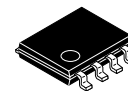


半桥栅极驱动器

FAN7380-OP



SOIC8
(8-SOP)
CASE 751EG

描述

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。onsemi 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。

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 90 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 摆幅扩大至低达 -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
- This is a Pb-Free Device

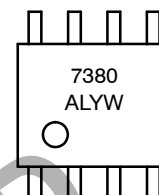
典型应用

- SMPS
- 电机驱动
- PDP 扫描驱动器
- 工业应用1

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

MARKING DIAGRAM



7380 = Device Code
A = Assembly Site
L = Wafer Lot Number
YW = Assembly Start Week

ORDERING INFORMATION

See detailed ordering and shipping information on page 11 of this data sheet.

FAN7380-OP

典型应用电路

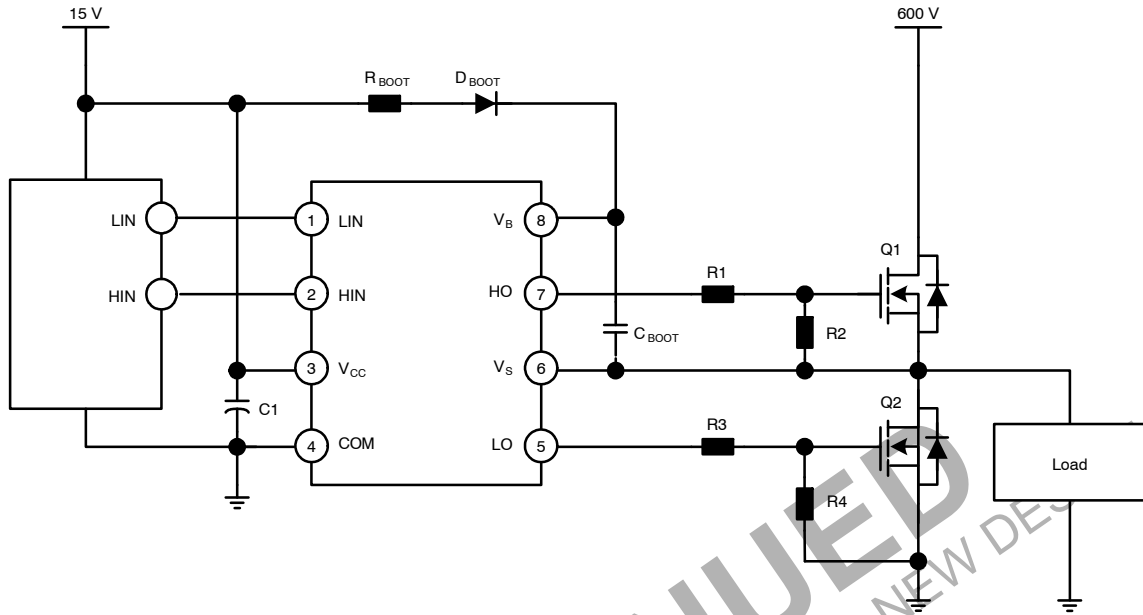


图 1. 半桥应用电路

内部框图

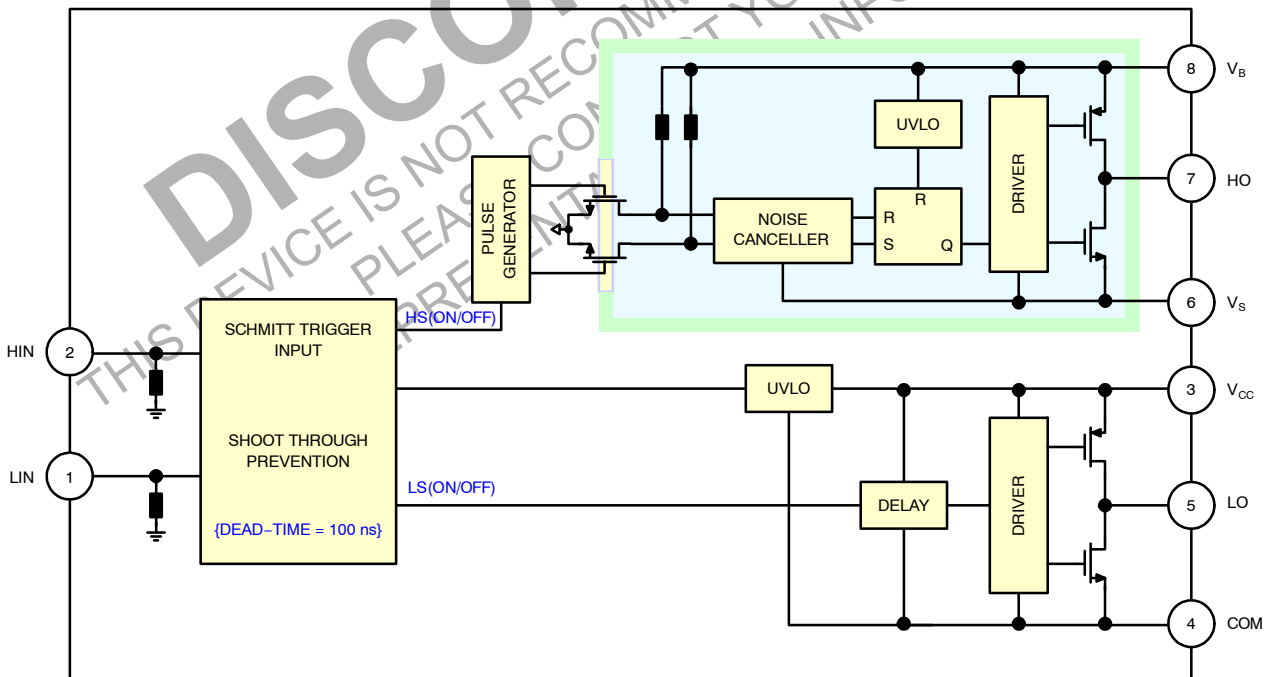


图 2. 功能框图

FAN7380-OP

引脚配置

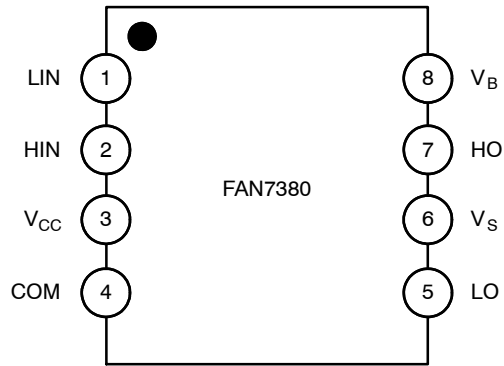


图 3. 引脚配置 (俯视图)

引脚定义

引脚号	名称	I/O	描述
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

FAN7380-OP

绝对最大额定值 (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 (注意 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_S	存储温度	-50	150	$^{\circ}\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

(参考译文)

如果电压超过最大额定值表中列出的值范围, 器件可能会损坏。如果超过任何这些限值, 将无法保证器件功能, 可能会导致器件损坏, 影响可靠性。

1. 安装到 76.2 x 114.3 x 1.6 mm PCB (FR-4 环氧玻璃材料)。
2. 参考以下标准:
JE5D51-2: 集成电路热测试方法环境条件- 自然对流
JE5D51-3: 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 。

推荐工作额定值

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	$^{\circ}\text{C}$

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

(参考译文)

高于推荐工作范围表格中所列电压时, 不保证能够正常运行。长时间在推荐工作范围表格中规定范围以外的电压下运行, 可能会影响器件的可靠性。

FAN7380-OP

静态电气特性 ($V_{BIAS}(V_{CC}, V_{BS}) = 15.0\text{ V}$, $T_A = 25^\circ\text{C}$ 。VIN 和 IIN 参数以 COM 为参考点。参数 VO 和 IO 以 VS 和 COM 作为基准，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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

(参考译文)

除非另有说明，“电气特性”表格中列出的是所列测试条件下的产品性能参数。如果在不同条件下运行，产品性能可能与“电气特性”表格中所列性能参数不一致。

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 V (说明 4)	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	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

(参考译文)

除非另有说明，“电气特性”表格中列出的是所列测试条件下的产品性能参数。如果在不同条件下运行，产品性能可能与“电气特性”表格中所列性能参数不一致。

4. 该参数由设计保证。

典型性能特征

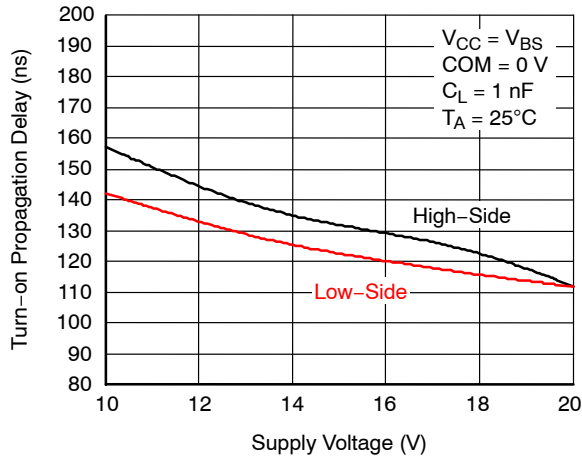


图 4. 导通传播延时与电源电压的关系

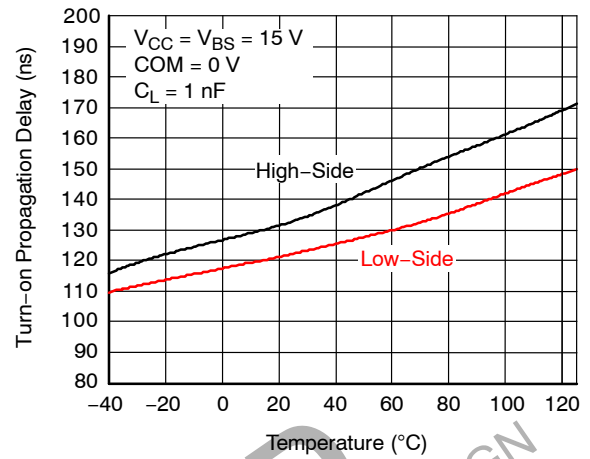


图 5. 导通传播延时与温度的关系

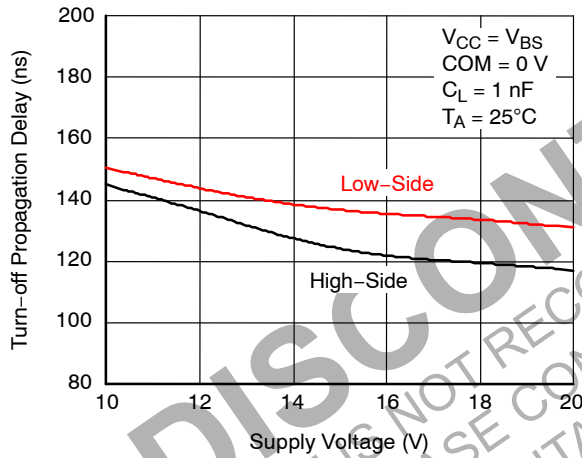


图 6. 关断传播延时与电源电压的关系

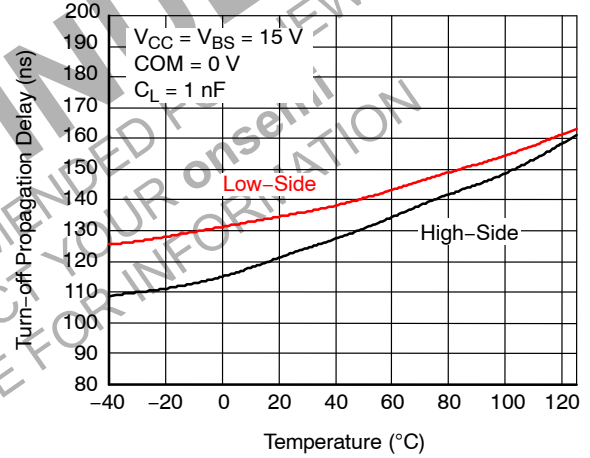


图 7. 关断传播延时与温度的关系

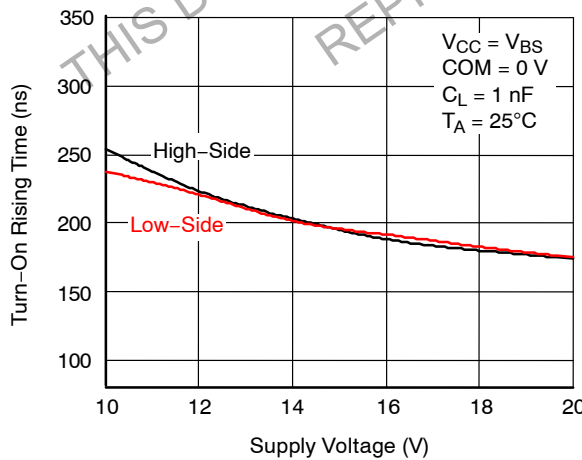


图 8. 导通上升时间与电源电压的关系

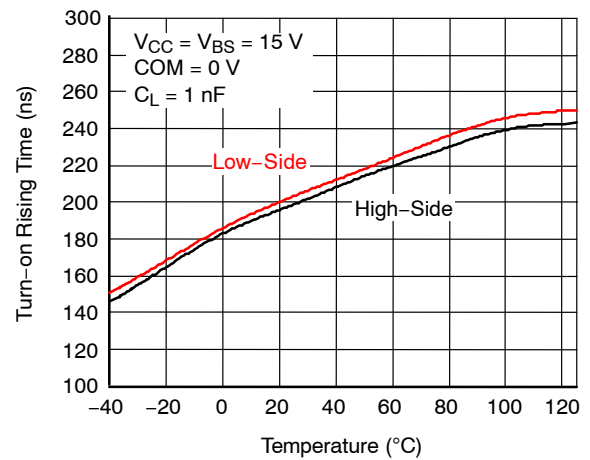


图 9. 导通上升时间与温度的关系

典型性能特征 (接上页)

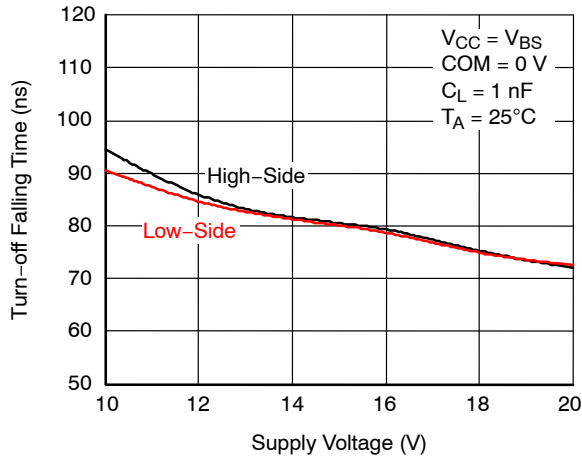


图 10. 关断下降时间与电源电压的关系

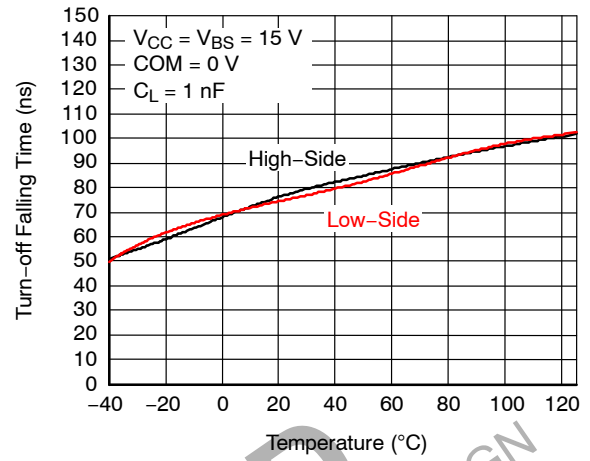


图 11. 关断下降时间与温度的关系

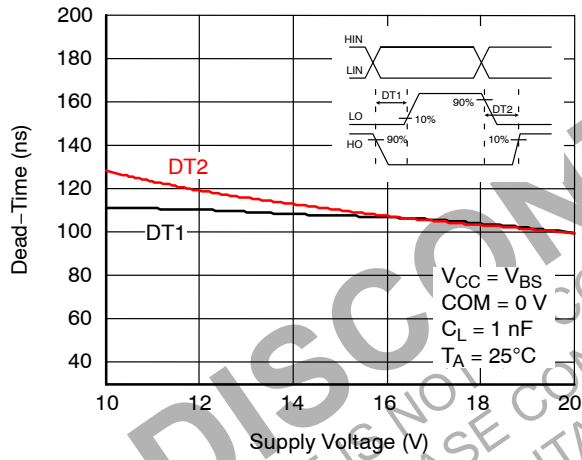


图 12. 死区时间与电源电压的关系

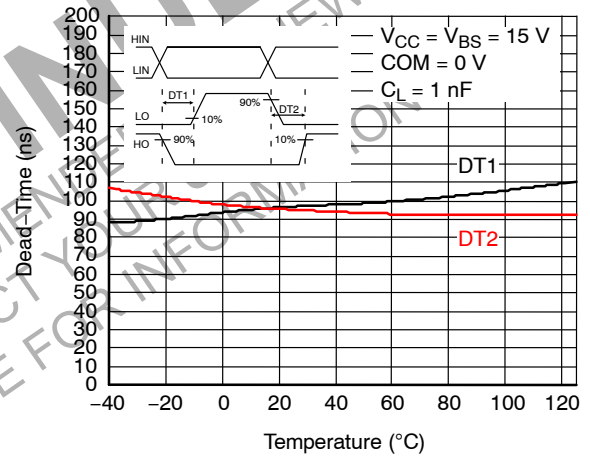


图 13. 死区时间与温度的关系

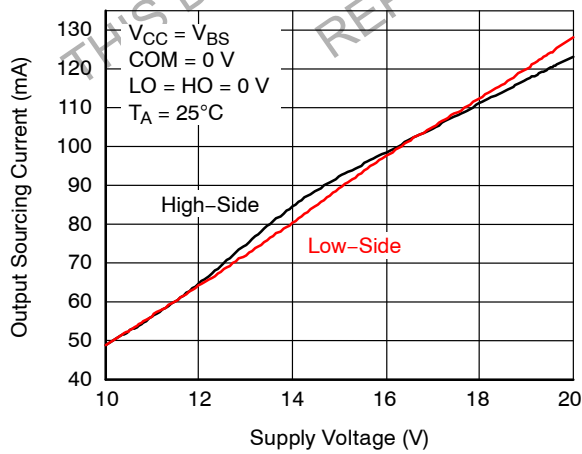


图 14. 输出源电流与电源电压的关系

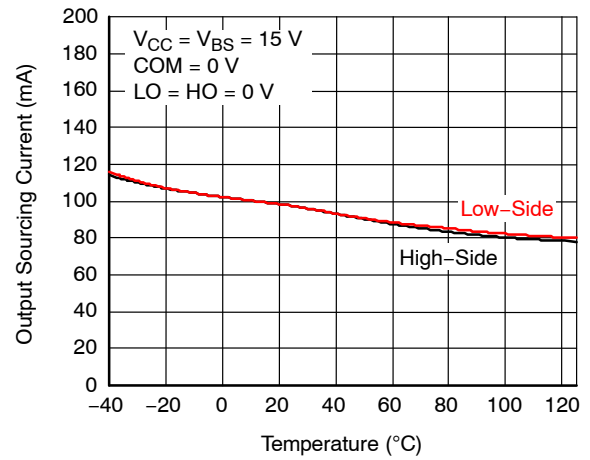


图 15. 输出源电流与温度的关系

典型性能特征 (接上页)

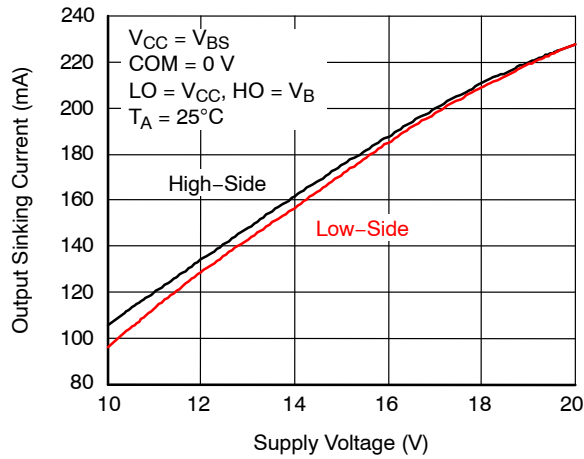


图 16. 输出灌电流与电源电压的关系

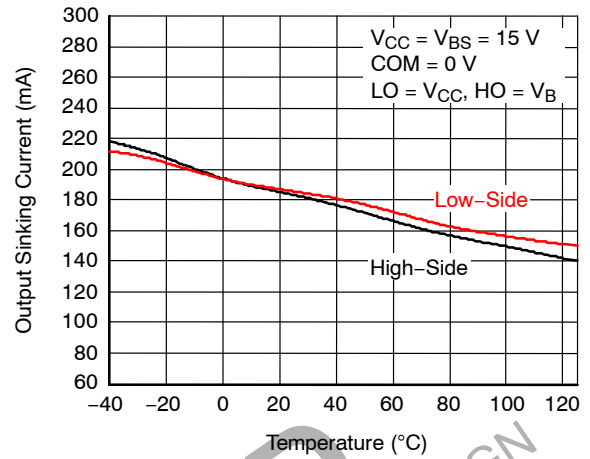
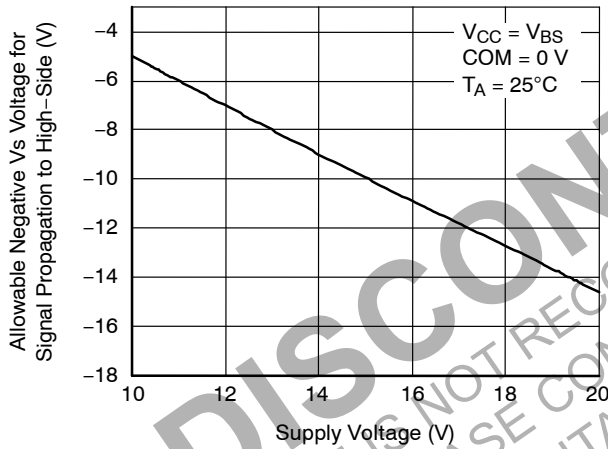
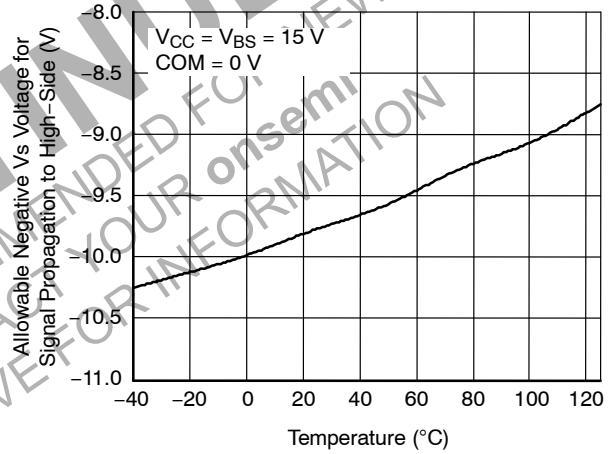
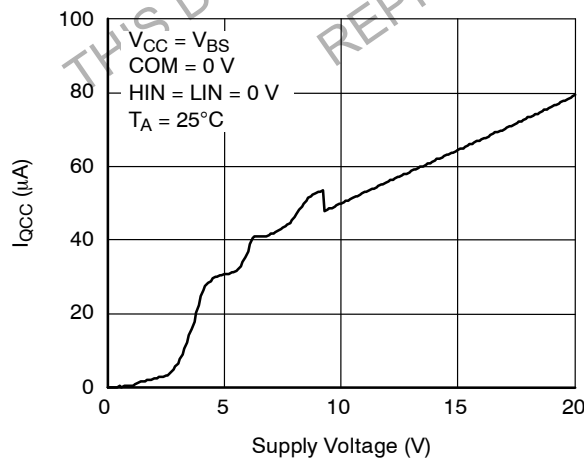
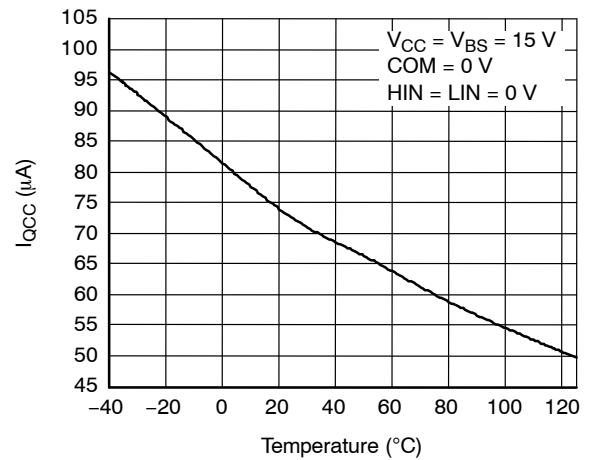


图 17. 输出灌电流与温度的关系

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)

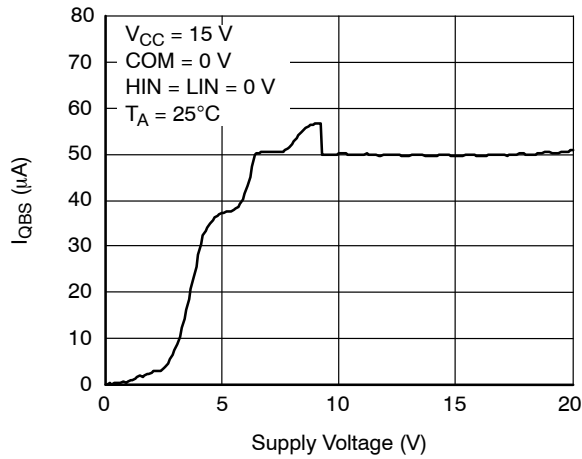
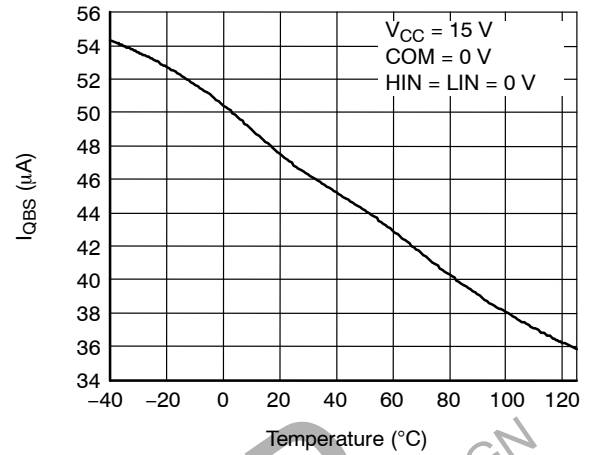
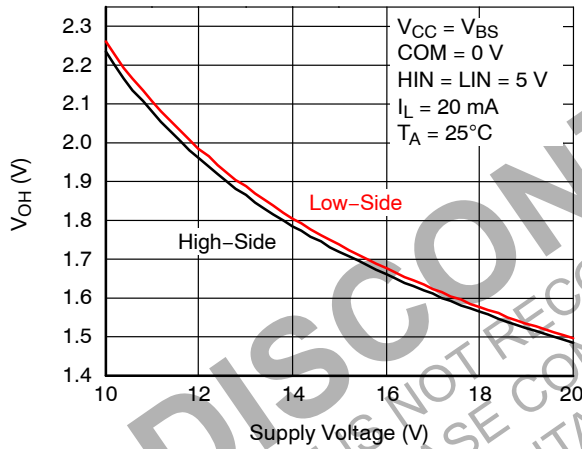
图 22. I_{QBS} 与电源电压的关系图 23. I_{QBS} 与温度的关系

图 24. 高电平输出电压与电源电压的关系

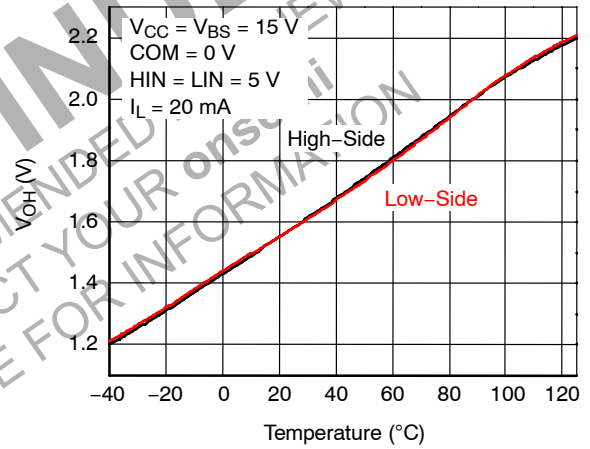


图 25. 高电平输出电压与温度的关系

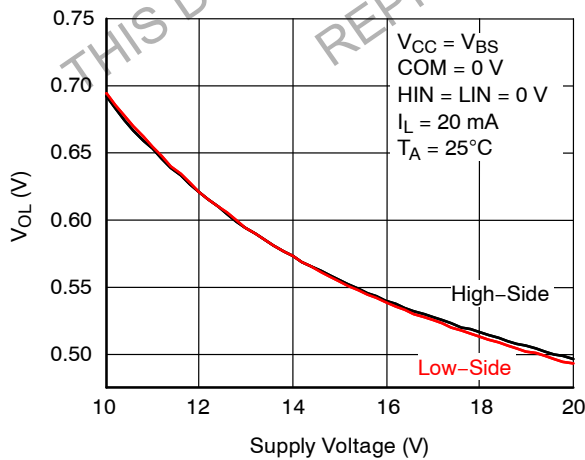


图 26. 低电平输出电压与电源电压的关系

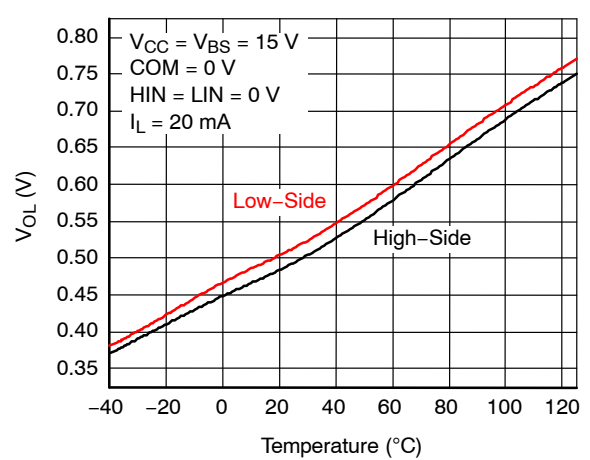


图 27. 低电平输出电压与温度的关系

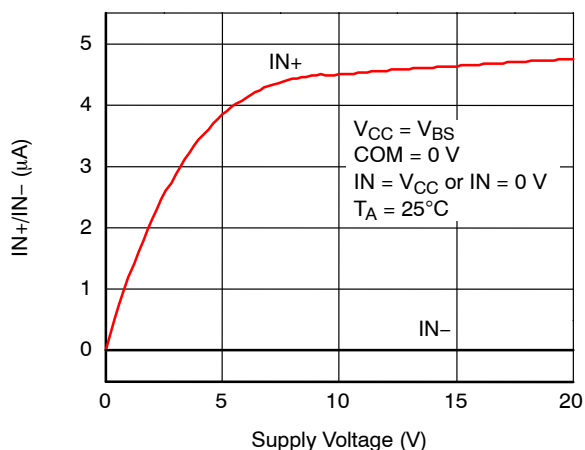


图 28. 输入偏置电流与电源电压的关系

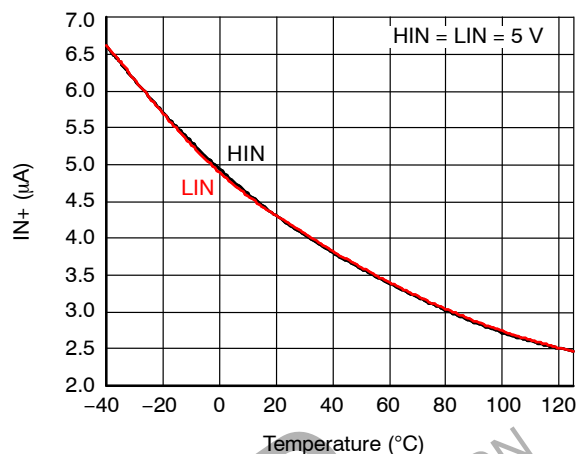


图 29. 输入偏置电流与温度的关系

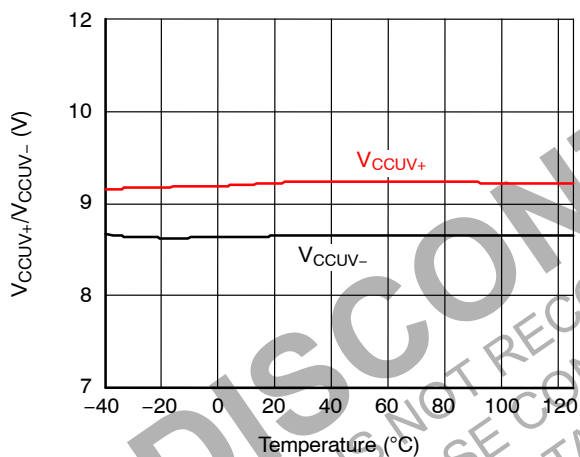
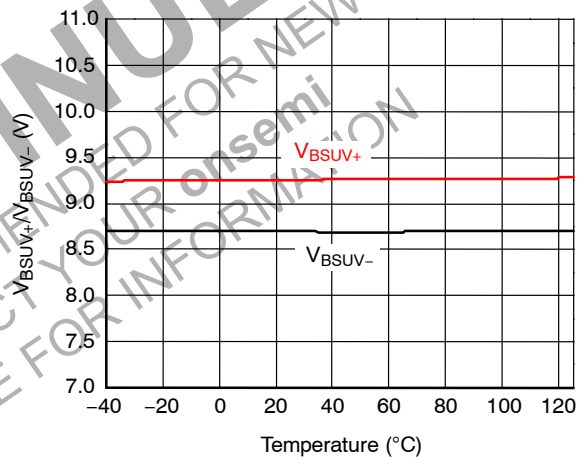
图 30. V_{CC} 欠压锁定阈值电压与温度的关系

图 31. 欠压锁定阈值电压与温度的关系

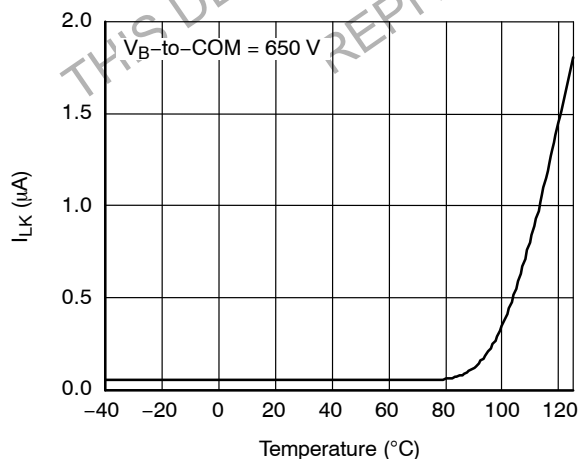


图 32. VB 至 COM 漏电流与温度的关系

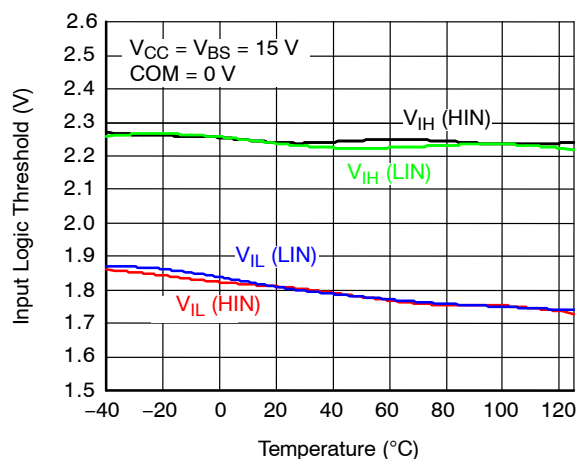


图 33. 输入逻辑阈值与温度的关系

FAN7380-OP

开关时间定义

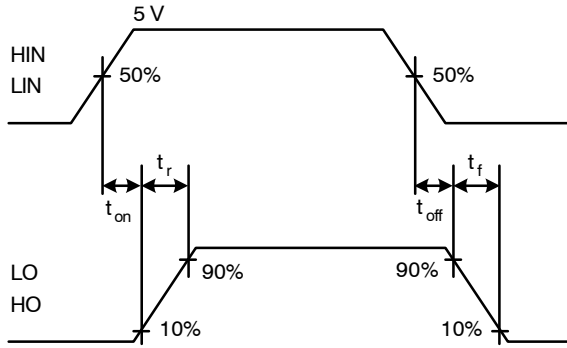


图 34. 开关时间波形

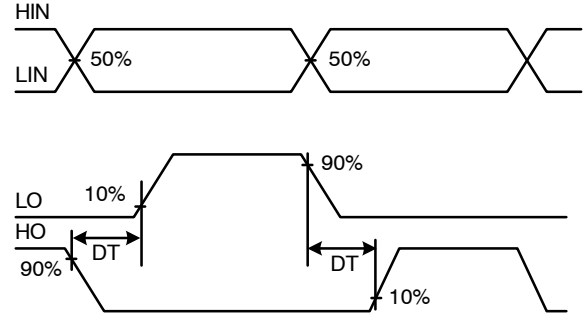


图 35. 内部死区时间时序

订购信息

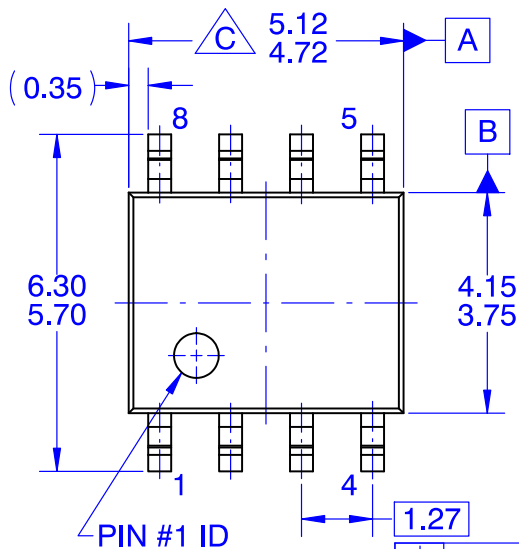
器件	封装	无铅	无铅	描述	Shipping [†]
FAN7380MX-OP (说明 5)	SOIC8 (8-SOP)	是	-40°C~+125°C	一般应用	3000 / 卷带和卷盘

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

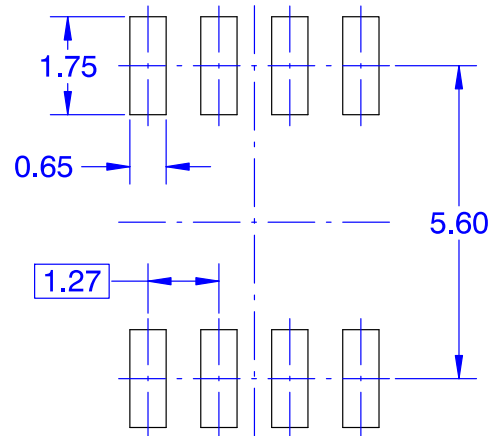
5. 该器件已通过 JESD22A-111 波动焊接测试。

SOIC8
CASE 751EG
ISSUE O

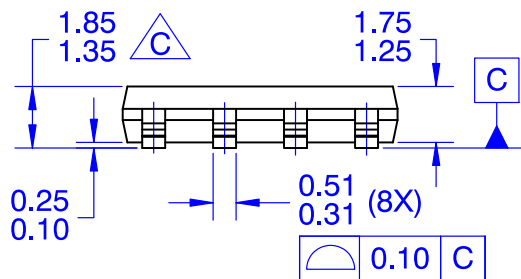
DATE 30 SEP 2016



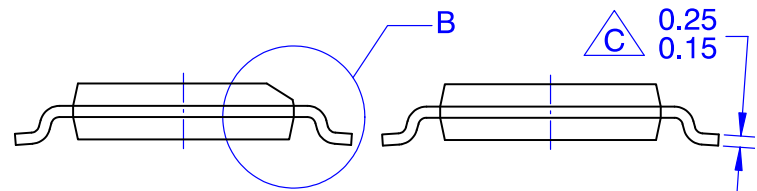
TOP VIEW



LAND PATTERN RECOMMENDATION



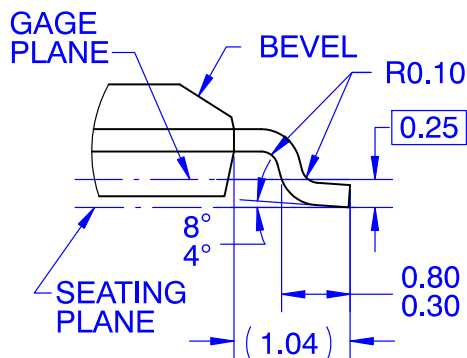
FRONT VIEW



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

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DESCRIPTION:	SOIC8	PAGE 1 OF 1

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