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# FAN73611\_OP

## 单通道高侧栅极驱动 IC

### 特性

- 浮动通道可实现高达 +600 V 的自举运行
- 250 mA/500 mA 的典型源电流 / 灌电流驱动能力
- 共模 dv/dt 噪声消除电路
- 兼容 3.3 V 和 5 V 输入逻辑
- 输出与输入信号同相
- $V_{DD}$  和  $V_{BS}$  欠压锁定
- 8- 引脚小尺寸封装 (SOP)

### 应用

- PDP 扫描驱动器
- 电机驱动
- 开关电源 SMPS

### 相关应用说明

- [AN-6076 — 高压栅极驱动 IC 自举电路的设计与应用指南](#)
- [AN-9052 — 自举元件选择的设计指南](#)
- [AN-8102 — 避免 HVIC 栅极驱动器应用中的短脉冲宽度问题的建议](#)

### 说明

FAN73611\_OP 是一款单片高端栅极驱动 IC，可以驱动工作电压最高达 +600 V 的 MOSFET 和 IGBT。Fairchild 的高压工艺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，能使高端栅极驱动器的工作电压在  $V_{BS} = 15\text{ V}$  时高达  $V_S = -9.8\text{ V}$ （典型值）。当  $V_{DD}$  或  $V_{BS}$  小于指定阈值电压时，UVLO 电路可防止发生故障。输出驱动器的典型源电流 / 灌电流分别为 250 mA/500 mA，适于等离子显示板 (PDP) 应用、电机驱动逆变器和开关电源应用。

8-SOP



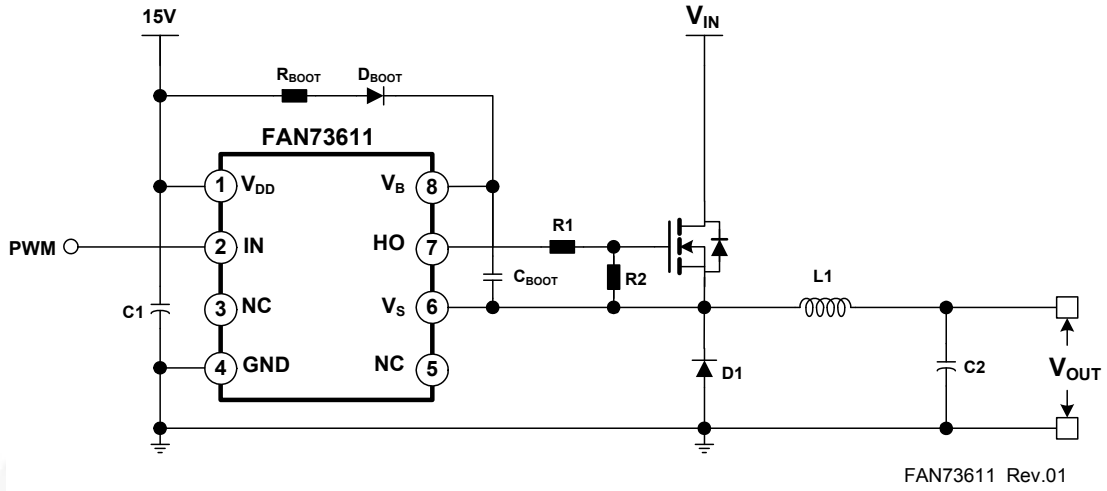
### Ordering Information

部件编号	封装	工作温度	包装方法	说明
FAN73611MX_OP <sup>(1)</sup>	8 SOP	-40°C ~ 125°C	卷带和卷盘	一般应用

#### 说明:

1. 该器件已通过 JESD22A-111 波峰焊测试。

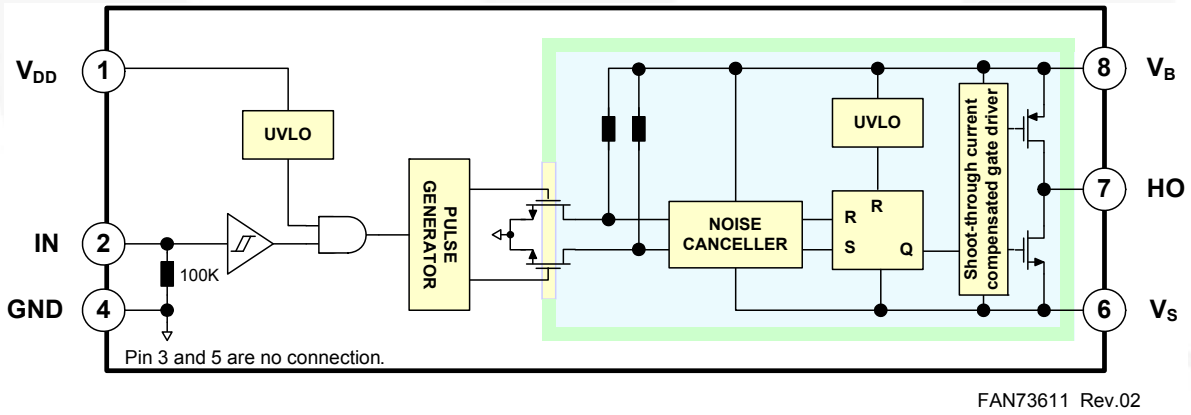
典型应用电路图



FAN73611 Rev.01

图 1. 降压直流 — 直流转换器应用

内部框图



FAN73611 Rev.02

图 2. 功能框图

## 引脚配置

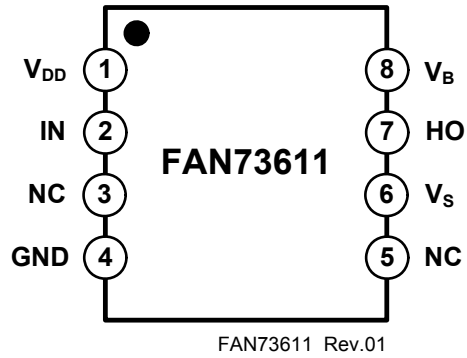


图 3. 引脚配置（俯视图）

## 引脚定义

引脚号	名称	说明
1	V <sub>DD</sub>	电源电压
2	IN	高侧栅极驱动器输出的逻辑输入
3	NC	无连接
4	GND	接地
5	NC	无连接
6	V <sub>S</sub>	高侧浮动电源电压返回
7	HO	高侧驱动输出
8	V <sub>B</sub>	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。除非另有说明， $T_A = 25^\circ\text{C}$ 。

符号	特性	最小值	最大值	单位
$V_S$	高侧浮动偏置电压	$V_B - 25$	$V_B + 0.3$	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	$V_S - 0.3$	$V_B + 0.3$	V
$V_{DD}$	低端和逻辑电源电压	-0.3	25.0	V
$V_{IN}$	逻辑输入电压	-0.3	$V_{DD} + 0.3$	V
$dV_S/dt$	允许的偏置电压变化速率		$\pm 50$	V/ns
$P_D$	功耗 <sup>(2, 3, 4)</sup>		0.625	W
$\theta_{JA}$	热阻		200	$^\circ\text{C}/\text{W}$
$T_J$	结温	-55	+150	$^\circ\text{C}$
$T_{STG}$	存储温度	-55	+150	$^\circ\text{C}$

### 注意：

- 安装到 76.2 x 114.3 x 1.6 mm PCB 板（FR-4 环氧玻璃材料）。
- 参照下列标准：  
JESD51-2: 集成电路热测试方法环境条件 - 自然对流和  
JESD51-3: 含铅表面贴装封装的低有效导热系数测试板
- 任何情况下，都不得超过功耗 ( $P_D$ )。

## 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。Fairchild 不建议超出推荐的工作条件，或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	$V_S + 10$	$V_S + 20$	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
$V_{IN}$	逻辑输入电压	GND	$V_{DD}$	V
$V_{DD}$	电源电压	10	20	V
$T_A$	操作环境温度	-40	+125	$^\circ\text{C}$

## 电气特性

$V_{BIAS}$  ( $V_{DD}$ 、 $V_{BS}$ ) = 15.0 V 且  $T_A = 25^\circ\text{C}$ 。  $V_{IN}$  和  $I_{IN}$  参数以 GND 作为基准。  $I_O$  和  $I_O$  参数以  $V_S$  为参考点，适用于对应的输出 HO，除非另有规定。

符号	特性	测试条件	最小值	典型值	最大值	单位
<b>电源部分</b>						
$I_{QDD}$	$V_{DD}$ 静态电源电流	$V_{IN}=0\text{ V}$ 或 $5\text{ V}$ 、 $C_{LOAD}=1000\text{ pF}$		80	140	$\mu\text{A}$
$I_{PDD}$	$V_{DD}$ 工作电源电流	$C_{LOAD}=1000\text{ pF}$ 、 $f_{IN}=20\text{ KHz}$ 、 RMS 值		80	160	$\mu\text{A}$
$V_{DDUV+}$ $V_{BSUV+}$	$V_{DD}$ 和 $V_{BS}$ 电源欠压正向阈值电压	$V_{DD}=\text{扫描}$ 、 $V_{BS}=\text{扫描}$	7.8	8.8	9.8	V
$V_{DDUV-}$ $V_{BSUV-}$	$V_{DD}$ 和 $V_{BS}$ 电源欠压负向阈值电压	$V_{DD}=\text{扫描}$ 、 $V_{BS}=\text{扫描}$	7.3	8.3	9.3	V
$V_{DDHYS}$ $V_{BSHYS}$	$V_{DD}$ 和 $V_{BS}$ 电源欠压锁定滞回电压	$V_{DD}=\text{扫描}$ 、 $V_{BS}=\text{扫描}$		0.5		V
$I_{LK}$	偏置电源漏电流	$V_B=V_S=600\text{ V}$			10	$\mu\text{A}$
$I_{QBS}$	$V_{BS}$ 静态电源电流	$V_{IN}=0\text{ V}$ 或 $5\text{ V}$ 、 $C_{LOAD}=1000\text{ pF}$		60	100	$\mu\text{A}$
$I_{PBS}$	$V_{BS}$ 工作电源电流	$C_{LOAD}=1000\text{ pF}$ 、 $f_{IN}=20\text{ KHz}$ 、 RMS 值		420	600	$\mu\text{A}$
<b>输入逻辑部分</b>						
$V_{IH}$	逻辑“1”输入电压		2.5			V
$V_{IL}$	逻辑“0”输入电压				0.8	V
$I_{IN+}$	逻辑输入高电平偏置电流	$V_{IN}=5\text{ V}$		50	75	$\mu\text{A}$
$I_{IN-}$	逻辑输入低电平偏置电流	$V_{IN}=0\text{ V}$			2	$\mu\text{A}$
$R_{IN}$	输入下拉电阻		60	100		$\text{K}\Omega$
<b>栅极驱动器输出部分</b>						
$V_{OH}$	高电平输出电压 ( $V_{BIAS} - V_O$ )	无负载			0.1	V
$V_{OL}$	低电平输出电压	无负载			0.1	V
$I_{O+}$	输出高，短路脉冲电流	$V_{HO}=0\text{ V}$ 、 $V_{IN}=5\text{ V}$ 、 $PW \leq 10\text{ }\mu\text{s}$	200	250		mA
$I_{O-}$	输出低，短路脉冲电流	$V_{HO}=15\text{ V}$ 、 $V_{IN}=0\text{ V}$ 、 $PW \leq 10\text{ }\mu\text{s}$	400	500		mA
$V_S$	IN 信号传播到 HO 时允许的 $V_S$ 引脚负电压	$V_{BS}=15\text{ V}$		-9.8	-7.0	V

## 动态电气特性

$V_{DD}=V_{BS}=15\text{ V}$ 、 $C_{LOAD}=1000\text{ pF}$  且  $T_A=25^\circ\text{C}$ ，除非另有规定。

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	$V_S=0\text{ V}$	70	120	170	ns
$t_{off}$	关断传播延迟时间	$V_S=0\text{ V}$	70	120	170	ns
$t_r$	开通上升时间			70	140	ns
$t_f$	关断下降时间			30	60	ns

典型特性

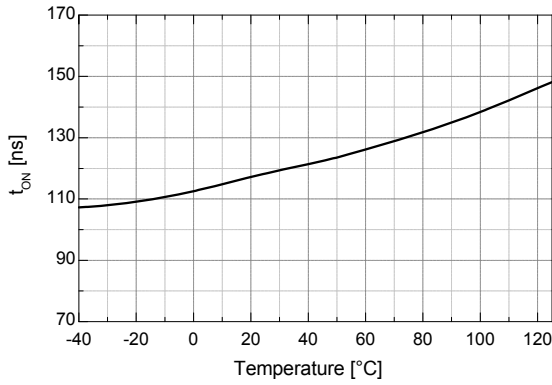


图 5. 开通传输延时与温度的关系

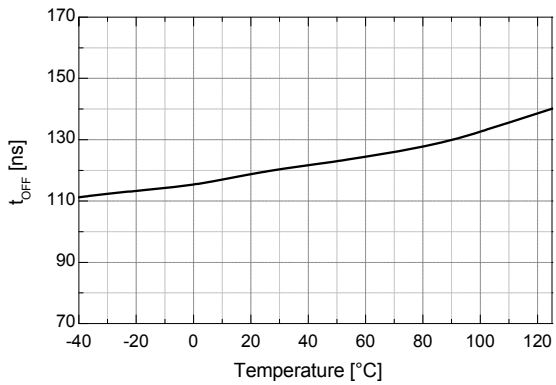


图 6. 关断传输延时与温度的关系

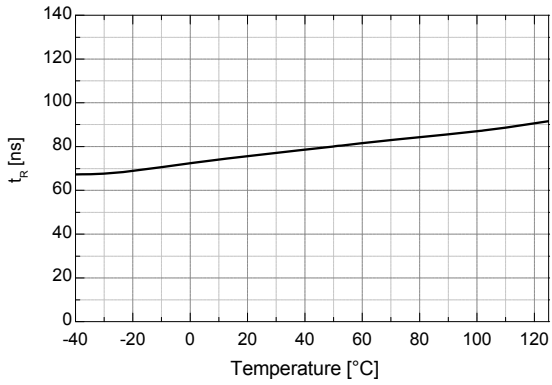


图 7. 开通上升时间与温度的关系

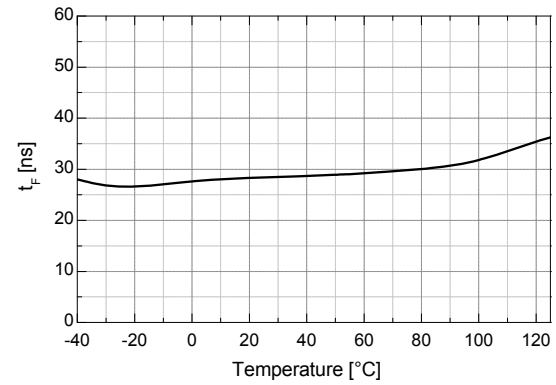


图 8. 导通下降时间与温度的关系

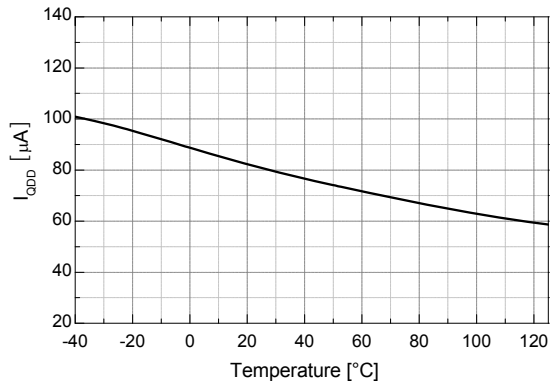


图 9. 静态  $V_{DD}$  电源电流与温度的关系

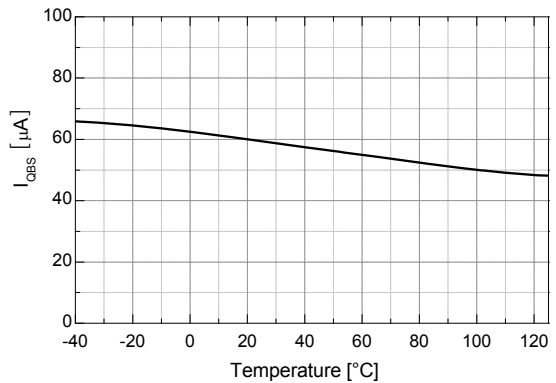


图 10. 静态  $V_{BS}$  电源电流与温度的关系

典型特性 (续)

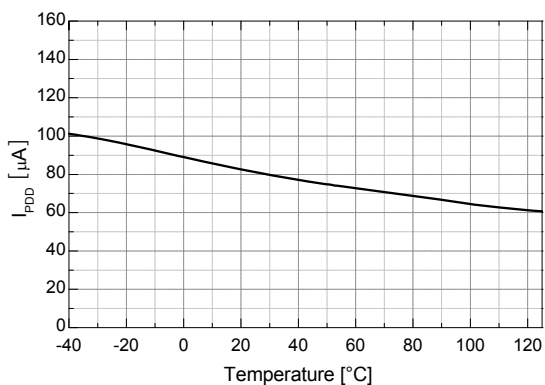


图 11. 工作时 V<sub>DD</sub> 电源电流与温度的关系

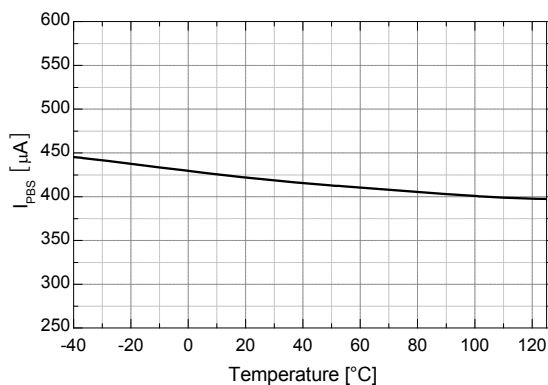


图 12. V<sub>BS</sub> 工作电源电流与温度的关系

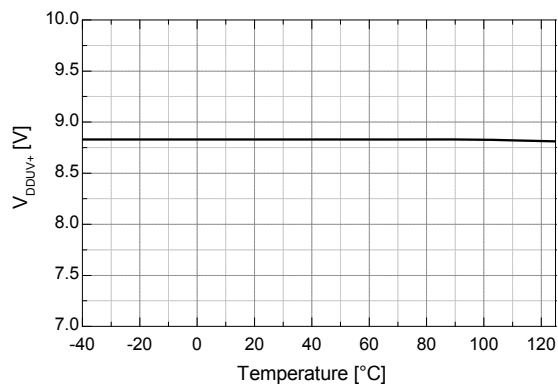


图 13. V<sub>DD</sub> UVLO+ 与温度的关系

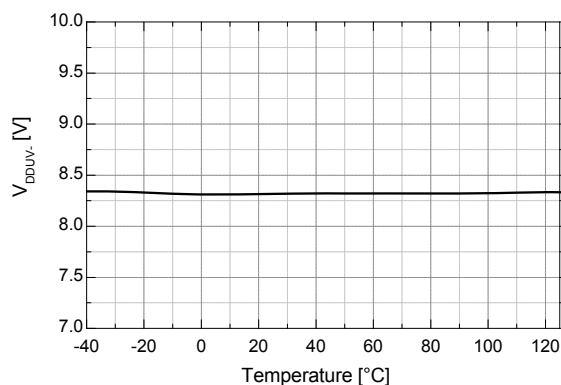


图 14. V<sub>DD</sub> UVLO- 与温度的关系

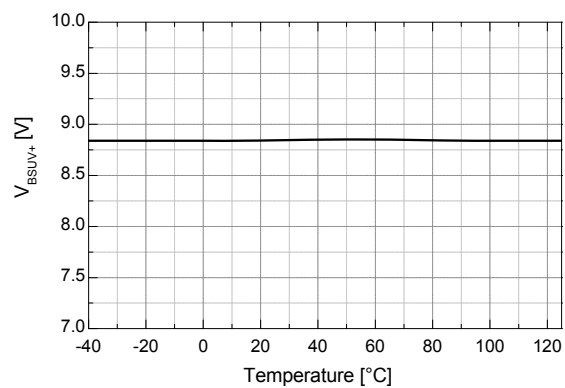


图 15. V<sub>BS</sub> UVLO+ 与温度的关系

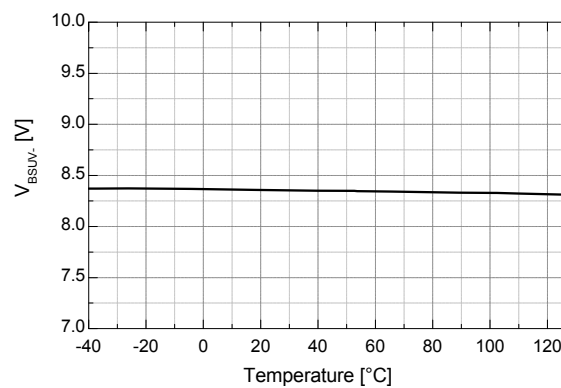


图 16. V<sub>BS</sub> UVLO- 与温度的关系



典型特性 (续)

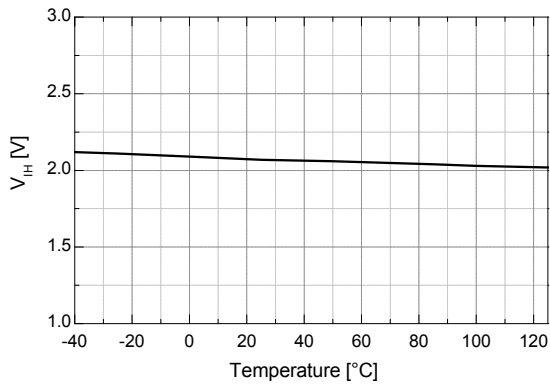


图 17. 逻辑高输入电压与温度的关系

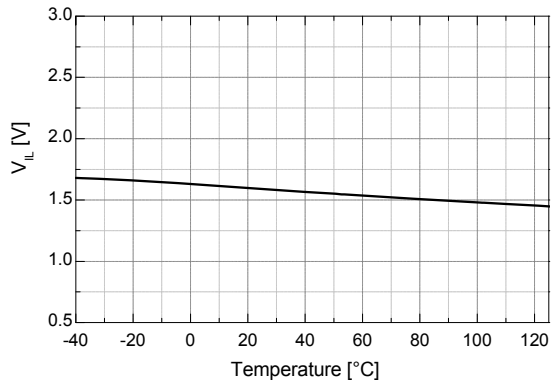


图 18. 逻辑低输入电压与温度的关系

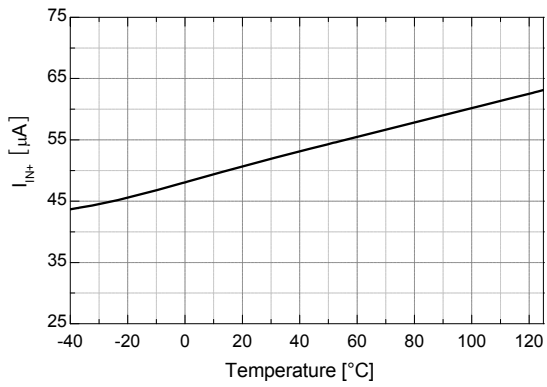


图 19. 逻辑高输入偏压电流与温度的关系

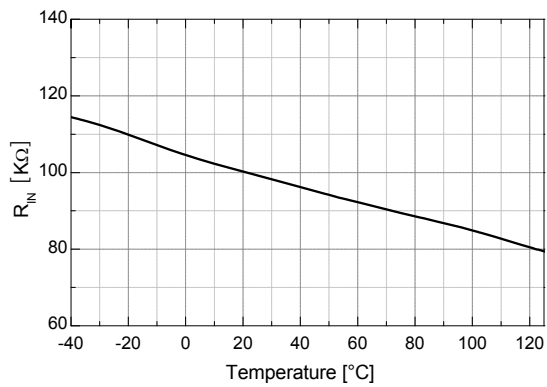


图 20. 输入下拉电阻与温度的关系

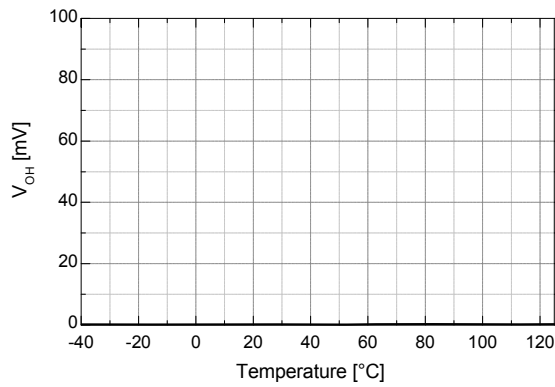


图 21. 高电平输出电压与温度的关系

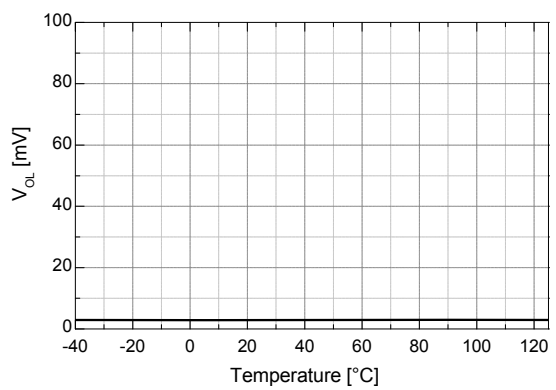


图 22. 低电平输出电压与温度的关系

典型特性 (续)

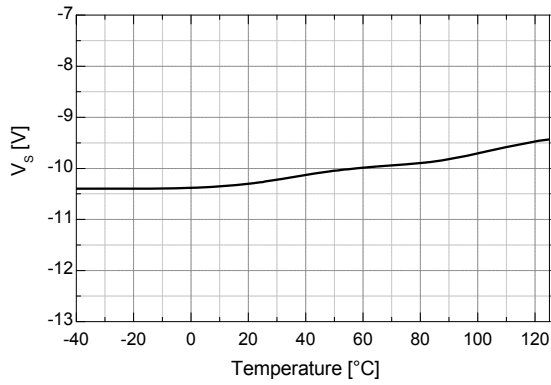


图 23. 容许的负  $V_S$  电压与温度的关系

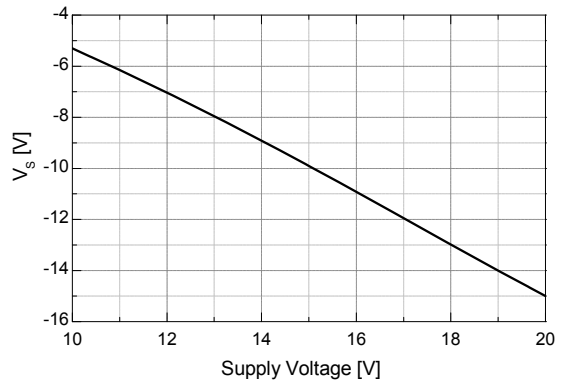


图 24. 允许负  $V_S$  电压与电源电压

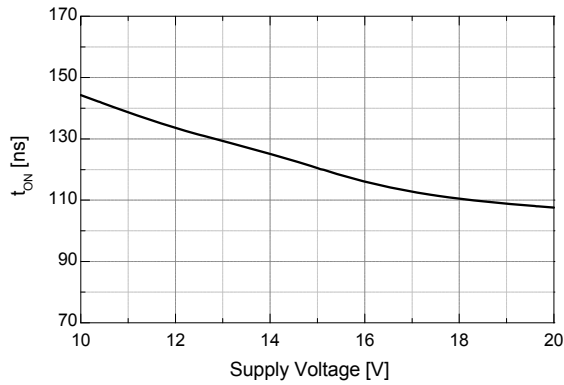


图 25. 导通传播延时与电源电压的关系

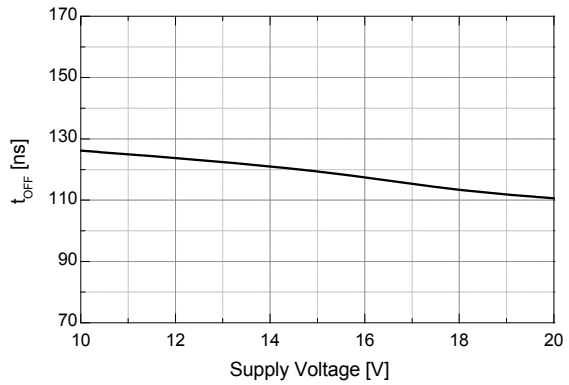


图 26. 关断传播延时与电源电压的关系

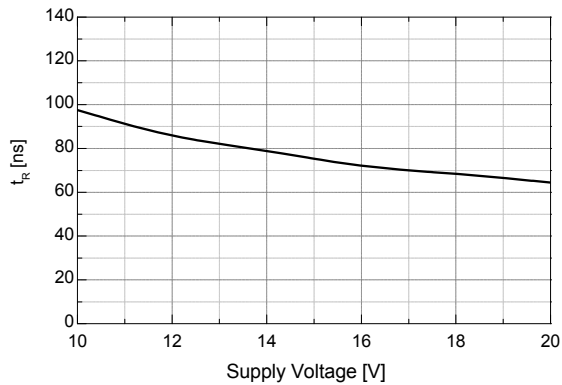


图 27. 开通上升时间与电源电压的关系

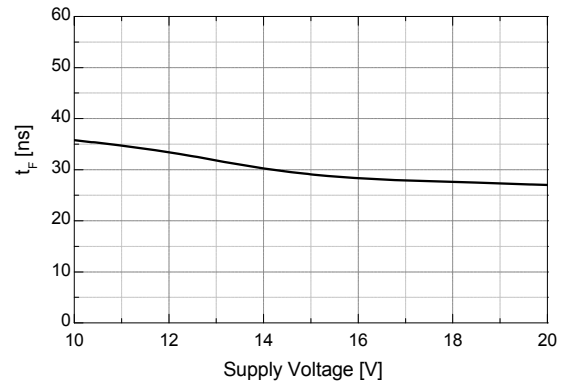


图 28. 关断下降时间与电源电压

典型特性 (续)

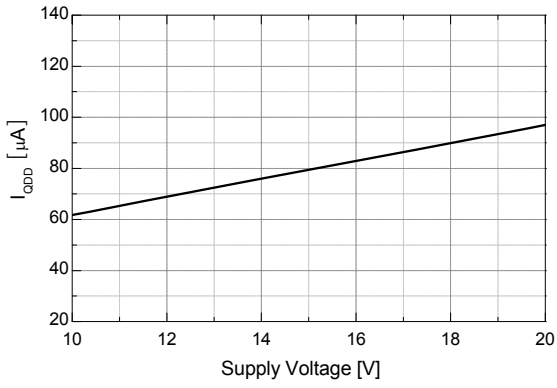


图 29.  $V_{DD}$  静态电源电流与电源电压的关系

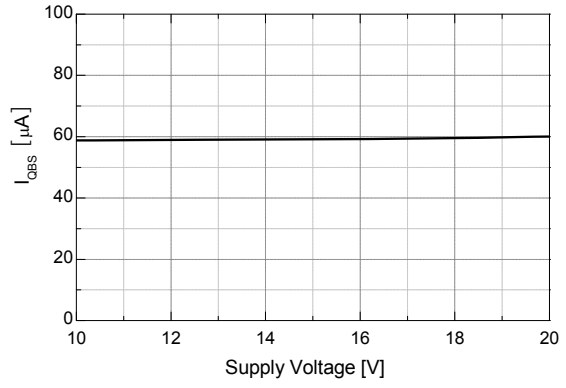


图 30.  $V_{BS}$  静态电源电流与电源电压的关系

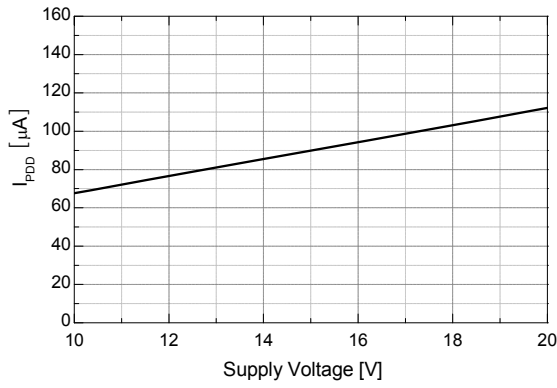


图 31. 工作时  $V_{DD}$  电源电流

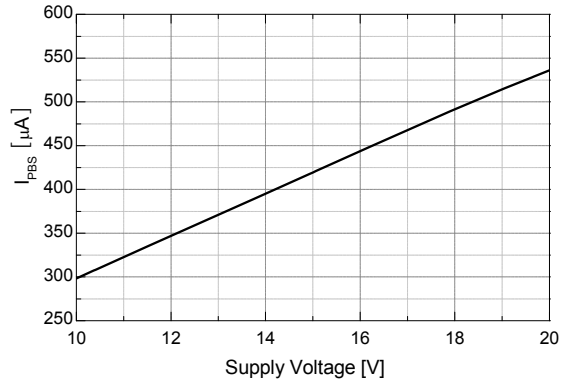


图 32. 工作时  $V_{BS}$  电源电流与电源电压的关系

### 开关时间定义

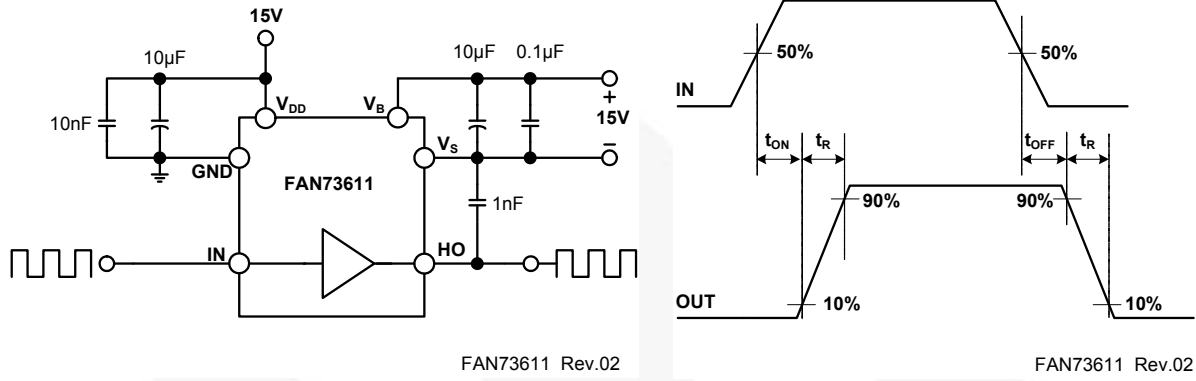


图 33. 开关时间测试电路和波形定义

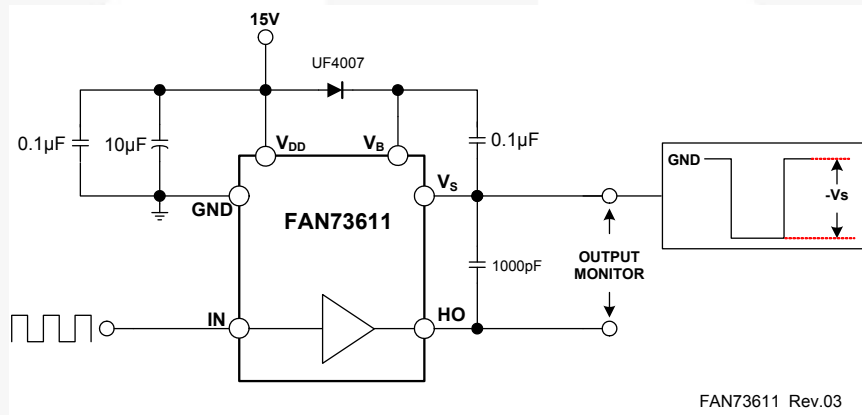
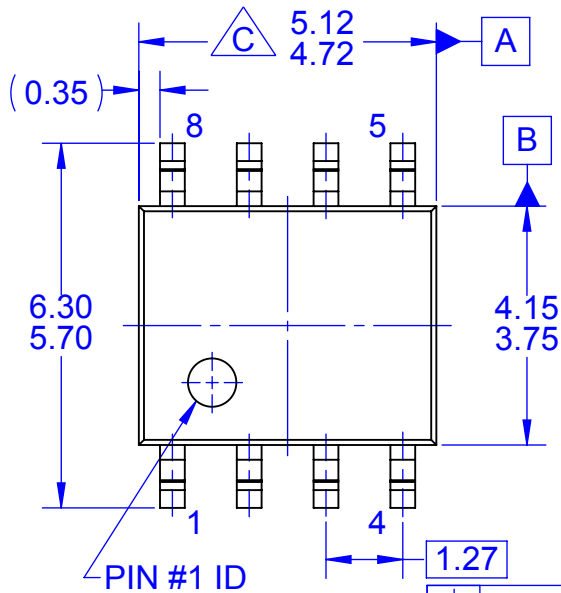
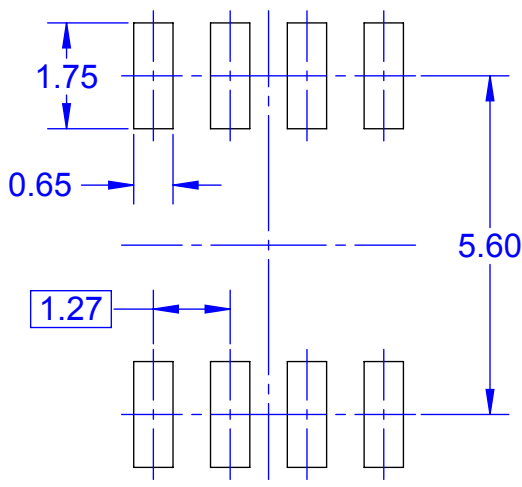


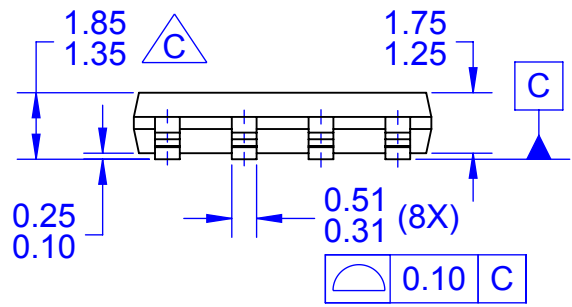
图 34. 浮动电源电压瞬态测试



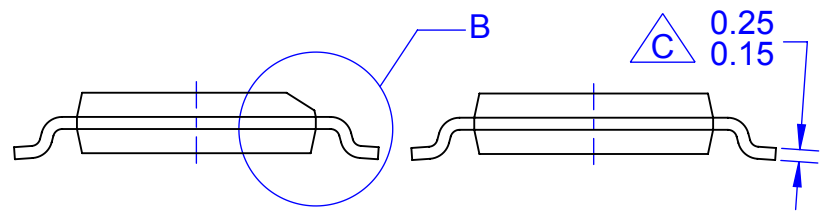
TOP VIEW



LAND PATTERN RECOMMENDATION



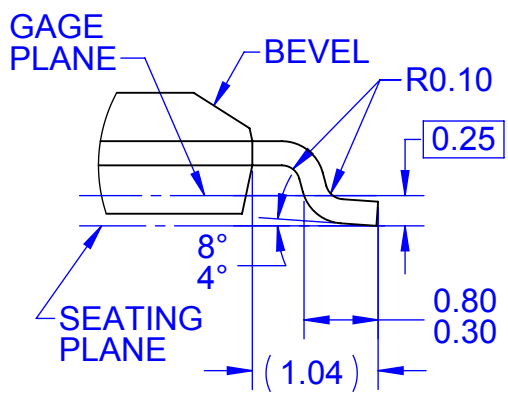
FRONT VIEW



OPTION A  
BEVEL EDGE

OPTION B  
NON-BEVEL EDGE

SIDE VIEW



DETAIL "B"  
SCALE 2:1

NOTES: UNLESS OTHERWISE SPECIFIED

- A. THIS PACKAGE CONFORMS TO JEDEC MS-012 VARIATION A EXCEPT WHERE NOTED.
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. OUT OF JEDEC STANDARD VALUE
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- E. LAND PATTERN AS PER IPC SOIC127P600X175-8M
- F. DRAWING FILENAME: MKT-M08Brev2



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