



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

FAN73833

半桥栅极驱动 IC

特性

- 浮动通道可实现高达 +600V 的自举运行
- 两个通道的 350 mA/650 mA 的典型源电流 / 灌电流驱动能力
- 将容许负 V_S 摆幅扩展至 -9.8V, 在当 $V_{DD}=V_{BS}=15V$ 时的信号传播时
- 兼容 3.3V 和 5V 逻辑输入电平
- 输出与输入信号同相
- 两个通道均内置欠压闭锁 (UVLO) 功能
- 内置直通预防电路
- 内置共模 dv/dt 噪声消除电路
- 内部死区时间典型值 400 ns

应用

- SMPS
- 电机驱动逆变器
- 荧光灯镇流器
- HID 镇流器

说明

FAN73833 是半桥栅极驱动 IC, 用于驱动 MOSFET 和 IGBT, 工作电压高达 +600V。

飞兆的高压流程和共模噪声消除技术可使高端驱动器在高 dv/dt 噪声环境下稳定运行。

先进的电平转换电路使高侧栅极驱动器在 $V_{BS}=15V$ 时可耐受高达 $V_S=-9.8V$ (典型值) 时仍然正常工作。

当 V_{DD} 和 V_{BS} 小于指定阈值电压时, 两个通道的欠压闭锁 (UVLO) 电路可防止发生故障。

输出驱动器的源电流 / 灌电流典型值分别为 350mA / 650mA, 适用于各种各样的半桥和全桥逆变器。

8-SOP



订购信息

| 器件编号 | 封装 | 工作温度范围 | 包装方法 |
|------------|-------|----------------|-------|
| FAN73833M | 8-SOP | -40°C 至 +125°C | 塑料管 |
| FAN73833MX | | | 卷带和卷盘 |

引脚布局

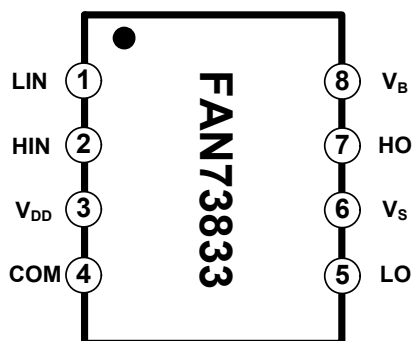


图 3. 引脚布局（顶视图）

引脚定义

| 引脚号 | 名称 | 说明 |
|-----|-----------------|--------------|
| 1 | LIN | 低侧驱动器的逻辑输入 |
| 2 | HIN | 高侧驱动器的逻辑输入 |
| 3 | V _{DD} | 低端电源电压 |
| 4 | COM | 逻辑接地和低侧驱动器返回 |
| 5 | LO | 低侧驱动输出 |
| 6 | V _S | 高侧浮动电源返回 |
| 7 | HO | 高侧驱动输出 |
| 8 | V _B | 高侧浮动电源 |

绝对最大额定值

应力若超过绝对最大额定值，可能会损坏器件。在超出推荐的工作条件的情况下，该器件可能无法正常工作，所以不建议让器件在这些条件下长期工作。此外，长期在超出推荐的工作条件下工作，会影响器件的可靠性。绝对最大额定值仅是应力规格值。除非另有规定，否则 $T_A=25^{\circ}\text{C}$ 。

| 符号 | 参数 | 最小值 | 最大值 | 单位 |
|-------------------|------------------|-------------|--------------|-----------------------------|
| V_S | 高侧偏置电压 | V_B-25 | $V_B+0.3$ | V |
| V_B | 高侧浮动电源电压 | -0.3 | 625 | V |
| V_{HO} | 高侧浮动输出电压 HO | $V_S-0.3$ | $V_B+0.3$ | V |
| V_{DD} | 低侧和逻辑固定电源电压 | -0.3 | 25 | V |
| V_{LO} | 低侧输出电压 LO | -0.3 | $V_{DD}+0.3$ | V |
| V_{IN} | 逻辑输入电压 (HIN/LIN) | -0.3 | $V_{DD}+0.3$ | V |
| COM | 逻辑接地和低侧驱动器返回 | $V_{DD}-25$ | $V_{DD}+0.3$ | V |
| dV_S/dt | 容许偏置电压变化速率 | | 50 | V/ns |
| $P_D^{(1)(2)(3)}$ | 功耗 | | 0.625 | W |
| θ_{JA} | 结至环境热阻 | | 200 | $^{\circ}\text{C}/\text{W}$ |
| T_J | 结温 | | 150 | $^{\circ}\text{C}$ |
| T_{STG} | 存储温度 | -55 | 150 | $^{\circ}\text{C}$ |

注意：

1. 安装到 76.2 x 114.3 x 1.6 mm PCB 板 (FR-4 环氧玻璃材料)。
2. 参考以下标准：
 - JESD51-2: 集成电路热测试方法环境条件 - 自然对流
 - JESD51-3: 含铅表面贴装封装的低有效导热系数测试板
3. 在任何情况下，都不要超过 P_D 。

推荐工作条件

推荐的操作条件表明了器件的真实工作条件。指定推荐的工作条件，以确保器件的最佳性能达到数据表中的规格。飞兆半导体建议不要超过推荐工作条件，也不能按照绝对最大额定值进行设计。

| 符号 | 参数 | 最小值 | 最大值 | 单位 |
|----------|------------------|------------|----------|--------------------|
| V_B | 高侧浮动电源电压 | V_S+11 | V_S+20 | V |
| V_S | 高侧浮动电源偏置电压 | $6-V_{DD}$ | 600 | V |
| V_{DD} | 低侧电源电压 | 11 | 20 | V |
| V_{HO} | 高侧 (HO) 输出电压 | V_S | V_B | V |
| V_{LO} | 低侧 (LO) 输出电压 | COM | V_{DD} | V |
| V_{IN} | 逻辑输入电压 (HIN/LIN) | COM | V_{DD} | V |
| T_A | 环境温度 | -40 | 125 | $^{\circ}\text{C}$ |

电气特性

除非另有规定，否则 V_{BIAS} (V_{DD} , V_{BS}) = 15.0 V 和 $T_A=25^{\circ}\text{C}$ 。 V_{IN} 和 I_{IN} 参数是以 COM 为参考点的值。 V_O 和 I_O 参数是以 V_S 和 COM 为参考点的值，并分别适用于输出 HO 和 LO。

| 符号 | 参数 | 条件 | 最小值 | 典型值 | 最大值 | 单位 |
|----------------------------|--------------------------------------|--|-----|------|------|---------------|
| 电源电流部分 | | | | | | |
| I_{QBS} | 静态 V_{BS} 电源电流 | $V_{IN}=0\text{ V}$ 或 5 V | | 35 | 100 | μA |
| I_{QDD} | 静态 V_{DD} 电源电流 | $V_{IN}=0\text{ V}$ 或 5 V | | 80 | 200 | μA |
| I_{PBS} | 工作 V_{BS} 电源电流 | $f_{IN}=20\text{ kHz}$, rms 值 | | 420 | 750 | μA |
| I_{PDD} | 工作 V_{DD} 电源电流 | $f_{IN}=20\text{ kHz}$, rms 值 | | 420 | 750 | μA |
| I_{LK} | 偏置电源的漏电流 | $V_B=V_S=600\text{ V}$ | | | 10 | μA |
| 电源部分 | | | | | | |
| V_{DDUV+} V_{BSUV+} | V_{DD} 和 V_{BS} 电源欠压正向（电压从高到低）阈值 | | 8.2 | 9.2 | 10.1 | V |
| V_{DDUV-} V_{BSUV-} | V_{DD} 和 V_{BS} 电源欠压负向（电压从低到高）阈值 | | 7.2 | 8.3 | 9.2 | V |
| V_{DDUVH} V_{BSUVH} | V_{DD} 电源欠压闭锁滞回电压回差 | | | 0.9 | | V |
| 栅极驱动器输出部分 | | | | | | |
| V_{OH} | 高电平输出电压, $V_{BIAS}-V_O$ | $I_O=20\text{ mA}$ | | | 1.0 | V |
| V_{OL} | 低电平输出电压, V_O | | | | 0.6 | V |
| $I_{O+}^{(4)}$ | 输出高电平短路脉冲电流 | $V_O=0\text{ V}$, $V_{IN}=5\text{ V}$ 和 $PW<10\text{ }\mu\text{s}$ | 250 | 350 | | mA |
| $I_{O-}^{(4)}$ | 输出低电平短路脉冲电流 | $V_O=15\text{ V}$, $V_{IN}=0\text{ V}$ 和 $PW<10\text{ }\mu\text{s}$ | 500 | 650 | | mA |
| V_S | IN 信号传播到 HO 时允许的 V_S 引脚负电压 | | | -9.8 | -7.0 | V |
| 逻辑输入部分（输入和关断） | | | | | | |
| V_{IH} | 逻辑“1”输入电压 | | 2.5 | | | V |
| V_{IL} | 逻辑“0”输入电压 | | | | 1.2 | V |
| I_{IN+} | 逻辑“1”输入偏置电流 | $V_{IN}=5\text{ V}$ | | 50 | 100 | μA |
| I_{IN-} | 逻辑“0”输入偏置电流 | $V_{IN}=0\text{ V}$ | | | 2.0 | μA |
| R_{PD} | 输入下拉电阻 | | | 100 | | K Ω |

注:

4. 参数由设计者提供

动态电气特性

除非另有规定，否则 V_{BIAS} (V_{DD} , V_{BS}) = 15.0 V, V_S = COM, C_L = 1000 pF 和 T_A = 25°C。

| 符号 | 参数 | 工作条件 | 最小值 | 典型值 | 最大值 | 单位 |
|-----------|----------|-------------|-----|-----|-----|----|
| t_{ON} | 导通传播延迟时间 | $V_S = 0$ V | | 150 | 270 | ns |
| t_{OFF} | 关断传播延迟时间 | $V_S = 0$ V | | 140 | 250 | ns |
| t_R | 导通上升时间 | | | 50 | 100 | ns |
| t_F | 关断下降时间 | | | 30 | 80 | ns |
| DT | 死区时间 | | 330 | 450 | 580 | ns |

典型特性

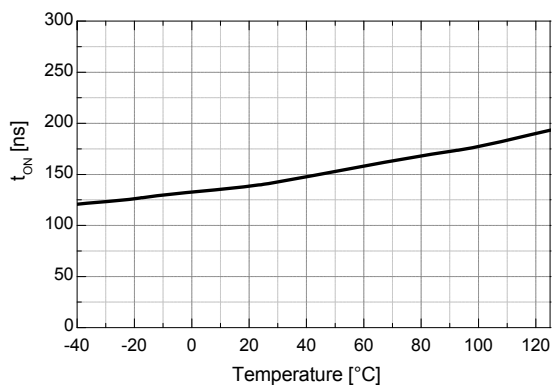


图 4. 导通传播延时 vs 温度

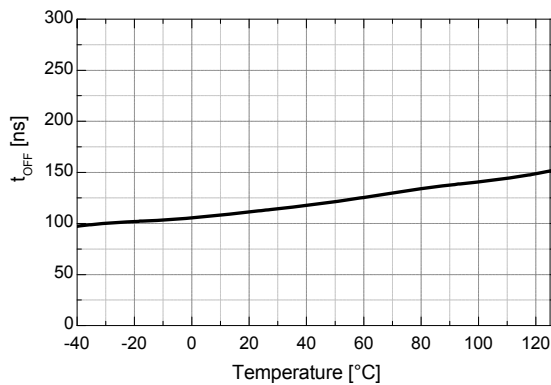


图 5. 关断传播延时 vs 温度

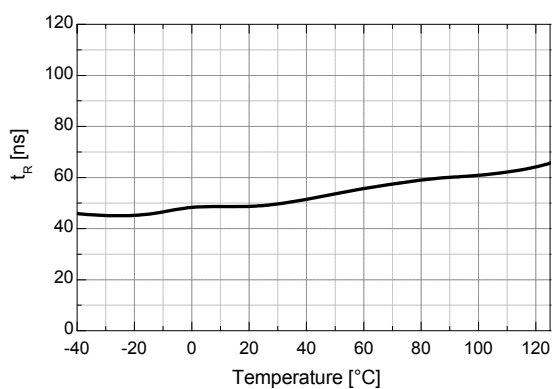


图 6. 导通上升时间 vs 温度

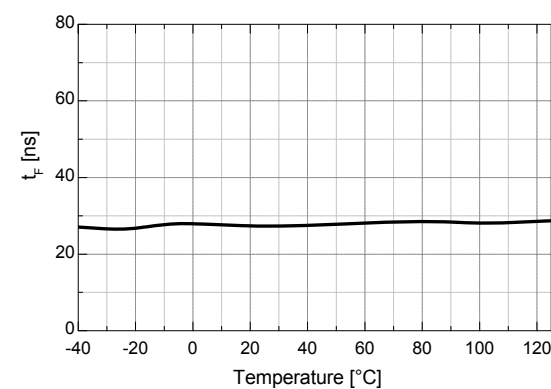


图 7. 关断下降时间 vs 温度

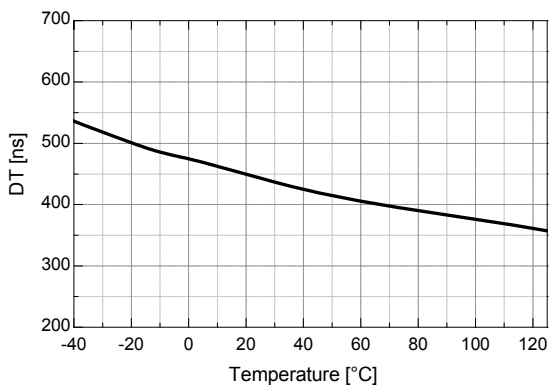


图 8. 死区时间 vs 温度

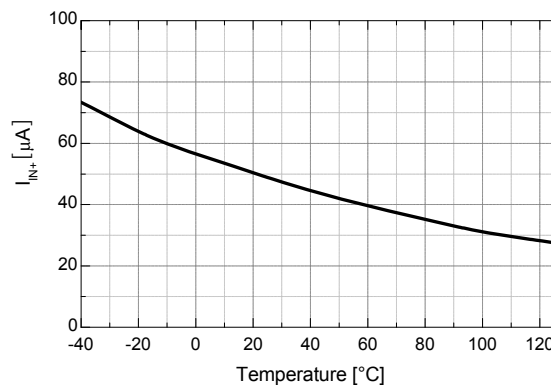


图 9. 逻辑输入高偏置电流 vs 温度

典型特性 (续)

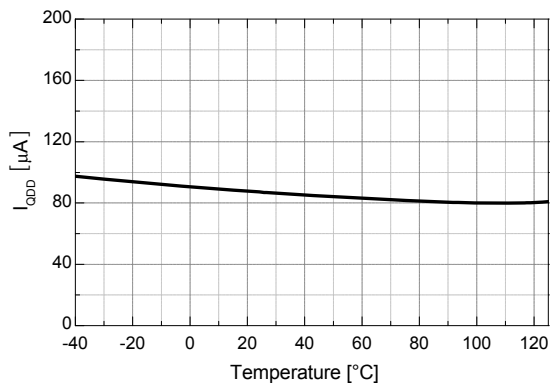


图 10. 静态 V_{DD} 电源电流与温度的关系

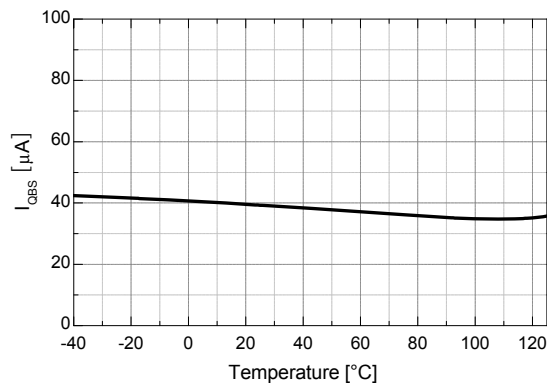


图 11. 静态 V_{BS} 电源电流与温度的关系

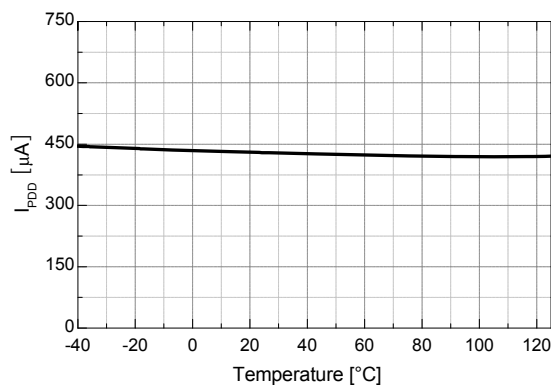


图 12. 工作 V_{DD} 电源电流与温度的关系

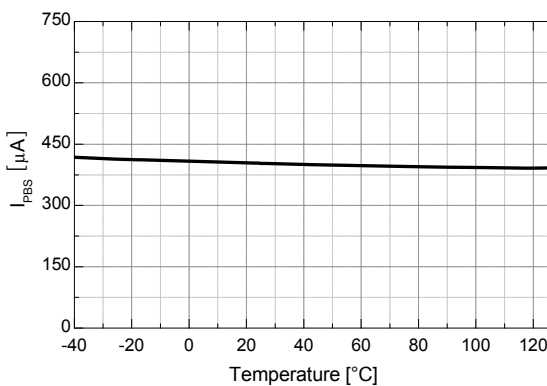


图 13. 工作 V_{BS} 电源电流与温度的关系

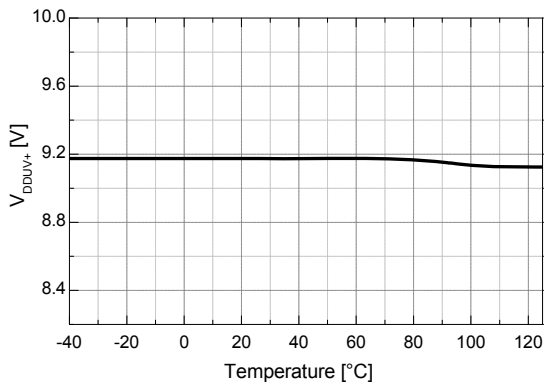


图 14. V_{DD} UVLO+ 与温度的关系

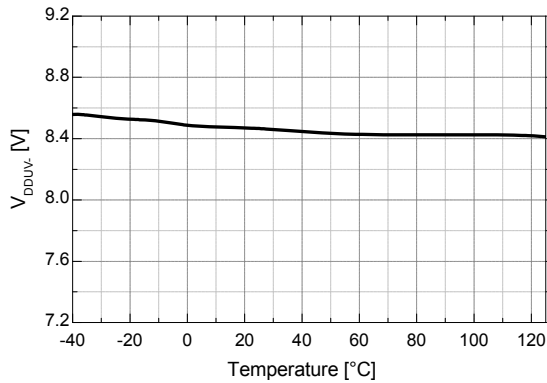


图 15. V_{DD} UVLO- 与温度的关系

典型特性 (续)

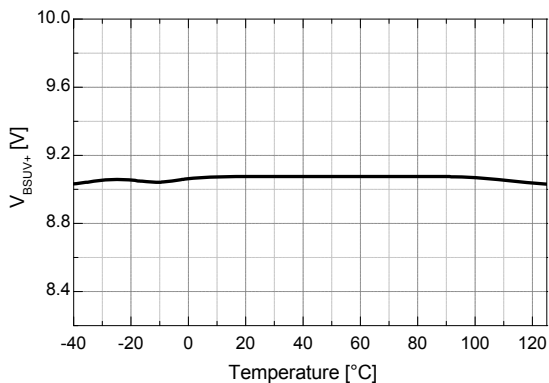


图 16. V_{BS} UVLO+ 与温度的关系

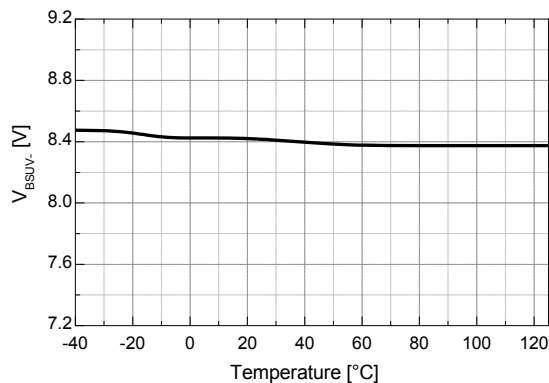


图 17. V_{BS} UVLO- 与温度的关系

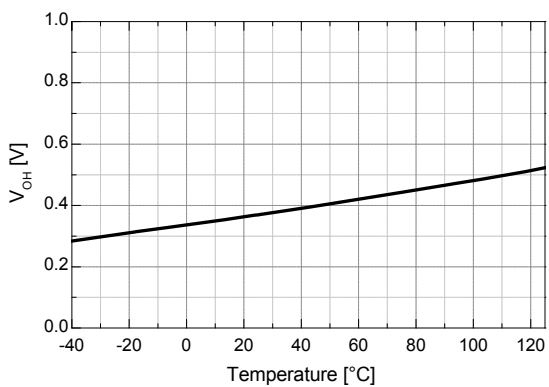


图 18. 高电平输出电压 vs 温度

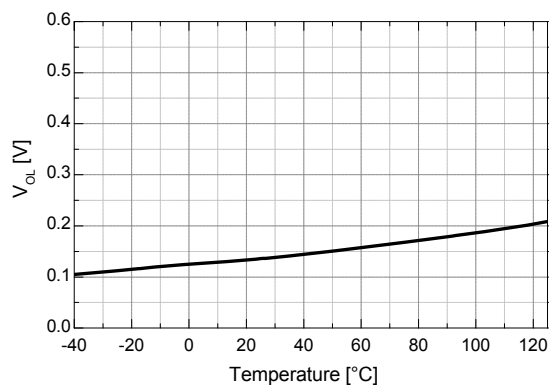


图 19. 低电平输出电压与温度的关系

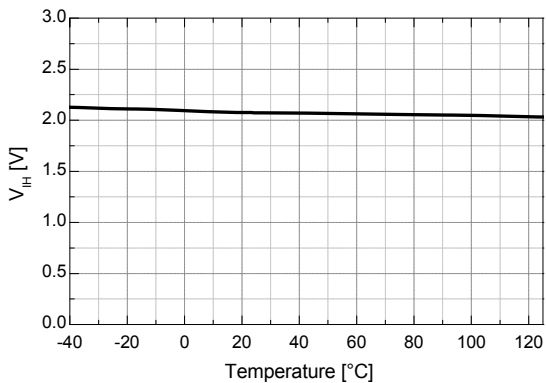


图 20. 逻辑高输入电压 vs 温度

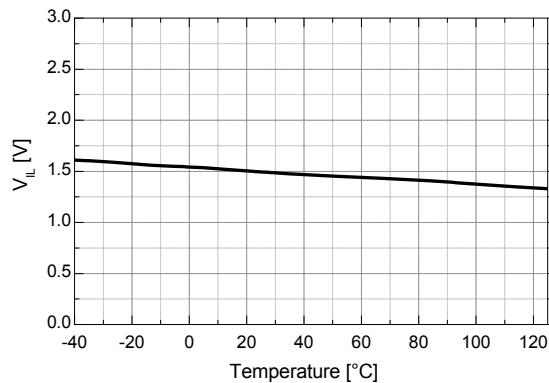
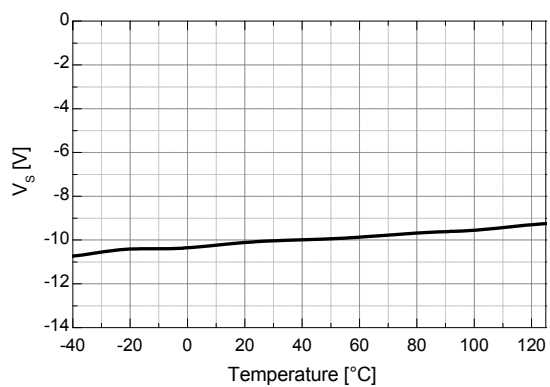


图 21. 逻辑低输入电压 vs 温度

典型特性 (续)

图 22. 容许负 V_S 电压与温度的关系

应用信息

1. 保护功能

1.1 欠压锁定 (UVLO)

高侧和低侧驱动器的每个通道包括欠压闭锁 (UVLO) 保护电路, 用于分别监控电源电压 (V_{DD}) 和自举电容电压 (V_{BS})。当 V_{DD} 和 V_{BS} 小于指定阈值电压时, 欠压闭锁 (UVLO) 保护电路启动保护可防止发生故障。UVLO 滞回特性防止电源变化过程中的抖动。

1.2 直通预防功能

FAN73833 具有直通预防电路, 用于监控高侧和低侧控制输入。可防止同时导通高侧和低侧输出, 如图 23 和 28 中所示。

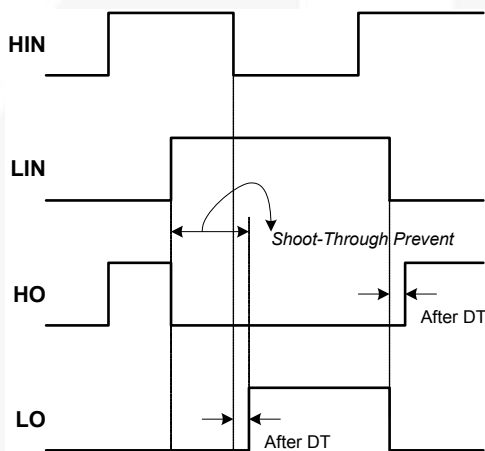


图 23. 直通预防波形

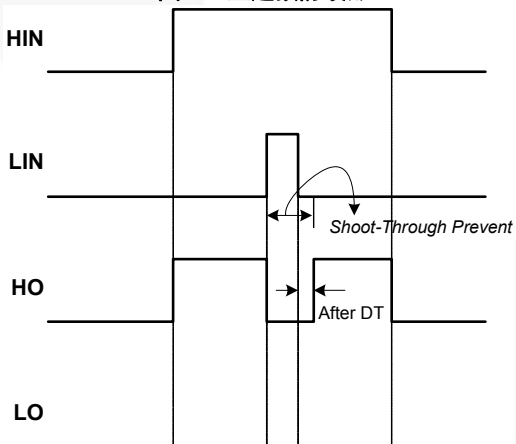


图 24. 直通预防波形

2. 开关时间定义

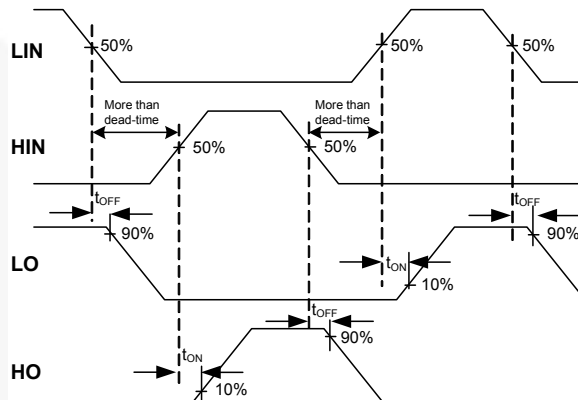


图 25. 开关时间定义



TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

- | | | | |
|--|--|---------------------------------------|------------------|
| 2Cool™ | FPS™ | PowerTrench® | Sync-Lock™ |
| AccuPower™ | F-PFS™ | PowerXS™ | SYSTEM GENERAL® |
| AX-CAP®* | FRFET® | Programmable Active Droop™ | TinyBoost™ |
| BitSiC™ | Global Power Resource™ | QFET® | TinyBuck™ |
| Build it Now™ | GreenBridge™ | QS™ | TinyCalc™ |
| CorePLUS™ | Green FPS™ | Quiet Series™ | TinyLogic® |
| CorePOWER™ | Green FPS™ e-Series™ | RapidConfigure™ | TINYOPTO™ |
| CROSSVOLT™ | Gmax™ | Saving our world, 1mW/W/kW at a time™ | TinyPower™ |
| CTL™ | GTO™ | SignalWise™ | TinyPWM™ |
| Current Transfer Logic™ | IntelliMAX™ | SmartMax™ | TinyWire™ |
| DEUXPEED® | ISOPLANAR™ | SMART START™ | TranSiC™ |
| Dual Cool™ | Making Small Speakers Sound Louder and Better™ | Solutions for Your Success™ | TriFault Detect™ |
| EcoSPARK® | MegaBuck™ | SPM® | TRUECURRENT®* |
| EfficientMax™ | MICROCOUPLER™ | STEALTH™ | µSerDes™ |
| ESBC™ | MicroFET™ | SuperFET® | SerDes® |
|  Fairchild® | MicroPak™ | SuperSOT™-3 | UHC® |
| Fairchild Semiconductor® | MicroPak2™ | SuperSOT™-6 | Ultra FRFET™ |
| FACT Quiet Series™ | MillerDrive™ | SuperSOT™-8 | UniFET™ |
| FACT® | MotionMax™ | SupreMOS® | VCX™ |
| FAST® | mWSaver™ | SyncFET™ | VisualMax™ |
| FastvCore™ | OptoHiT™ | | VoltagePlus™ |
| FETBench™ | OPTOLOGIC® | | XS™ |
| | OPTOPLANAR® | | |

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

| Datasheet Identification | Product Status | Definition |
|--------------------------|-----------------------|---|
| Advance Information | Formative / In Design | Datasheet contains the design specifications for product development. Specifications may change in any manner without notice. |
| Preliminary | First Production | Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design. |
| No Identification Needed | Full Production | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design. |
| Obsolete | Not In Production | Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only. |

Rev. I64

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local
Sales Representative