FAN7382
Half-Bridge Gate Driver

Features
- Floating Channels Designed for Bootstrap Operation to +600V
- Typically 350mA/650mA Sourcing/Sinking Current Driving Capability for Both Channels
- Common-Mode dv/dt Noise Canceling Circuit
- Extended Allowable Negative VS Swing to -9V for Signal Propagation @ VCC=VBS=15V
- VCC & VBS Supply Range from 10V to 20V
- UVLO Functions for Both Channels
- TTL Compatible Input Logic Threshold Levels
- Matched Propagation Delay Below 50nsec
- Output In-phase with Input

Applications
- PDP Scan Driver
- Fluorescent Lamp Ballast
- SMPS
- Motor Driver

Description
The FAN7382, a monolithic half-bridge gate driver IC, can drive MOSFETs and IGBTs that operate up to +600V. Fairchild’s high-voltage process and common-mode noise canceling technique provides stable operation of the high-side driver under high dv/dt noise circumstances. An advanced level shift circuit allows high-side gate driver operation up to VS=-9.8 V(typ.) for VBS=15V. The input logic level is compatible with standard TTL-series logic gates. UVLO circuits for both channels prevent malfunction when VCC and VBS are lower than the specified threshold voltage. Output drivers typically source/sink 350mA/650mA, respectively, which is suitable for fluorescent lamp ballasts, PDP scan drivers, motor controls, etc.

Ordering Information

<table>
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<tr>
<th>Part Number</th>
<th>Package</th>
<th>Pb-Free</th>
<th>Operating Temperature Range</th>
<th>Packing Method</th>
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<tr>
<td>FAN7382N</td>
<td>8-DIP</td>
<td>Yes</td>
<td>-40°C to 125°C</td>
<td>TUBE</td>
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<tr>
<td>FAN7382M</td>
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<td>-40°C to 125°C</td>
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<tr>
<td>FAN7382MX</td>
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<td>-40°C to 125°C</td>
<td>TAPE &amp; REEL</td>
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Pin Assignments

Pin Definitions

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<tr>
<th>Pin</th>
<th>Name</th>
<th>Function/ Description</th>
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<tbody>
<tr>
<td>1</td>
<td>VCC</td>
<td>Low-Side Supply Voltage</td>
</tr>
<tr>
<td>2</td>
<td>HIN</td>
<td>Logic Input for High-Side Gate Driver Output</td>
</tr>
<tr>
<td>3</td>
<td>LIN</td>
<td>Logic Input for Low-Side Gate Driver Output</td>
</tr>
<tr>
<td>4</td>
<td>COM</td>
<td>Logic Ground and Low-Side Driver Return</td>
</tr>
<tr>
<td>5</td>
<td>LO</td>
<td>Low-Side Driver Output</td>
</tr>
<tr>
<td>6</td>
<td>VS</td>
<td>High-Voltage Floating Supply Return</td>
</tr>
<tr>
<td>7</td>
<td>HO</td>
<td>High-Side Driver Output</td>
</tr>
<tr>
<td>8</td>
<td>VB</td>
<td>High-Side Floating Supply</td>
</tr>
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## Absolute Maximum Ratings

The “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Characteristics</th>
<th>Min.</th>
<th>Max.</th>
<th>Unit</th>
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<tbody>
<tr>
<td>$V_S$</td>
<td>High-side offset voltage</td>
<td>$V_B-25$</td>
<td>$V_B+0.3$</td>
<td>V</td>
</tr>
<tr>
<td>$V_B$</td>
<td>High-side floating supply voltage</td>
<td>-0.3</td>
<td>625</td>
<td></td>
</tr>
<tr>
<td>$V_{HO}$</td>
<td>High-side floating output voltage HO</td>
<td>$V_S-0.3$</td>
<td>$V_B+0.3$</td>
<td></td>
</tr>
<tr>
<td>$V_{CC}$</td>
<td>Low-side and logic fixed supply voltage</td>
<td>-0.3</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>$V_{LO}$</td>
<td>Low-side output voltage LO</td>
<td>-0.3</td>
<td>$V_{CC}+0.3$</td>
<td></td>
</tr>
<tr>
<td>$V_{IN}$</td>
<td>Logic input voltage(HIN, LIN)</td>
<td>-0.3</td>
<td>$V_{CC}+0.3$</td>
<td></td>
</tr>
<tr>
<td>COM</td>
<td>Logic ground</td>
<td>$V_{CC}-25$</td>
<td>$V_{CC}+0.3$</td>
<td></td>
</tr>
<tr>
<td>$dV_s/dt$</td>
<td>Allowable offset voltage SLEW RATE</td>
<td>-</td>
<td>50</td>
<td>V/ns</td>
</tr>
<tr>
<td>$P_D$</td>
<td>Power dissipation</td>
<td>SOP</td>
<td>0.625</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DIP</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>$R_{thja}$</td>
<td>Thermal resistance, junction-to-ambient</td>
<td>SOP</td>
<td>200</td>
<td>°C/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DIP</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>$T_J$</td>
<td>Junction temperature</td>
<td>-</td>
<td>150</td>
<td>°C</td>
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<tr>
<td>$T_S$</td>
<td>Storage temperature</td>
<td>-</td>
<td>150</td>
<td>°C</td>
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Electrical Characteristics

($V_{\text{BIAS}}(V_{\text{CC}}, V_{\text{BS}})=15.0\text{V}, T_A = 25^\circ\text{C},$ unless otherwise specified. The $V_{\text{IN}}, V_{\text{TH}},$ and $I_{\text{IN}}$ parameters are referenced to COM. The $V_O$ and $I_O$ parameters are referenced to COM and $V_S$ is applicable to HO and LO.)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>$V_{\text{CCUV+}}$</td>
<td>$V_{\text{BSUV+}}$</td>
</tr>
<tr>
<td>$V_{\text{CCUV-}}$</td>
<td>$V_{\text{BSUV-}}$</td>
</tr>
<tr>
<td>$V_{\text{CCUVH}}$</td>
<td>$V_{\text{BSUVH}}$</td>
</tr>
<tr>
<td>$I_{\text{LK}}$</td>
<td>Offset supply leakage current</td>
</tr>
<tr>
<td>$I_{\text{QBS}}$</td>
<td>Quiescent VBS supply current</td>
</tr>
<tr>
<td>$I_{\text{QCC}}$</td>
<td>Quiescent VCC supply current</td>
</tr>
<tr>
<td>$I_{\text{PBS}}$</td>
<td>Operating VBS supply current</td>
</tr>
<tr>
<td>$I_{\text{PCc}}$</td>
<td>Operating VCC supply current</td>
</tr>
<tr>
<td>$V_{\text{IH}}$</td>
<td>Logic “1” input voltage</td>
</tr>
<tr>
<td>$V_{\text{IL}}$</td>
<td>Logic “0” input voltage</td>
</tr>
<tr>
<td>$V_{\text{OH}}$</td>
<td>High level output voltage, $V_{\text{BIAS-VO}}$</td>
</tr>
<tr>
<td>$V_{\text{OL}}$</td>
<td>Low level output voltage, VO</td>
</tr>
<tr>
<td>$I_{\text{IN+}}$</td>
<td>Logic “1” input bias current</td>
</tr>
<tr>
<td>$I_{\text{IN-}}$</td>
<td>Logic “0” input bias current</td>
</tr>
<tr>
<td>$I_{\text{OP+}}$</td>
<td>Output high short circuit pulse current</td>
</tr>
<tr>
<td>$I_{\text{OP-}}$</td>
<td>Output low short circuit pulsed current</td>
</tr>
<tr>
<td>$V_S$</td>
<td>Allowable negative $V_S$ pin voltage for $H_{\text{IN}}$ signal propagation to HO</td>
</tr>
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Dynamic Electrical Characteristics

($V_{\text{BIAS}}(V_{\text{CC}}, V_{\text{BS}})=15.0\text{V}, V_S=\text{COM}, C_L=1000\text{pF}$ and $T_A = 25^\circ\text{C},$ unless otherwise specified.)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>$t_{\text{on}}$</td>
<td>Turn-on propagation delay</td>
</tr>
<tr>
<td>$t_{\text{off}}$</td>
<td>Turn-off propagation delay</td>
</tr>
<tr>
<td>$t_r$</td>
<td>Turn-on rise time</td>
</tr>
<tr>
<td>$t_f$</td>
<td>Turn-off fall time</td>
</tr>
<tr>
<td>MT</td>
<td>Delay matching, HS &amp; LS turn-on/off</td>
</tr>
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Typical Characteristics

Figure 1. Turn-On Propagation Delay vs. Supply Voltage

Figure 2. Turn-On Propagation Delay vs. Temp.

Figure 3. Turn-Off Propagation Delay vs. Supply Voltage

Figure 4. Turn-Off Propagation Delay vs. Temp.

Figure 5. Turn-On Rising Time vs. Supply Voltage

Figure 6. Turn-On Rising Time vs. Temp.
Typical Characteristics (Continued)

Figure 7. Turn-Off Falling Time vs. Supply Voltage

Figure 8. Turn-Off Falling Time vs. Temp.

Figure 9. Output Sourcing Current vs. Supply Voltage

Figure 10. Output Sourcing Current vs. Temp.

Figure 11. Output Sinking Current vs. Supply Voltage

Figure 12. Output Sinking Current vs. Temp.
Typical Characteristics (Continued)

Figure 13. Allowable Negative VS Voltage for Signal Propagation to High Side vs. Supply Voltage

Figure 14. Allowable Negative VS Voltage for Signal Propagation to High Side vs. Temp.

Figure 15. IQCC vs. Supply Voltage

Figure 16. IQCC vs. Temp.

Figure 17. IQBS vs. Supply Voltage

Figure 18. IQBS vs. Temp.
Typical Characteristics (Continued)

Figure 19. High-Level Output Voltage vs. Supply Voltage

Figure 20. High-Level Output Voltage vs. Temp.

Figure 21. Low-Level Output Voltage vs. Supply Voltage

Figure 22. Low-Level Output Voltage vs. Temp.

Figure 23. Input Bias Current vs. Supply Voltage

Figure 24. Input Bias Current vs. Temp.
Typical Characteristics (Continued)

Figure 25. VCC UVLO Threshold Voltage vs. Temp.

Figure 26. VBS UVLO Threshold Voltage vs. Temp.

Figure 27. VB to COM Leakage Current vs. Temp.

Figure 28. Input Logic Threshold Voltage vs. Temp.
Typical Characteristics (Continued)

Figure 29. Switching Time Test Circuit

Figure 30. Input / Output Timing Diagram

Figure 31. Switching Time Waveform Definitions

Figure 32. Delay Matching Waveform Definition

HIN

LIN

HO

LO

10% 50% 90% 100%

50% 90% 10%

50% 90% 10%

50% 90% 10%

50% 90% 10%

50% 90% 10%

50% 90% 10%

50% 90% 10%

50% 90% 10%

50% 90% 10%
Mechanical Dimensions

8-SOP
Dimensions are in millimeters (inches) unless otherwise noted.
Mechanical Dimensions (Continued)

8-DIP
Dimensions are in millimeters (inches) unless otherwise noted.

[Diagram of 8-DIP package dimensions]

September 1999, Rev B
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Definition of Terms

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<th>Datasheet Identification</th>
<th>Product Status</th>
<th>Definition</th>
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<td>Advance Information</td>
<td>Formative or In Design</td>
<td>This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.</td>
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<tr>
<td>Preliminary</td>
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