



# 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  $V_{BS} = 15V$ .

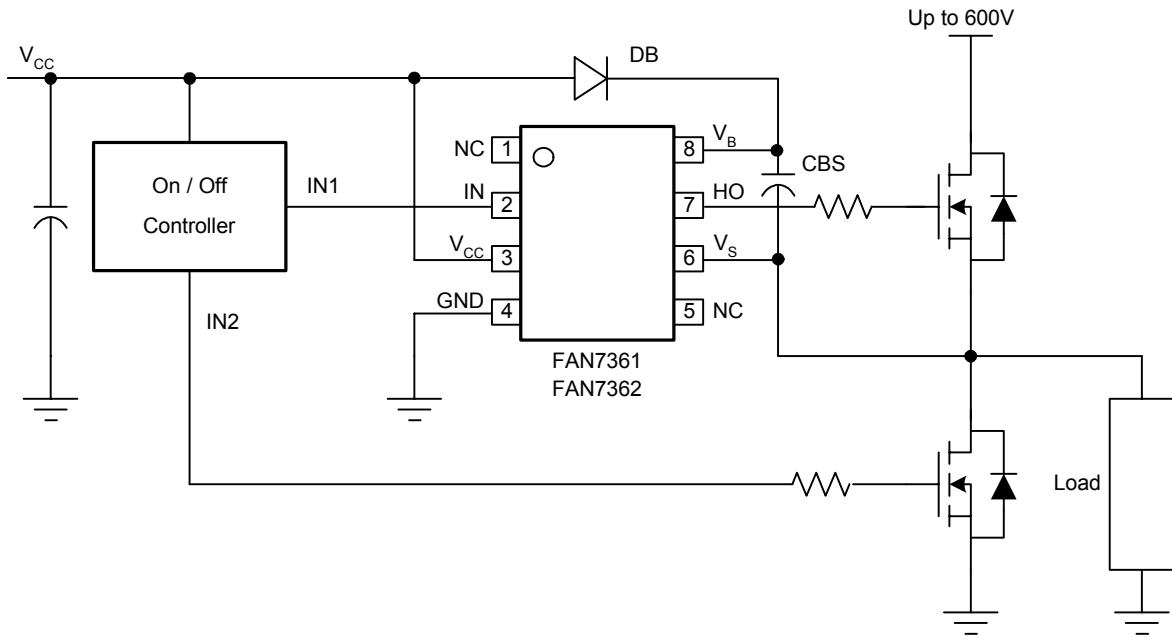
The UVLO circuit prevents malfunction when  $V_{BS}$  is lower than the specified threshold voltage. Output drivers typically source/sink 250mA/500mA, respectively, which is suitable for fluorescent lamp ballast, PDP scan driver, motor control, and so on.



## Ordering Information

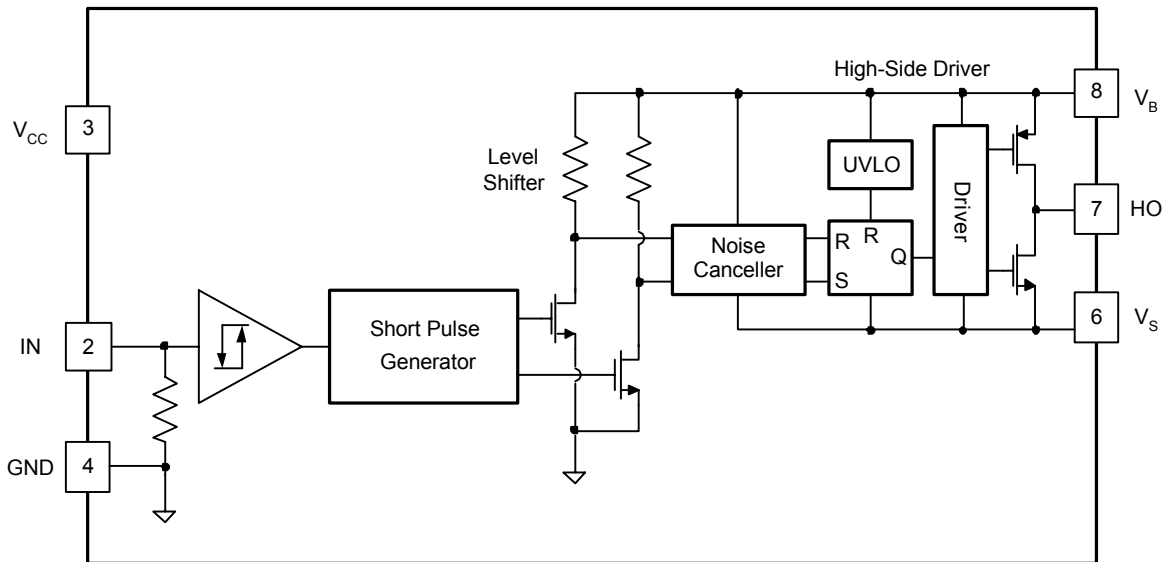
Part Number	Package	Pb-Free	Operating Temperature Range	Packing Method
FAN7361M	8-SOP	Yes	-40°C ~ 125°C	TUBE
FAN7361MX				TAPE & REEL
FAN7362M				TUBE
FAN7362MX				TAPE & REEL

### Typical Application Circuit



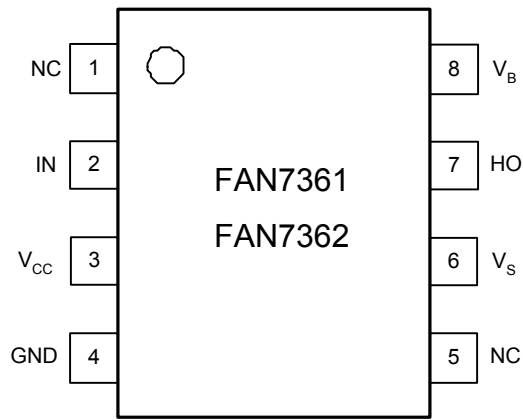
FAN7361 Rev.03

### Internal Block Diagram



FAN7361 Rev.03

## Pin Assignments



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## Pin Definitions

Pin	Name	Function/ Description
1	N.C.	No Connection
2	IN	Logic Input for High-Side Gate Driver Output
3	V <sub>CC</sub>	Supply Voltage
4	GND	Logic Ground
5	N.C.	No Connection
6	V <sub>S</sub>	High-Voltage Floating Supply Return
7	HO	High-Side Driver Output
8	V <sub>B</sub>	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		$\pm 50$	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	V
			FAN7362	7.2	8.2	9.2	
$V_{BSHYS}$	$V_{BS}$ Supply Under-Current Lockout Hysteresis	$V_{IN}=0V$	FAN7361		0.5		V
			FAN7362		0.4		
$I_{LK}$	Offset Supply Leakage Current	$V_B=V_S=H=600V$			10	$\mu A$	
$I_{QBS}$	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	V
			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	$\mu A$	
$I_{IN-}$	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

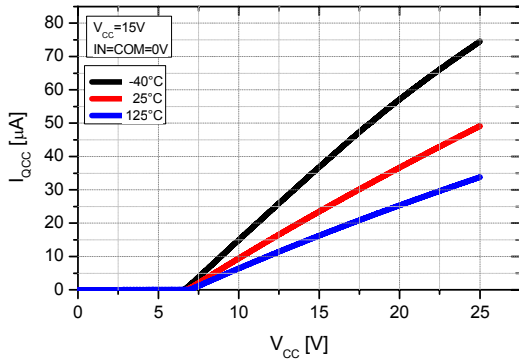


Figure 1.  $I_{QCC}$  vs. Supply Voltage

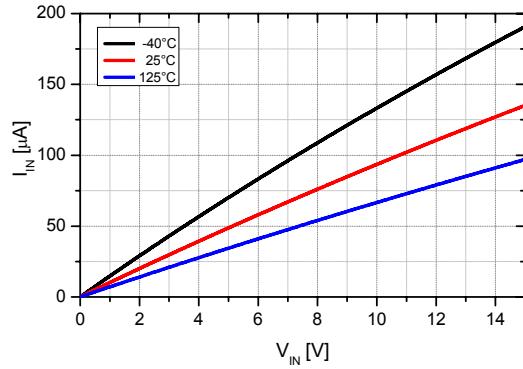


Figure 2. Input Bias Current vs. Input Voltage

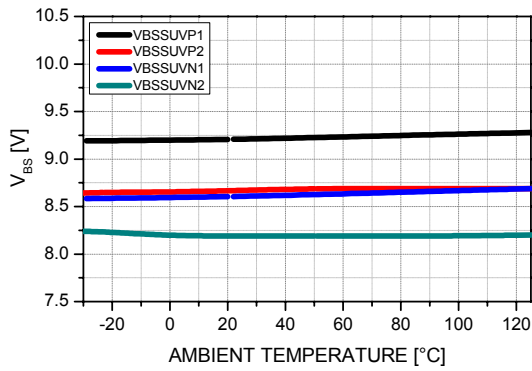


Figure 3.  $V_{BS}$  UVLO vs. Temp.

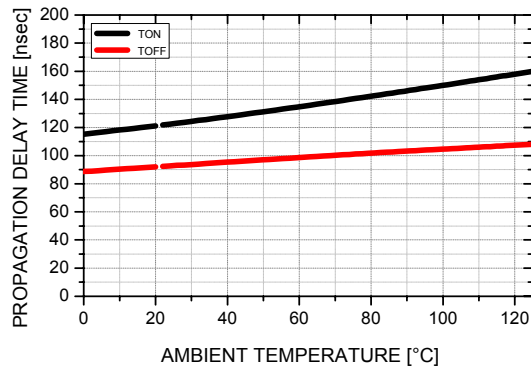


Figure 4. Turn On/Off Propagation Time vs. Temp.

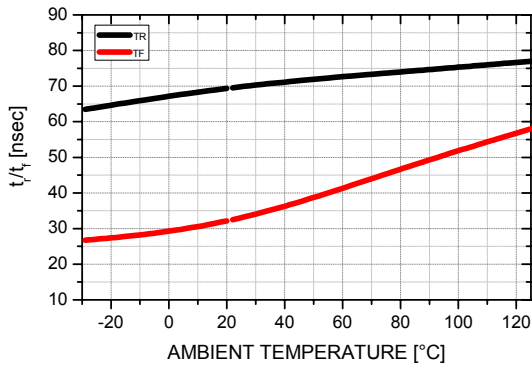


Figure 5. Rising/Falling Time vs. Temp.

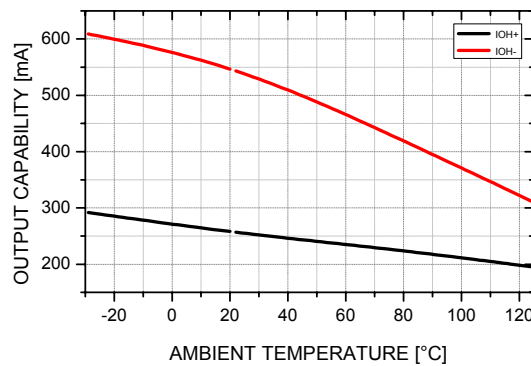


Figure 6. Output Sinking/Sourcing Current vs. Temp.

### Switching Time Definition

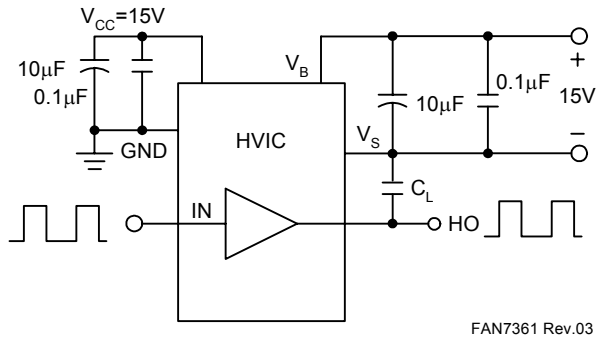


Figure 7. Switching Time Test Circuit

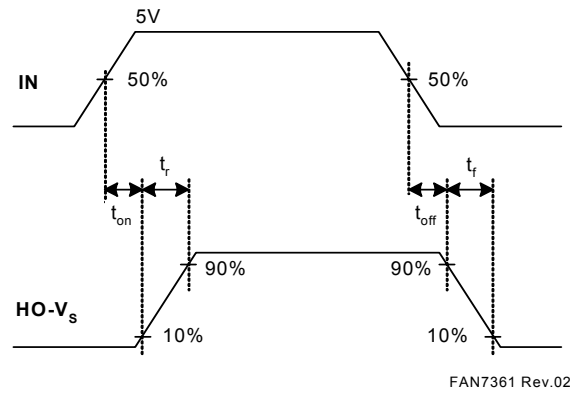
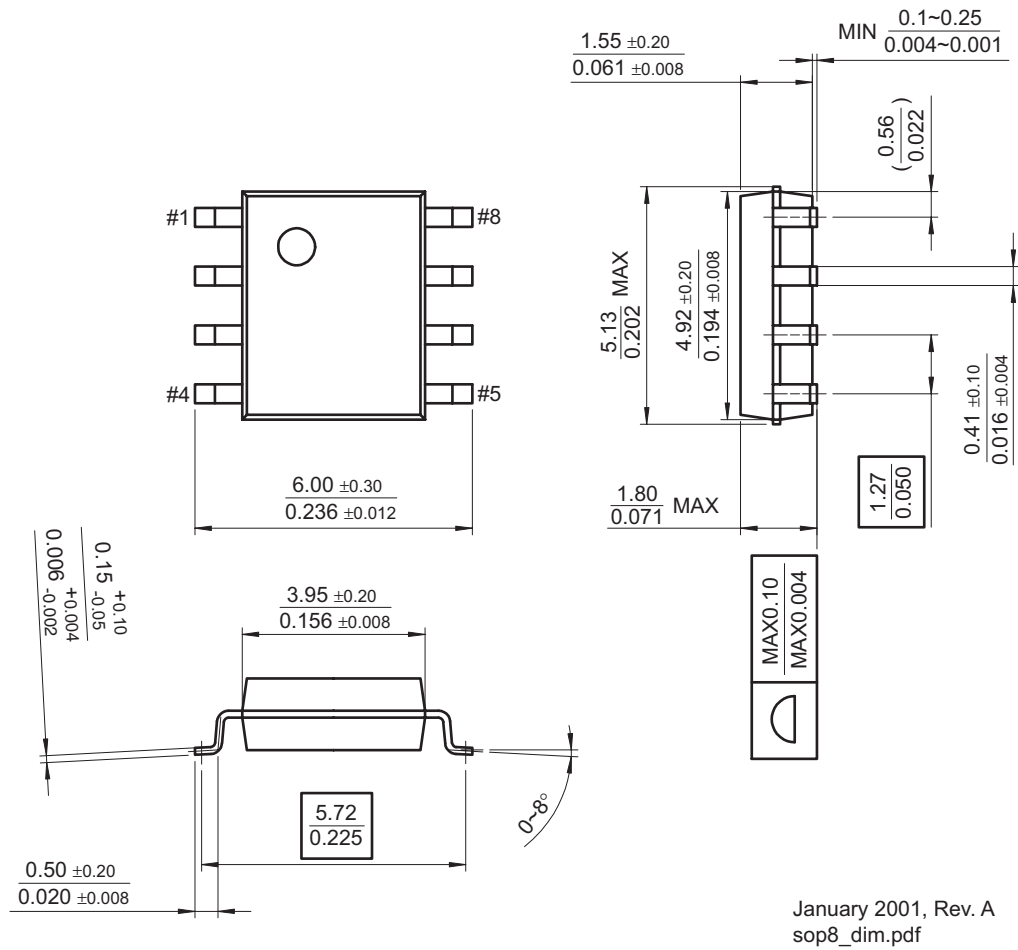


Figure 8. Input / Output Timing Diagram

### 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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CoolFET <sup>TM</sup>	i-Lo <sup>TM</sup>	POP <sup>TM</sup>	Stealth <sup>TM</sup>	TinyPWM <sup>TM</sup>
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