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FAN73901
高侧和低侧栅极驱动 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
- 共模 dv/dt 噪声消除电路
- 两个通道均内置欠压闭锁功能
- 适用于两个通道的匹配传播延迟
- 兼容 3.3V 和 5V 逻辑输入电平
- 输出与输入同相

应用

- 半桥驱动器
- HID 灯镇流器
- SMPS
- 电动机驱动

说明

FAN73901 是单片高侧和低侧栅极驱动 IC，可以驱动工作电压最高达 +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。

大电流和低输出压降的特性，使得 FAN73901 适合开关电源、电机驱动器和大功率 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	包装方法
FAN73901M	8-SOP	-40°C ~ 125°C	塑料管
FAN73901MX			卷带和卷盘

典型应用电路
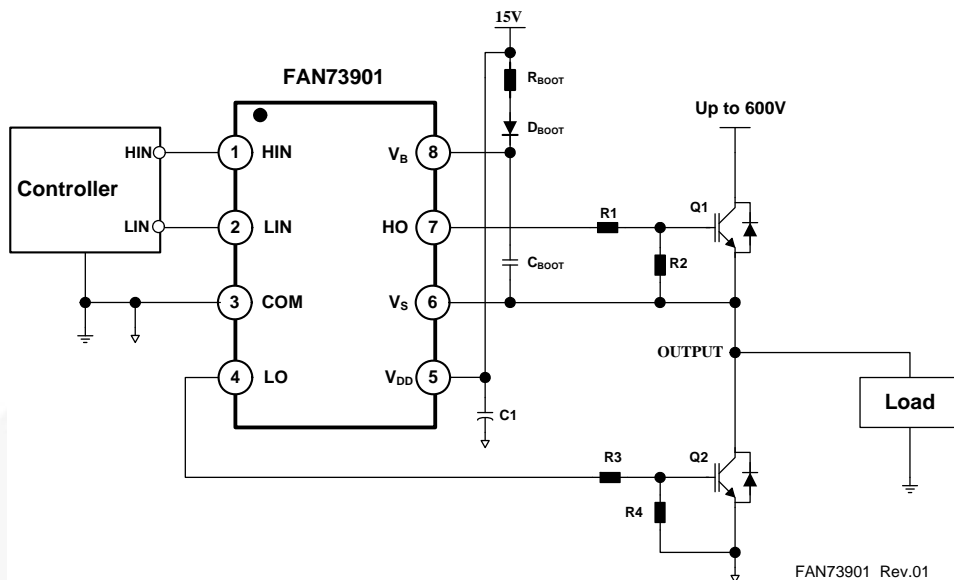
图 **1.** 半桥应用电路

内部框图
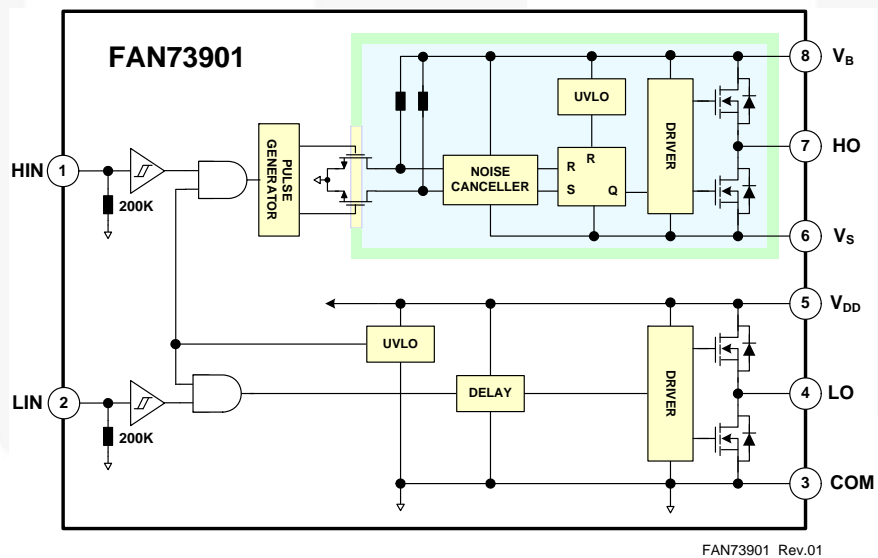
图 **2.** 功能框图

引脚布局
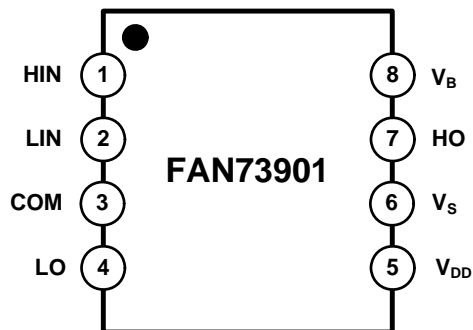
FAN73901 Rev.01

图 **3.** 引脚分配 （顶视图 **/** 俯视图）

引脚定义

引脚号	名称	说明
1	HIN	高侧栅极驱动器输出的逻辑输入
2	LIN	低侧栅极驱动器输出的逻辑输入
3	COM	低侧驱动返回
4	LO	低侧驱动输出
5	V_{DD}	低侧和逻辑电路的电源电压
6	V_S	高侧浮动电源电压返回
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。除非另有说明，$T_A=25℃$。

符号	特性	最小值	最大值	单位
V_S	高侧浮动电源偏置电压	V_B-25	V_B+0.3	V
V_B	高侧浮动电源电压	-0.3	625.0	V
V_{HO}	高侧浮动输出电压 HO	V_S-0.3	V_B+0.3	V
V_{DD}	低侧和固定逻辑电源电压	-0.3	25.0	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
dV_S/dt	允许的偏置电压变化速率		50	V/ns
P_D	功耗 [1][2][3]		0.625	W
θ_{JA}	结至环境热阻		200	℃/W
T_J	结温		+150	℃
T_{STG}	存储温度		+150	℃

注意：

1. 安装在 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确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 （HIN 和 LIN）	COM	V_{DD}	V
T_A	工作环境温度	-40	+125	℃

电气特性

除非另有规定，否则 V_{BIAS} (V_{DD}, V_{BS})=15.0 V，V_S=COM，T_A=25°C。V_{IL}、V_{IH} 和 I_{IN} 参数指的是以 COM 为参考点的值，同时适用于输入信号 HIN 和 LIN。V_O 和 I_O 参数指的是以 COM 为参考点的值，V_S 同时适用于输出信号 HO 和 LO。

符号	特性	测试条件	最小值	典型值	最大值	单位
电源部分 （V_{DD} 和 V_{BS})						
V_{DDUV+} V_{BSUV+}	V_{DD} 和 V_{BS} 电源欠压正向 （电压从高到低）阈值		8.0	8.8	9.8	V
V_{DDUV-} V_{BSUV-}	V_{DD} 和 V_{BS} 电源欠压负向 （电压从低到高）阈值		7.4	8.3	9.0	V
V_{DDUVH} V_{BSUVH}	V_{DD} 和 V_{BS} 电源欠压闭锁滞回电压回差			0.5		V
I_{LK}	偏置漏电流	$V_B=V_S$=600 V			50	µA
I_{QBS}	静态 V_{BS} 电源电流	V_{IN}=0V 或 5 V		45	80	µA
I_{QDD}	静态 V_{DD} 电源电流	V_{IN}=0V 或 5 V		75	110	µA
I_{PBS}	工作 V_{BS} 电源电流	f_{IN}=20 kHz，rms 值		530	640	µA
I_{PDD}	工作 V_{DD} 电源电流	f_{IN}=20 kHz，rms 值		530	640	µA
逻辑输入部分 (HIN, LIN)						
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 V		25	50	µA
I_{IN-}	逻辑 "0" 输入偏置电流	V_{IN}=0 V		1.0	2.0	µA
R_{IN}	输入下拉电阻		100	200		KΩ
栅极驱动器输出部分 （HO, LO）						
V_{OH}	高电平输出电压，V_{BIAS}-V_O	无负载			1.0	V
V_{OL}	低电平输出电压，V_O	无负载			35	mV
I_{O+}	输出高电平、短路脉冲电流[4]	V_O=0 V，V_{IN}=5 V 及 PW<10 µs	1.8	2.5		A
I_{O-}	输出低电平、短路脉冲电流[4]	V_O=15 V，V_{IN}=0 V 及 PW<10 µs	1.8	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：

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=0 V，C_L=1000 pF 和 T_A=25°C。

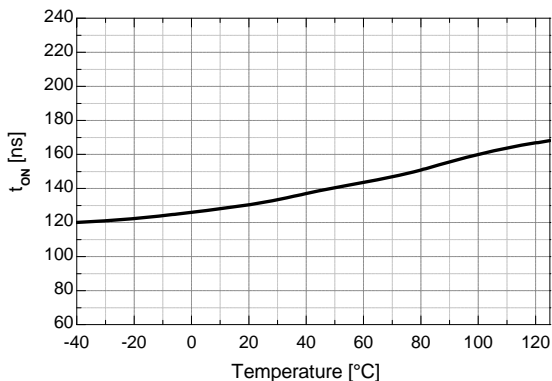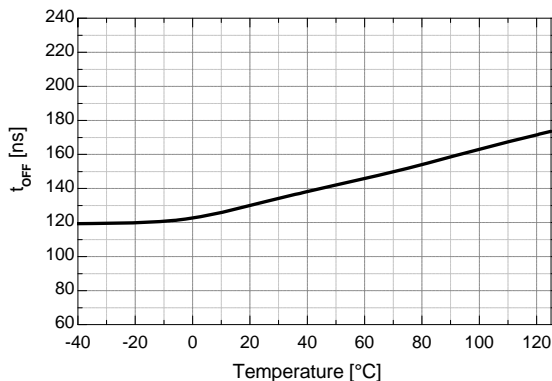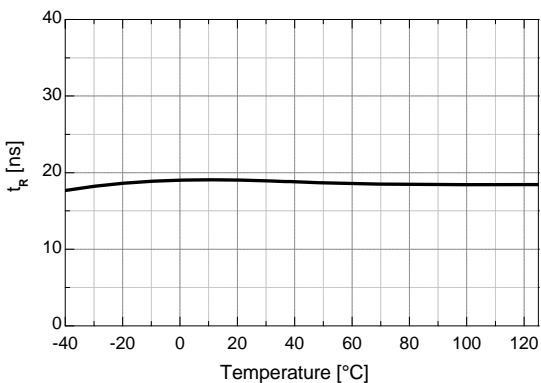| 符号	特性	测试条件	最小值	典型值	最大值	单位
t_{on}	导通传播延时	V_S=0 V		140	200	ns
t_{off}	关断传播延时	V_S=0 V		140	200	ns
MT	延时匹配，HS 与 LS 导通/关断			0	50	ns
t_r	导通上升时间			25	50	ns
t_f	关断下降时间			20	45	ns

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
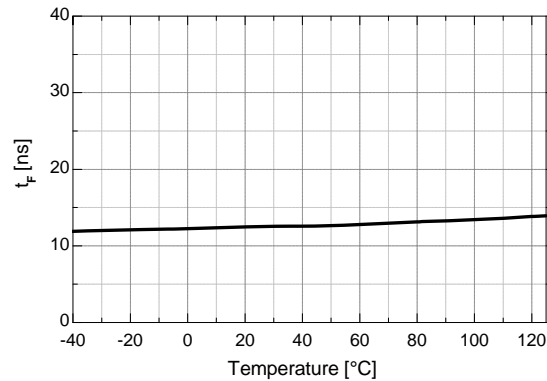
图 **7.** 导通下降时间与温度的关系
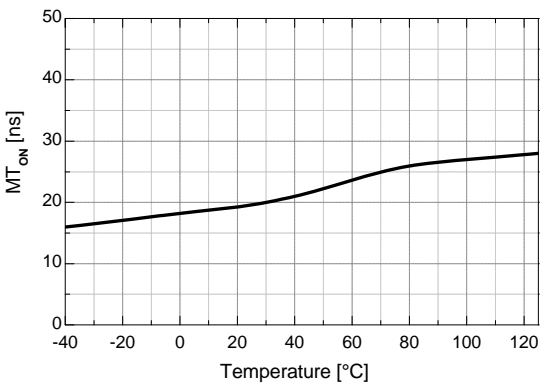
图 **8.** 导通延时匹配与 温度的关系
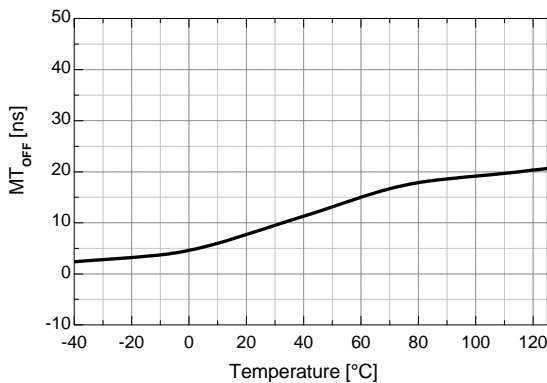
图 **9.** 关断延时匹配与温度的关系

典型特性 （续）
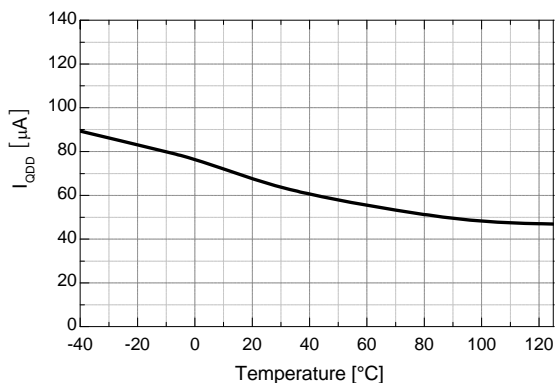
图 **10.** 静态 **V_{DD}** 电源电流
与温度的关系
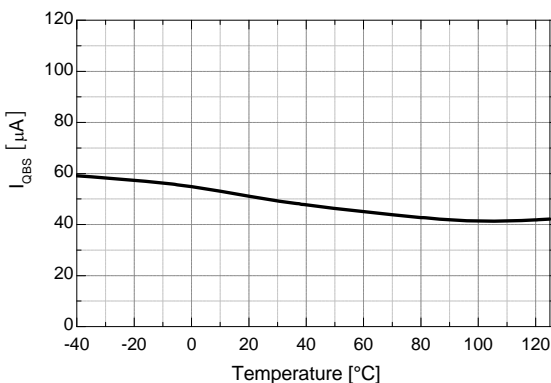
图 **11.** 静态 **V_{BS}** 电源电流
与温度的关系
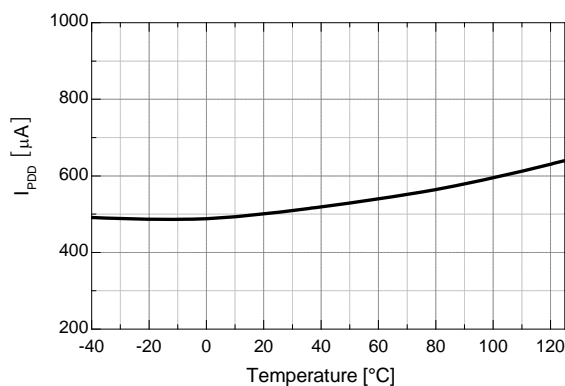
图 **12.** 工作 **V_{DD}** 电源电流
与温度的关系
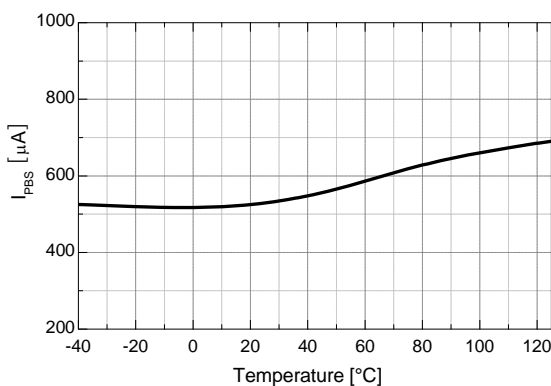
图 **13.** 工作 **V_{BS}** 电源电流
与温度的关系
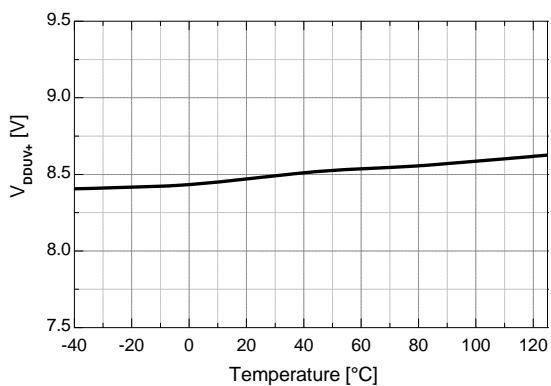
图 **14.V_{DD} UVLO+** 与温度的关系
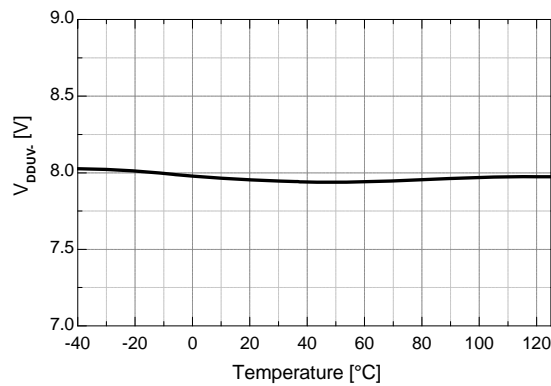
图 **15.V_{DD} UVLO-** 与温度的关系

典型特性 （续）
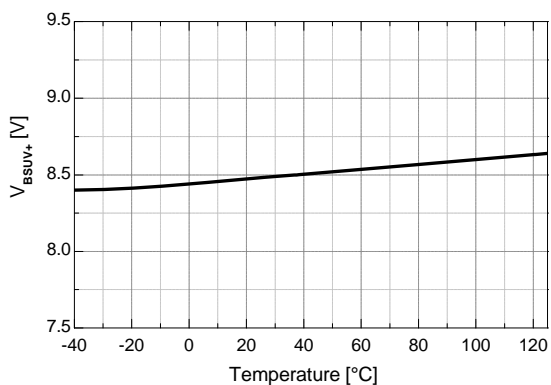
图 **16.V$_{BS}$ UVLO+** 与温度的关系
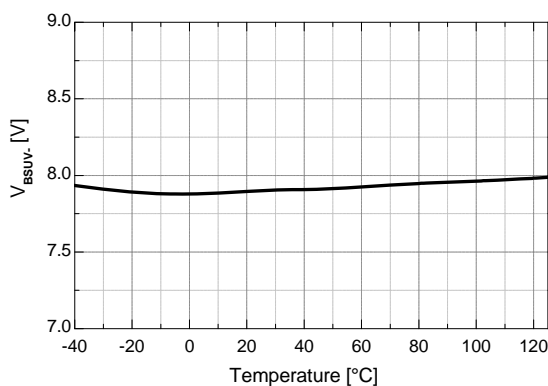
图 **17.V$_{BS}$ UVLO-** 与温度的关系
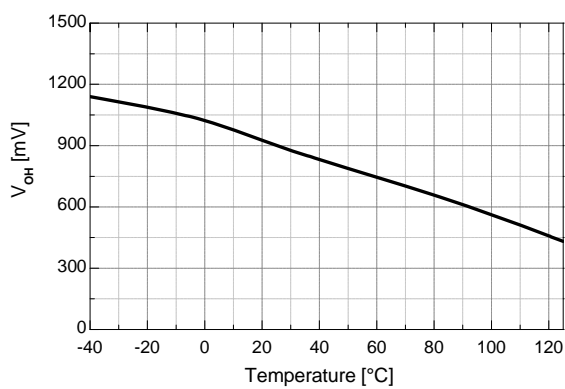
图 **18.** 高电平输出电压
与温度的关系
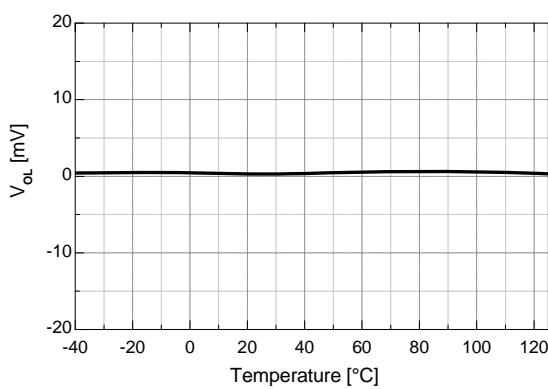
图 **19.** 低电平输出电压
与温度的关系
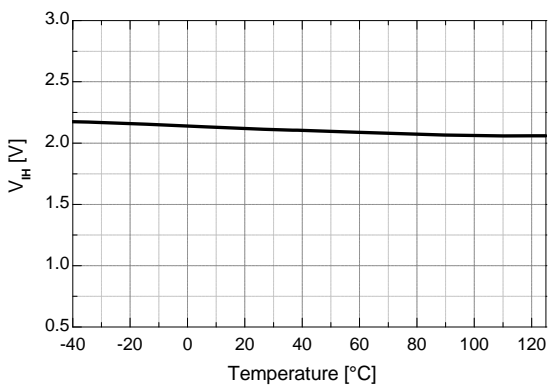
图 **20.** 逻辑高输入电压与 温度的关系
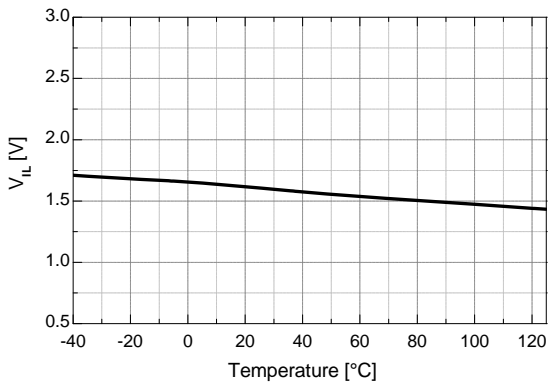
图 **21.** 逻辑低输入电压与 温度的关系

典型特性 （续）
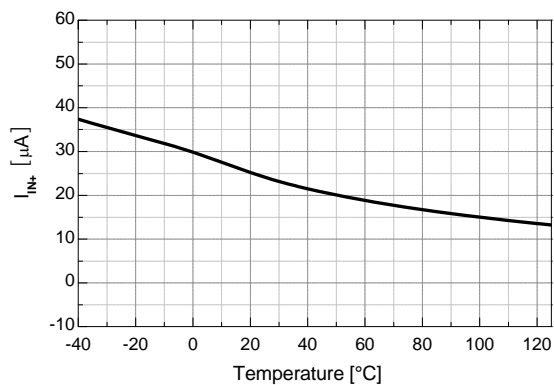
图 **22.** 逻辑输入高偏置电流
与温度的关系
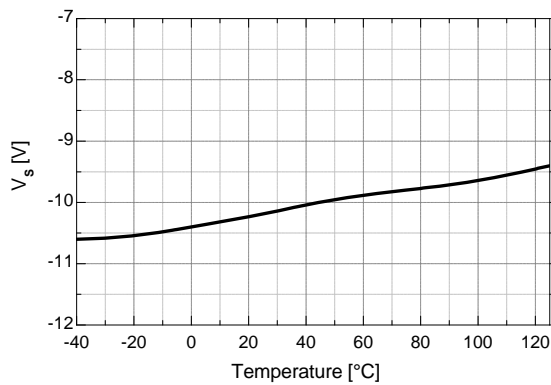
图 **23.** 容许负 **V_S** 电压
与温度的关系

开关时间定义
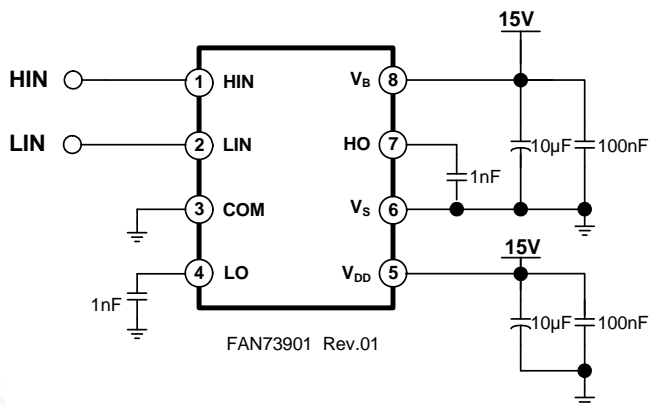
图 **24.** 开关时间测试电路
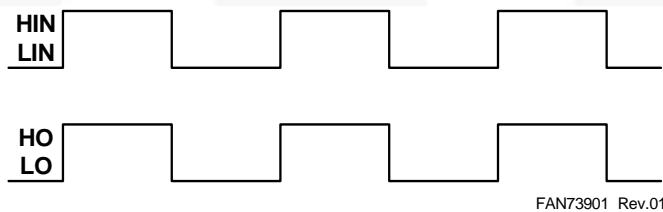
图 **25.** 输入 **/** 输出时序图
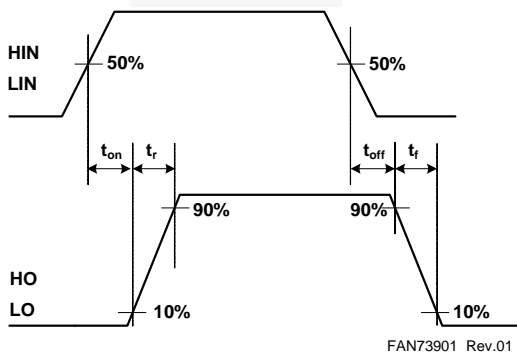
图 **26.** 开关时间波形定义

图 **27.** 开关匹配波形定义

机械尺寸

.

5.00
4.80 A

3.81

8   5 B

6.20
5.80

4.00
3.80

PIN ONE
INDICATOR

1   4

(0.33)

1.27

⊕ | 0.25Ⓜ | C | B | A

0.25
0.10

1.75 MAX C

0.51
0.33

0.50
0.25 x 45°

R0.10   GAGE PLANE

R0.10

0.36

8°
0°   SEATING PLANE

0.90
0.40

(1.04)

DETAIL A
SCALE: 2:1

0.65

1.75

5.60

1.27

LAND PATTERN RECOMMENDATION
SEE DETAIL A

0.25
0.19

⌒ | 0.10

OPTION A - BEVEL EDGE

OPTION B - NO BEVEL EDGE

NOTES: UNLESS OTHERWISE SPECIFIED

A) THIS PACKAGE CONFORMS TO JEDEC
   MS-012, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE MOLD
   FLASH OR BURRS.
D) LANDPATTERN STANDARD: SOIC127P600X175-8M.
E) DRAWING FILENAME: M08Arev14
F) FAIRCHILD SEMICONDUCTOR.

图 **28. 8-** 引脚小尺寸封装 **(SOP)**

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http://www.fairchildsemi.com/dwg/M0/M08B.pdf.

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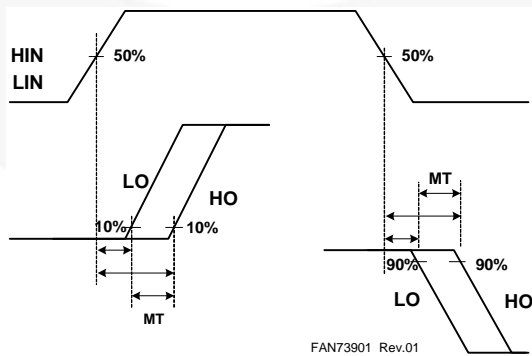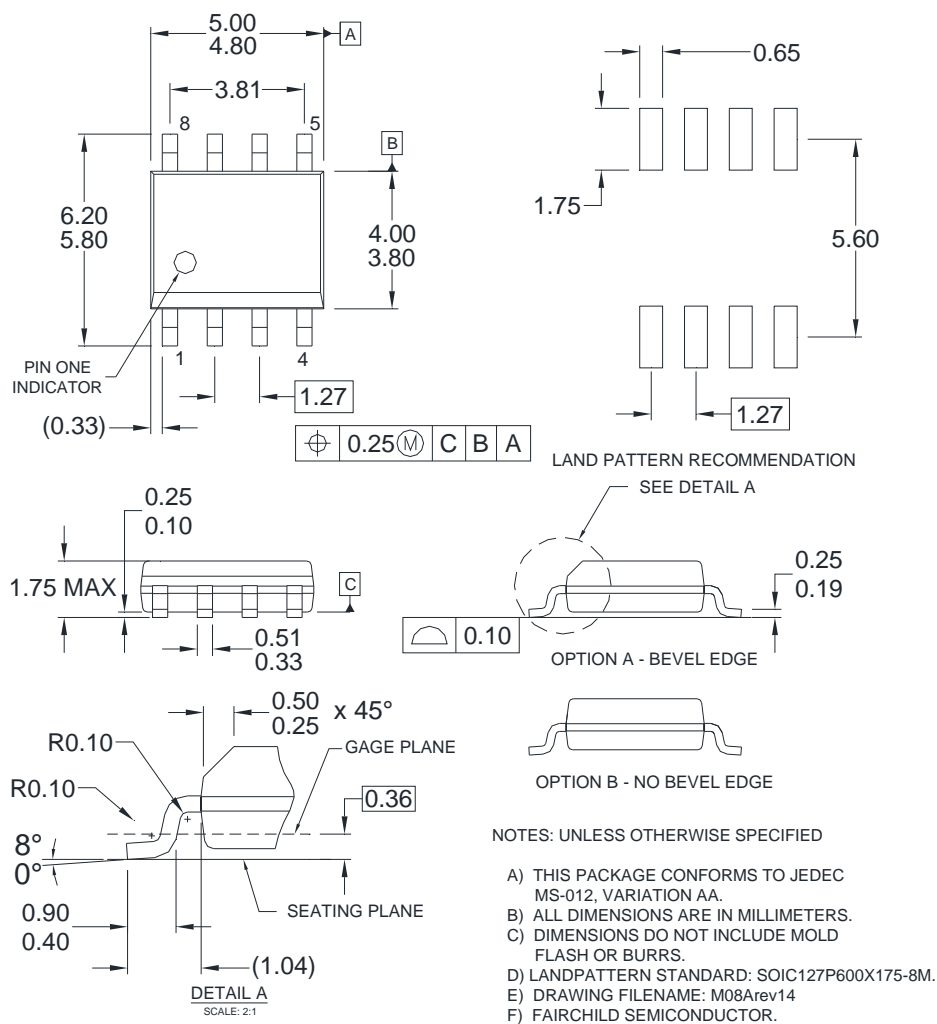
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AX-CAP®*	FRFET®	®	SYSTEM GENERAL®*
BitSiC™	Global Power Resource℠		
Build it Now™	GreenBridge™	PowerTrench®	TinyBoost®
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CorePOWER™	Green FPS™ e-Series™	Programmable Active Droop™	TinyCalc™
CROSSVOLT™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

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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.

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PUBLICATION ORDERING INFORMATION

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