**Features**

- **High Peak Output Current:** 1.5A
- **Wide Input Supply Voltage Operating Range:**
  - 4.5V to 18V
- **High Capacitive Load Drive Capability:**
  - 1000 pF in 25 ns (typ.)
- **Short Delay Times:** 30 ns (typ.)
- **Matched Rise, Fall and Delay Times**
- **Low Supply Current:**
  - With Logic ‘1’ Input – 1 mA (typ.)
  - With Logic ‘0’ Input – 100 µA (typ.)
- **Low Output Impedance:** 7Ω (typ.)
- **Latch-Up Protected: Will Withstand 0.5A Reverse Current**
- **Input: Will Withstand Negative Inputs Up to 5V**
- **ESD Protected:** 4 kV
- **Pin-compatible with the TC426M/TC427M/TC428M and TC4426M/TC4427M/TC4428M**
- **Wide Operating Temperature Range:**
  - -55°C to +125°C
- **See TC4426A/TC4427A/TC4428A Data Sheet (DS21423) for additional temperature range and packaging offerings**

**General Description**

The TC4426AM/TC4427AM/TC4428AM are improved versions of the earlier TC4426M/TC4427M/TC4428M family of MOSFET drivers. In addition to matched rise and fall times, the TC4426AM/TC4427AM/TC4428AM devices have matched leading and falling edge propagation delay times.

These devices are highly latch-up resistant under any conditions within their power and voltage ratings. They are not subject to damage when up to 5V of noise spiking (of either polarity) occurs on the ground pin. They can accept, without damage or logic upset, up to 500 mA of reverse current (of either polarity) being forced back into their outputs. All terminals are fully protected against Electrostatic Discharge (ESD) up to 4 kV.

The TC4426AM/TC4427AM/TC4428AM MOSFET drivers can easily charge/discharge 1000 pF gate capacitances in under 30 ns, while providing low enough impedances in both the on and off states to ensure the MOSFET’s intended state will not be affected, even by large transients.

**Applications**

- Switch-mode Power Supplies
- Line Drivers
- Pulse Transformer Drive

**Package Types**

![8-Pin CERDIP TC4426AM TC4427AM TC4428AM](image-url)
Functional Block Diagram

Note 1: The TC4426AM has two inverting drivers; the TC4427AM has two non-inverting drivers; the TC4428AM has one inverting and one non-inverting driver.

2: Ground any unused driver input.
1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings†

Supply Voltage .........................................................+22V
Input Voltage, IN A or IN B.......(VDD + 0.3V) to (GND – 5V)

† 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.

DC CHARACTERISTICS

Electrical Specifications: Unless otherwise noted, over operating temperature range with 4.5V ≤ VDD ≤ 18V.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sym</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logic '1', High Input Voltage</td>
<td>VIH</td>
<td>2.4</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Logic '0', Low Input Voltage</td>
<td>VIL</td>
<td>—</td>
<td>—</td>
<td>0.8</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Input Current</td>
<td>IN</td>
<td>-1.0</td>
<td>—</td>
<td>+1.0</td>
<td>µA</td>
<td>0V ≤ VIN ≤ VDD</td>
</tr>
</tbody>
</table>

Output

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sym</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Output Voltage</td>
<td>VOH</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>V</td>
<td>DC TEST</td>
</tr>
<tr>
<td>Low Output Voltage</td>
<td>VOL</td>
<td>—</td>
<td>0.025</td>
<td>—</td>
<td>V</td>
<td>DC TEST</td>
</tr>
<tr>
<td>Output Resistance</td>
<td>RO</td>
<td>—</td>
<td>7</td>
<td>9</td>
<td>Ω</td>
<td>IOUT = 10 mA, VDD = 18V, TA = +25°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>8</td>
<td>12</td>
<td></td>
<td>-55°C ≤ TA ≤ +125°C</td>
</tr>
<tr>
<td>Peak Output Current</td>
<td>IPK</td>
<td>—</td>
<td>1.5</td>
<td>—</td>
<td>A</td>
<td>VDD = 18V</td>
</tr>
<tr>
<td>Latch-Up Protection</td>
<td>REV</td>
<td>—</td>
<td>&gt;0.5</td>
<td>—</td>
<td>A</td>
<td>Duty cycle ≤ 2%, t ≤ 300 µs</td>
</tr>
<tr>
<td>Withstand Reverse Current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VDD = 18V</td>
</tr>
</tbody>
</table>

Switching Time (Note 1)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sym</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rise Time</td>
<td>tR</td>
<td>—</td>
<td>25</td>
<td>35</td>
<td>ns</td>
<td>TA = +25°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>30</td>
<td>40</td>
<td>-55°C ≤ TA ≤ +125°C, Figure 4-1</td>
</tr>
<tr>
<td>Fall Time</td>
<td>tF</td>
<td>—</td>
<td>25</td>
<td>35</td>
<td>ns</td>
<td>TA = +25°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>30</td>
<td>40</td>
<td>-55°C ≤ TA ≤ +125°C, Figure 4-1</td>
</tr>
<tr>
<td>Delay Time</td>
<td>tD1</td>
<td>—</td>
<td>30</td>
<td>35</td>
<td>ns</td>
<td>TA = +25°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>38</td>
<td>50</td>
<td>-55°C ≤ TA ≤ +125°C, Figure 4-1</td>
</tr>
<tr>
<td>Delay Time</td>
<td>tD2</td>
<td>—</td>
<td>30</td>
<td>35</td>
<td>ns</td>
<td>TA = +25°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>38</td>
<td>50</td>
<td>-55°C ≤ TA ≤ +125°C, Figure 4-1</td>
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</tbody>
</table>

Power Supply

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sym</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Current</td>
<td>IS</td>
<td>—</td>
<td>1.0</td>
<td>2.0</td>
<td>mA</td>
<td>VIN = 3V (Both inputs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.1</td>
<td>0.2</td>
<td></td>
<td>VIN = 0V (Both inputs), VDD = 18V</td>
</tr>
</tbody>
</table>

Note 1: Switching times ensured by design.

TEMPERATURE CHARACTERISTICS

Electrical Specifications: Unless otherwise noted, all parameters apply with 4.5V ≤ VDD ≤ 18V.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sym</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Ranges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specified Temperature Range (M)</td>
<td>TA</td>
<td>-55</td>
<td>—</td>
<td>+125</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Maximum Junction Temperature</td>
<td>TJ</td>
<td>—</td>
<td>—</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>TA</td>
<td>-65</td>
<td>—</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Package Thermal Resistances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Resistance, 8L-CERDIP</td>
<td>θJA</td>
<td>—</td>
<td>150</td>
<td>—</td>
<td>°C/W</td>
<td></td>
</tr>
</tbody>
</table>
2.0 TYPICAL PERFORMANCE CURVES

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.

Note: Unless otherwise indicated, over operating temperature range with 4.5V \( \leq V_{DD} \leq 18V \).

**FIGURE 2-1:** Rise Time vs. Supply Voltage.

**FIGURE 2-2:** Delay Time vs. Input Amplitude.

**FIGURE 2-3:** Rise and Fall Times vs. Temperature.

**FIGURE 2-4:** Fall Time vs. Supply Voltage.

**FIGURE 2-5:** Propagation Delay Time vs. Supply Voltage.

**FIGURE 2-6:** Propagation Delay Time vs. Temperature.
Note: Unless otherwise indicated, over operating temperature range with $4.5V \leq V_{DD} \leq 18V$. 

**FIGURE 2-7:** High-State Output Resistance. 

**FIGURE 2-8:** Supply Current vs. Frequency. 

**FIGURE 2-9:** Supply Current vs. Frequency. 

**FIGURE 2-10:** Low-State Output Resistance. 

**FIGURE 2-11:** Supply Current vs. Capacitive Load. 

**FIGURE 2-12:** Supply Current vs. Capacitive Load.
Note: Unless otherwise indicated, over operating temperature range with $4.5V \leq V_{DD} \leq 18V$.

**FIGURE 2-13:** Supply Current vs. Frequency.

**FIGURE 2-14:** Quiescent Supply Current vs. Voltage.

**FIGURE 2-15:** Supply Current vs. Capacitive Load.

**FIGURE 2-16:** Quiescent Supply Current vs. Temperature.
3.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 3-1.

TABLE 3-1: PIN FUNCTION TABLE

<table>
<thead>
<tr>
<th>8-Pin CERDIP</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NC</td>
<td>No connection</td>
</tr>
<tr>
<td>2</td>
<td>IN A</td>
<td>Input A</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>IN B</td>
<td>Input B</td>
</tr>
<tr>
<td>5</td>
<td>OUT B</td>
<td>Output B</td>
</tr>
<tr>
<td>6</td>
<td>VDD</td>
<td>Supply input</td>
</tr>
<tr>
<td>7</td>
<td>OUT A</td>
<td>Output A</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
<td>No connection</td>
</tr>
</tbody>
</table>

3.1 Inputs A & B (IN A and IN B)

MOSFET driver IN A & B are high-impedance, TTL/CMOS-compatible inputs. These inputs also have 300 mV of hysteresis between the high and low thresholds, which prevents output glitching even when the rise and fall time of the input signal is very slow.

3.2 Ground (GND)

The GND pin is the return path for both the bias current and the high peak current that discharges the external load capacitance. The ground pin should be tied into a ground plane or have a very short trace to the bias supply source return.

3.3 Outputs A & B (OUT A and OUT B)

MOSFET driver OUT A & B are low-impedance, CMOS, push-pull style outputs. The pull-down and pull-up devices are of equal strength, making the rise and fall times equivalent.

3.4 Supply Input (VDD)

The VDD input is the bias supply for the MOSFET driver and is rated for 4.5V to 18V, with respect to the ground pin. The VDD input should be bypassed with local ceramic capacitors. The value of these capacitors should be chosen based on the capacitive load that is being driven.
4.0 APPLICATIONS INFORMATION

FIGURE 4-1: Switching Time Test Circuit.

**FIGURE 4-1: Switching Time Test Circuit.**
5.0 PACKAGING INFORMATION

5.1 Package Marking Information

Legend:

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

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.
8-Lead Ceramic Dual In-line – 300 mil (CERDIP)

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

<table>
<thead>
<tr>
<th>Units</th>
<th>INCHES</th>
<th>MILLIMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension Limits</td>
<td>MIN</td>
<td>NOM</td>
</tr>
<tr>
<td>Number of Pins</td>
<td>n</td>
<td>8</td>
</tr>
<tr>
<td>Pitch</td>
<td>P</td>
<td>.100</td>
</tr>
<tr>
<td>Top to Seating Plane</td>
<td>A</td>
<td>.160</td>
</tr>
<tr>
<td>Standoff §</td>
<td>A1</td>
<td>.020</td>
</tr>
<tr>
<td>Shoulder to Shoulder Width</td>
<td>E</td>
<td>.290</td>
</tr>
<tr>
<td>Ceramic Pkg. Width</td>
<td>E1</td>
<td>.230</td>
</tr>
<tr>
<td>Overall Length</td>
<td>D</td>
<td>.370</td>
</tr>
<tr>
<td>Tip to Seating Plane</td>
<td>L</td>
<td>.125</td>
</tr>
<tr>
<td>Lead Thickness</td>
<td>c</td>
<td>.008</td>
</tr>
<tr>
<td>Upper Lead Width</td>
<td>B1</td>
<td>.045</td>
</tr>
<tr>
<td>Lower Lead Width</td>
<td>B</td>
<td>.016</td>
</tr>
<tr>
<td>Overall Row Spacing</td>
<td>eB</td>
<td>.320</td>
</tr>
</tbody>
</table>

*Controlling Parameter
JEDEC Equivalent: MS-030
Drawing No. C04-010
APPENDIX A: REVISION HISTORY

Revision A (February 2005)

- Original Release of this Document.

Revision B (January 2013)

Added a note to each package outline drawing.
TC4426AM/TC4427AM/TC4428AM

PRODUCT IDENTIFICATION SYSTEM

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

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>XX</th>
<th>Package</th>
<th>Device and Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>JA</td>
<td>TC4426AM: 1.5A Dual MOSFET Driver, Inverting, -55°C to +125°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TC4427AM: 1.5A Dual MOSFET Driver, Non-Inverting, -55°C to +125°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TC4428AM: 1.5A Dual MOSFET Driver, Complementary, -55°C to +125°C</td>
</tr>
</tbody>
</table>

Examples:

a) TC4426AMJA: 1.5A Dual MOSFET driver, Inverting, -55°C to +125°C 8LD CERDIP package.

a) TC4427AMJA: 1.5A Dual MOSFET driver, Non-Inverting -55°C to +125°C 8LD CERDIP package.

a) TC4428AMJA: 1.5A Dual MOSFET driver, Complementary, -55°C to +125°C 8LD CERDIP package.
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  Fax: 905-673-6509

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  Tel: 86-28-8665-5511  
  Fax: 86-28-8665-7889
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