

## 1.5A Dual High-Speed Power MOSFET Drivers

### Features

- High-Speed Switching ( $C_L = 1000$  pF): 30 nsec
- High Peak Output Current: 1.5A
- High Output Voltage Swing:
  - $V_{DD} - 25$  mV
  - GND +25 mV
- Low Input Current (Logic '0' or '1'): 1  $\mu$ A
- TTL/CMOS Input Compatible
- Available in Inverting and Noninverting Configurations
- Wide Operating Supply Voltage:
  - 4.5V to 18V
- Current Consumption:
  - Inputs Low – 0.4 mA
  - Inputs High – 8 mA
- Single Supply Operation
- Low Output Impedance: 6 $\Omega$
- Latch-Up Resistant: Withstands > 500 mA Reverse Current
- ESD Protected: 2 kV

### Applications

- Switch Mode Power Supplies
- Pulse Transformer Drive
- Clock Line Driver
- Coax Cable Driver

### General Description

The TC426/TC427/TC428 are dual CMOS high-speed drivers. A TTL/CMOS input voltage level is translated into a rail-to-rail output voltage level swing. The CMOS output is within 25 mV of ground or positive supply.

The low-impedance, high-current driver outputs swing a 1000 pF load to 18V in 30 nsec. The unique current and voltage drive qualities make the TC426/TC427/TC428 ideal power MOSFET drivers, line drivers, and DC-to-DC converter building blocks.

Input logic signals may equal the power supply voltage. Input current is a low 1  $\mu$ A, making direct interface to CMOS/bipolar switch-mode power supply control ICs possible, as well as open-collector analog comparators.

Quiescent power supply current is 8 mA maximum, which is important in DC-to-DC converter applications with power efficiency constraints and high-frequency switch-mode power supply applications. Quiescent current is typically 6 mA when driving a 1000 pF load to 18V at 100 kHz.

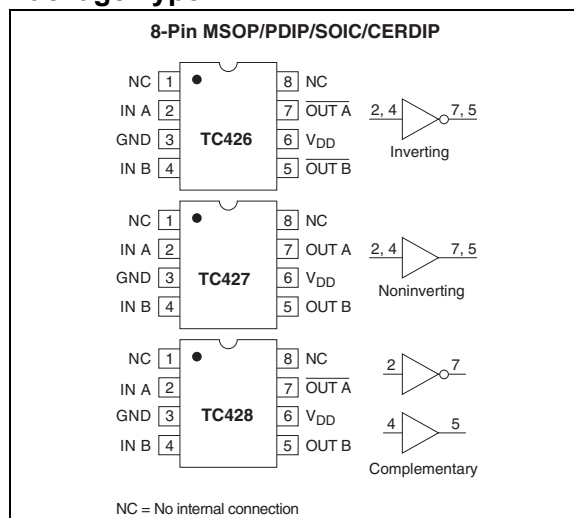
TC426 is inverting driver.

TC427 is noninverting driver.

TC428 contains an inverting and noninverting driver.

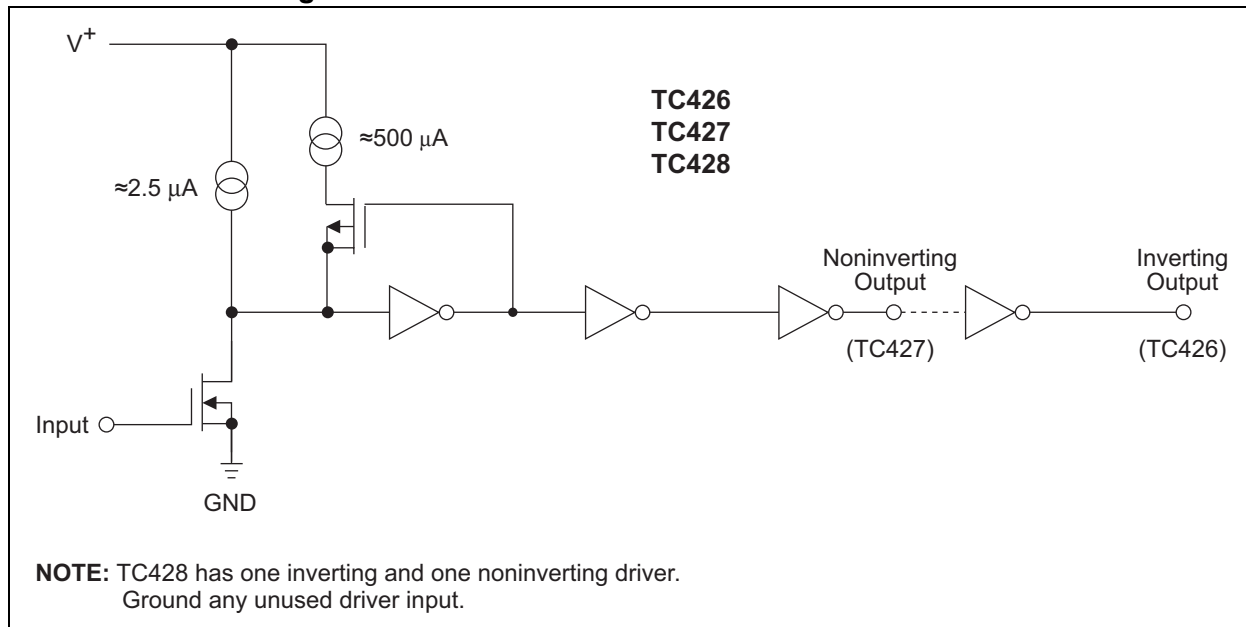
Other pin-compatible driver families are the TC1426/TC1427/TC1428, TC4426/TC4427/TC4428 and TC4426A/TC4427A/TC4428A.

### Package Type



# TC426/TC427/TC428

## Functional Block Diagram



## 1.0 ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings †

|   |                               |
|---|-------------------------------|
| Supply Voltage .....                        | +20V                          |
| Input Voltage, Any Terminal .....           | $V_{DD} + 0.3V$ to GND – 0.3V |
| Power Dissipation ( $T_A \leq 70^\circ C$ ) |                               |
| PDIP .....                                  | 730 mW                        |
| CERDIP .....                                | 800 mW                        |
| SOIC .....                                  | 470 mW                        |
| MSOP .....                                  | 340 mW                        |
| Derating Factor                             |                               |
| PDIP .....                                  | 8 mW/°C                       |
| CERDIP .....                                | 6.4 mW/°C                     |
| SOIC .....                                  | 4 mW/°C                       |
| MSOP .....                                  | 4.8 mW/°C                     |
| Operating Temperature Range                 |                               |
| C Version .....                             | 0°C to +70°C                  |
| I Version .....                             | -25°C to +85°C                |
| E Version .....                             | -40°C to +85°C                |
| M Version .....                             | -55°C to +125°C               |
| Storage Temperature Range .....             | -65°C to +150°C               |

† **Notice:** 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.

### TC426/TC427/TC428 ELECTRICAL SPECIFICATIONS

| Electrical Characteristics: $T_A = +25^\circ C$ 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               | -1               | —    | 1        | $\mu A$  | $0V \leq V_{IN} \leq V_{DD}$                               |
| <b>Output</b>  |                             |                  |      |          |          |  |
| $V_{OH}$   | High Output Voltage         | $V_{DD} - 0.025$ | —    | —        | V        | $I_{OUT} = 0$ mA   |
| $V_{OL}$   | Low Output Voltage          | —                | —    | 0.025    | V        | $I_{OUT} = 0$ mA   |
| $R_{OH}$   | High Output Resistance      | —                | 10   | 15       | $\Omega$ | $I_{OUT} = 10$ mA, $V_{DD} = 18V$                          |
| $R_{OL}$   | Low Output Resistance       | —                | 6    | 10       | $\Omega$ | $I_{OUT} = 10$ mA, $V_{DD} = 18V$                          |
| $I_{PK}$   | Peak Output Current         | —                | 1.5  | —        | A        | Note 1   |
| <b>Switching Time (Note 1)</b>   |                             |                  |      |          |          |  |
| $t_R$  | Rise Time                   | —                | —    | 30       | nsec     | Figure 3-1, Figure 3-2                                     |
| $t_F$  | Fall Time                   | —                | —    | 30       | nsec     | Figure 3-1, Figure 3-2                                     |
| $t_{D1}$   | Delay Time                  | —                | —    | 50       | nsec     | Figure 3-1, Figure 3-2                                     |
| $t_{D2}$   | Delay Time                  | —                | —    | 75       | nsec     | Figure 3-1, Figure 3-2                                     |
| <b>Power Supply</b>  |                             |                  |      |          |          |  |
| $I_S$  | Power Supply Current        | —                | —    | 8<br>0.4 | mA       | $V_{IN} = 3V$ (Both Inputs)<br>$V_{IN} = 0V$ (Both Inputs) |

**Note 1:** Ensured by design. Not production tested.

# TC426/TC427/TC428

## TC426/TC427/TC428 ELECTRICAL SPECIFICATIONS (CONTINUED)

**Electrical Characteristics:** Over operating temperature range (-55°C to +125°C) 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              | —    | 10        | $\mu A$  | $0V \leq V_{IN} \leq V_{DD}$                               |
| <b>Output</b>                  |                             |                  |      |           |          |  |
| $V_{OH}$                       | High Output Voltage         | $V_{DD} - 0.025$ | —    | —         | V        | $I_{OUT} = 0 \text{ mA}$                                   |
| $V_{OL}$                       | Low Output Voltage          | —                | —    | 0.025     | V        | $I_{OUT} = 0 \text{ mA}$                                   |
| $R_{OH}$                       | High Output Resistance      | —                | 13   | 20        | $\Omega$ | $I_{OUT} = 10 \text{ mA}$ , $V_{DD} = 18V$                 |
| $R_{OL}$                       | Low Output Resistance       | —                | 8    | 15        | $\Omega$ | $I_{OUT} = 10 \text{ mA}$ , $V_{DD} = 18V$                 |
| <b>Switching Time (Note 1)</b> |                             |                  |      |           |          |  |
| $t_R$                          | Rise Time                   | —                | —    | 60        | nsec     | Figure 3-1, Figure 3-2                                     |
| $t_F$                          | Fall Time                   | —                | —    | 60        | nsec     | Figure 3-1, Figure 3-2                                     |
| $t_{D1}$                       | Delay Time                  | —                | —    | 75        | nsec     | Figure 3-1, Figure 3-2                                     |
| $t_{D2}$                       | Delay Time                  | —                | —    | 120       | nsec     | Figure 3-1, Figure 3-2                                     |
| <b>Power Supply</b>            |                             |                  |      |           |          |  |
| $I_S$                          | Power Supply Current        | —                | —    | 12<br>0.6 | mA       | $V_{IN} = 3V$ (Both Inputs)<br>$V_{IN} = 0V$ (Both Inputs) |

**Note 1:** Ensured by design. Not production tested.

## 2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in [Table 2-1](#).

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

| Pin No.<br>(8-Pin MSOP, PDIP,<br>SOIC, CERDIP) | Symbol  | Description                                       |
|--|---|---|
| TC426/TC427/TC428                              |   |   |
| 1  | NC  | No internal connection.                           |
| 2  | IN A  | Control input A, TTL/CMOS compatible logic input. |
| 3  | GND   | Ground.   |
| 4  | IN B  | Control input B, TTL/CMOS compatible logic input. |
| 5  | $\overline{\text{OUT B}}/\text{OUT B}/\text{OUT B}$ | CMOS totem-pole output.                           |
| 6  | $V_{DD}$  | Supply input, 4.5V to 18V.                        |
| 7  | $\overline{\text{OUT A}}/\text{OUT A}/\text{OUT A}$ | CMOS totem-pole output.                           |
| 8  | NC  | No internal connection.                           |

# TC426/TC427/TC428

## 3.0 APPLICATIONS INFORMATION

### 3.1 Supply Bypassing

Charging and discharging large capacitive loads quickly requires large currents. For example, charging a 1000 pF load to 18V in 25 nsec requires an 0.72A current from the device power supply.

To ensure low supply impedance over a wide frequency range, a parallel capacitor combination is recommended for supply bypassing. Low-inductance ceramic disk capacitors with short lead lengths (< 0.5 in.) should be used. A 1  $\mu$ F film capacitor in parallel with one or two 0.1  $\mu$ F ceramic disk capacitors normally provides adequate bypassing.

### 3.2 Grounding

The TC426 and TC428 contain inverting drivers. Ground potential drops developed in common ground impedances from input to output will appear as negative feedback and degrade switching speed characteristics.

Individual ground returns for the input and output circuits, or a ground plane, should be used.

### 3.3 Input Stage

The input voltage level changes the no-load or quiescent supply current. The N-channel MOSFET input stage transistor drives a 2.5 mA current source load. At  $T_A = +25^\circ\text{C}$  with a logic '1' input, the maximum quiescent supply current is 8 mA. Logic '0' input level signals reduce quiescent current to 0.4 mA maximum. Minimum power dissipation occurs for logic '0' inputs for the TC426/TC427/TC428. **Unused driver inputs must be connected to  $V_{DD}$  or GND.**

The drivers are designed with 100 mV of hysteresis. This provides clean transitions and minimizes output stage current spiking when changing states. Input voltage thresholds are approximately 1.5V, making the device TTL compatible over the 4.5V to 18V supply operating range. Input current is less than 1  $\mu$ A over this range.

The TC426/TC427/TC428 may be directly driven by the TL494, SG1526/1527, SG1524, SE5560, and similar switch-mode power supply integrated circuits.

### 3.4 Power Dissipation

The supply current vs. frequency and supply current vs. capacitive load characteristic curves will aid in determining power dissipation calculations.

The TC426/TC427/TC428 CMOS drivers have greatly reduced quiescent DC power consumption. Maximum quiescent current is 8 mA. For a 15V supply, power dissipation is typically 40 mW.

Two other power dissipation components are:

- Output stage AC and DC load power.
- Transition state power.

Output stage power is:

$$\begin{aligned} P_o &= P_{DC} + P_{AC} \\ &= V_o (I_{DC}) + f C_L V_S^2 \end{aligned}$$

Where:

- $V_o$  = DC output voltage
- $I_{DC}$  = DC output load current
- $f$  = Switching frequency
- $V_s$  = Supply voltage

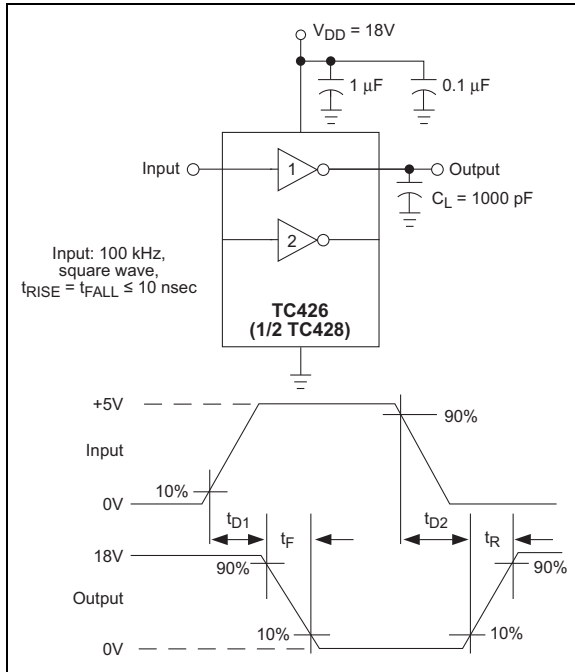
In power MOSFET drive applications, the  $P_{DC}$  term is negligible. MOSFET power transistors are high-impedance, capacitive input devices. In applications where resistive loads or relays are driven, the  $P_{DC}$  component will normally dominate.

The magnitude of  $P_{AC}$  is readily estimated for several cases:

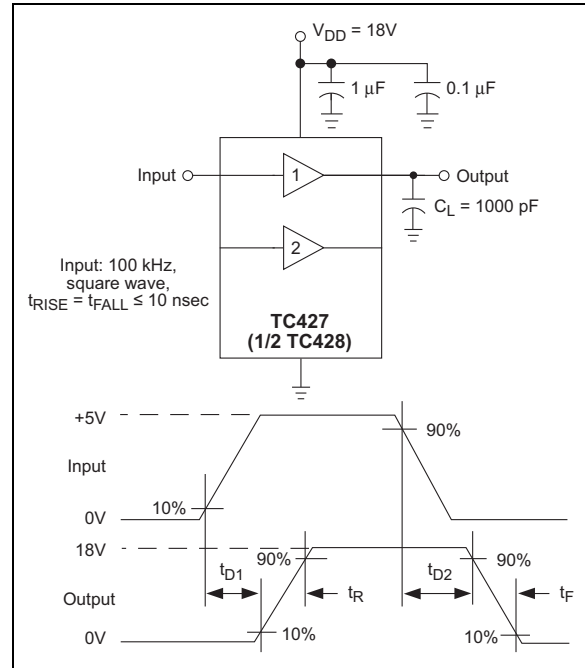
- |                             |                             |
|-----------------------------|-----------------------------|
| A.                          | B.                          |
| 1. $f = 200 \text{ kHz}$    | 1. $f = 200 \text{ kHz}$    |
| 2. $C_L = 1000 \text{ pf}$  | 2. $C_L = 1000 \text{ pf}$  |
| 3. $V_s = 18\text{V}$       | 3. $V_s = 15\text{V}$       |
| 4. $P_{AC} = 65 \text{ mW}$ | 4. $P_{AC} = 45 \text{ mW}$ |

During output level state changes, a current surge will flow through the series-connected N and P channel output MOSFETS as one device is turning "ON" while the other is turning "OFF". The current spike flows only during output transitions. The input levels should not be maintained between the logic '0' and logic '1' levels. **Unused driver inputs must be tied to ground and not be allowed to float.** Average power dissipation will be reduced by minimizing input rise times. As shown in the characteristic curves, average supply current is frequency dependent.

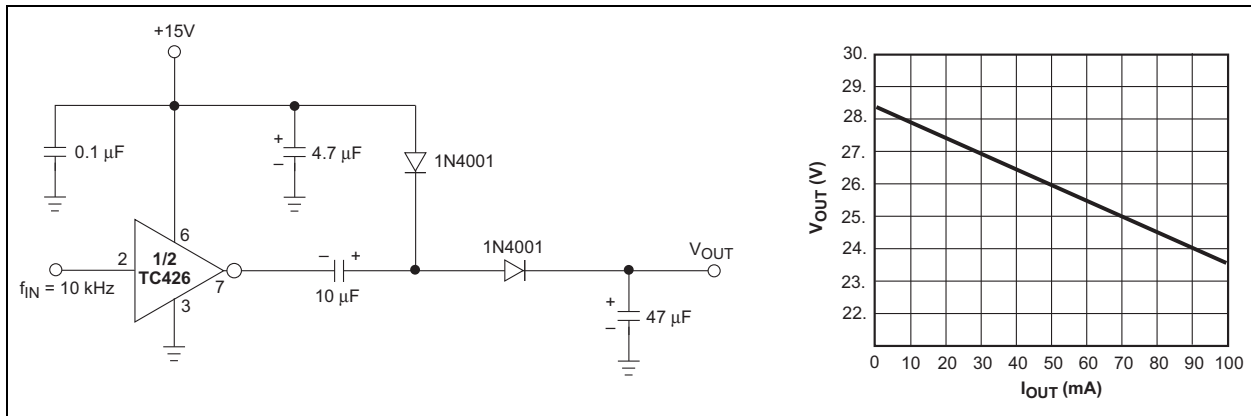
# TC426/TC427/TC428



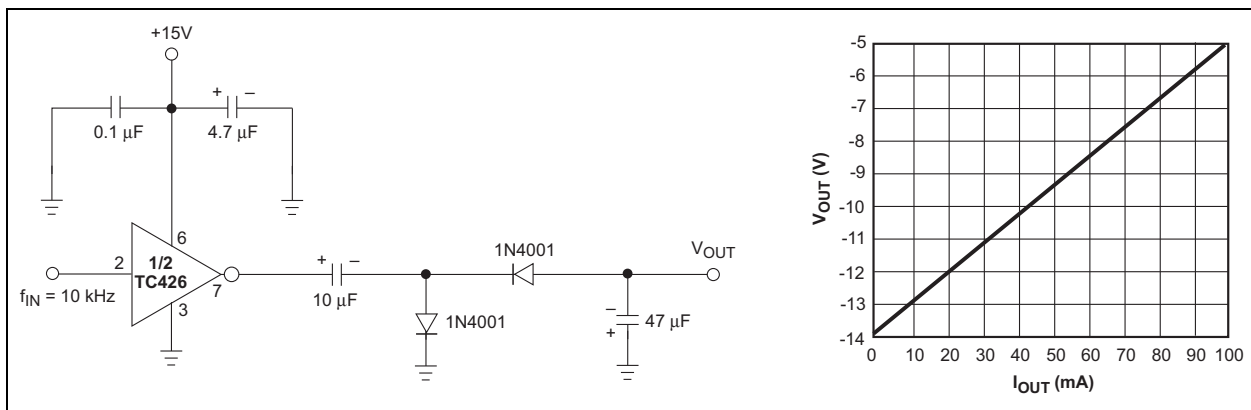
**FIGURE 3-1:** Inverting Driver Switching Time Test Circuit.



**FIGURE 3-2:** Noninverting Driver Switching Time Test Circuit.



**FIGURE 3-3:** Voltage Doubler.

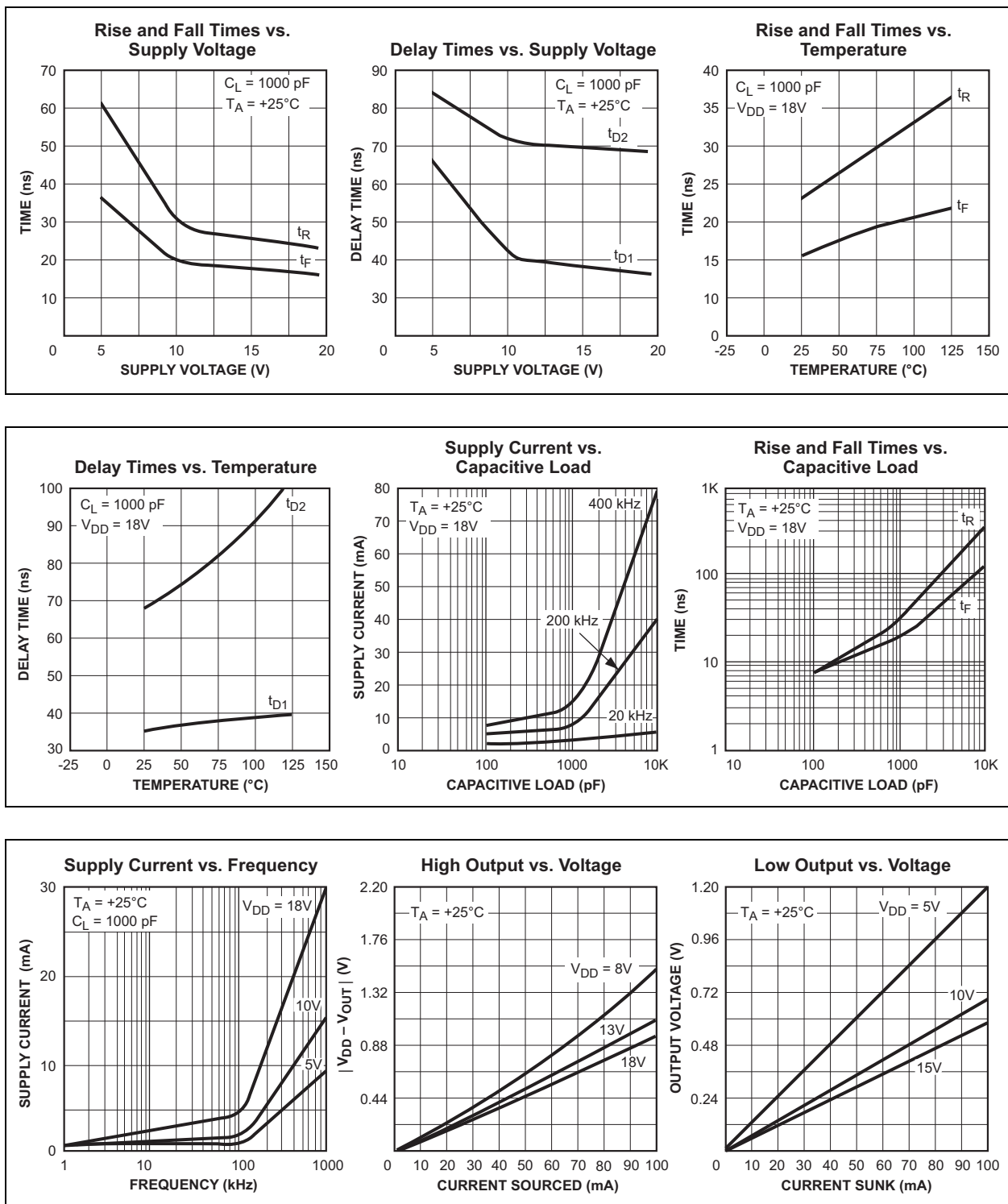


**FIGURE 3-4:** Voltage Inverter.

# TC426/TC427/TC428

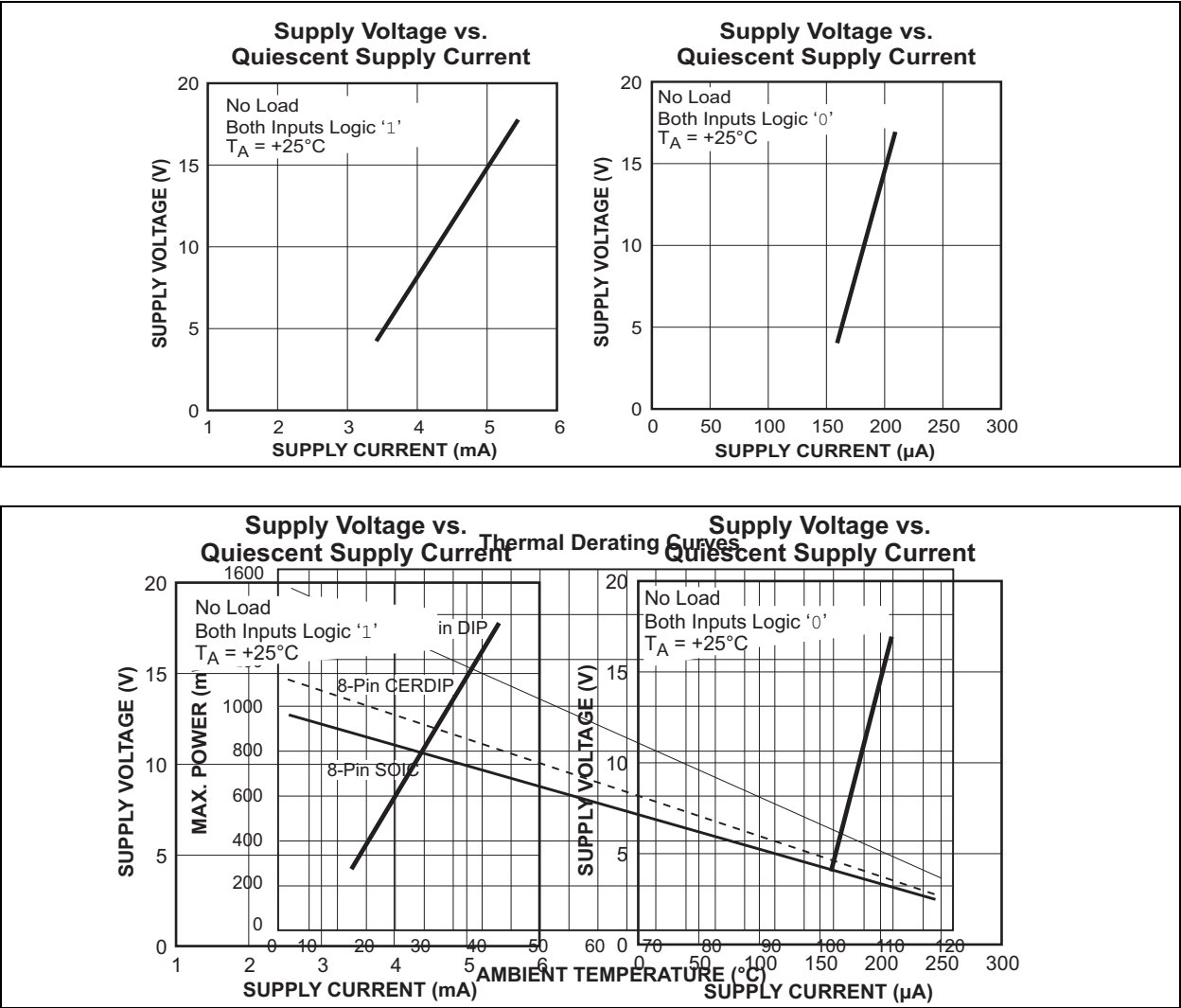
## 4.0 TYPICAL CHARACTERISTICS

**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.





TYPICAL CHARACTERISTICS (CONTINUED)

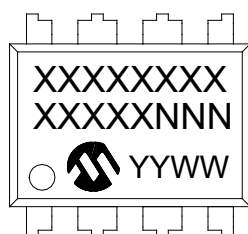


# TC426/TC427/TC428

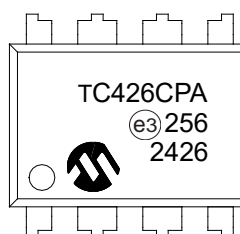
## 5.0 PACKAGING INFORMATION

### 5.1 Package Marking Information

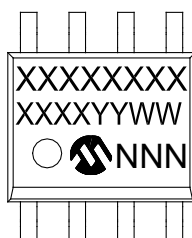
8-Lead PDIP



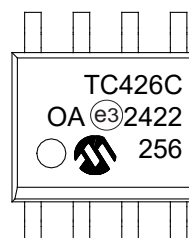
Example



8-Lead SOIC



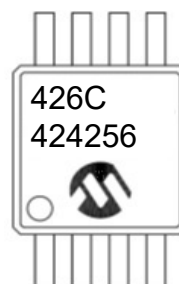
Example



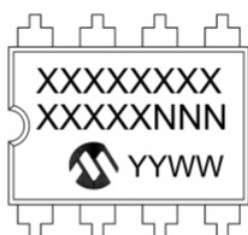
8-Lead MSOP



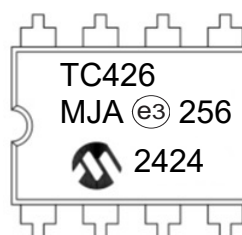
Example



8-Lead Cerdip



Example

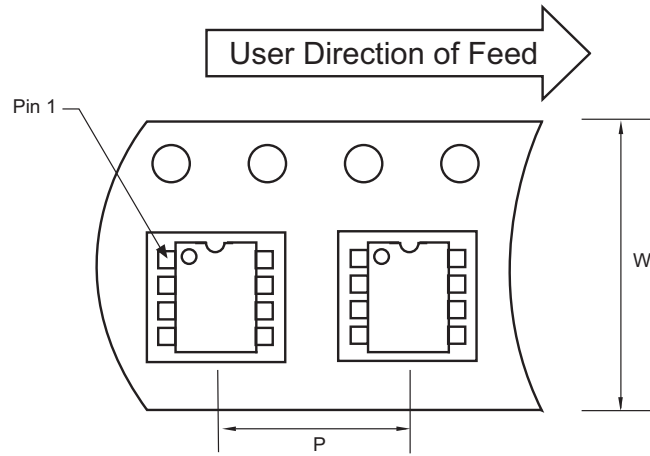


|                |        |  |
|----------------|--------|--|
| <b>Legend:</b> | XX...X | Customer-specific information  |
|                | Y      | Year code (last digit of calendar year)  |
|                | YY     | Year code (last 2 digits of calendar year)   |
|                | WW     | Week code (week of January 1 is week '01')   |
|                | NNN    | Alphanumeric traceability code   |
|                | e3     | Pb-free JEDEC® designator for Matte Tin (Sn)   |
|                | *      | This package is Pb-free. The Pb-free JEDEC designator (e3) can be found on the outer packaging for this package. |

**Note:** In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information.

## 5.2 Taping Form

### Component Taping Orientation for 8-Pin MSOP Devices

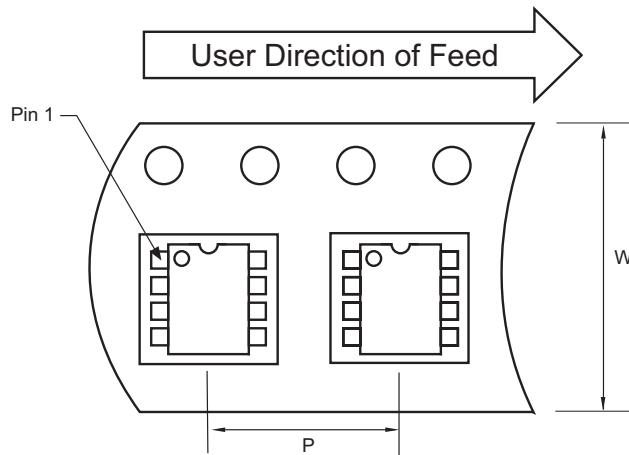


Standard Reel Component Orientation  
for 713 Suffix Device

Carrier Tape, Number of Components Per Reel and Reel Size

| Package    | Carrier Width (W) | Pitch (P) | Part Per Full Reel | Reel Size |
|------------|-------------------|-----------|--------------------|-----------|
| 8-Pin MSOP | 12 mm             | 8 mm      | 2500               | 13 in     |

### Component Taping Orientation for 8-Pin SOIC (Narrow) Devices



Standard Reel Component Orientation  
for 713 Suffix Device

Carrier Tape, Number of Components Per Reel and Reel Size

| Package        | Carrier Width (W) | Pitch (P) | Part Per Full Reel | Reel Size |
|----------------|-------------------|-----------|--------------------|-----------|
| 8-Pin SOIC (N) | 12 mm             | 8 mm      | 2500               | 13 in     |

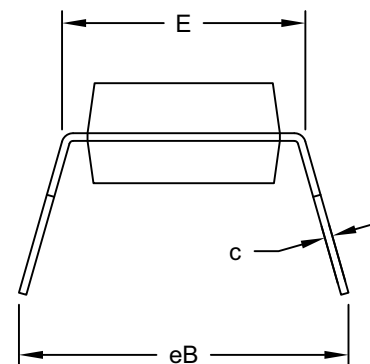
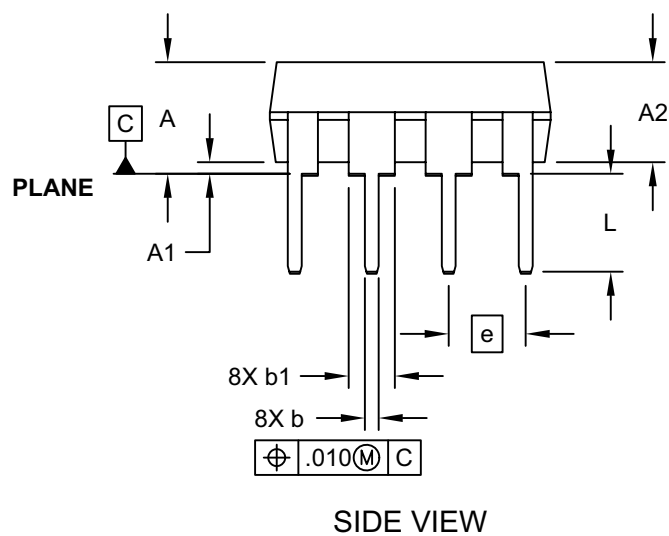
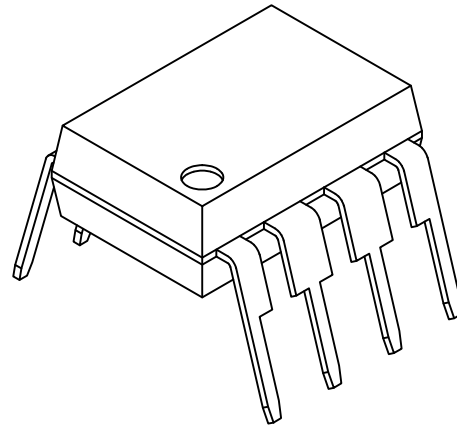
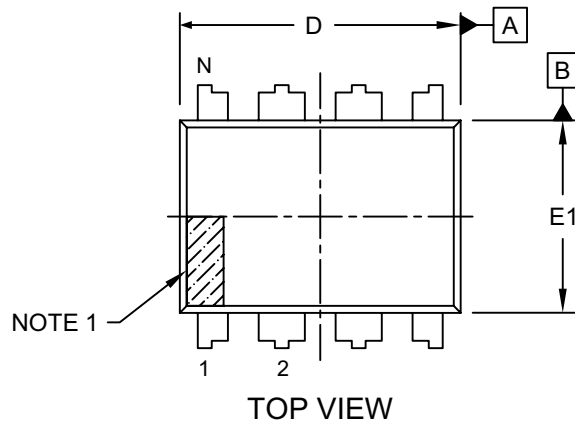
# TC426/TC427/TC428

## 5.3 Package Dimensions

### 8-Lead Plastic Dual In-Line (C4X) - 300 mil Body [PDIP]

#### Atmel Legacy Package

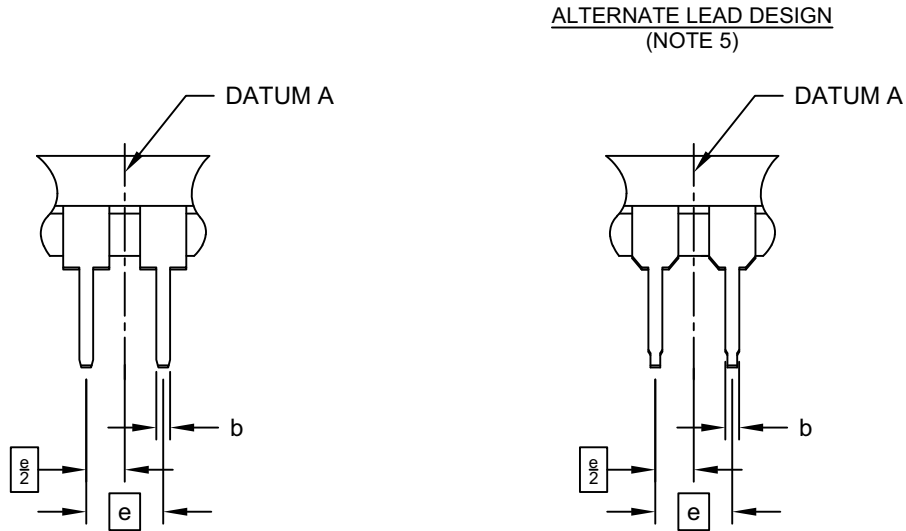
**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Microchip Technology Drawing No. C04-018-C4X Rev G Sheet 1 of 2

## 8-Lead Plastic Dual In-Line (C4X) - 300 mil Body [PDIP] Atmel Legacy Package

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



| Units                      |    | INCHES   |      |      |
|----------------------------|----|----------|------|------|
| Dimension Limits           |    | MIN      | NOM  | MAX  |
| Number of Pins             | N  | 8        |      |      |
| Pitch                      | e  | .100 BSC |      |      |
| Top to Seating Plane       | A  | -        | -    | .210 |
| Molded Package Thickness   | A2 | .115     | .130 | .195 |
| Base to Seating Plane      | A1 | .015     | -    | -    |
| Shoulder to Shoulder Width | E  | .290     | .310 | .325 |
| Molded Package Width       | E1 | .240     | .250 | .280 |
| Overall Length             | D  | .348     | .365 | .400 |
| Tip to Seating Plane       | L  | .115     | .130 | .150 |
| Lead Thickness             | c  | .008     | .010 | .015 |
| Upper Lead Width           | b1 | .040     | .060 | .070 |
| Lower Lead Width           | b  | .014     | .018 | .022 |
| Overall Row Spacing §      | eB | -        | -    | .430 |

**Notes:**

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed .010" per side.
- Dimensioning and tolerancing per ASME Y14.5M  
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
- Lead design above seating plane may vary, based on assembly vendor.

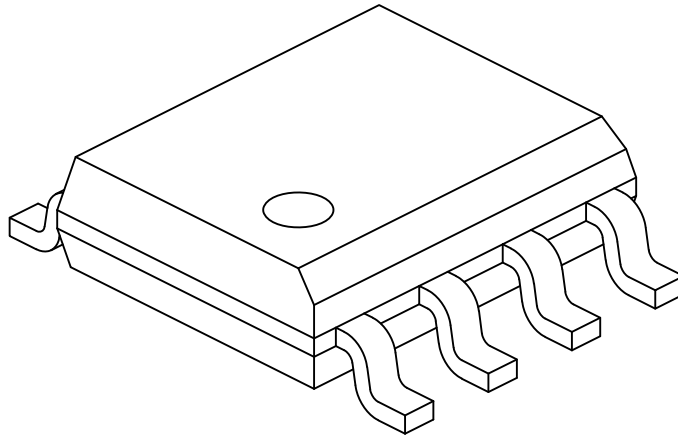
Microchip Technology Drawing No. C04-018-C4X Rev G Sheet 2 of 2



# TC426/TC427/TC428

## 8-Lead Plastic Small Outline (C2X) - Narrow, 3.90 mm (.150 In.) Body [SOIC] Atmel Legacy Global Package Code SWB

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



|                          |    | Units | MILLIMETERS |     |      |
|--------------------------|----|-------|-------------|-----|------|
| Dimension Limits         |    |       | MIN         | NOM | MAX  |
| Number of Pins           | N  |       | 8           |     |      |
| Pitch                    | e  |       | 1.27 BSC    |     |      |
| Overall Height           | A  |       | –           | –   | 1.75 |
| Molded Package Thickness | A2 |       | 1.25        | –   | –    |
| Standoff §               | A1 |       | 0.10        | –   | 0.25 |
| Overall Width            | E  |       | 6.00 BSC    |     |      |
| Molded Package Width     | E1 |       | 3.90 BSC    |     |      |
| Overall Length           | D  |       | 4.90 BSC    |     |      |
| Chamfer (Optional)       | h  |       | 0.25        | –   | 0.50 |
| Foot Length              | L  |       | 0.40        | –   | 1.27 |
| Footprint                | L1 |       | 1.04 REF    |     |      |
| Lead Thickness           | c  |       | 0.17        | –   | 0.25 |
| Lead Width               | b  |       | 0.31        | –   | 0.51 |
| Lead Bend Radius         | R  |       | 0.07        | –   | –    |
| Lead Bend Radius         | R1 |       | 0.07        | –   | –    |
| Foot Angle               | θ  |       | 0°          | –   | 8°   |
| Mold Draft Angle         | θ1 |       | 5°          | –   | 15°  |
| Lead Angle               | θ2 |       | 0°          | –   | –    |

### Notes:

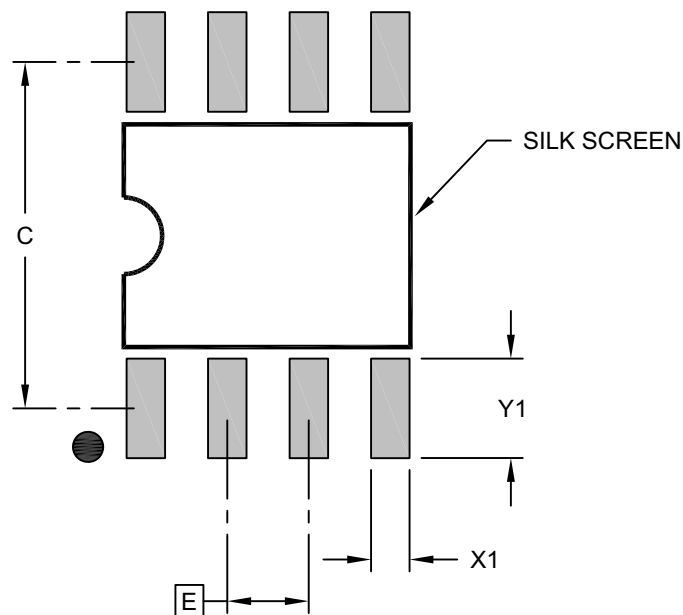
- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M  
BSC: Basic Dimension. Theoretically exact value shown without tolerances.  
REF: Reference Dimension, usually without tolerance, for information purposes only.
- Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-057-C2X Rev K Sheet 2 of 2

# TC426/TC427/TC428

## 8-Lead Plastic Small Outline (C2X) - Narrow, 3.90 mm (.150 In.) Body [SOIC]

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



RECOMMENDED LAND PATTERN

| Dimension Limits        | Units | MILLIMETERS |      |      |
|-------------------------|-------|-------------|------|------|
|                         |       | MIN         | NOM  | MAX  |
| Contact Pitch           | E     | 1.27 BSC    |      |      |
| Contact Pad Spacing     | C     |             | 5.40 |      |
| Contact Pad Width (X8)  | X1    |             |      | 0.60 |
| Contact Pad Length (X8) | Y1    |             |      | 1.55 |

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

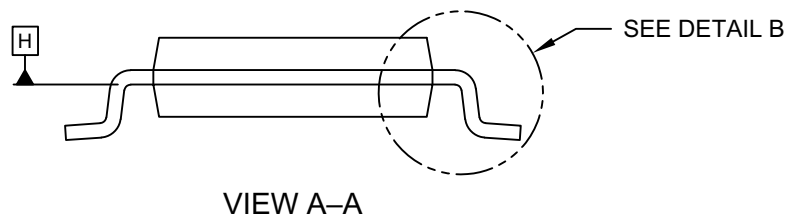
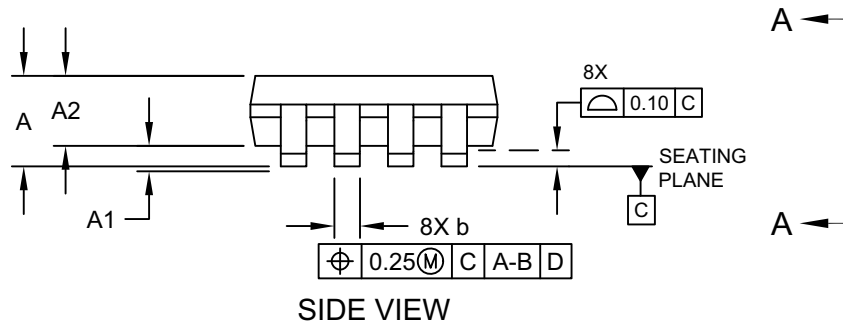
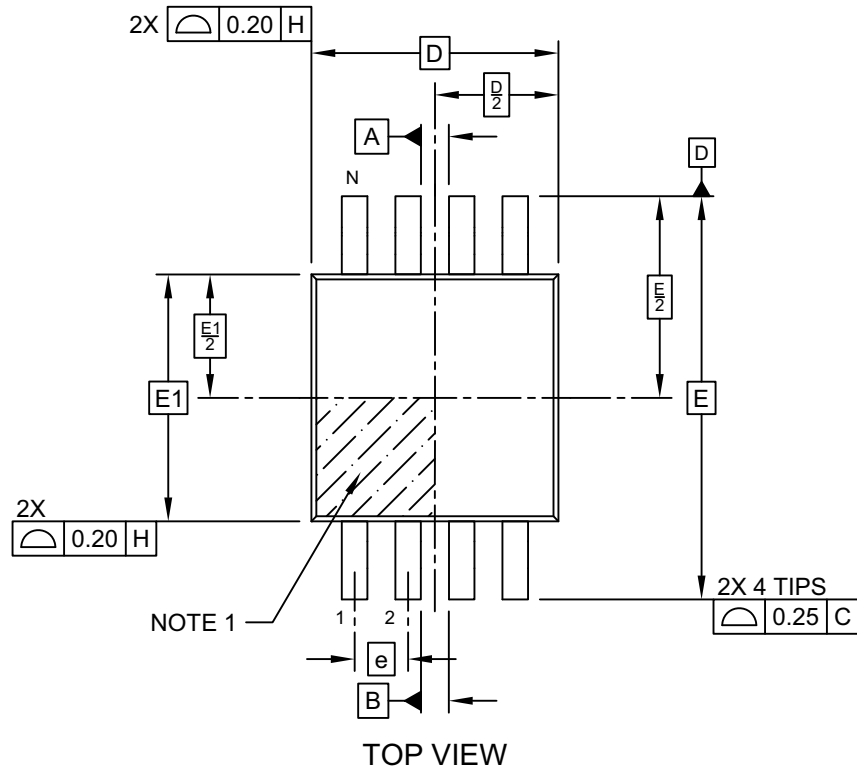
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2057-C2X Rev K



## 8-Lead Plastic Micro Small Outline Package (A3X) - 3x3 mm Body [MSOP]

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

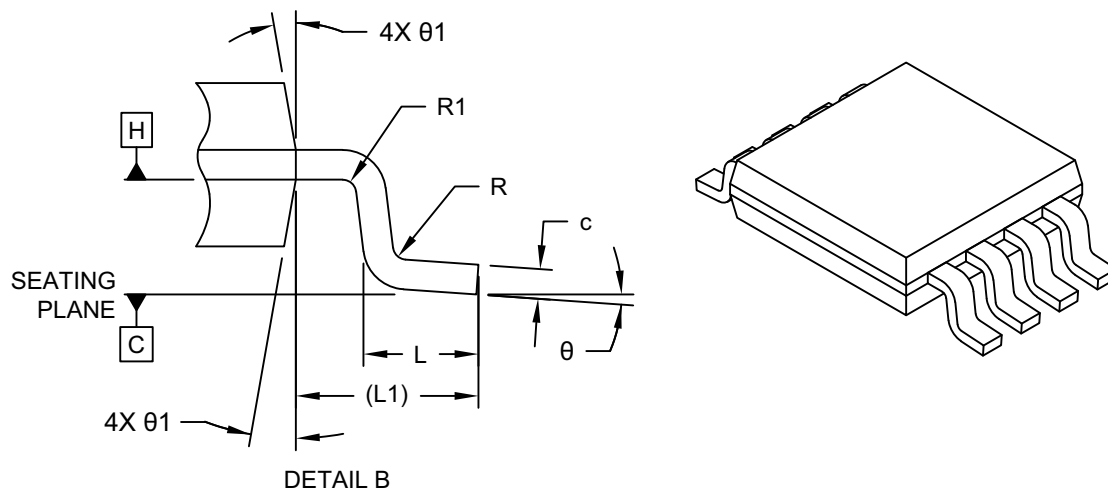


Microchip Technology Drawing C04-111-A3X Rev F Sheet 1 of 2

# TC426/TC427/TC428

## 8-Lead Plastic Micro Small Outline Package (A3X) - 3x3 mm Body [MSOP]

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



|                          |    | Units | MILLIMETERS |      |      |
|--------------------------|----|-------|-------------|------|------|
| Dimension Limits         |    |       | MIN         | NOM  | MAX  |
| Number of Terminals      | N  |       | 8           |      |      |
| Pitch                    | e  |       | 0.65 BSC    |      |      |
| Overall Height           | A  |       | –           | –    | 1.10 |
| Standoff                 | A1 |       | 0.00        | –    | 0.15 |
| Molded Package Thickness | A2 |       | 0.75        | 0.85 | 0.95 |
| Overall Length           | D  |       | 3.00 BSC    |      |      |
| Overall Width            | E  |       | 4.90 BSC    |      |      |
| Molded Package Width     | E1 |       | 3.00 BSC    |      |      |
| Terminal Width           | b  |       | 0.22        | –    | 0.40 |
| Terminal Thickness       | c  |       | 0.08        | –    | 0.23 |
| Terminal Length          | L  |       | 0.40        | 0.60 | 0.80 |
| Footprint                | L1 |       | 0.95 REF    |      |      |
| Lead Bend Radius         | R  |       | 0.07        | –    | –    |
| Lead Bend Radius         | R1 |       | 0.07        | –    | –    |
| Foot Angle               | θ  |       | 0°          | –    | 8°   |
| Mold Draft Angle         | θ1 |       | 5°          | –    | 15°  |

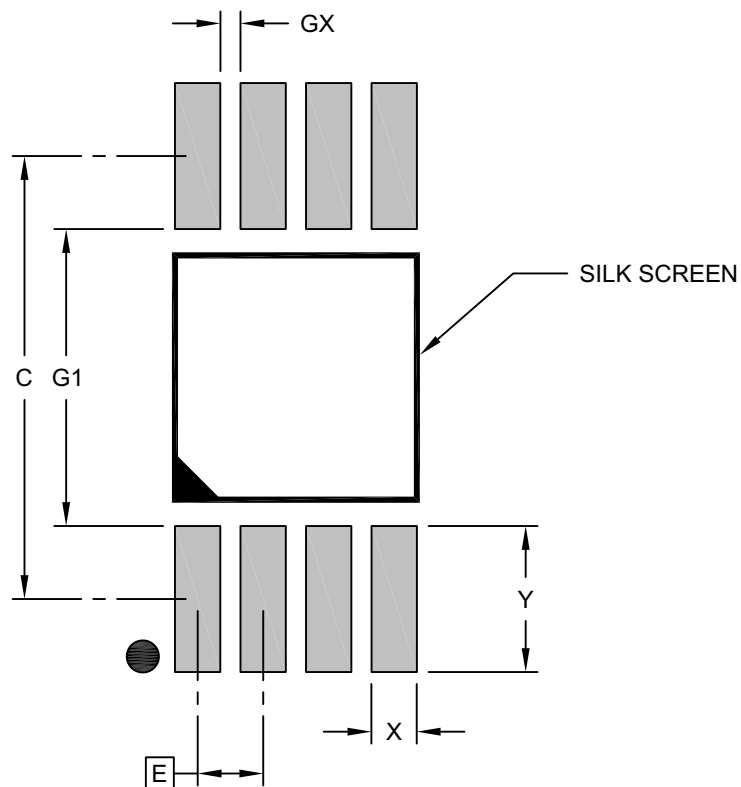
### Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M  
BSC: Basic Dimension. Theoretically exact value shown without tolerances.  
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-111-A3X Rev F Sheet 2 of 2

## 8-Lead Plastic Micro Small Outline Package (A3X) - 3x3 mm Body [MSOP]

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



### RECOMMENDED LAND PATTERN

|                                 |    | Units | MILLIMETERS |      |      |
|---------------------------------|----|-------|-------------|------|------|
| Dimension Limits                |    |       | MIN         | NOM  | MAX  |
| Contact Pitch                   | E  |       | 0.65 BSC    |      |      |
| Contact Pad Spacing             | C  |       |             | 4.40 |      |
| Contact Pad Width (X8)          | X  |       |             |      | 0.45 |
| Contact Pad Length (X8)         | Y  |       |             |      | 1.45 |
| Contact Pad to Contact Pad (X4) | G1 |       | 2.95        |      |      |
| Contact Pad to Contact Pad (X6) | GX |       | 0.20        |      |      |

#### Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

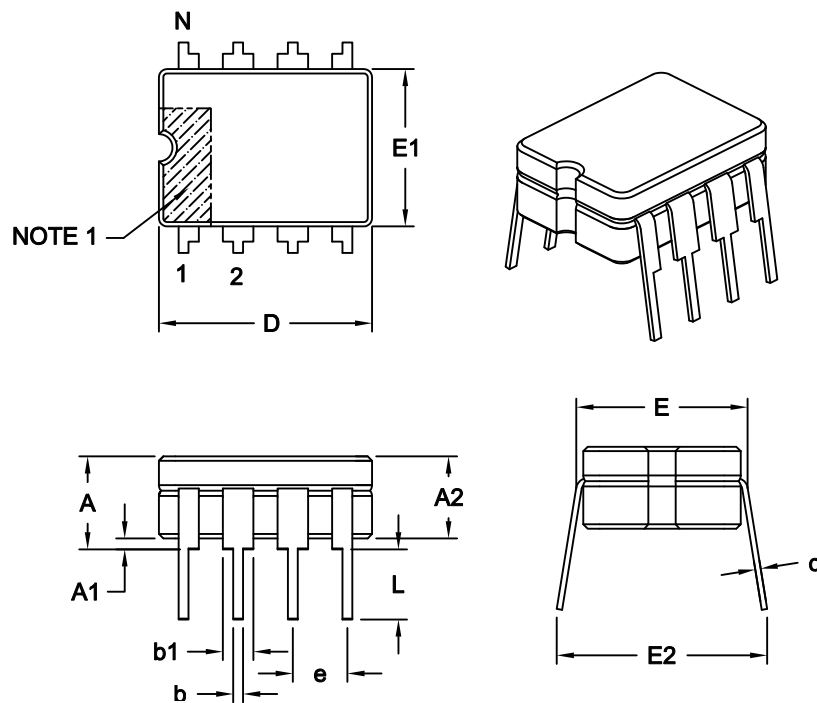
BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2111-A3X Rev F

# TC426/TC427/TC428

## 8-Lead Ceramic Dual In-Line (JA) ~ .300" Body [CERDIP]

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



| Units                      |    | INCHES   |      |      |
|----------------------------|----|----------|------|------|
| Dimension Limits           |    | MIN      | NOM  | MAX  |
| Number of Pins             | N  | 8        |      |      |
| Pitch                      | e  | .100 BSC |      |      |
| Top to Seating Plane       | A  | -        | -    | .200 |
| Base to Seating Plane §    | A1 | .015     | -    | -    |
| Ceramic Package Height     | A2 | .140     | -    | .175 |
| Shoulder to Shoulder Width | E  | .290     | -    | .320 |
| Ceramic Pkg. Width         | E1 | .230     | .248 | .300 |
| Overall Length             | D  | .370     | .380 | .400 |
| Tip to Seating Plane       | L  | .125     | -    | .200 |
| Lead Thickness             | c  | .008     | -    | .015 |
| Upper Lead Width           | b1 | .045     | -    | .065 |
| Lower Lead Width           | b  | .015     | -    | .023 |
| Overall Row Spacing        | E2 | .314     | -    | .410 |

### Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- § Significant Characteristic
- Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing No. C04-001C

## APPENDIX A: REVISION HISTORY

### Revision E (June 2025)

- Update [Features](#), [General Description](#) and [Section 3.4, Power Dissipation](#).
- Added MSOP package information throughout the document.
- Updated measurement unit in [Section 4.0 “Typical Characteristics”](#), graphic “Supply Voltage vs. Quiescent Supply Current”, No load, Both Inputs Logic ‘0’.
- Updated [Section 5.0 “Packaging Information”](#) by adding Package Markings Information and Package Outline Drawings.
- Removed Device Selection Table and added [Section “Product Identification System”](#).
- Minor text and format changes throughout.

### Revision D (December 2012)

- Added a note to each package outline drawing.

# TC426/TC427/TC428

## PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

| <u>PART NO.</u>  | <u>X</u>          | <u>/XX</u> | <u>[X]<sup>(1)</sup></u> | <b>Examples:</b>  |
|--|-------------------|------------|--------------------------|---|
| Device   | Temperature Range | Package    | Tape and Reel Option     |   |
| <b>Device:</b><br>TC426: 1.5A Dual High-Speed Power MOSFET Driver, Inverting<br>TC427: 1.5A Dual High-Speed Power MOSFET Driver, Noninverting<br>TC428: 1.5A Dual High-Speed Power MOSFET Driver, Complementary                                  |                   |            |                          | a) TC426COA: 1.5A Dual High-Speed Power MOSFET Driver, Inverting, 0°C to +70°C Temp. Range, 8-Lead SOIC Package, 100/Tube   |
| <b>Temperature Range:</b><br>C = 0°C to +70°C<br>E = -40°C to +85°C<br>I = -25°C to +85°C<br>M = -55°C to +125°C   |                   |            |                          | b) TC426EOA713: 1.5A Dual High-Speed Power MOSFET Driver, Inverting, -40°C to +85°C Temp. Range, 8-Lead SOIC Package, Tape and Reel, 3300/Reel  |
| <b>Package:</b><br>PA = 8-Lead PDIP<br>OA = 8-Lead SOIC<br>JA = 8-Lead Cerdip<br>UA = 8-Lead MSOP  |                   |            |                          | c) TC427IJA: 1.5A Dual High-Speed Power MOSFET Driver, Noninverting, -25°C to +85°C Temp. Range, 8-Lead Cerdip Package, 56/Tube   |
| <b>Tape and Reel:</b><br>Blank = Tube, 60/Tube (8-Lead PDIP option only)<br>Blank = Tube, 100/Tube (8-Lead MSOP/SOIC option only)<br>Blank = Tube, 56/Tube (8-Lead Cerdip option only)<br>713 = Tape and Reel, 3300/Reel (8-Lead MSOP/SOIC only) |                   |            |                          | d) TC427MJA: 1.5A Dual High-Speed Power MOSFET Driver, Noninverting, -55°C to +125°C Temp. Range, 8-Lead Cerdip Package, 56/Tube  |
|  |                   |            |                          | e) TC427EOA713: 1.5A Dual High-Speed Power MOSFET Driver, Noninverting, -40°C to +85°C Temp. Range, 8-Lead SOIC Package, Tape and Reel, 3300/Reel   |
|  |                   |            |                          | f) TC428CPA: 1.5A Dual High-Speed Power MOSFET Driver, Complementary, 0°C to +70°C Temp. Range, 8-Lead PDIP Package, 60/Tube  |
|  |                   |            |                          | g) TC428COA713: 1.5A Dual High-Speed Power MOSFET Driver, Complementary, 0°C to +70°C Temp. Range, 8-Lead SOIC Package, Tape and Reel, 3300/Reel  |
|  |                   |            |                          | <b>Note 1:</b> Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option. |

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