



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.

FAN73932

半桥栅极驱动 IC

特性

- 浮动通道可实现高达 +600V 的自举运行
- 2.5A/2.5A 的典型源电流 / 灌电流驱动能力
- 扩展容许负 V_S 摆幅至 -9.8V, 适合 $V_{BS}=15V$ 的信号传播
- 高侧输出与 IN 输入信号同相
- 兼容 3.3V 和 5V 逻辑输入电平
- 适用于两个通道的匹配传播延迟
- 内置关断功能
- 两个通道均内置欠压闭锁 (UVLO) 功能
- 内置共模 dv/dt 噪声消除电路
- 内部最小 400ns 死区时间

应用

- 高速功率 MOSFET 和 IGBT 栅极驱动器
- 感应加热
- 大功率 DC-DC 转换器
- 同步降压转换器
- 电机驱动逆变器

说明

FAN73932 是一款半桥栅极驱动 IC, 带关断和死区时间控制功能, 可以驱动工作电压最高可达 +600V 的高速 MOSFET 和 IGBT。它具有缓冲输出级, 且所有 NMOS 晶体管设计为具有高脉冲电流驱动能力和最低交叠导通。

飞兆的高压工艺和共模噪声消除技术 s 可使高侧驱动器在高 dv/dt 噪声环境下稳定运行。先进的电平转换电路, 能使高侧栅极驱动器的工作电压在 $V_{BS}=15V$ 时 V_S 达到 -9.8V (典型值)。

UVLO (欠压保护) 电路在 V_{DD} 和 V_{BS} 低于额定阈值电压时启动保护防止故障发生。

大电流和低输出电压降功能使得此器件适合所有类型的半桥和全桥逆变器, 如电机驱动逆变器、开关电源、感应加热和大功率 DC-DC 转换器应用。

8-SOP



订购信息

器件编号	封装	工作温度范围	生态状况	包装方法
FAN73932M	8-SOP	-40°C 至 +125°C	RoHS	塑料管
FAN73932MX				卷带和卷盘



有关飞兆 Eco 状况的定义, 请访问: http://www.fairchildsemi.com/company/green/rohs_green.html。

应用电路图

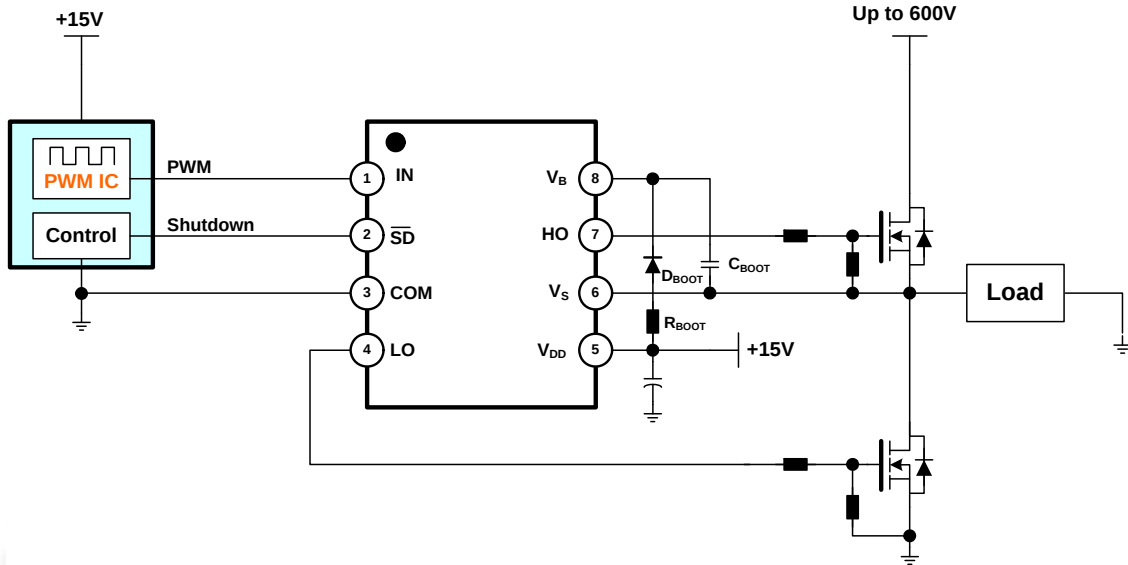


图 1. 典型应用电路

内部框图

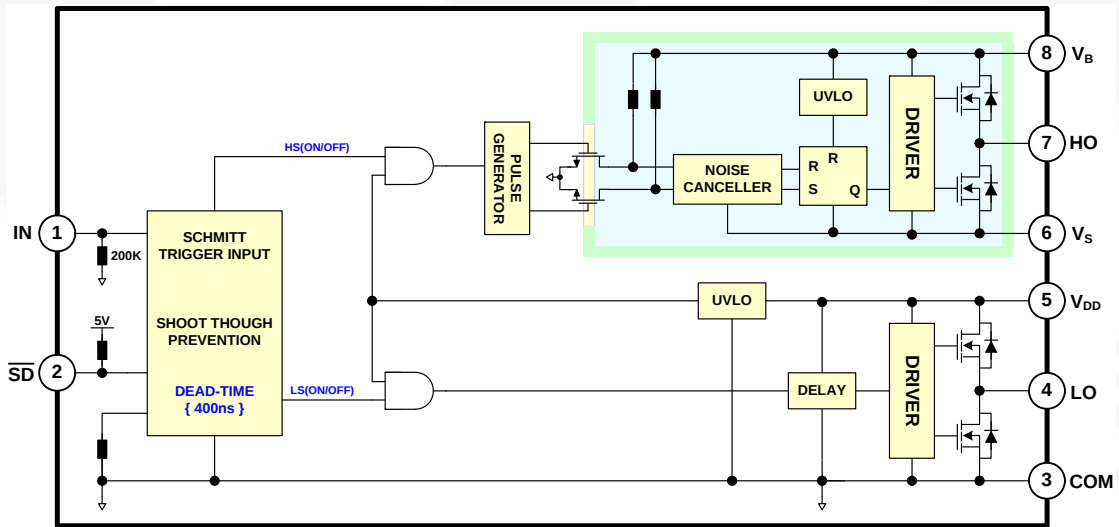


图 2. 功能框图

引脚布局

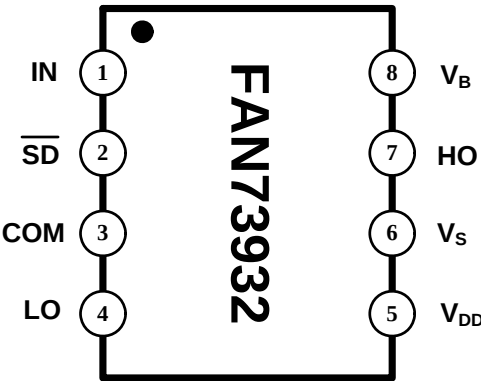


图 3. 引脚布局（顶视图）

引脚定义

引脚号	名称	说明
1	IN	高侧和低侧栅极驱动器输出的逻辑输入，与 HO 同相
2	$\overline{\text{SD}}$	关断逻辑输入
3	COM	接地
4	LO	低侧驱动输出
5	V_{DD}	电源电压
6	V_{S}	高压浮地
7	HO	高侧驱动输出
8	V_{B}	高侧浮动供电

绝对最大额定值

应力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，在远高于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。 $T_A=25^{\circ}\text{C}$ ，除非另有规定。

符号	参数	最小值	最大值	单位
V_B	高侧浮动电源电压	-0.3	625.0	V
V_S	高侧浮动偏置电压	$V_B-25.0$	$V_B+0.3$	V
V_{HO}	高侧浮动输出电压	$V_S-0.3$	$V_B+0.3$	V
V_{LO}	低侧输出电压	-0.3	$V_{DD}+0.3$	V
V_{DD}	低侧和逻辑电源电压	-0.3	25.0	V
V_{IN}	逻辑输入电压 (IN)	-0.3	$V_{DD}+0.3$	V
V_{SD}	逻辑输入电压 ($\overline{\text{SD}}$)	-0.3	5.5	V
COM	逻辑接地和低侧驱动器接地	$V_{DD}-25.0$	$V_{DD}+0.3$	V
dV_S/dt	允许偏置电压变化速率		± 50	V/ns
P_D	功耗 ^(1, 2, 3)		0.625	W
θ_{JA}	热阻		200	$^{\circ}\text{C/W}$
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 1.6mm 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

推荐的工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。飞兆不建议超出额定或依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+10	V_S+20	V
V_S	高侧浮动电源偏置电压	$6-V_{DD}$	600	V
V_{HO}	高侧输出电压	V_S	V_B	V
V_{DD}	低侧和逻辑电源电压	10	20	V
V_{LO}	低侧输出电压	COM	V_{DD}	V
V_{IN}	逻辑输入电压 (IN)	COM	V_{DD}	V
V_{SD}	逻辑输入电压 ($\overline{\text{SD}}$) ⁽⁴⁾	COM	5	V
T_A	工作环境温度	-40	+125	$^{\circ}\text{C}$

注：

4. 关断 ($\overline{\text{SD}}$) 输入在内部箝位至 5.2V。

电气特性

除非另有规定, 否则 $V_{BIAS}(V_{DD}, V_{BS})=15.0V$, $COM=0V$, 以及 $T_A = 25^{\circ}C$ 。 V_{IN} 和 I_{IN} 参数指的是以 COM 为参考点的值, 同时适用于输入引脚: IN 和 $\overline{SD}$ 。 V_O 和 I_O 参数指的是以 COM 为参考点的值, 同时适用于输出引脚: HO 和 LO。

符号	参数	测试条件	最小值	典型值	最大值	单位
电源部分						
I_{QDD}	静态 V_{DD} 电源电流	$V_{IN}=0V, \overline{SD}=5V$		320	700	μA
I_{QBS}	静态 V_{BS} 电源电流	$V_{IN}=0V$ 或 $5V, \overline{SD}=5V$		50	120	μA
I_{PDD}	工作 V_{DD} 电源电流	$f_{IN}=20KHz$, 无负载, $\overline{SD}=5V$		700	1300	μA
I_{PBS}	工作 V_{BS} 电源电流	$C_L=1nF, f_{IN}=20KHz, rms,$ $\overline{SD}=5V$		420	800	μA
I_{SD}	关断模式电源电流	$\overline{SD}=0V, \overline{SD}=5V$		400	800	μA
I_{LK}	偏置漏电流	$V_B=V_S=600V$			10	μA
自举电源部分						
V_{DDUV+} V_{BSUV+}	V_{DD} 和 V_{BS} 电源欠压 正向 (电压从高到低) 阈值电压	$V_{DD}=V_{BS}=Sweep$	8	9	10	V
V_{DDUV-} V_{BSUV-}	V_{DD} 和 V_{BS} 电源欠压 负向 (电压从低到高) 阈值电压	$V_{DD}=V_{BS}=Sweep$	7.4	8.4	9.4	V
V_{DDUVH} V_{BSUVH}	V_{DD} 和 V_{BS} 电源欠压闭锁滞回电压回差	$V_{DD}=V_{BS}=Sweep$		0.6		V
输入逻辑部分						
V_{IH}	HO 的逻辑 “1” 输入电压和 LO 的逻辑 “0”		2.5			V
V_{IL}	HO 的逻辑 “0” 输入电压和 LO 的逻辑 “1”				0.8	V
I_{IN+}	逻辑输入高偏置电流	$V_{IN}=5V, \overline{SD}=0V$		25	60	μA
I_{IN-}	逻辑输入低偏置电流	$V_{IN}=0V, \overline{SD}=5V$			3	μA
R_{IN}	逻辑输入下拉电阻			200		$K\Omega$
$V_{SDCLAMP}$	关断 ($\overline{SD}$) 输入箝位电压			5.0	5.5	V
$\overline{SD+}$	关断 ($\overline{SD}$) 输入正向阈值		2.5			V
$\overline{SD-}$	关断 ($\overline{SD}$) 输入负向阈值				0.8	V
R_{PSD}	关断 ($\overline{SD}$) 输入上拉电阻			200		$K\Omega$
栅极驱动器输出部分						
V_{OH}	高电平输出电压 ($V_{BIAS} - V_O$)	无负载			1.5	V
V_{OL}	低电平输出电压	无负载			100	mV
I_{O+}	输出高电平、短路脉冲电流 ⁽⁵⁾	$V_{HO}=0V, V_{IN}=5V, PW \leq 10\mu s$	2.0	2.5		A
I_{O-}	输出低电平、短路脉冲电流 ⁽⁵⁾	$V_{HO}=15V, V_{IN}=0V, PW \leq 10\mu s$	2.0	2.5		A
V_S	IN 信号传播到 HO 时允许的 VS 引脚负电压			-9.8	-7.0	V

注:

5 这些参数由设计保证。

动态电气特性

除非另有规定，否则 $V_{BIAS}(V_{DD}, V_{BS})=15.0V$ ， $COM=0V$ ， $C_L=1000pF$ ，和 $T_A=25^{\circ}C$ 。

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 ⁽⁶⁾	$V_S=0V$		600	850	ns
t_{OFF}	关断传播延迟时间	$V_S=0V$		200	350	ns
t_{SD}	关断传播延迟时间			140	220	ns
Mt_{ON}	延迟匹配，HO 和 LO 导通			0	50	ns
Mt_{OFF}	延迟匹配，HO 和 LO 关断			0	50	ns
t_R	开通上升时间	$V_S=0V$		25	50	ns
t_F	关断下降时间	$V_S=0V$		20	35	ns
DT	死区时间：LO 关断至 HO 导通和 HO 关断至 LO 导通		300	400	500	ns
MDT	死区时间匹配 $= DT_{LO-HO} - DT_{HO-LO} $			0	50	ns

注：

6. 导通传播延迟时间包括了死区时间。

典型特性

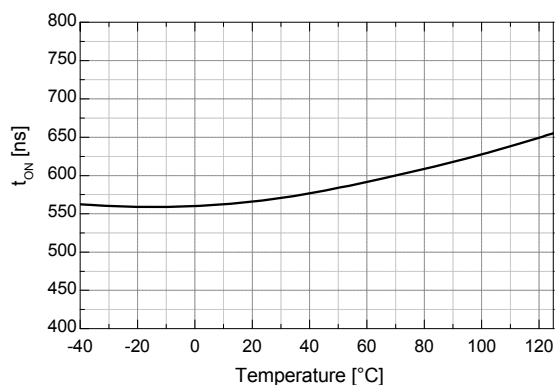
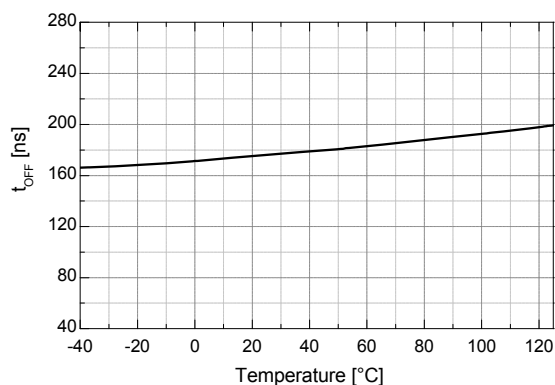
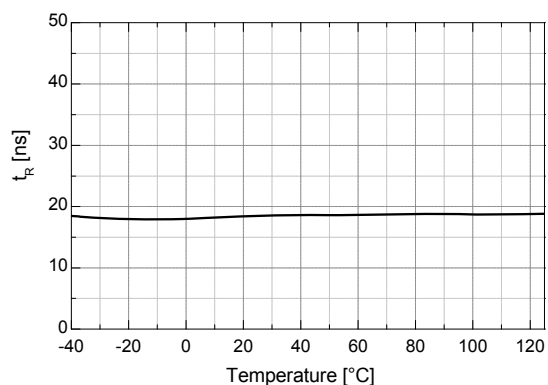
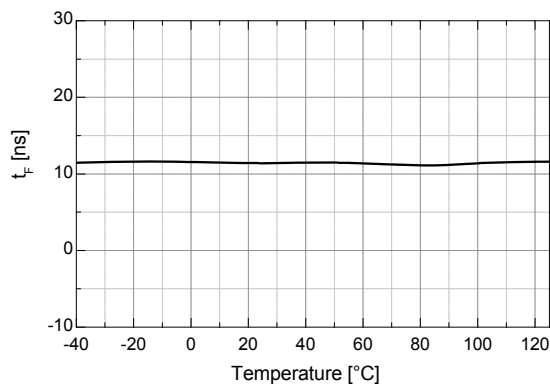
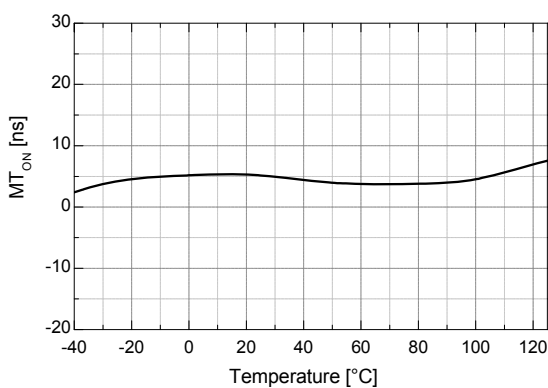
图 4. 导通传播延迟
与温度的关系图 5. 关断传播延迟
与温度的关系图 6. 导通上升时间
与温度的关系图 7. 关断下降时间
与温度的关系

图 8. 导通延迟匹配与温度的关系

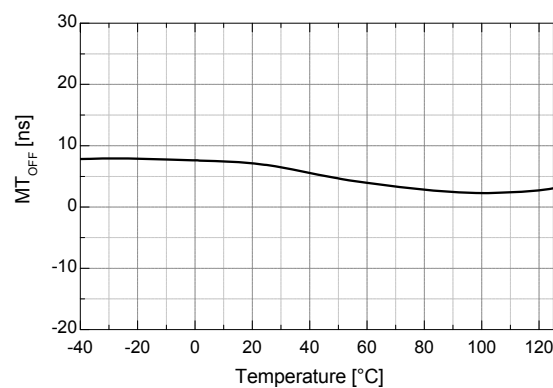


图 9. 关断延迟匹配与温度的关系

典型特性 (续)

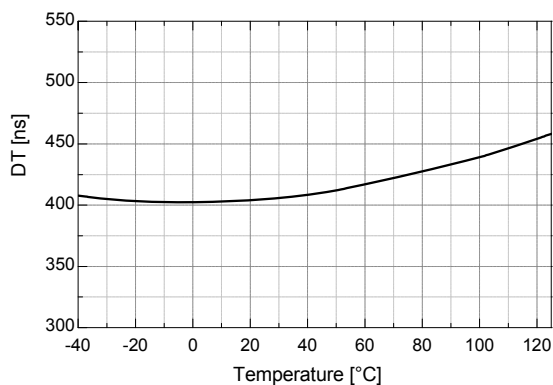


图 10. 死区时间与温度的关系

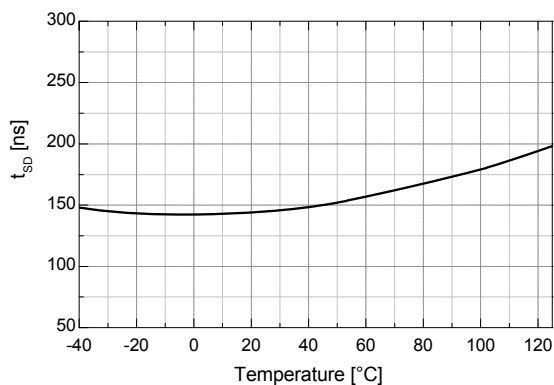
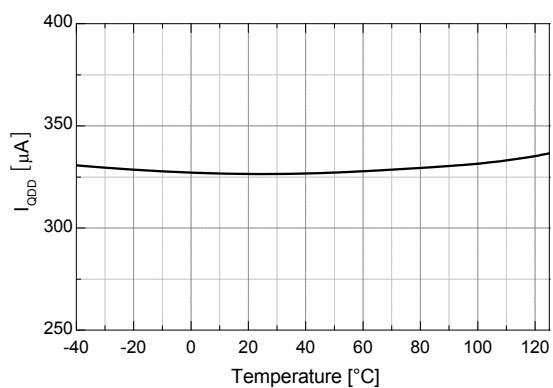
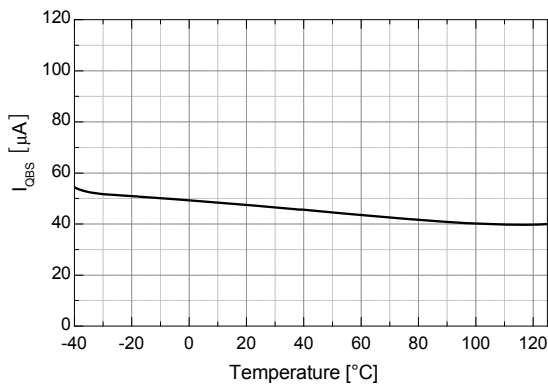
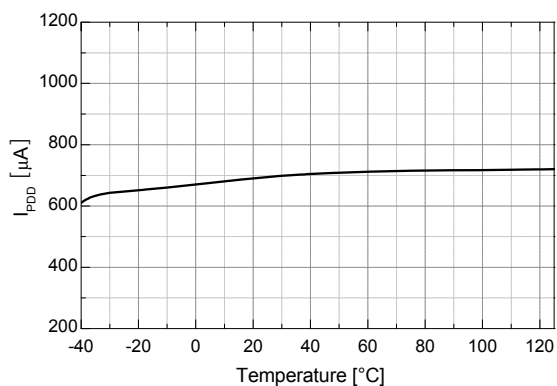
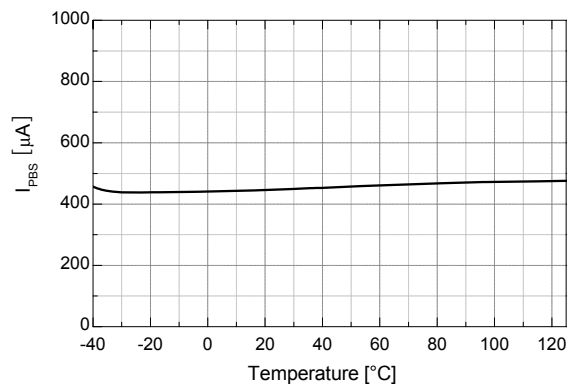
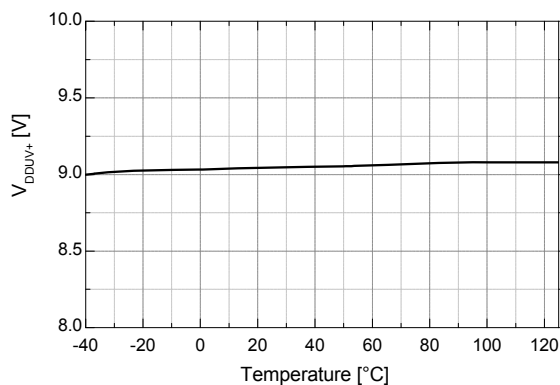
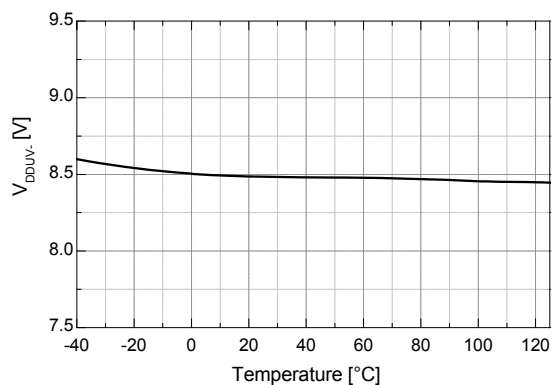
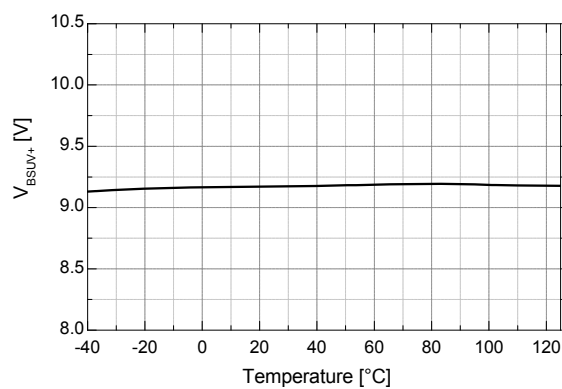
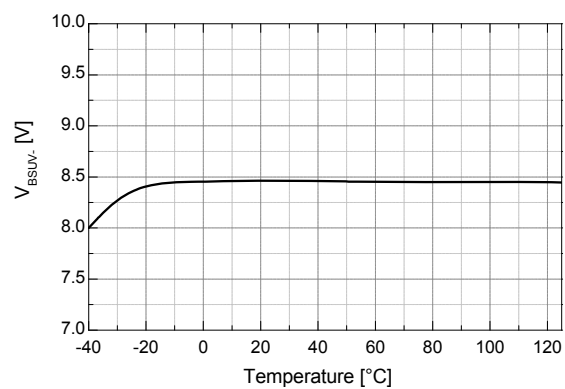
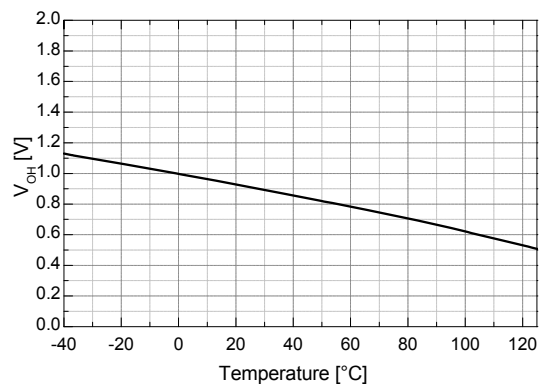
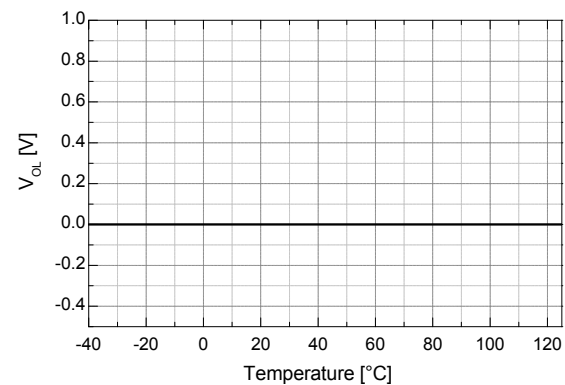


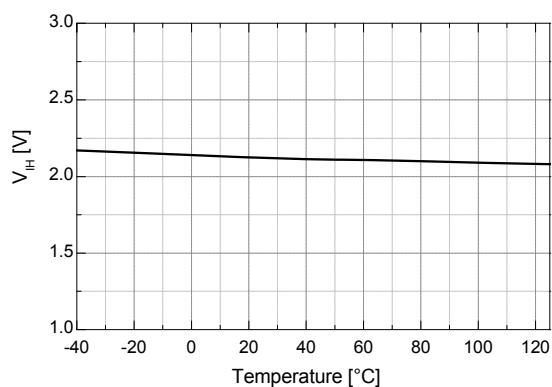
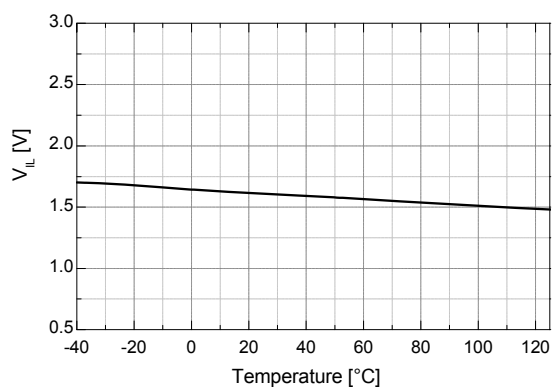
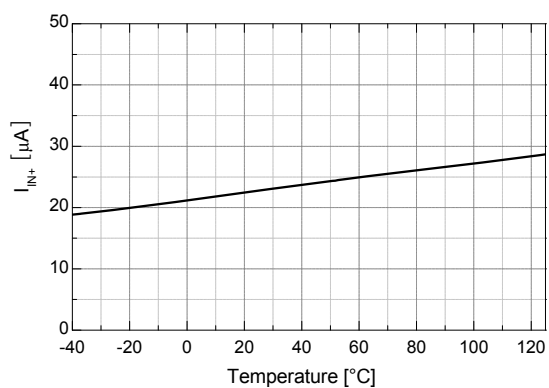
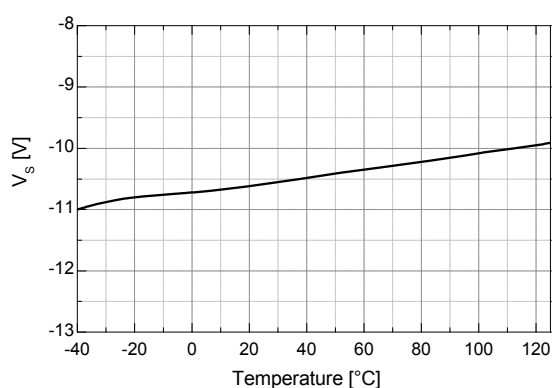
图 11. 关断传播延迟与温度的关系

图 12. 静态 V_{DD} 电源电流与温度的关系图 13. 静态 V_{BS} 电源电流与温度的关系图 14. 工作时 V_{DD} 电源电流与温度的关系图 15. 工作 V_{BS} 电源电流与温度的关系

典型特性 (续)

图 16. V_{DD} UVLO+ 与温度的关系图 17. V_{DD} UVLO- 与温度的关系图 18. V_{BS} UVLO+ 与温度的关系图 19. V_{BS} UVLO- 与温度的关系图 20. 高电平输出电压
与温度的关系图 21. 低电平输出电压
与温度的关系

典型特性 (续)

图 22. 逻辑高输入电压
与温度的关系图 23. 逻辑低输入电压
与温度的关系图 24. 逻辑输入高偏置电流
与温度的关系图 25. 容许负 V_S 电压
与温度的关系

开关时间定义

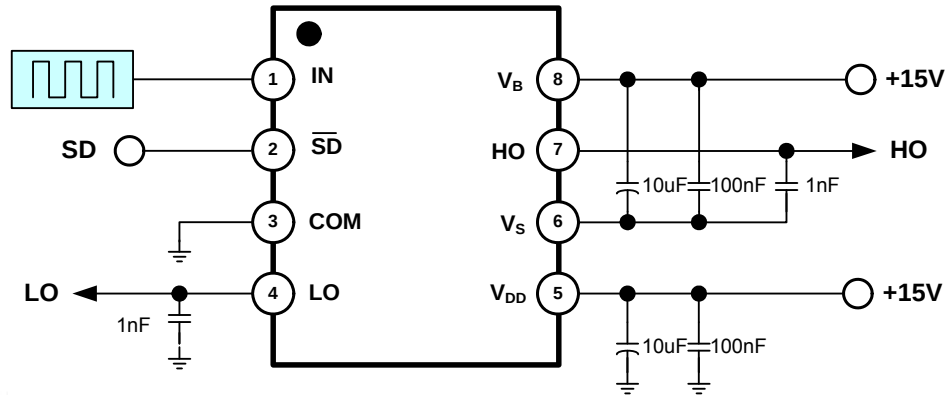


图 26. 开关时间测试电路

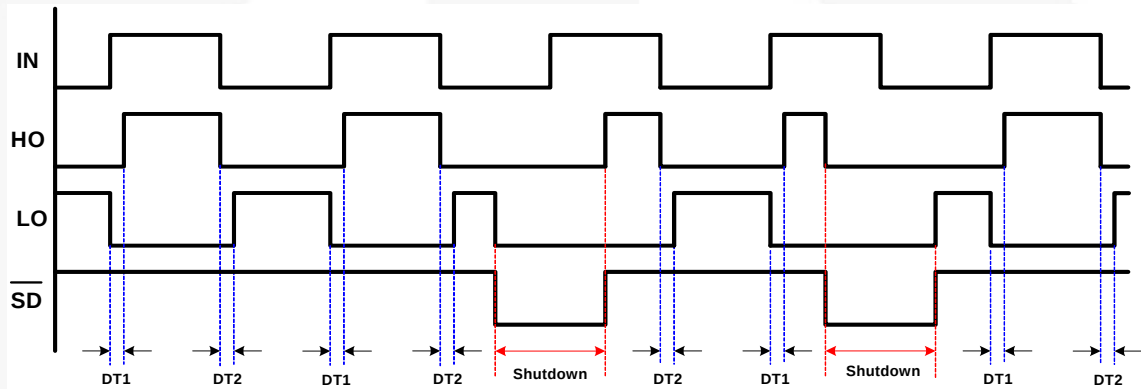


图 27. 输入 / 输出时序图

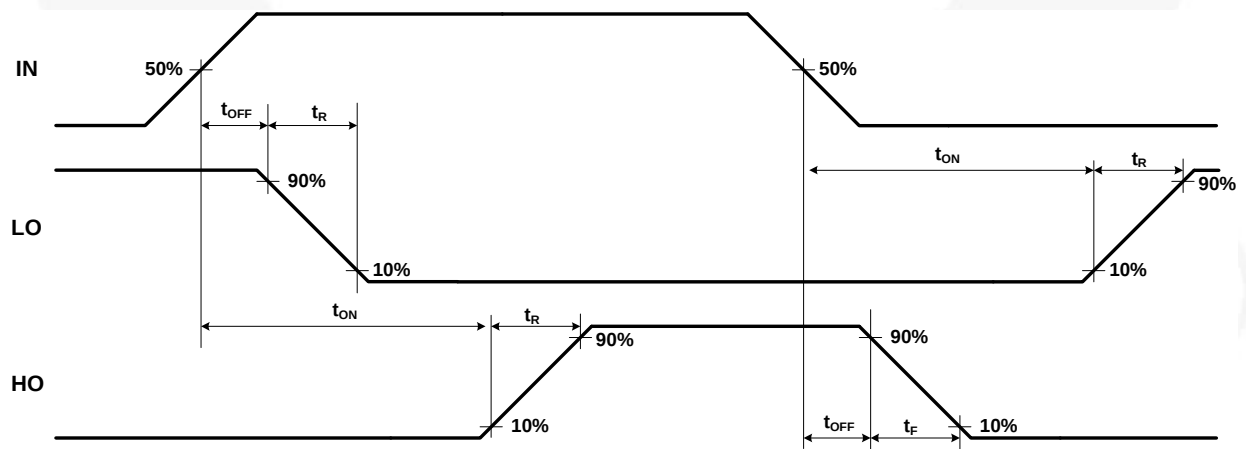


图 28. 开关时间波形定义

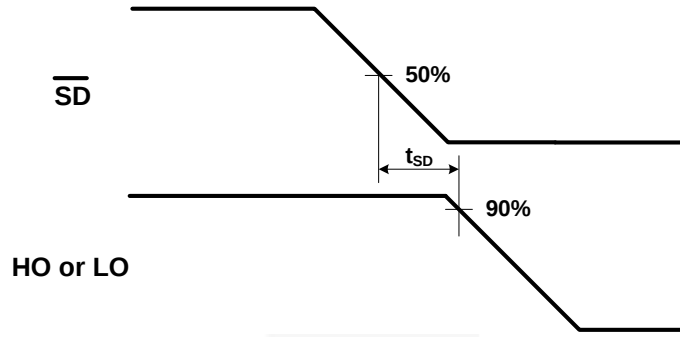


图 29. 关断波形定义

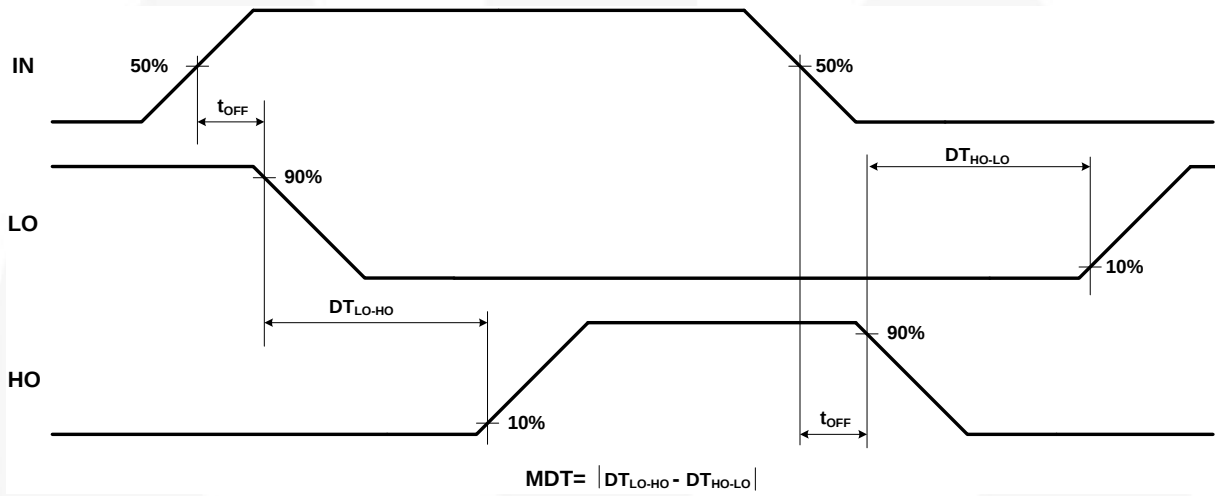


图 30. 死区时间波形定义

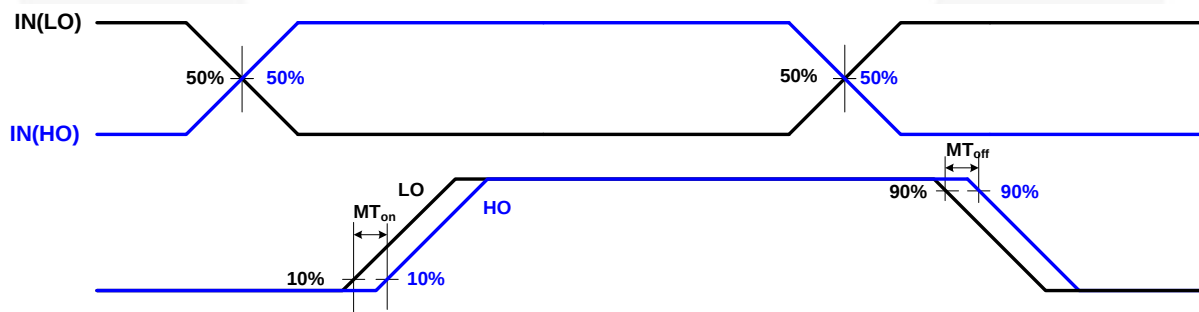


图 31. 延迟匹配波形定义



<http://www.fairchildsemi.com/packaging/>.



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.

AccuPower™	FRFET®	PowerTrench®	The Power Franchise®
Auto-SPM™	Global Power Resource™	PowerXS™	the power franchise
Build it Now™	Green FPS™	Programmable Active Droop™	TinyBoost™
CorePLUS™	Green FPS™ e-Series™	QFET®	TinyBuck™
CorePOWER™	Gmax™	QS™	TinyCalc™
CROSSVOLT™	GTO™	Quiet Series™	TinyLogic®
CTL™	IntelliMAX™	RapidConfigure™	TINYOPTO™
Current Transfer Logic™	ISOPLANAR™	 ™	TinyPower™
DEUXPEED®	MegaBuck™	Saving our world, 1mV/V/kW at a time™	TinyPWM™
Dual Cool™	MICROCOUPLER™	SignalWise™	TinyWire™
EcoSPARK®	MicroFET™	SmartMax™	TriFault Detect™
EfficientMax™	MicroPak™	SMART START™	TRUECURRENT™*
 ™	MicroPak2™	SPM®	µSerDes™
Fairchild®	MillerDrive™	STEALTH™	 ™
Fairchild Semiconductor®	MotionMax™	SuperFET™	UHC®
FACT Quiet Series™	Motion-SPM™	SuperSOT™-3	Ultra FRFET™
FACT®	OptoHiT™	SuperSOT™-6	UniFET™
FAST®	OPTOLOGIC®	SuperSOT™-8	VCX™
FastvCore™	OPTOPLANAR®	SupreMOS™	VisualMax™
FETBench™	 ™	SyncFET™	XS™
FlashWriter®	PDP SPM™	Sync-Lock™	
FPS™	Power-SPM™	 ™	
F-PFS™			

* 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. 147

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