

FAN7361, FAN7362 High-Side Gate Driver

Features

- Floating Channel Designed for Bootstrap Operation to +600V
- Typically 250mA/500mA Sourcing/Sinking Current Driving Capability
- Common-Mode dv/dt Noise Canceling Circuit
- V_{CC} & V_{BS} Supply Range from 10V to 20V
- UVLO Function
- Output In-phase with Input
- 8-SOP

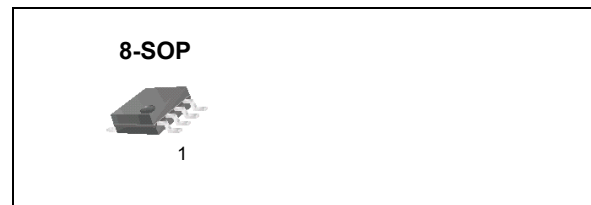
Applications

- PDP Scan Driver
- Motor Control
- SMPS
- Electronic Ballast

Description

The FAN7361/FAN7362, a monolithic high-side gate driver IC, can drive MOSFETs and IGBTs that operate up to +600V. Fairchild's high-voltage process and common-mode noise canceling techniques provide stable operation of the high-side driver under high dv/dt noise circumstances. An advanced level shift circuit offers high-side gate driver operation up to $V_S = -9.8V$ (typ.) for $V_{BS} = 15V$.

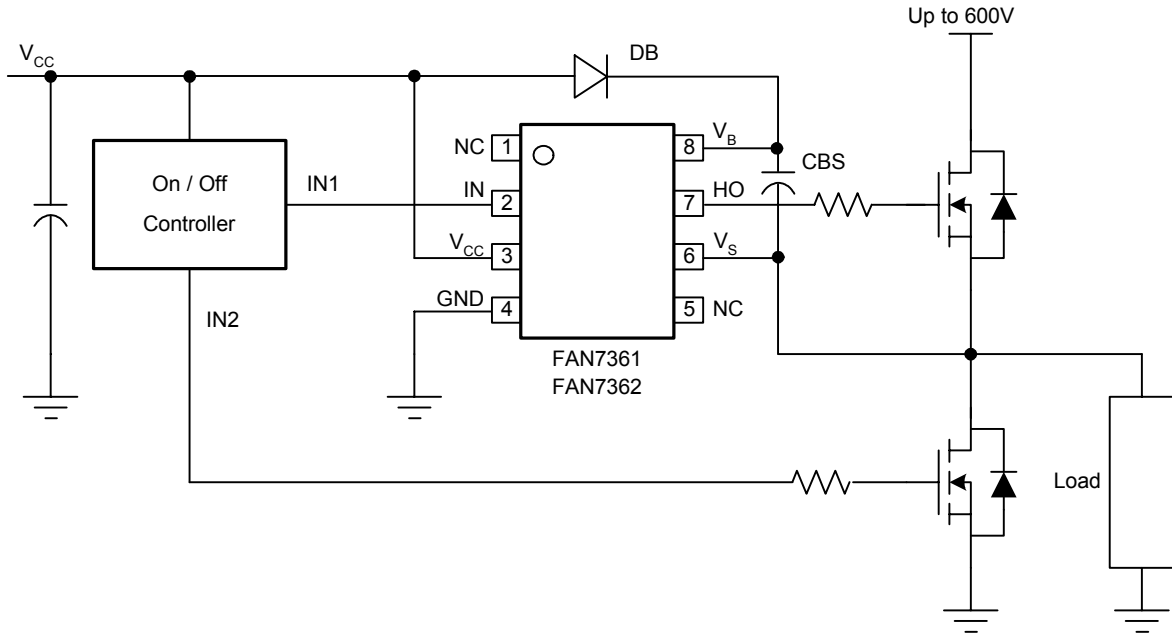
The UVLO circuit prevents malfunction when V_{BS} is lower than the specified threshold voltage. Output drivers typically source/sink 250mA/500mA, respectively, which is suitable for fluorescent lamp ballast, PDP scan driver, motor control, and so on.



Ordering Information

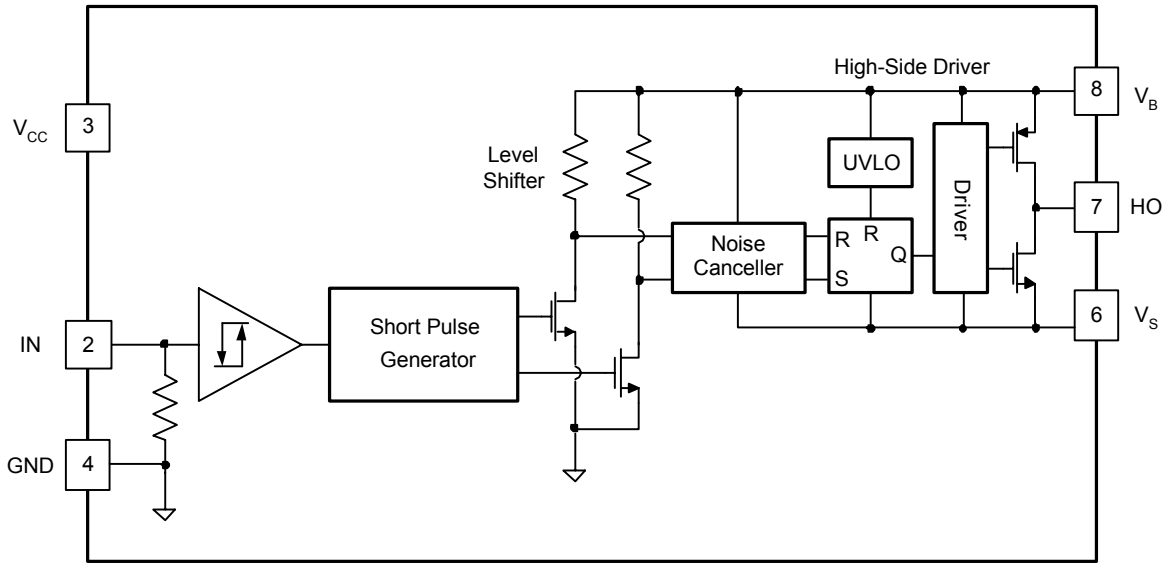
| Part Number | Package | Pb-Free | Operating Temperature Range | Packing Method |
|-------------|---------|---------|-----------------------------|----------------|
| FAN7361M | 8-SOP | Yes | -40°C ~ 125°C | TUBE |
| FAN7361MX | | | | TAPE & REEL |
| FAN7362M | | | | TUBE |
| FAN7362MX | | | | TAPE & REEL |

Typical Application Circuit



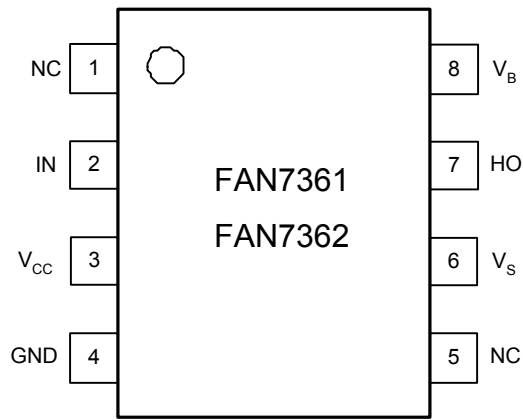
FAN7361 Rev.03

Internal Block Diagram



FAN7361 Rev.03

Pin Assignments



FAN7361 Rev.03

Pin Definitions

| Pin | Name | Function/ Description |
|-----|----------|--|
| 1 | N.C. | No Connection |
| 2 | IN | Logic Input for High-Side Gate Driver Output |
| 3 | V_{CC} | Supply Voltage |
| 4 | GND | Logic Ground |
| 5 | N.C. | No Connection |
| 6 | V_S | High-Voltage Floating Supply Return |
| 7 | HO | High-Side Driver Output |
| 8 | V_B | High-Side Floating Supply |

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. The “Recommended Operating Conditions” table defines the conditions for actual device operation.

| Symbol | Characteristics | Min. | Max. | Unit |
|------------|---|-----------|--------------|---------------|
| V_S | High-Side Offset Voltage | V_B-25 | $V_B+0.3$ | V |
| V_B | High-Side Floating Supply Voltage | -0.3 | 625 | |
| V_{HO} | High-Side Floating Output Voltage | $V_S-0.3$ | $V_B+0.3$ | |
| V_{CC} | Logic Fixed Supply Voltage | -0.3 | 25 | |
| V_{IN} | Logic Input Voltage | -0.3 | $V_{CC}+0.3$ | |
| dV_S/dt | Allowable Offset Voltage Slew Rate | | ± 50 | V/nsec |
| P_D | Power Dissipation | | 0.625 | W |
| R_{thja} | Thermal Resistance, Junction-to-Ambient | | 200 | $^{\circ}C/W$ |
| T_J | Junction Temperature | | 150 | $^{\circ}C$ |
| T_S | Storage Temperature | | 150 | $^{\circ}C$ |

Recommended Operating Conditions.

| Symbol | Parameter | Min. | Max. | Unit |
|----------|--|------------|----------|-------------|
| V_B | High-Side Floating Supply Voltage | V_S+10 | V_S+20 | V |
| V_S | High-Side Floating Supply Offset Voltage | $6-V_{CC}$ | 600 | |
| V_{HO} | High-Side Output Voltage | V_S | V_B | |
| V_{IN} | Logic Input Voltage | GND | V_{CC} | |
| V_{CC} | Logic Supply Voltage | 10 | 20 | |
| T_A | Ambient Temperature | -40 | 125 | $^{\circ}C$ |

Electrical Characteristics

$V_{BIAS}(V_{CC}, V_{BS})=15.0V$, $T_A = 25^\circ C$, unless otherwise specified. The V_{IN} , V_{TH} and I_{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.

| Symbol | Characteristics | Test Condition | Min. | Typ. | Max. | Unit | |
|-------------|--|--|---------|------|------|---------|---|
| V_{BSUV+} | V_{BS} Supply Under-Voltage Positive Going Threshold | $V_{IN}=0V$ | FAN7361 | 8.2 | 9.2 | 10.2 | V |
| | | | FAN7362 | 7.6 | 8.6 | 9.6 | |
| V_{BSUV-} | V_{BS} Supply Under-Voltage Negative Going Threshold | $V_{IN}=0V$ | FAN7361 | 7.4 | 8.6 | 9.2 | |
| | | | FAN7362 | 7.2 | 8.2 | 9.2 | |
| V_{BSHYS} | V_{BS} Supply Under-Current Lockout Hysteresis | $V_{IN}=0V$ | FAN7361 | | 0.5 | | |
| | | | FAN7362 | | 0.4 | | |
| I_{LK} | Offset Supply Leakage Current | $V_B=V_S=H=600V$ | | | 10 | μA | |
| I_{QBS} | Quiescent V_{BS} Supply Current | $V_{IN}=0V$ or $5V$ | | 50 | 80 | | |
| I_{QCC} | Quiescent V_{CC} Supply Current | $V_{IN}=0V$ | | 30 | 75 | | |
| I_{PBS} | Operating V_{BS} Supply Current | $C_L=1nF, f=10kHz$ | | 420 | 550 | | |
| V_{IH} | Logic "1" Input Voltage | | FAN7361 | 3.6 | | | V |
| | | | FAN7362 | 2.9 | | | |
| V_{IL} | Logic "0" Input Voltage | | FAN7361 | | | 1.0 | |
| | | | FAN7362 | | | 0.8 | |
| V_{OH} | High Level Output Voltage, V_B-V_{HO} | No load | | | 0.1 | | |
| V_{OL} | Low Level Output Voltage, V_{HO} | No load | | | 0.1 | | |
| I_{IN+} | Logic "1" Input Bias Current | $V_{IN}=5V$ | | 50 | 90 | μA | |
| I_{IN-} | Logic "0" Input Bias Current | $V_{IN}=0V$ | | 1.0 | 2.0 | | |
| I_{O+} | Output High Short Circuit Pulse Current | $V_{HO}=0V, V_{IN}=5V, PW \leq 10\mu s$ | 200 | 250 | | mA | |
| I_{O-} | Output Low Short Circuit Pulse Current | $V_{HO}=15V, V_{IN}=0V, PW \leq 10\mu s$ | 400 | 500 | | | |
| V_S | Allowable Negative V_S P Voltage for IN Signal Propagation to HO | | | -9.8 | -7 | V | |

Dynamic Electrical Characteristics

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

| Symbol | Characteristics | Test Condition | Min. | Typ. | Max. | Unit |
|-----------|----------------------------|--------------------|------|------|------|------|
| t_{on} | Turn-on Propagation Delay | $V_S=0V$ | | 120 | 200 | nsec |
| t_{off} | Turn-off Propagation Delay | $V_S=0V$ or $600V$ | | 90 | 180 | |
| t_r | Turn-on Rise Time | | | 70 | 160 | |
| t_f | Turn-off Fall Time | | | 30 | 100 | |

Typical Characteristics

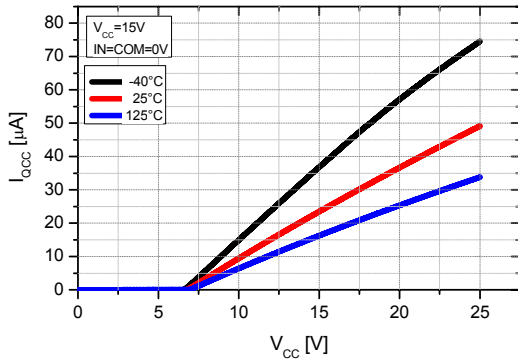


Figure 1. I_{QCC} vs. Supply Voltage

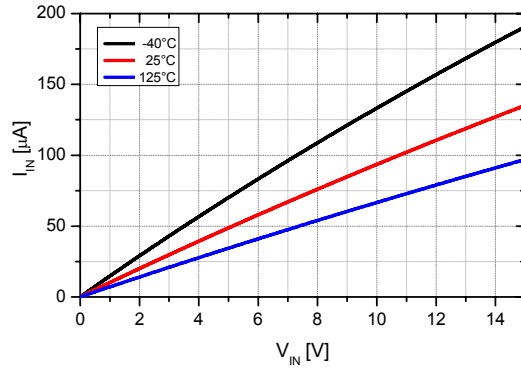


Figure 2. Input Bias Current vs. Input Voltage

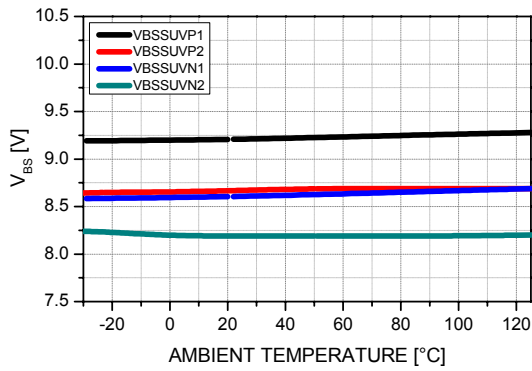


Figure 3. V_{BS} UVLO vs. Temp.

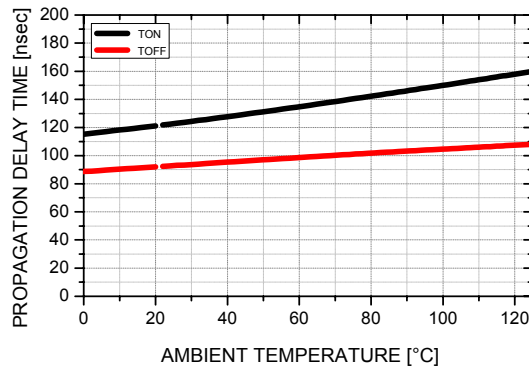


Figure 4. Turn On/Off Propagation Time vs. Temp.

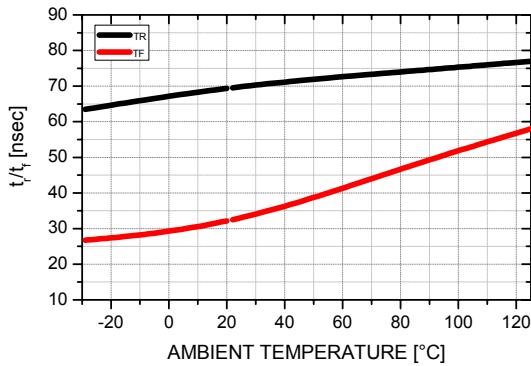


Figure 5. Rising/Falling Time vs. Temp.

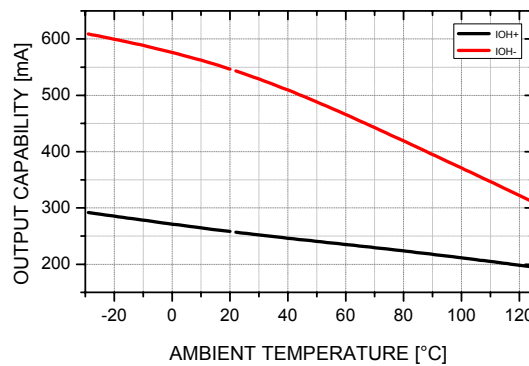


Figure 6. Output Sinking/Sourcing Current vs. Temp.

Switching Time Definition

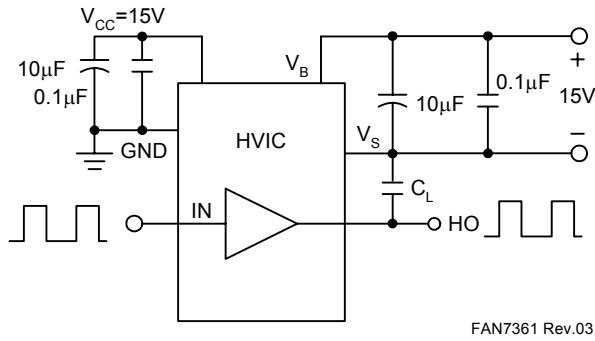


Figure 7. Switching Time Test Circuit

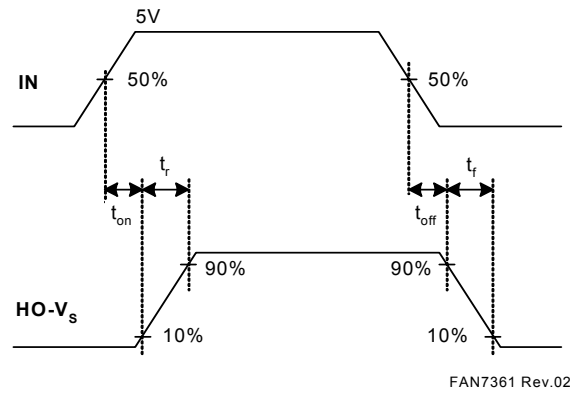
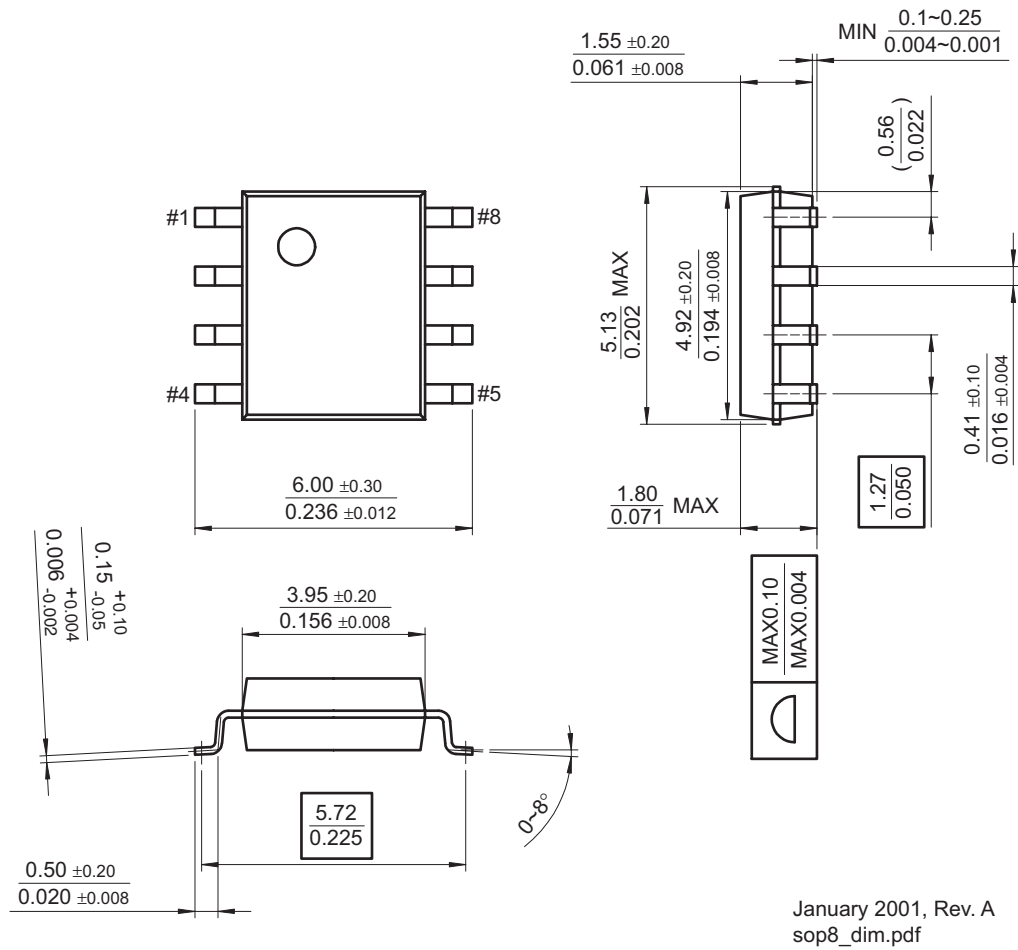


Figure 8. Input / Output Timing Diagram

Mechanical Dimensions

8-SOP

Dimensions are in millimeters (inches) unless otherwise noted.



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Figure 9. 8-Lead Small Outline Package (SOP)

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