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## 1.5A High-Speed, Floating Load Driver

### Features

- Low Quiescent Current: 300 $\mu$ A Max
- Capacitive Inputs With 300mV Hysteresis
- Both Inputs Must Be Driven to Drive Load
- Low Output Leakage
- High Peak Current Capability
- Fast Output Rise Time
- Outputs Individually Testable

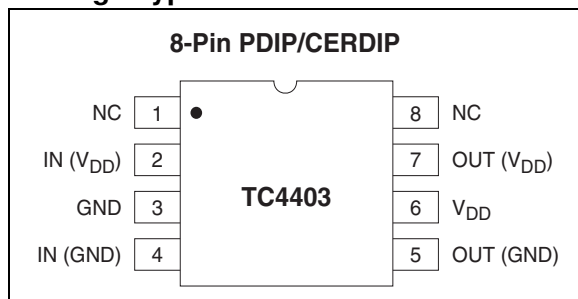
### Applications

- Isolated Load Drivers
- Pulsers
- Safety Interlocks

### Device Selection Table

Part Number	Package	Temp. Range
TC4403CPA	8-Pin PDIP	0°C to +70°C
TC4403EPA	8-Pin PDIP	-40°C to +85°C
TC4403MJA	8-Pin CERDIP	-55°C to +125°C

### Package Type



### General Description

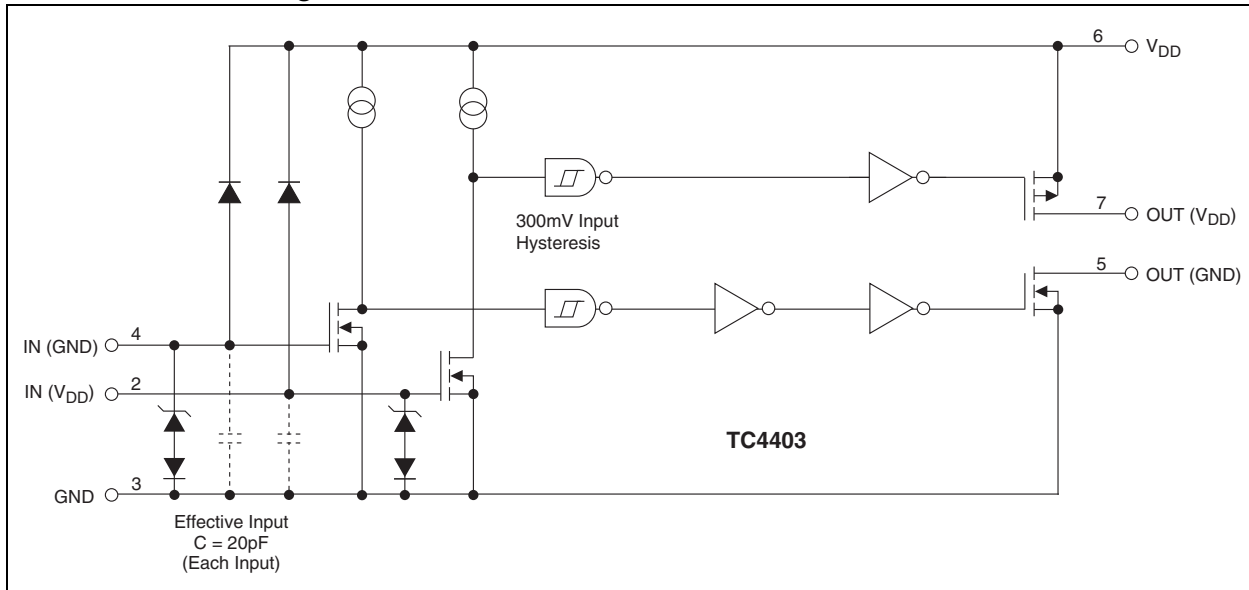
The TC4403 is a modified version of the TC4425 driver, intended to drive floating or isolated loads requiring high-current pulses. The load is intended to be connected between the outputs without other reference to supply or ground. Then, only when both logic inputs and the V<sub>DD</sub> input are energized, is power supplied to the load. This construction allows the implementation of a wide variety of redundant input controllers.

The low OFF-state output leakage and independence of the two half-circuits permit a wide variety of testing schemes to be utilized to assure functionality. The high peak current capability, short internal delays, and fast output rise and fall times ensure that sufficient power will be available to the load when it is needed. The TTL and CMOS compatible inputs allow operation from a wide variety of input devices. The ability to swing the inputs negative without affecting device performance allows negative biases to be placed on the inputs for greater safety. In addition, the capacitive nature of the inputs allows the use of series resistors on the inputs for extra noise suppression.

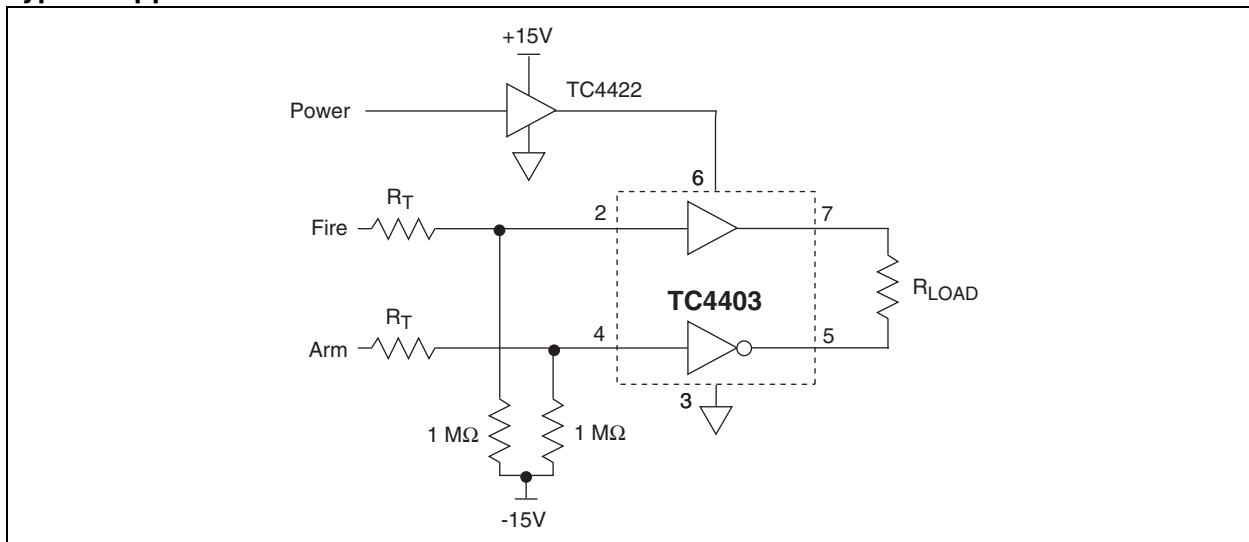
The TC4403 is built for outstanding ruggedness and reliability in harsh applications. Input voltage excursions above the supply voltage or below ground are clamped internally without damaging the device. The output stages are power MOSFETs with high-speed body diodes to prevent damage to the driver from inductive kickbacks.

# TC4403

## Functional Block Diagram



## Typical Application



## 1.0 ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings\*

Supply Voltage.....	+22V
Package Thermal Resistance	
CERDIP R <sub>θJ-A</sub> .....	150°C/W
CERDIP R <sub>θJ-C</sub> .....	50°C/W
PDIP R <sub>θJ-A</sub> .....	125°C/W
PDIP R <sub>θJ-C</sub> .....	42°C/W
Operating Temperature Range	
C Version.....	0°C to +70°C
E Version.....	-40°C to +85°C
M Version.....	-55°C to +125°C
Storage Temperature Range.....	-65°C to +150°C

\*Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operation sections of the specifications is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

### TC4403 ELECTRICAL SPECIFICATIONS

Electrical Characteristics: T <sub>A</sub> = +25°C, with 4.5V ≤ V <sub>DD</sub> ≤ 18V, unless otherwise noted.						
Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
<b>Input</b>						
V <sub>IH</sub>	Logic 1, High Input Voltage	2.4	—	—	V	
V <sub>IL</sub>	Logic 0, Low Input Voltage	—	—	0.8	V	
I <sub>IN</sub>	Input Current	-1000	±10	±1000	nA	-5V ≤ V <sub>IN</sub> ≤ V <sub>DD</sub>
<b>Output</b>						
V <sub>OH</sub>	High Output Voltage	V <sub>DD</sub> - 0.025	—	—	V	
V <sub>OL</sub>	Low Output Voltage	—	—	0.025	V	
R <sub>OS</sub>	Sourcing Output Resistance	—	2.8	5	Ω	I <sub>OUT</sub> = 10mA, V <sub>DD</sub> = 18V
R <sub>OG</sub>	Grounding Output Resistance	—	3.5	5	Ω	I <sub>OUT</sub> = -10mA, V <sub>DD</sub> = 18V
I <sub>PK</sub>	Peak Output Current	—	1.5	—	A	
<b>Switching Time (Note 1)</b>						
t <sub>R</sub>	Rise Time	—	23	35	nsec	Figure 3-1, C <sub>L</sub> = 1800pF
t <sub>F</sub>	Fall Time	—	25	35	nsec	Figure 3-1, C <sub>L</sub> = 1800pF
t <sub>D1</sub>	Delay Time	—	33	75	nsec	Figure 3-1, C <sub>L</sub> = 1800pF
t <sub>D2</sub>	Delay Time	—	38	75	nsec	Figure 3-1, C <sub>L</sub> = 1800pF
<b>Power Supply</b>						
I <sub>S</sub>	Power Supply Current	—	1.5	2.5	mA	V <sub>IN</sub> = 3V (Both Inputs)
		—	0.15	0.25		V <sub>IN</sub> = 0V (Both Inputs)

**Note 1:** Switching times ensured by design.

# TC4403

## TC4403 ELECTRICAL SPECIFICATIONS (CONTINUED)

Electrical Characteristics: Over operating temperature range with $4.5V \leq V_{DD} \leq 18V$ , unless otherwise noted.						
Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
<b>Input</b>						
$V_{IH}$	Logic 1, High Input Voltage	2.4	—	—	V	
$V_{IL}$	Logic 0, Low Input Voltage	—	—	0.8	V	
$I_{IN}$	Input Current	-10,000	$\pm 10$	$\pm 10,000$	nA	$-5V \leq V_{IN} \leq V_{DD}$
<b>Output</b>						
$V_{OH}$	High Output Voltage	$V_{DD} - 0.025$	—	—	V	
$V_{OL}$	Low Output Voltage	—	—	0.025	V	
$R_{OS}$	Sourcing Output Resistance	—	3.7	8	$\Omega$	$V_{IN} = 2.4V, I_{OUT} = 10mA, V_{DD} = 18V$
$R_{OG}$	Grounding Output Resistance	—	4.3	8	$\Omega$	$V_{IN} = 2.4V, I_{OUT} = -10mA, V_{DD} = 18V$
<b>Switching Time (Note 1)</b>						
$t_R$	Rise Time	—	28	60	nsec	Figure 3-1, $C_L = 1800pF$
$t_F$	Fall Time	—	32	60	nsec	Figure 3-1, $C_L = 1800pF$
$t_{D1}$	Delay Time	—	32	100	nsec	Figure 3-1, $C_L = 1800pF$
$t_{D2}$	Delay Time	—	38	100	nsec	Figure 3-1, $C_L = 1800pF$
<b>Power Supply</b>						
$I_S$	Power Supply Current	—	2	3.5	mA	$V_{IN} = 3V$ (Both Inputs)
		—	0.2	0.3		$V_{IN} = 0V$ (Both Inputs)

**Note 1:** Switching times ensured by design.

## 2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 2-1.

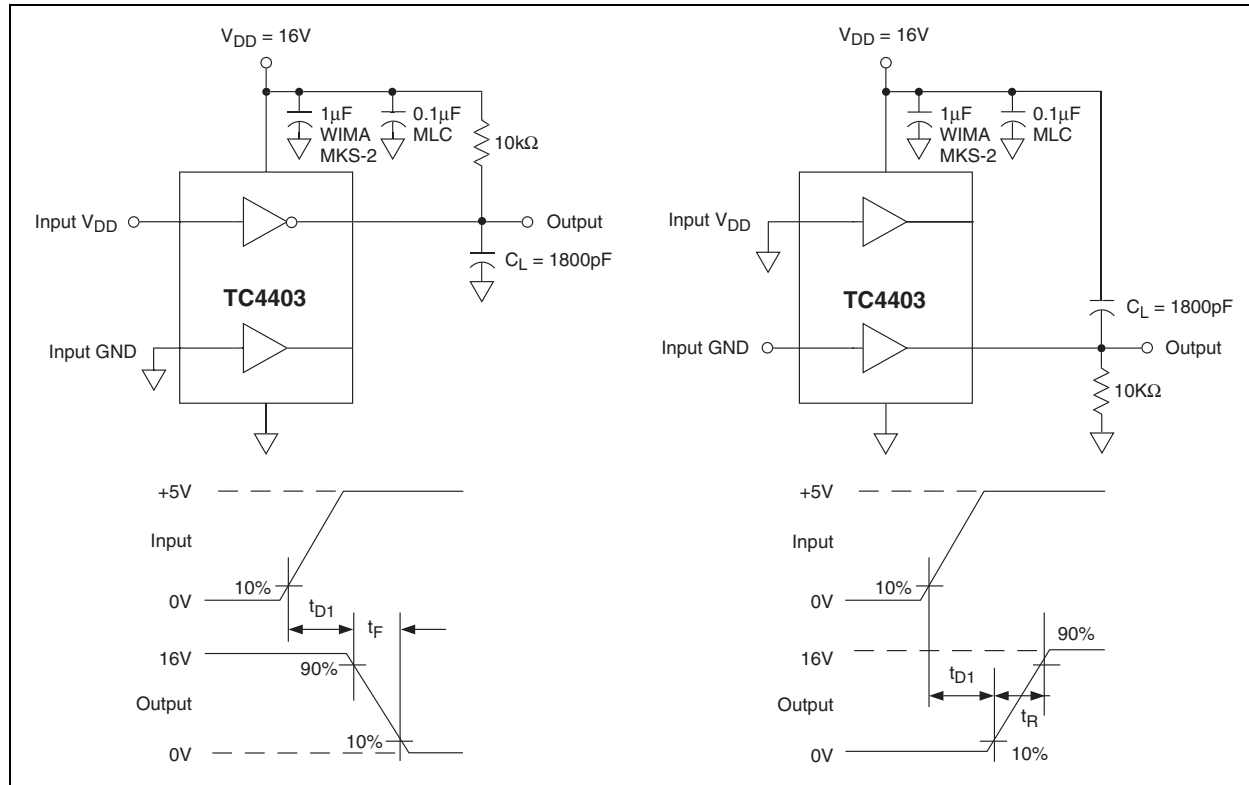
**TABLE 2-1: PIN FUNCTION TABLE**

Pin No. (8-Pin PDIP, CERDIP)	Symbol	Description
1	NC	No connection.
2	IN ( $V_{DD}$ )	Control input $V_{DD}$ . TTL/CMOS compatible logic input signal, controls OUT ( $V_{DD}$ ).
3	GND	Ground.
4	IN (GND)	Control Input GND, TTL/CMOS compatible logic input signal, controls OUT (GND).
5	OUT (GND)	Output GND, CMOS Pull Down Output.
6	$V_{DD}$	Supply Input, 4.5V to 18V.
7	OUT ( $V_{DD}$ )	Output $V_{DD}$ , CMOS pull-up output.
8	NC	No connection.

# TC4403

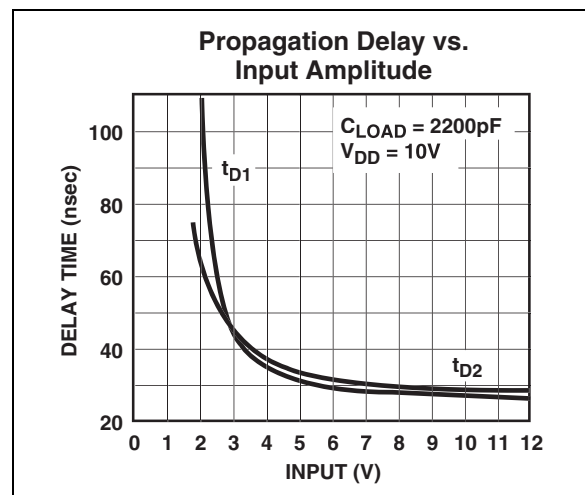
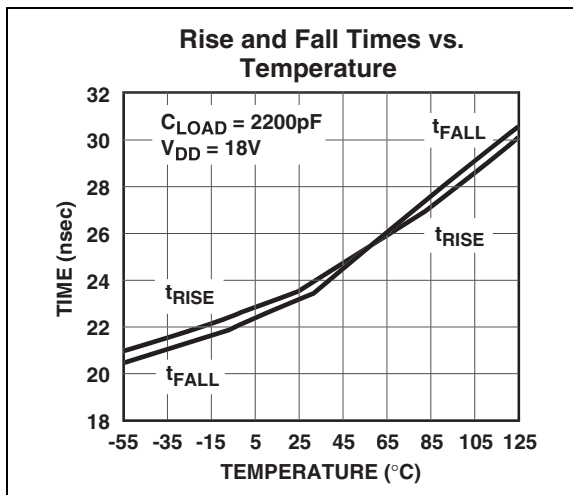
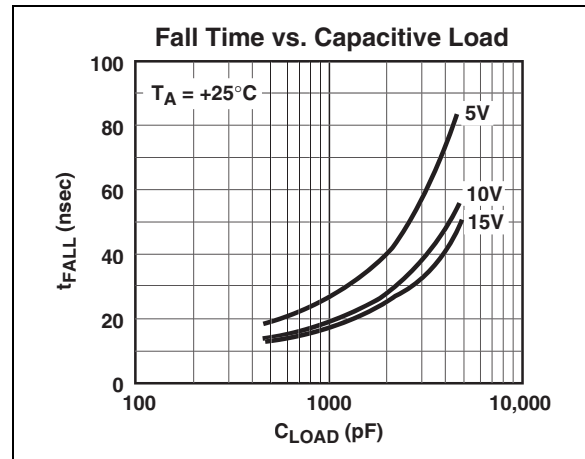
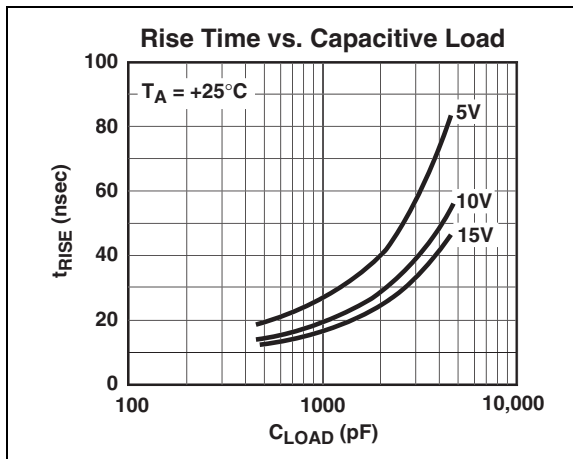
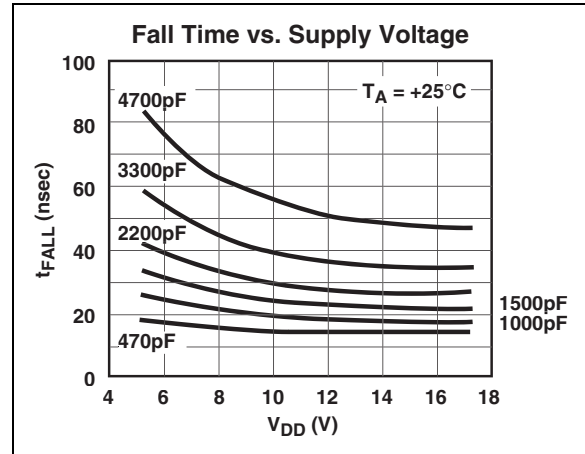
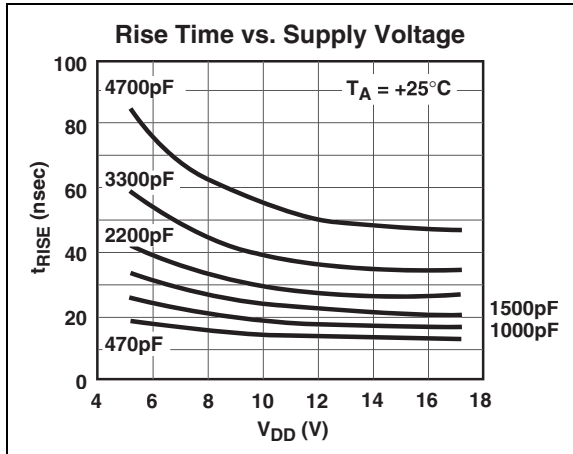
## 3.0 APPLICATIONS INFORMATION

FIGURE 3-1: SWITCHING TIME TEST CIRCUITS



## 4.0 TYPICAL CHARACTERISTICS

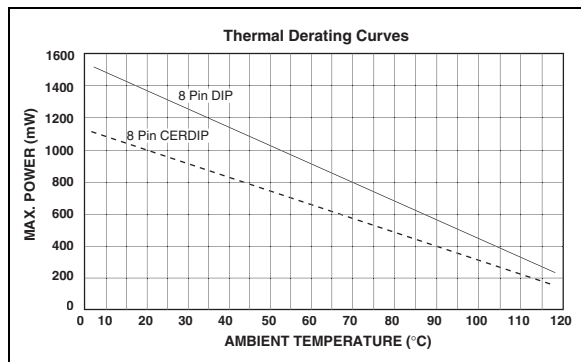
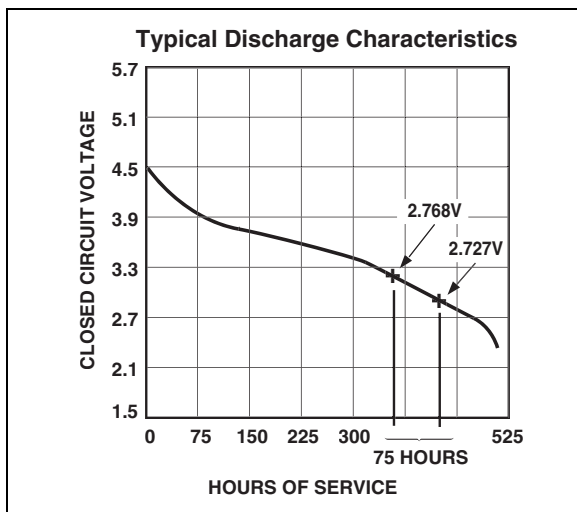
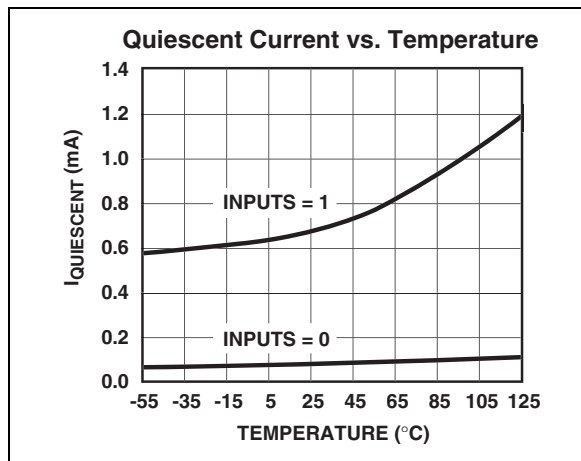
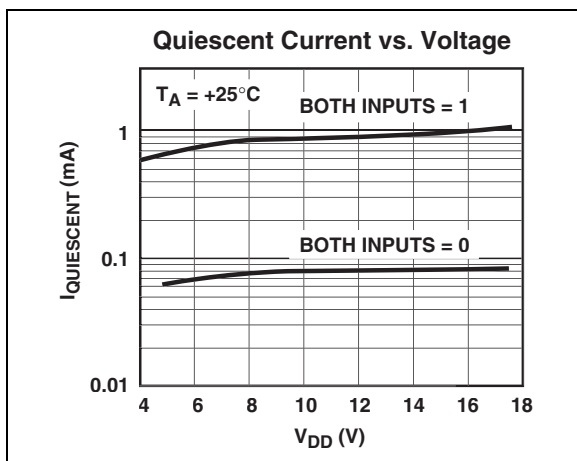
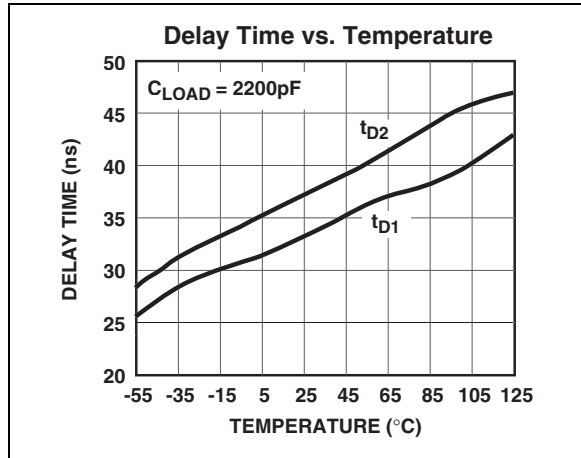
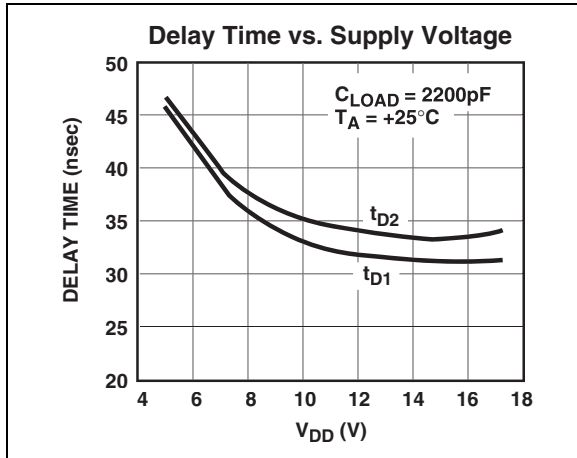
**Note:** The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. The performance characteristics listed herein are not tested or guaranteed. In some graphs or tables, the data presented may be outside the specified operating range (e.g., outside specified power supply range) and therefore outside the warranted range.





# TC4403

## TYPICAL CHARACTERISTICS (CONTINUED)



## 5.0 PACKAGING INFORMATION

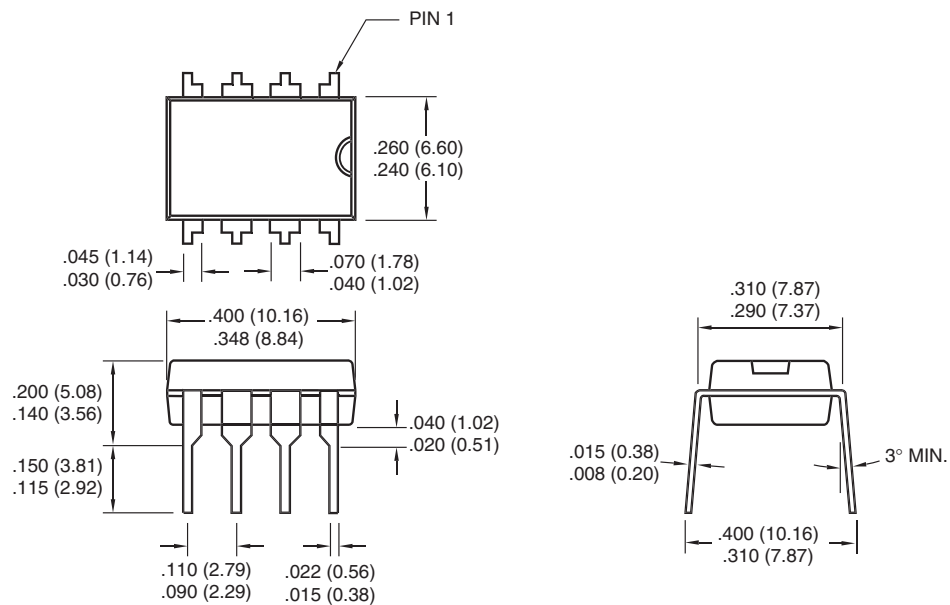
### 5.1 Package Marking Information

Package marking data not available at this time.

### 5.2 Package Dimensions

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

#### 8-Pin Plastic DIP

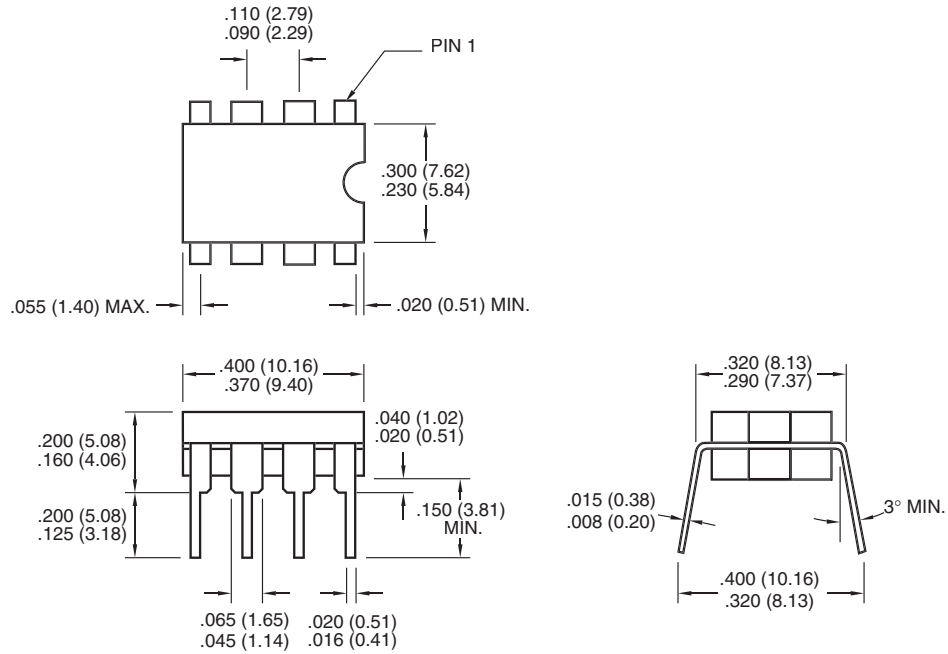


Dimensions: inches (mm)

# TC4403

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>

## 8-Pin CERDIP (Narrow)



Dimensions: inches (mm)

## 6.0 REVISION HISTORY

### Revision C (December 2012)

Added a note to each package outline drawing.

# TC4403

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NOTES:

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# TC4403

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NOTES:

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