



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.

FAN7380_OP 半桥栅极驱动器

特性

- 浮动通道专为高达 +600 V 的自举运行而设计
- 两个通道的源 / 灌电流驱动能力典型值为 0 mA / 180 mA
- 共模 dv/dt 噪声消除电路
- 在 $V_{CC} = V_{BS} = 15\text{ V}$ 时信号传播过程中, 允许负 V_S 摆幅扩大至高达 -9.8 V
- V_{CC} 和 V_{BS} 供电范围从 10 V 至 20 V
- 双通道的欠压锁定功能
- 兼容 TTL 的输入逻辑阈值电平
- 匹配传播延迟低于 50 ns
- 内置 100 ns 死区时间控制功能
- 输出信号与输入信号同相位

典型应用

- SMPS
- 电机驱动
- PDP 扫描驱动器
- 工业应用

相关资源

- [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

FAN7380_OP 是单片半桥栅极驱动 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)。输入逻辑电平与标准 TTL 系列逻辑栅极兼容。内部击穿保护电路提供 100 ns 死区时间以阻止输出开关器件在转换期间不被导通。当 V_{CC} 和 V_{BS} 小于指定阈值电压时, 两个通道的欠压锁定 (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 90 mA / 180 mA, 适合荧光灯 / 紧凑型荧光灯应用和要求低 di/dt 噪声的系统。

8-SOP



订购信息

器件	封装	无铅	工作温度	包装	说明
FAN7380MX_OP ⁽¹⁾	8-SOP	是	-40°C ~ +125°C	卷带和卷盘	一般应用

说明:

1. 该器件已通过 JESD22A-111 波动焊接测试。

典型应用电路

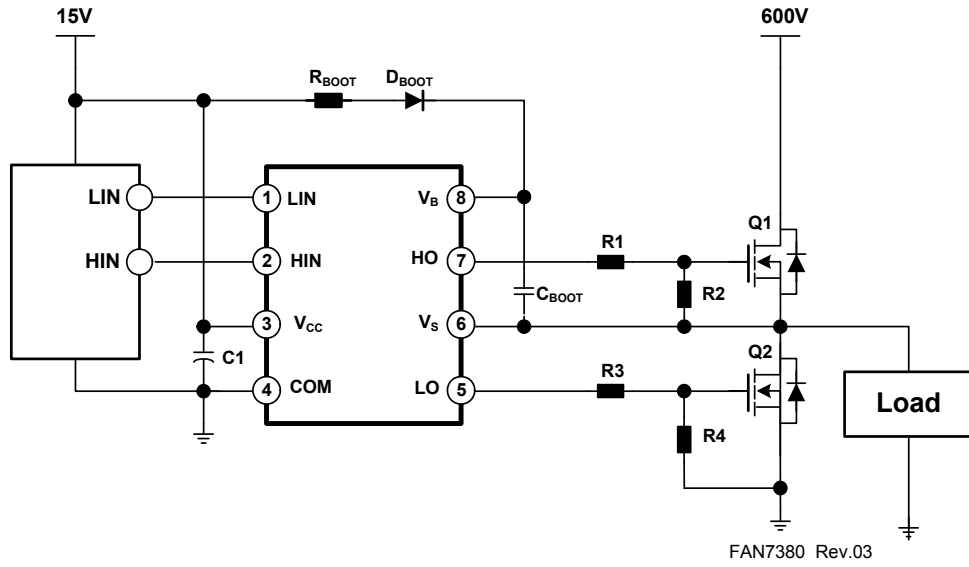


图 1. 半桥应用电路

内部框图

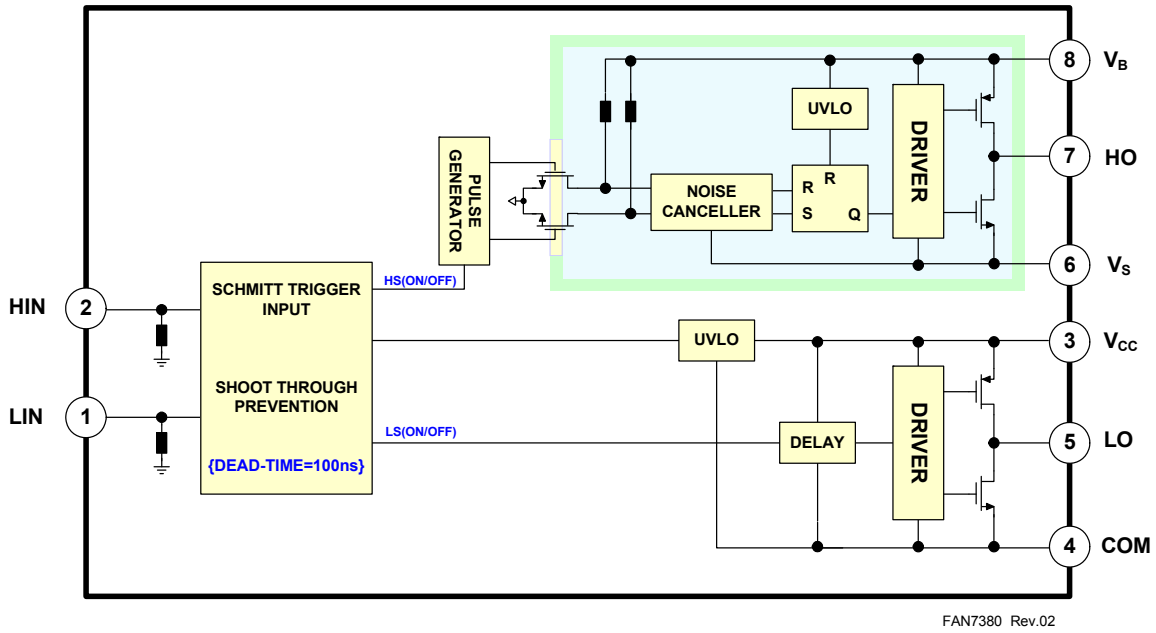


图 2. 功能框图

引脚配置

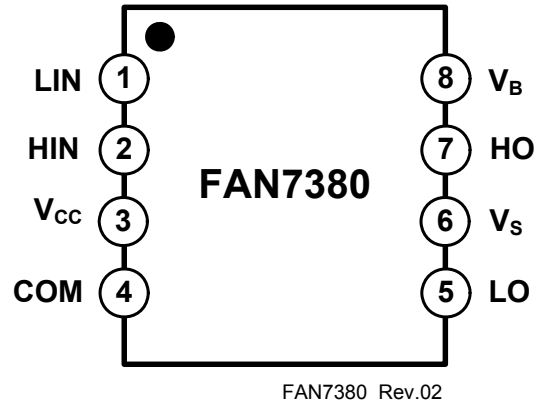


图 3. 引脚配置（俯视图）

引脚定义

引脚号	名称	I/O	说明
1	LIN	I	低侧栅极驱动器输出的逻辑输入
2	HIN	I	高侧栅极驱动器输出的逻辑输入
3	V _{CC}	I	低侧电源电压
4	COM		逻辑地和低侧驱动器返回
5	LO	O	低侧栅极输出
6	V _S	I	高侧浮动电源电压返回
7	HO	O	高侧驱动输出
8	V _B	I	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	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	625.0	
V_{HO}	高侧浮动输出电压 HO	$V_S-0.3$	$V_B+0.3$	
V_{CC}	低侧和固定逻辑电源电压	-0.3	25.0	
V_{LO}	低侧输出电压 LO	-0.3	$V_{CC}+0.3$	
V_{IN}	逻辑输入电压 (HIN、LIN)	-0.3	$V_{CC}+0.3$	
COM	逻辑地	$V_{CC}-25$	$V_{CC}+0.3$	
dV_S/dt	允许的偏置电压变化速率		50	V/ns
$P_D^{(2)(3)(4)}$	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_S	存储温度	-50	150	$^{\circ}\text{C}$

注意：

2. 安装到 76.2 x 114.3 x 1.6 mm PCB (FR-4 环氧玻璃材料)。
3. 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
4. 在任何情况下，都不要超过 P_D 。

推荐工作额定值

推荐的操作条件表明了器件的真实工作条件。指定建议工作条件是为了确保最佳性能。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+10	V_S+20	V
V_S	高侧浮动电源偏置电压	$6-V_{CC}$	600	
V_{HO}	高侧 (HO) 输出电压	V_S	V_B	
V_{LO}	低侧 (LO) 输出电压	COM	V_{CC}	
V_{IN}	逻辑输入电压 (HIN、LIN)	COM	V_{CC}	
V_{CC}	低侧电源电压	10	20	
T_A	环境温度	-40	125	$^{\circ}\text{C}$

静态电气特性

$V_{BIAS}(V_{CC}, V_{BS}) = 15.0\text{ V}$ 、 $T_A = 25^\circ\text{C}$ 。 V_{IN} 和 I_{IN} 参数以 COM 为参考点。参数 V_O 和 I_O 以 V_S 和 COM 作为基准，适用于相应的输出 HO 和 LO，除非另有说明。

符号	参数	工作条件	最小值	典型值	最大值	单位
V_{CCUV+} V_{BSUV+}	V_{CC} 和 V_{BS} 电源欠压正向阈值		8.2	9.2	10.0	V
V_{CCUV-} V_{BSUV-}	V_{CC} 和 V_{BS} 电源欠压负向阈值		7.6	8.7	9.6	
V_{CCUVH} V_{BSUVH}	V_{CC} 电源欠压锁定滞回电压回差			0.5		
I_{LK}	偏置电源漏电流	$V_B=V_S=600\text{ V}$			50	μA
I_{QBS}	V_{BS} 静态电源电流	$V_{IN}=0\text{ V}$ 或 5 V		44	100	
I_{QCC}	V_{CC} 静态电源电流	$V_{IN}=0\text{ V}$ 或 5 V		70	180	
I_{PBS}	V_{BS} 工作电源电流	$f_{IN}=20\text{ kHz}$, rms value			600	μA
I_{PCC}	V_{CC} 工作电源电流	$f_{IN}=20\text{ kHz}$, rms value			610	
V_{IH}	逻辑“1”输入电压		2.5			V
V_{IL}	逻辑“0”输入电压				0.8	
V_{OH}	高电平输出电压, $V_{BIAS}-V_O$	$I_O=20\text{ mA}$			2.8	V
V_{OL}	低电平输出电压, V_O				1.2	
I_{IN+}	逻辑“1”输入偏置电流	$V_{IN}=5\text{ V}$		5	40	μA
I_{IN-}	逻辑“0”输入偏置电流	$V_{IN}=0\text{ V}$		1.0	2.0	
I_{O+}	输出高电平短路脉冲电流	$V_O=0\text{ V}$, $V_{IN}=5\text{ V}$ 和 $PW\leq 10\text{ }\mu\text{s}$	60	90		mA
I_{O-}	输出低电平短路脉冲电流	$V_O=15\text{ V}$, $V_{IN}=0\text{ V}$ 和 $PW\leq 10\text{ }\mu\text{s}$	130	180		
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

动态电气特性

$V_{BIAS}(V_{CC}, V_{BS}) = 15.0\text{ V}$ 、 $V_S = \text{COM}$ 、 $C_L = 1000\text{ pF}$ 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}	导通传播延时	$V_S=0\text{ V}$	70	135	200	ns
t_{off}	关断传播延时	$V_S=0\text{ V}$ 或 $600\text{ V}^{(5)}$	60	130	190	
t_r	导通上升时间		160	230	290	
t_f	关断下降时间		20	90	160	
DT	死区时间		80	120	190	
MT	延时匹配, HS 与 LS 导通 / 关断				50	

说明:

5. 该参数由设计保证。

典型性能特征

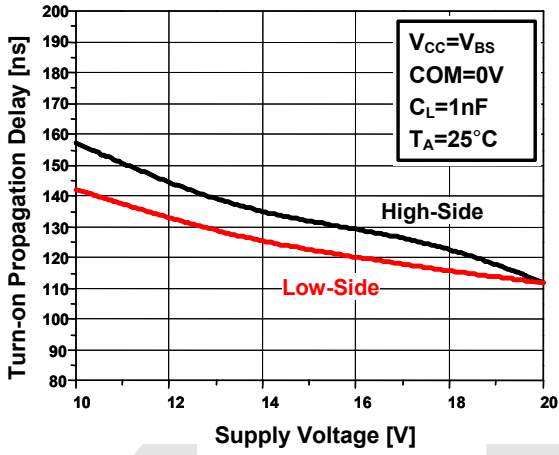


图 4. 导通传播延时与电源电压的关系

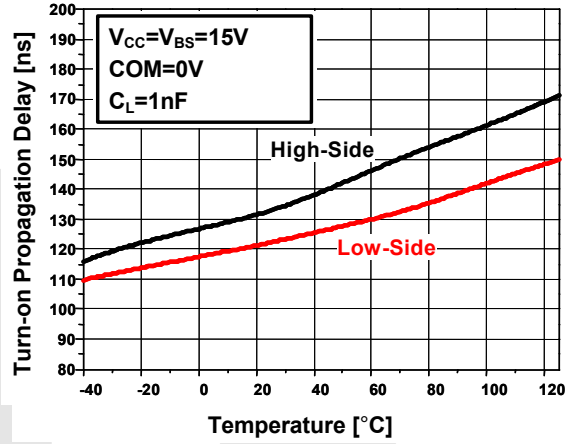


图 5. 导通传输延时与温度的关系

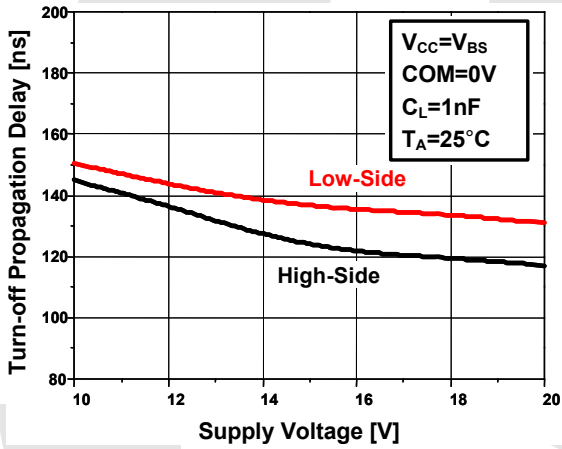


图 6. 关断传播延时与电源电压的关系

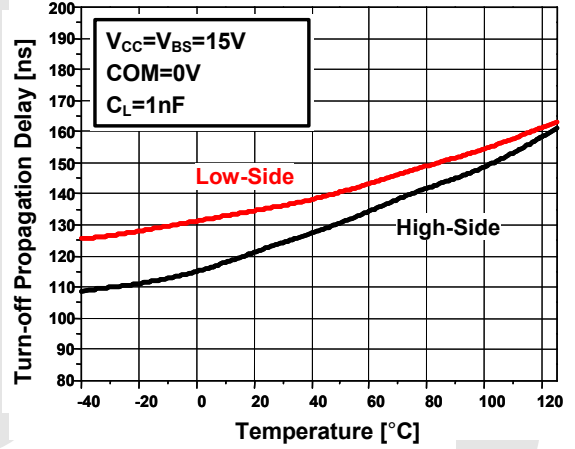


图 7. 关断传播延时与温度的关系

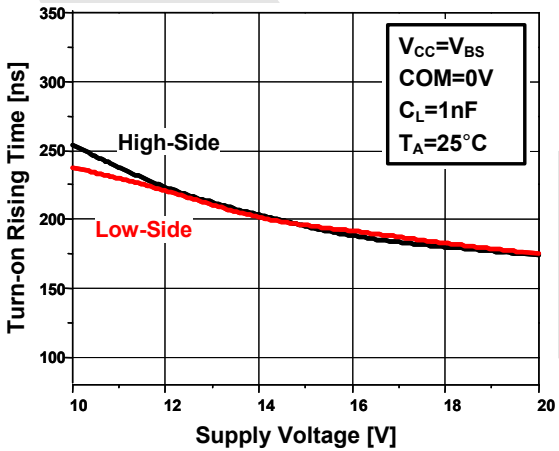


图 8. 导通上升时间与电源电压的关系

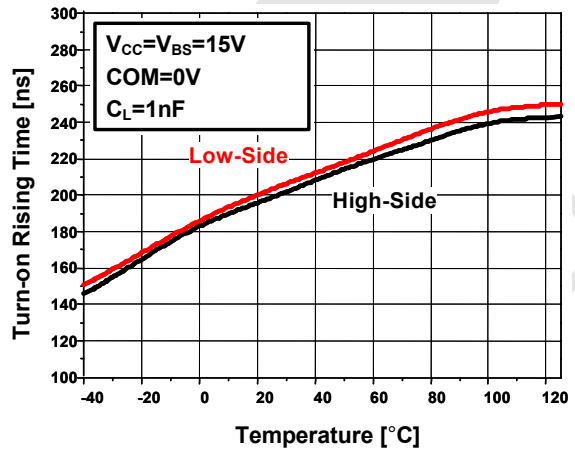


图 9. 导通上升时间与温度的关系

典型性能特征 (接上页)

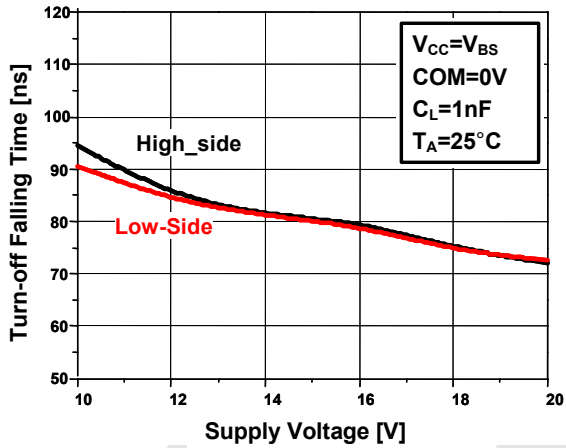


图 10. 关断下降时间与电源电压的关系

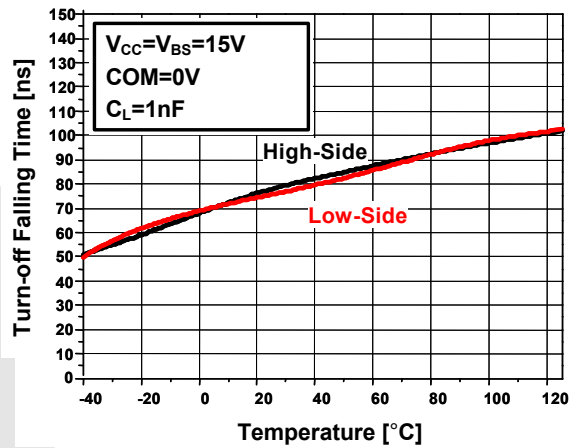


图 11. 关断下降时间与温度的关系

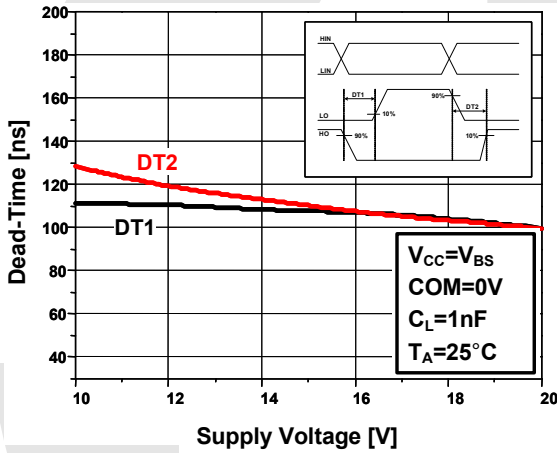


图 12. 死区时间与电源电压的关系

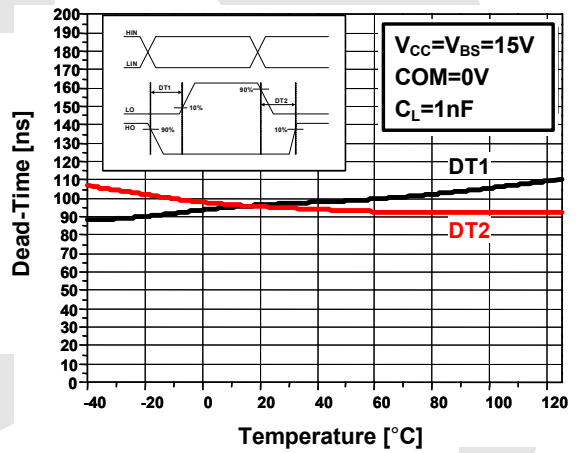


图 13. 死区时间与温度的关系

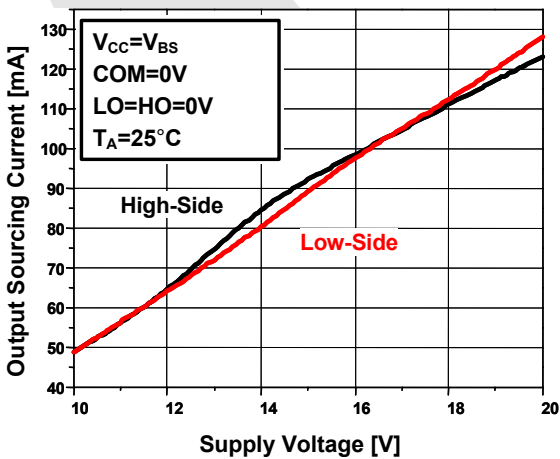


图 14. 输出源电流与电源电压的关系

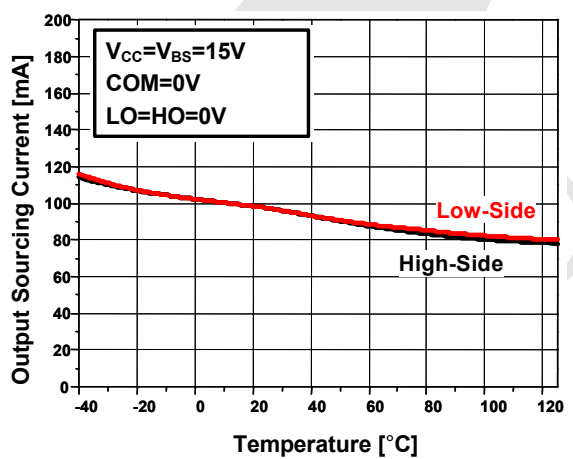


图 15. 输出源电流与温度的关系

典型性能特征 (接上页)

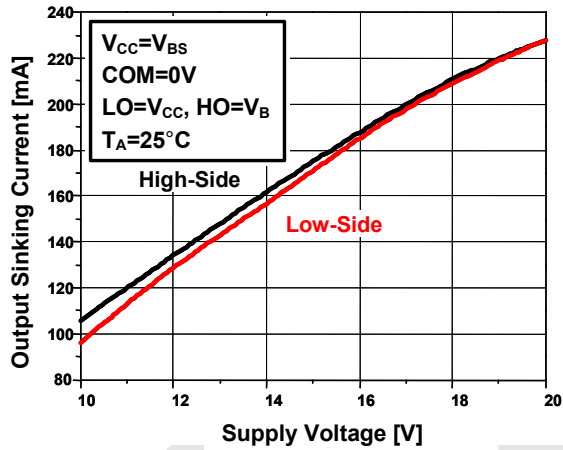


图 16. 输出灌电流与电源电压的关系

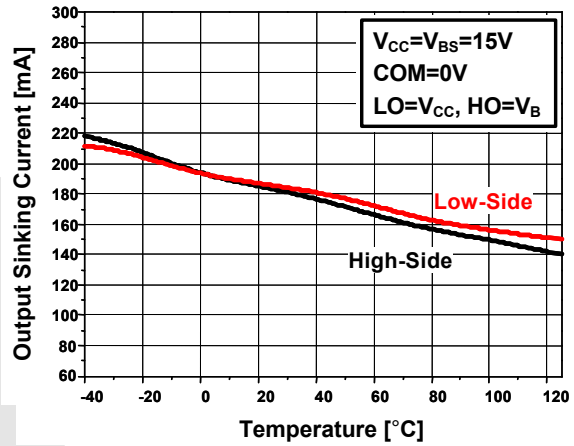


图 17. 输出灌电流与温度的关系

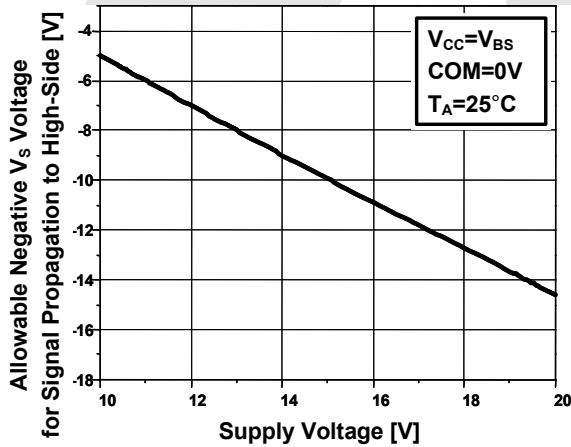


图 18. 信号传播到高侧时允许的 V_S 负电压与电源电压的关系

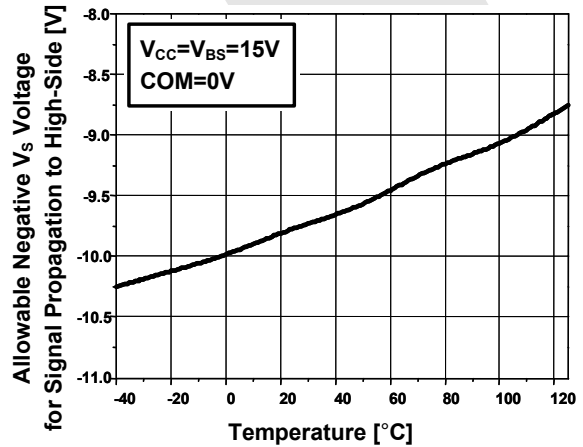


图 19. 信号传播至高端允许的 V_S 负电压与温度的关系

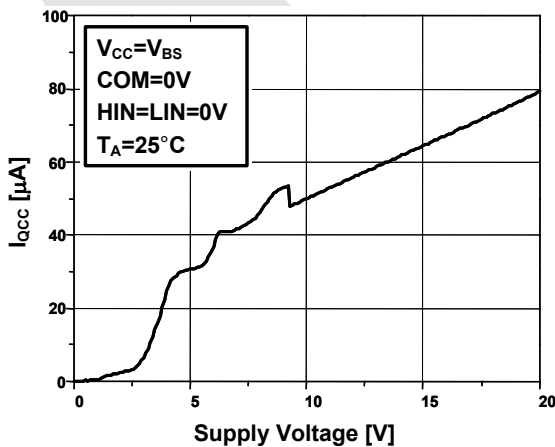


图 20. I_{QCC} 与电源电压的关系

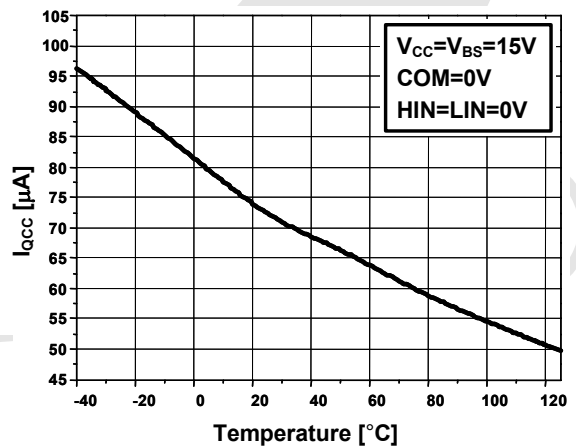


图 21. I_{QCC} 与温度的关系

典型性能特征 (接上页)

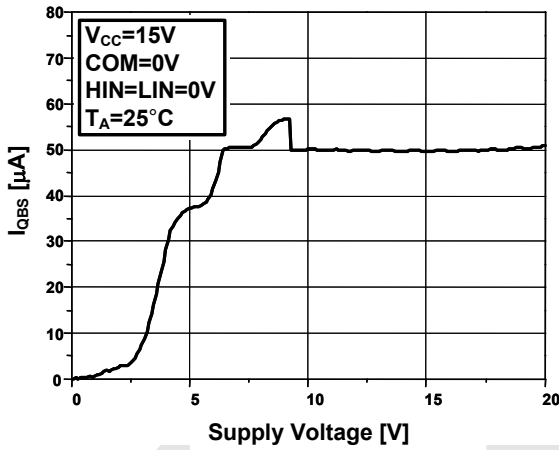


图 22. I_{QBS} 与电源电压的关系

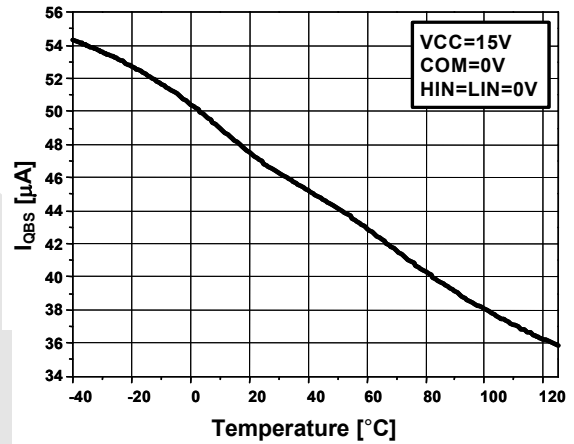


图 23. I_{QBS} 与温度的关系

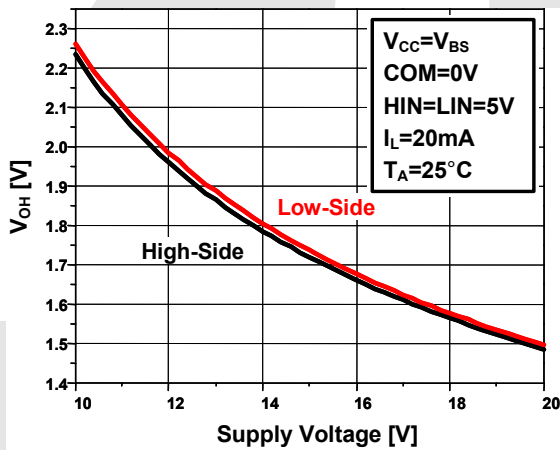


图 24. 高电平输出电压与电源电压的关系

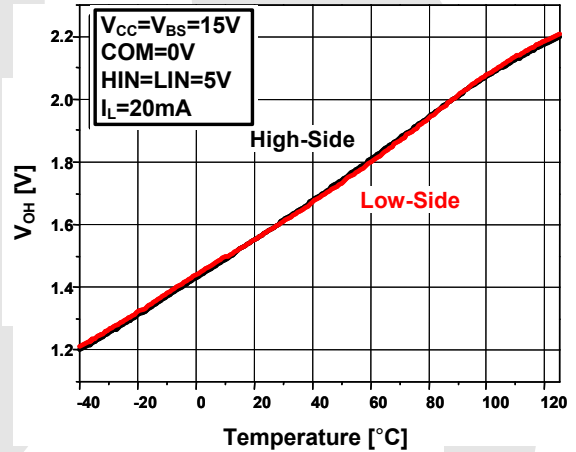


图 25. 高电平输出电压与温度的关系

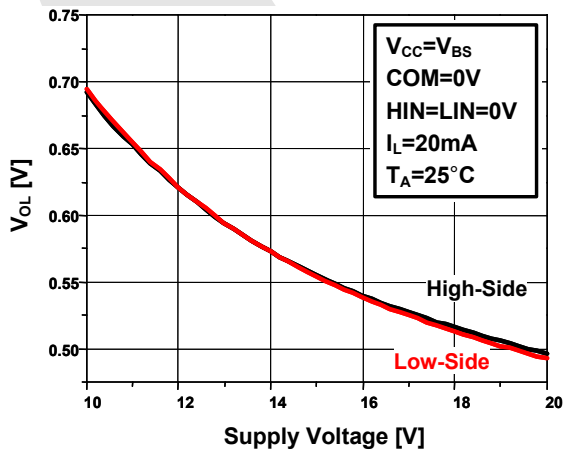


图 26. 低电平输出电压与电源电压的关系

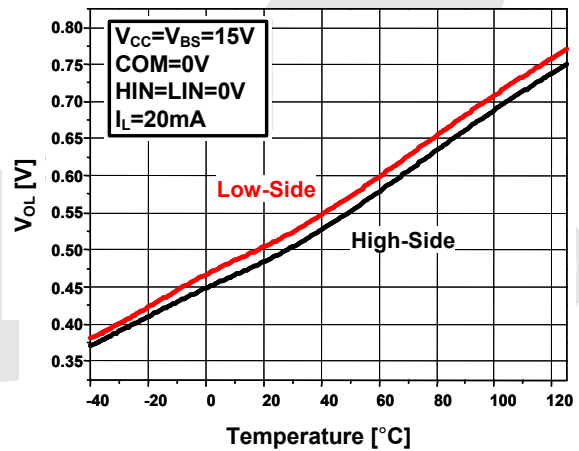


图 27. 低电平输出电压与温度的关系

典型性能特征 (接上页)

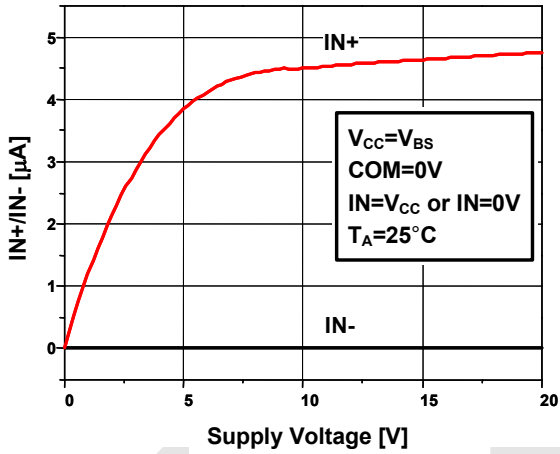


图 28. 输入偏置电流与电源电压的关系

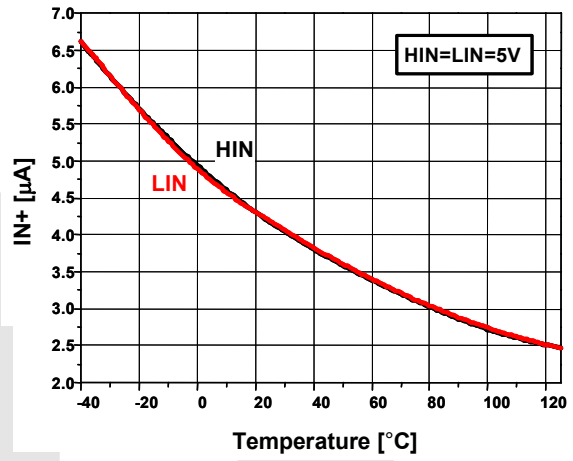


图 29. 输入偏置电流与温度的关系

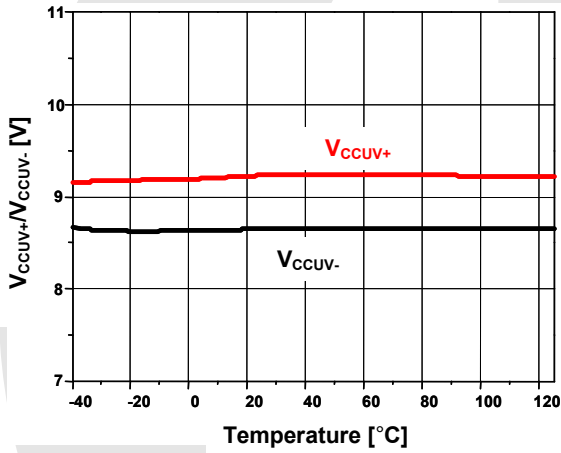


图 30. V_{CC} 欠压锁定阈值电压与温度的关系

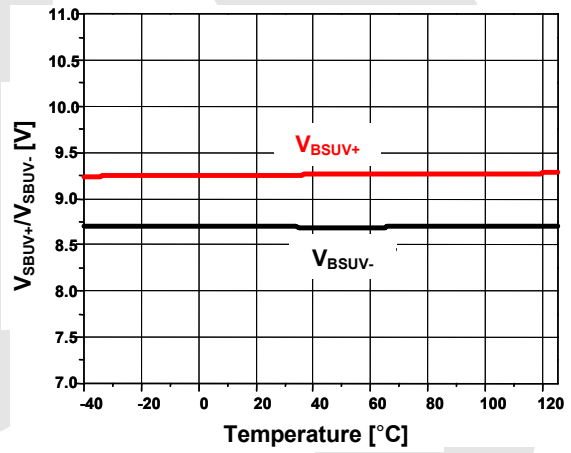


图 31. 欠压锁定阈值电压与温度的关系

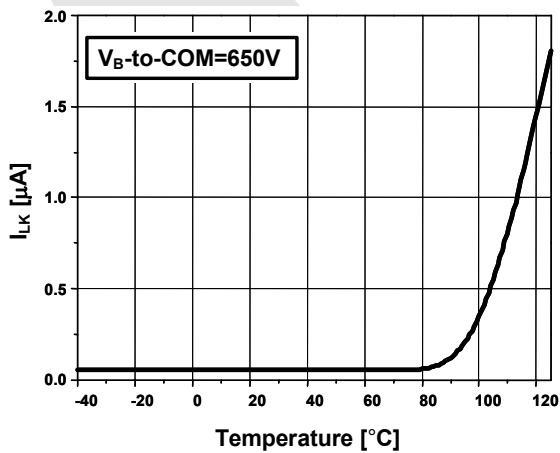


图 32. VB 至 COM 漏电流与温度的关系

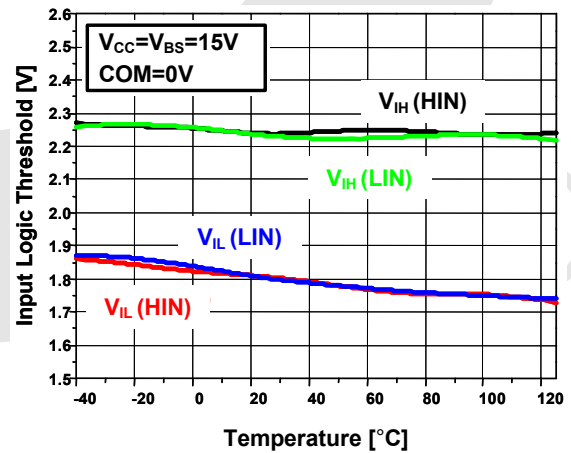


图 33. 输入逻辑阈值与温度的关系

开关时间定义

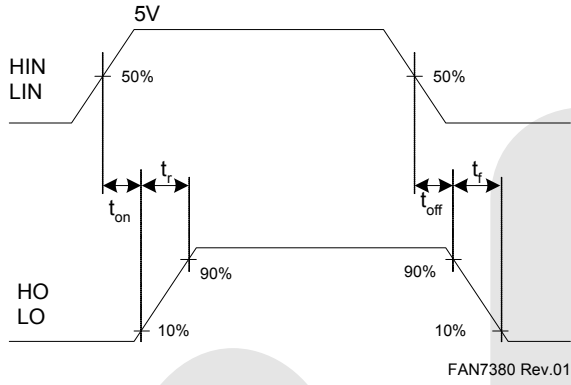


图 34. 开关时间波形

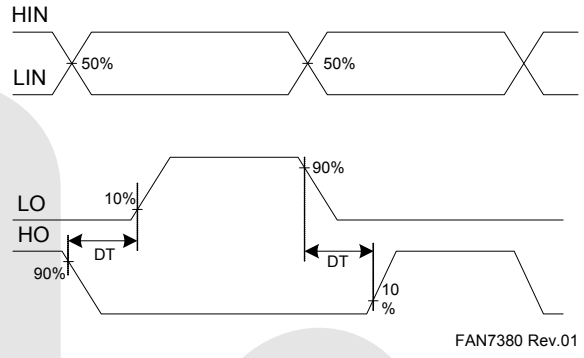


图 35. 内部死区时间时序





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
- $\triangle C$ 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



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