# UMW FAN3111

2A Single-Channel, High-Speed Gate Driver

## 1.Description

The UMW FAN3111 2A gate driver is designed to drive an N-channel enhancement-mode MOSFET in low-side switching applications. UMW FAN3111 has dual CMOS inputs with thresholds referenced to VDD for use with PWM controllers and other input-signal sources that operate from the same supply voltage as the driver.

## 2.Applications

- Switch-Mode Power Supplies
- Synchronous Rectifier Circuits
- Pulse Transformer Driver
- Logic to Power Buffer
- Motor Control

## 3.Features

- Dual inputs allow configuration as non-inverting or inverting with enable function
- CMOS logic inputs
- Input logic protection as low as -10V
- 4.5 to 25-V Single-Supply Range
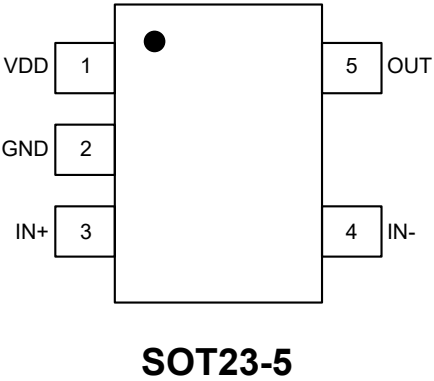- 2-A Peak Source and Sink-Drive Curren

- Internal resistance turns off driver when there is no input
- Operating Temperature Range of -40 to 125°C
- Turn on/Turn off Delays:
  -- Ton/Toff =20ns/20ns

## 4.Pin Configuration
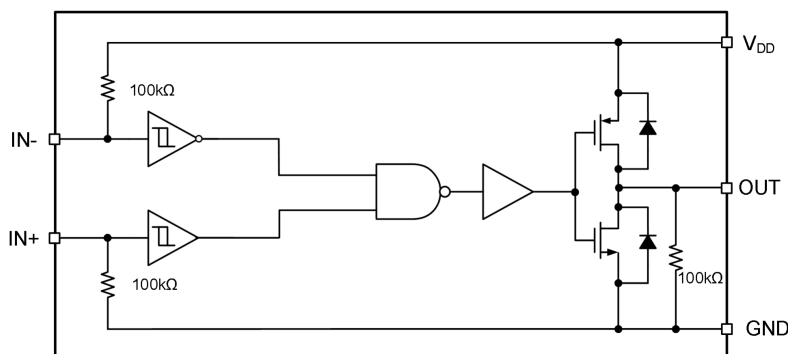
## 5.Pinning Information



**SOT23-5**

Lead Definitions

| Number | Symbol | Description |
|--------|--------|-------------|
| 1 | VDD | Bias supply input |
| 2 | GND | Ground: All signals are referenced to this pin |
| 3 | IN+ | Non-inverting Input |
| 4 | IN- | Inverting Input |
| 5 | OUT | Gate driven Ouput |

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## 6.Absolute Maximum Ratings

Exceeding the limit maximum rating may cause permanent damage to the device. All voltage parameters are rated with reference to $V_{SS}$ and an ambient temperature of 25°C.

| Parameter | | Symbol | Min | Max | Units |
|---|---|---|---|---|---|
| Supply voltage range | | $V_{DD}$ | -0.3 | 25 | V |
| OUT voltage range | | $V_O$ | -0.3 | $V_{DD}+0.3$ | V |
| IN+, IN- voltage | | $V_{IN}$ | -12 | 25 | V |
| Voltage on IN to GND | FAN3111E | | -0.3 | $V_{XREF}+0.3$ | V |
| Voltage on XREF to GND | FAN3111E | $V_{XREF}$ | -0.3 | 5.5 | V |

## 7.ESD Rating

| Parameter | Symbol | Min | Max | Units |
|---|---|---|---|---|
| Human body model (HBM) | ESD | - | 2000 | V |
| Charged device model (CDM) | | - | 500 | V |

## 8.Rated Power

| Parameter | Symbol | Min | Max | Units |
|---|---|---|---|---|
| SOIC package power（$T_A$ ≤70°C） | PD | - | 470 | mW |

## 9.Thermal Information

| Parameter | Symbol | Min | Max | Units |
|---|---|---|---|---|
| Storage Temperature | $T_S$ | -65 | 150 | °C |
| Operating Junction Temperature | $T_J$ | - | 150 | °C |

## 10.Recommended Operating Conditions

To properly operate, device should be used in the following recommended conditions. All voltages are with respect to GND unless otherwise noted, Currents are positive into, negative out of the specified terminal, environment temperature is 25°C.

| Parameter | | Symbol | Min | Max | Units |
|---|---|---|---|---|---|
| Supply voltage range | | $V_{DD}$ | 4.5 | 25 | V |
| OUT voltage range | | $V_O$ | 0 | $V_{DD}$ | V |
| IN+, IN- voltage | | $V_{IN}$ | -10 | 25 | V |
| Ambient temperature | | $T_A$ | -40 | 125 | °C |
| Input Voltage IN | FAN3111E | $V_{IN}$ | 0 | $V_{XREF}$ | V |
| External Reference Voltage XREF | FAN3111E | $V_{XREF}$ | 2 | 5 | V |

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## 11.Electrical Characteristics

$T_A$= 25°C, $V_{DD}$=15V(unless otherwise noted).

| Definition | Symbol | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Input signal high threshold | $V_{IH}$ | 0.7*$V_{CC}$ | 7.5 | | V |
| Input signal low threshold | $V_{IL}$ | | | 0.3*$V_{CC}$ | V |
| Input current(IN+=15V, IN-=0V) | $I_{IN+}$ | | 150 | 300 | µA |
| Input current(IN+=0V,IN-=15V) | $I_{IN-}$ | | | 1 | µA |
| High output voltage | $V_{OH}$ | $V_{DD}$-0.025 | | | V |
| Low output voltage | $V_{OL}$ | | | 0.025 | V |
| Output high short-circuit pulse current | $I_{O+}$ | | 2 | | A |
| Output low short-circuit pulse current | $I_{O-}$ | | 2 | | A |
| Rise time($C_L$=1nF) | $t_R$ | | | 15 | ns |
| Fall time($C_L$=1nF) | $t_F$ | | | 15 | ns |
| Turn-on propagation delay($C_L$=1nF) | $t_{ON}$ | | | 30 | ns |
| Turn-off propagation delay($C_L$=1nF) | $t_{OFF}$ | | | 30 | ns |
| $V_{CC}$ supply current($V_{IN-}$=HIGH $V_{IN+}$=LOW) | $I_{Q1}$ | | | 30 | µA |
| $V_{CC}$ supply current($V_{IN-}$=LOW $V_{IN+}$=HIGH) | $I_{Q2}$ | | 300 | 500 | µA |

## 12.Function Description
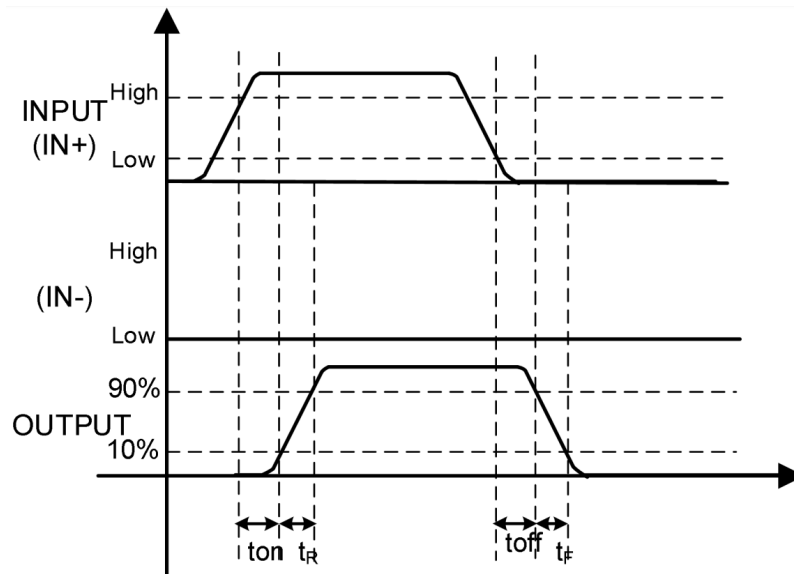


Figure 1. Input-Output waveform(non-inverting)
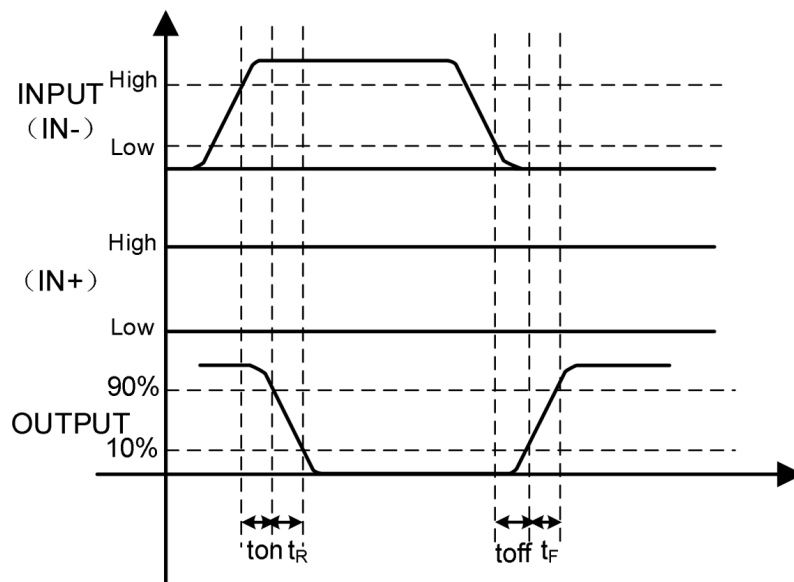


Figure 2. Input-Output waveform(inverting)

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## 13.Function Block Diagram
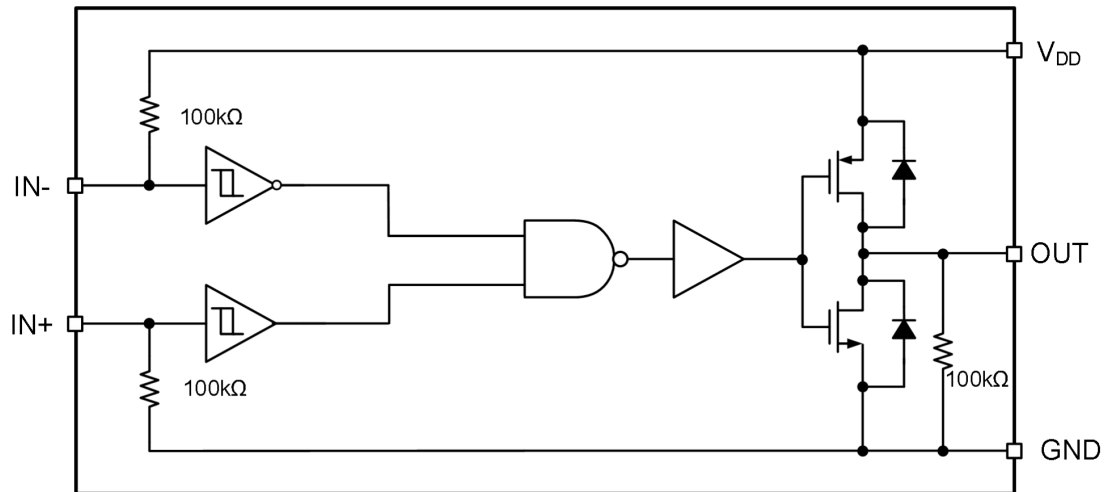


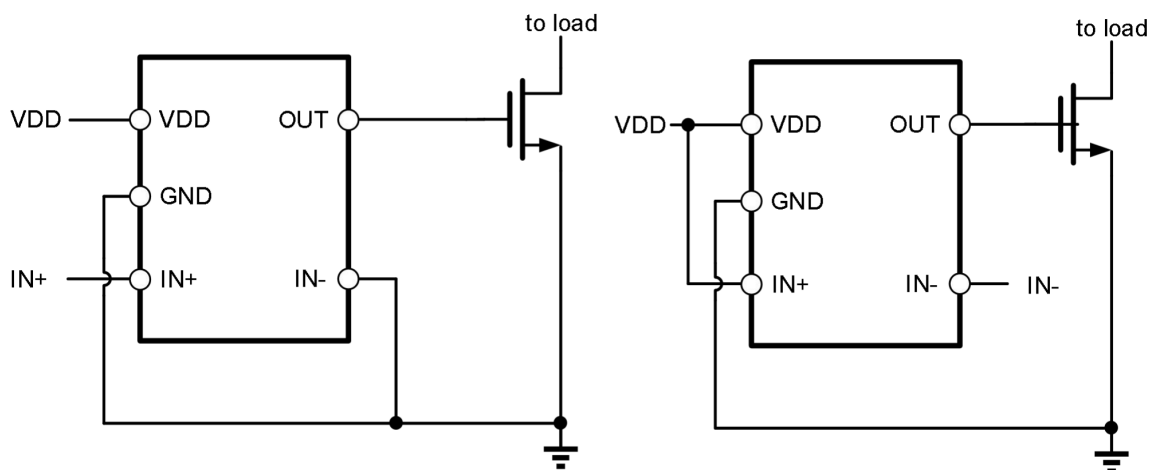Figure 3. Function Block Diagram of FAN3111
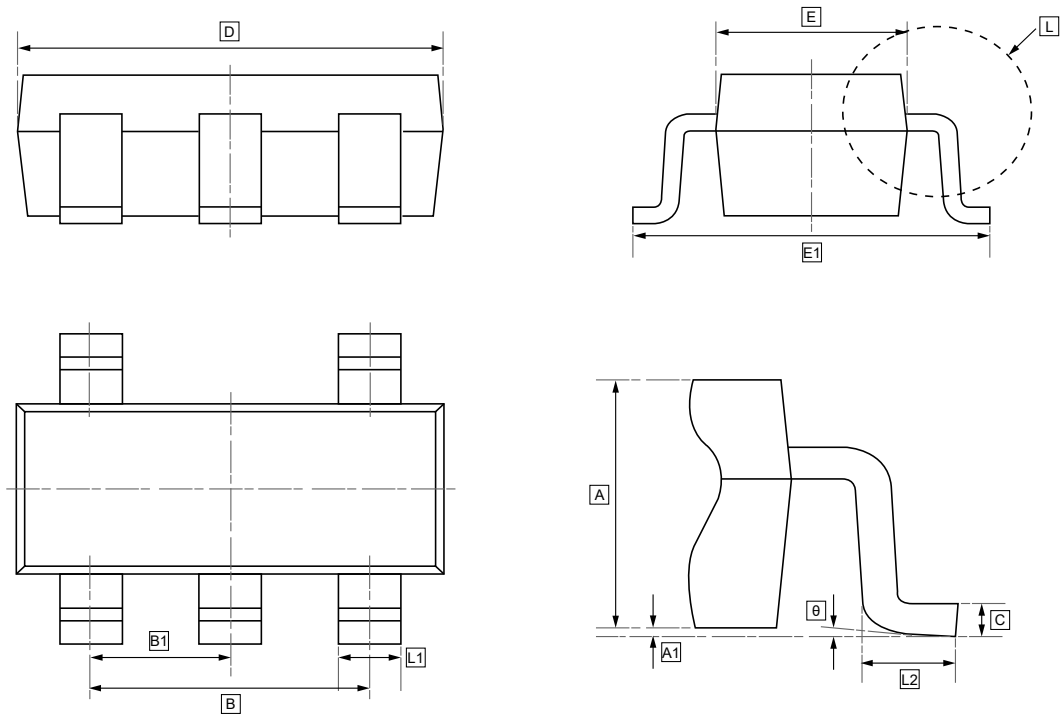
## 14.Application Message



Figure 4. Typical application circuit of FAN3111
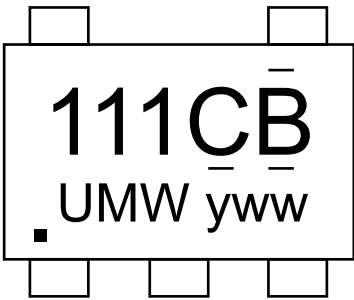
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## 15.SOT23-5 Package Outline Dimensions

**DIMENSIONS (mm are the original dimensions)**

| Symbol | A | A1 | B | B1 | C | D | E | E1 | L1 | L2 | θ |
|--------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|
| Min | 1.050 | 0.000 | 1.800 | 0.950 | 0.100 | 2.820 | 1.500 | 2.650 | 0.300 | 0.300 | 0° |
| Max | 1.150 | 0.100 | 2.000 | TYP | 0.200 | 3.020 | 1.700 | 2.950 | 0.500 | 0.600 | 8° |

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## 16.Ordering information

```
111CB
UMW yww
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yww: Batch Code

| Order Code | Marking | Package | Base QTY | Delivery Mode |
|---|---|---|---|---|
| UMW FAN3111CSX | 111CB | SOT23-5 | 3000 | Tape and reel |
| UMW FAN3111ESX | 111EA | SOT23-5 | 3000 | Tape and reel |

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