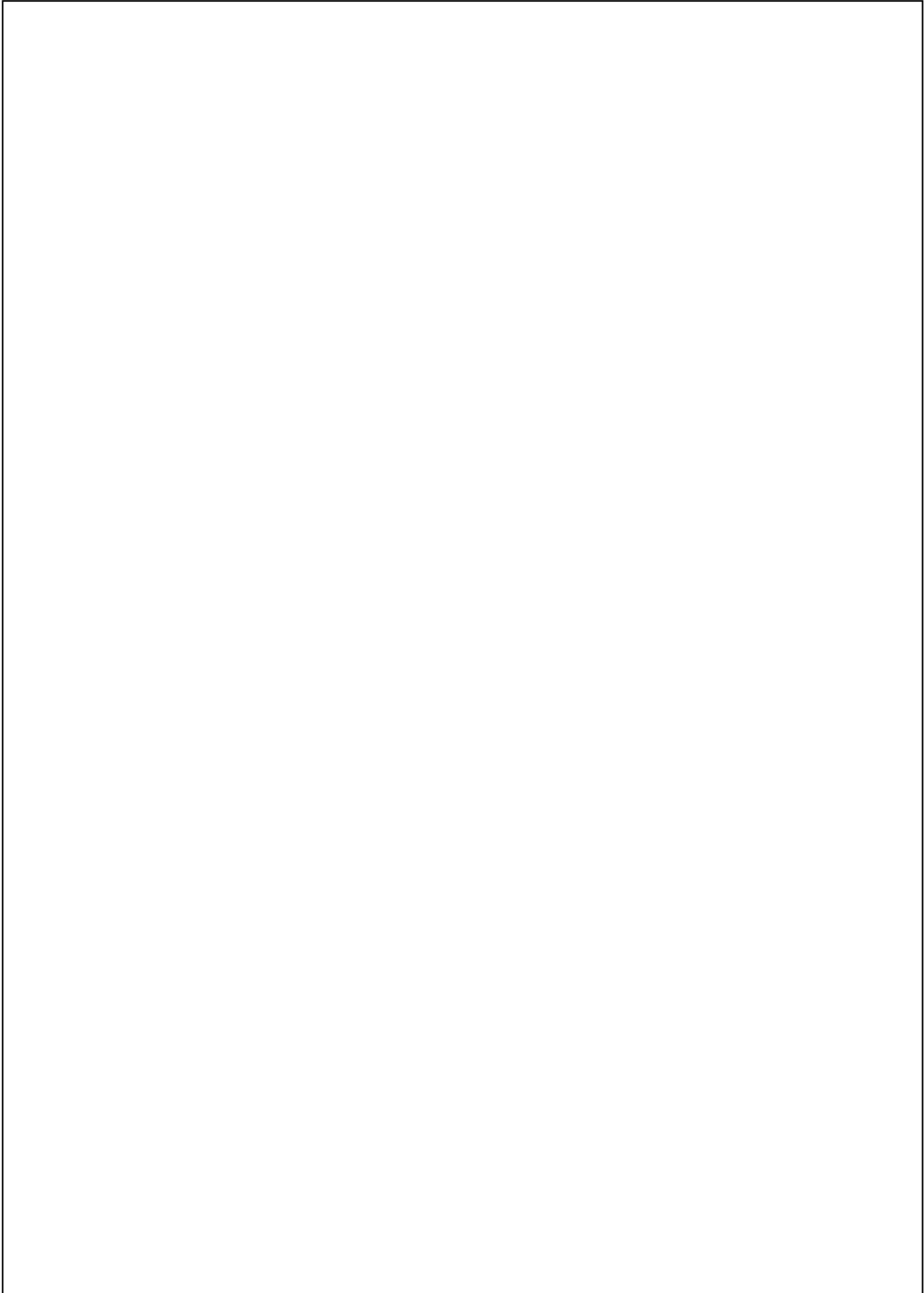
FIGURE 2. Propagation Delay and Transition Times

Ordering Information

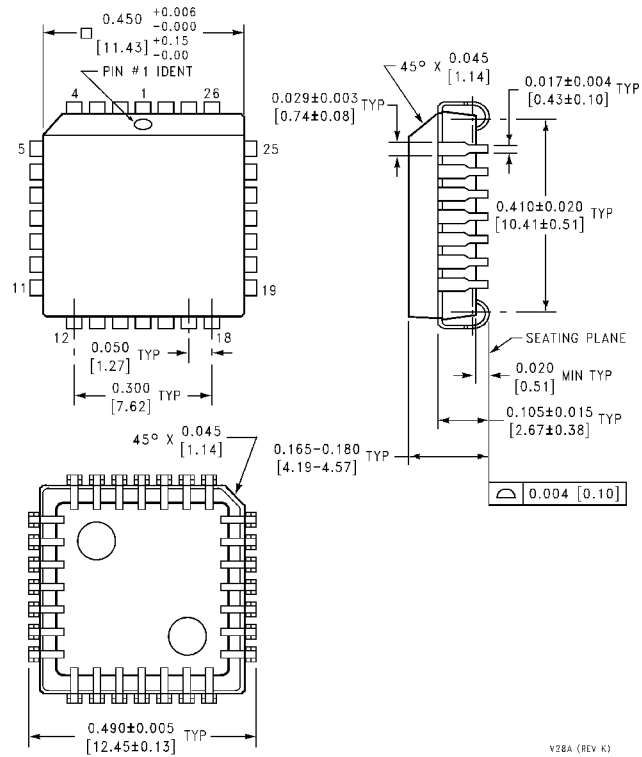
The device number is used to form part of a simplified purchasing code where a package type and temperature range are defined as follows:



DS009877-8



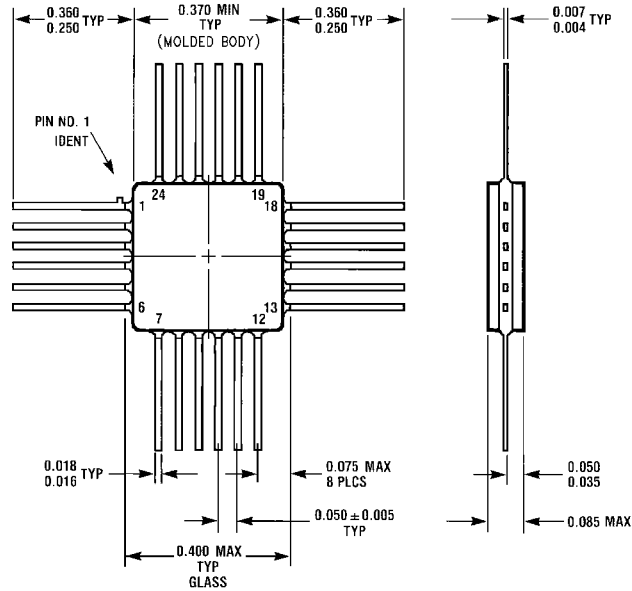
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



**28 Lead Plastic Chip Carrier (Q)
Package Number V28A**

V28A (REV K)

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



W24B (REV D)

**24 Lead Quad Cerpak (F)
Package Number W24B**

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