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FAN7382

高侧和低侧栅极驱动器

特性

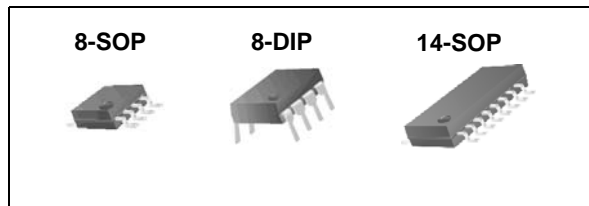
- 浮动通道专为高达 +600 V 的自举运行而设计
- 两个通道的源 / 灌电流驱动能力典型值为 350 mA/650 mA
- 共模 dv/dt 噪声消除电路
- 在 $V_{CC} = V_{BS} = 15\text{ V}$ 时信号传输过程中, 扩展允许负 V_S 摆幅低至 -9.8 V
- V_{CC} 和 V_{BS} 供电范围从 10 V 至 20 V
- 双通道的欠压锁定功能
- 兼容 TTL 的输入逻辑阈值电平
- 匹配传输延迟低于 50 ns
- 输出信号与输入信号同相位

应用

- PDP 扫描驱动器
- 荧光灯镇流器
- SMPS
- 电动机驱动

说明

FAN7382 为单片高侧和低侧栅极驱动 IC, 用来驱动工作电压高达 +600 V 的 MOSFET 和 IGBT。飞兆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允许高侧驱动器的工作偏置电压达 $V_S = -9.8\text{ V}$ (典型值), 当 $V_{BS} = 15\text{ V}$ 时, 输入逻辑电平与标准 TTL 系列逻辑栅极兼容。两个通道的欠压闭锁锁定电路在 V_{CC} 或 V_{BS} 低于指定阈值电压时, 防止出现故障。输出驱动器通常提供 350mA/650mA 的源电流 / 灌电流, 适合荧光灯镇流器、PDP 扫描驱动器和电机控制等。



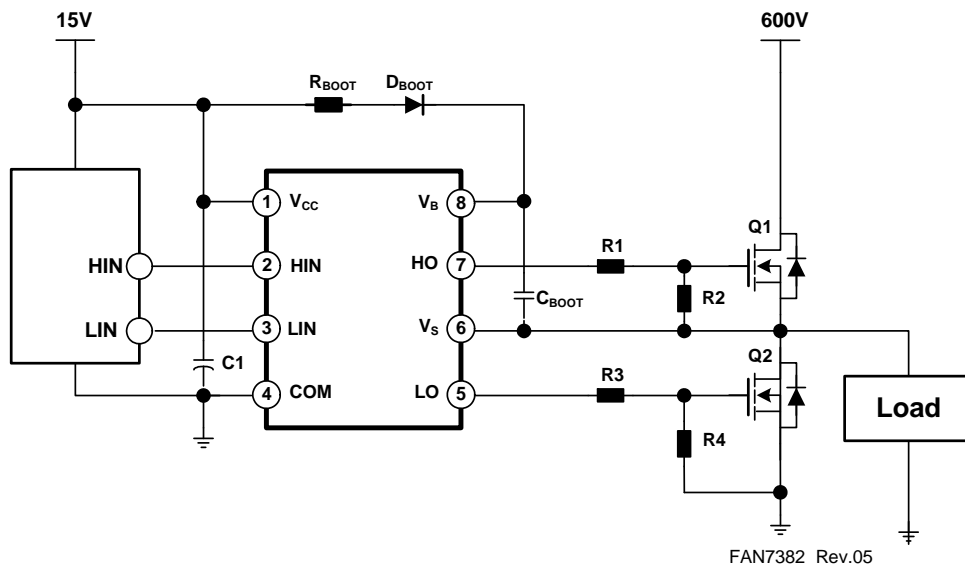
订购信息

器件编号	封装	无铅	工作温度范围	包装方法
FAN7382N	8-DIP	是	-40°C ~ 125°C	塑料管
FAN7382M ⁽¹⁾	8-SOP			塑料管
FAN7382MX ⁽¹⁾				卷带和卷盘
FAN7382M1 ⁽¹⁾	14-SOP			塑料管
FAN7382M1X ⁽¹⁾				卷带和卷盘

注:

1. 这些器件通过了 JESD22A-111 波峰焊测试。

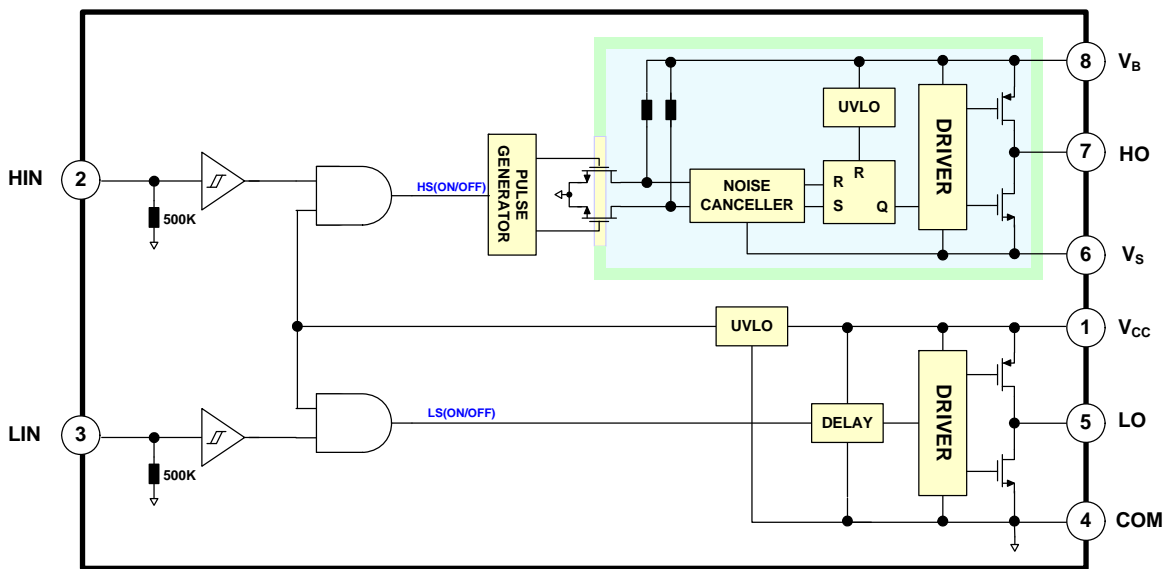
典型应用电路



FAN7382 Rev.05

图 1. 半桥应用电路

内部框图



FAN7382 Rev.04

图 2. 功能框图

引脚配置

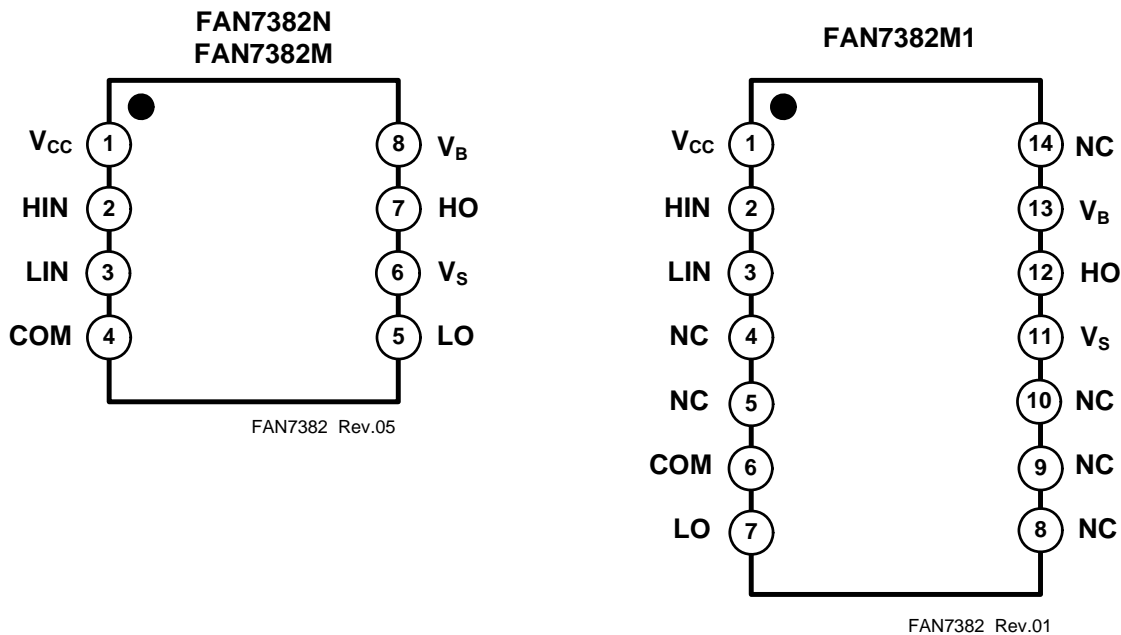


图 3. 引脚配置（俯视图）

引脚定义

名称	说明
V _{CC}	低侧电源电压
HIN	高侧栅极驱动器输出的逻辑输入
LIN	低侧栅极驱动器输出的逻辑输入
COM	逻辑地和低侧驱动器返回
LO	低侧栅极输出
V _S	高侧浮动电源电压返回
HO	高侧驱动输出
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。

符号	特性	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	
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	
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	8-SOP	0.625	W
		14-SOP	1.0	
		8-DIP	1.2	
θ_{JA}	结至环境热阻	8-SOP	200	°C/W
		14-SOP	110	
		8-DIP	100	
T_J	结温		150	°C
T_{STG}	存储温度		150	°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
- 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	°C

电气特性

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

符号	特性	测试条件	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			0.6		
I_{LK}	偏置电源漏电流	$V_B=V_S=600V$			50	μA
I_{QBS}	V_{BS} 静态电源电流	$V_{IN}=0V$ 或 $5V$		45	120	
I_{QCC}	V_{CC} 静态电源电流	$V_{IN}=0V$ 或 $5V$		70	180	
I_{PBS}	V_{BS} 工作电源电流	$f_{IN}=20kHz$ 、rms 值			600	μA
I_{PCC}	V_{CC} 工作电源电流	$f_{IN}=20kHz$,rms value			600	
V_{IH}	逻辑“1”输入电压		2.9			V
V_{IL}	逻辑“0”输入电压				0.8	
V_{OH}	高电平输出电压, $V_{BIAS}-V_O$	$I_O=20mA$			1.0	
V_{OL}	低电平输出电压, V_O				0.6	
I_{IN+}	逻辑“1”输入偏置电流	$V_{IN}=5V$		10	20	μA
I_{IN-}	逻辑“0”输入偏置电流	$V_{IN}=0V$		1.0	2.0	
I_{O+}	输出高电平短路脉冲电流	$V_O=0V$ 、 $V_{IN}=5V$ 、 $PW<10\mu s$	250	350		mA
I_{O-}	输出低电平短路脉冲电流	$V_O=15V$ 、 $V_{IN}=0V$ 、 $PW<10\mu s$	500	650		
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

除非另有说明, $V_{BIAS} (V_{CC}, V_{BS})=15.0V$, $V_S=COM$, $C_L=1000pF$ and, $T_A = 25^{\circ}C$ 。

符号	特性	测试条件	最小值	典型值	最大值	单位
t_{on}	导通传输延时	$V_S=0V$	100	170	300	ns
t_{off}	关断传输延时	$V_S=0V$ 或 $600V^{(5)}$	100	200	300	
t_r	导通上升时间		20	60	140	
t_f	关断下降时间			30	80	
MT	延时匹配, HS 与 LS 导通 / 关断				50	

注:

5. 该参数由设计保证。

典型特性

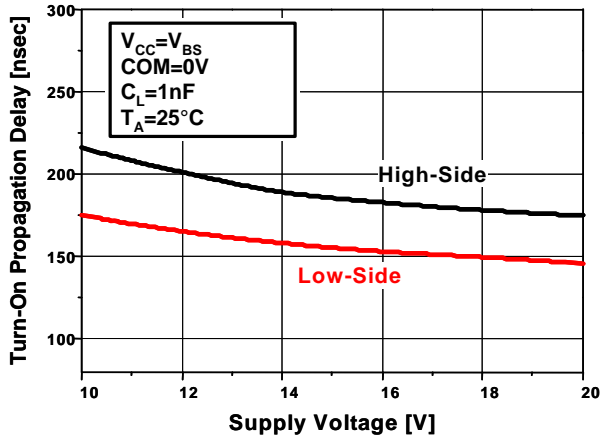


图 4. 导通传播延时与电源电压的关系

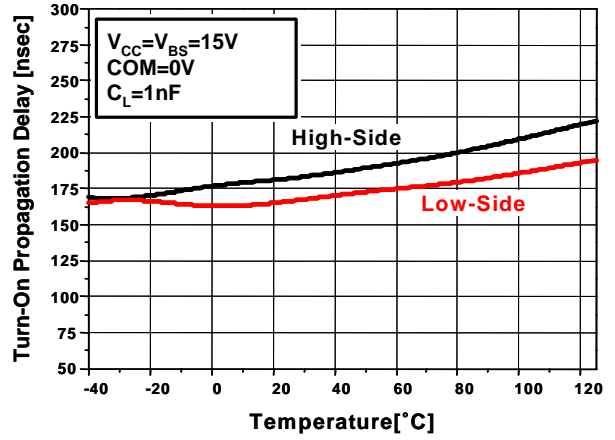


图 5. 导通传播延时与温度的关系

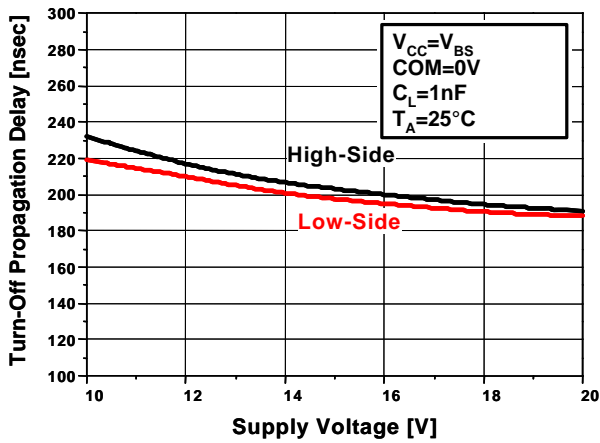


图 6. 关断传播延时与电源电压的关系

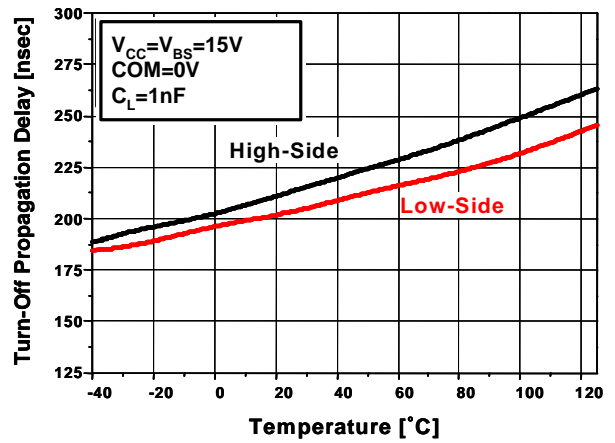


图 7. 关断传播延时与温度的关系

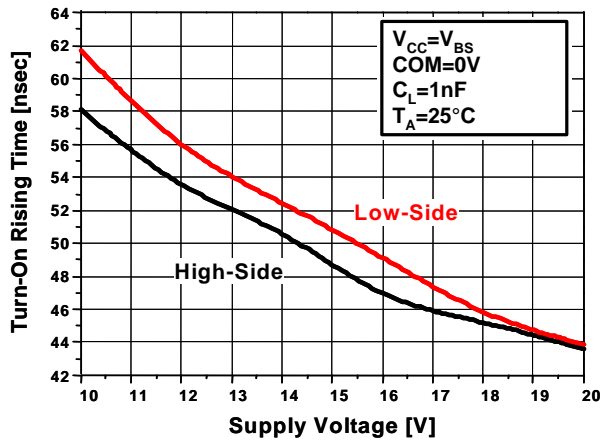


图 8. 导通上升时间与电源电压的关系

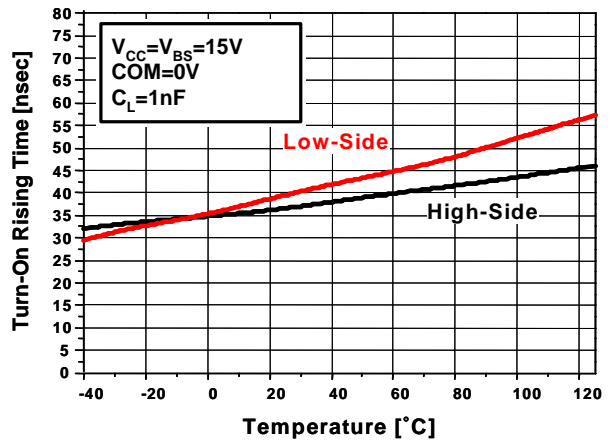


图 9. 导通上升时间与温度的关系

典型特性 (续)

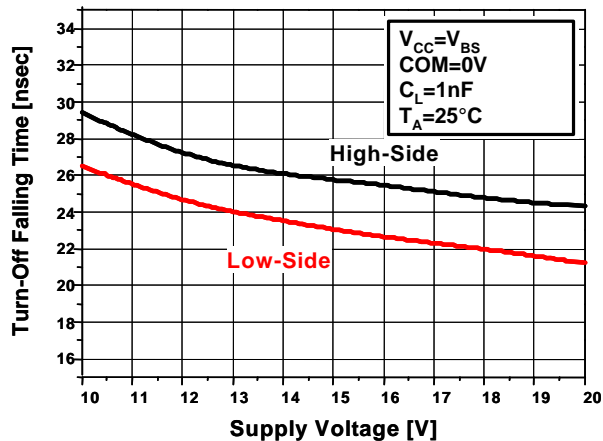


图 10. 关断下降时间与电源电压的关系

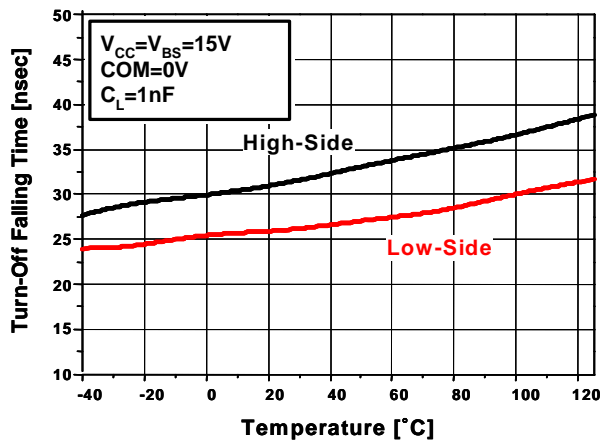


图 11. 关断下降时间与温度的关系

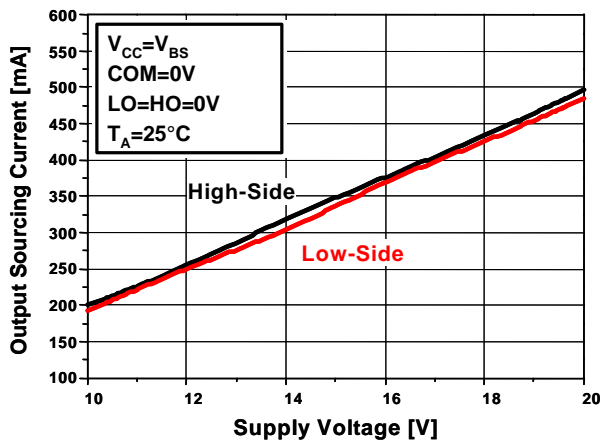


图 12. 输出源电流与电源电压的关系

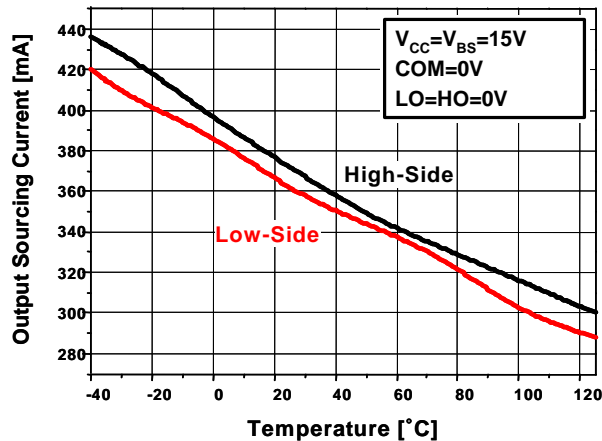


图 13. 输出源电流与温度的关系

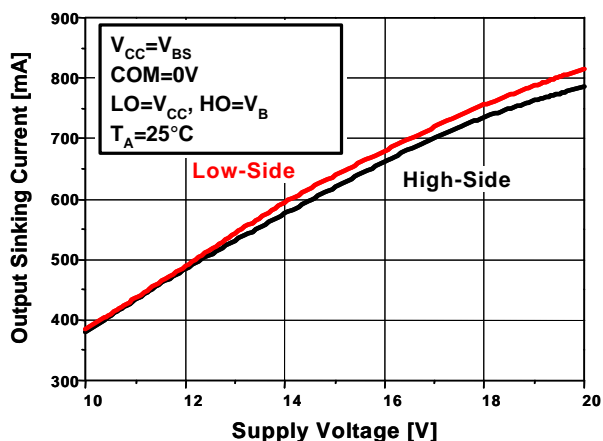


图 14. 输出灌电流与电源电压的关系

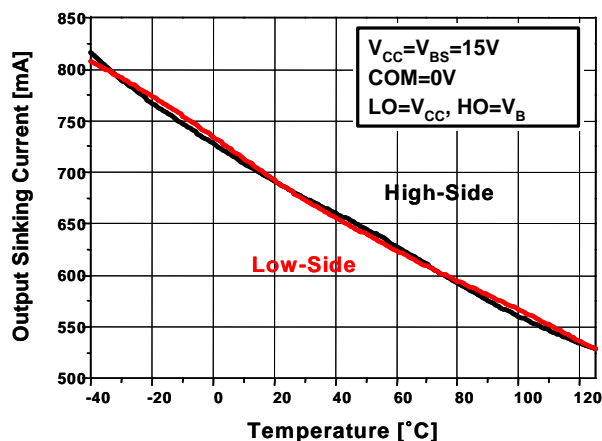


图 15. 输出灌电流与温度的关系

典型特性 (续)

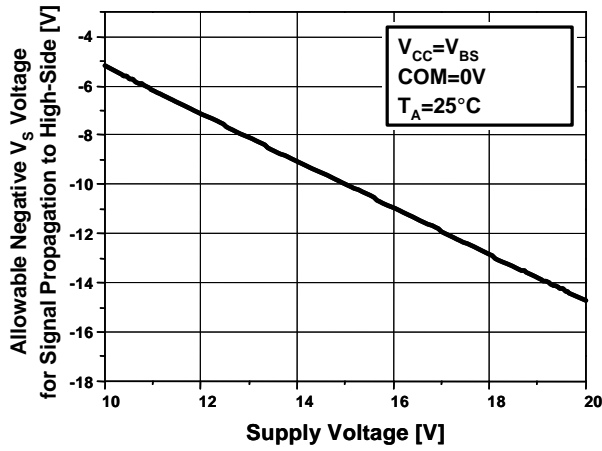


图 16. 信号传播到高侧时允许的 V_S 负电压与电源电压的关系

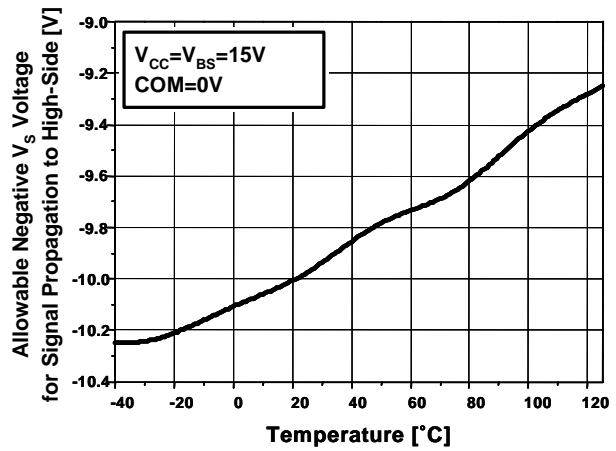


图 17. 信号传播到高侧时允许的 V_S 负电压与温度的关系

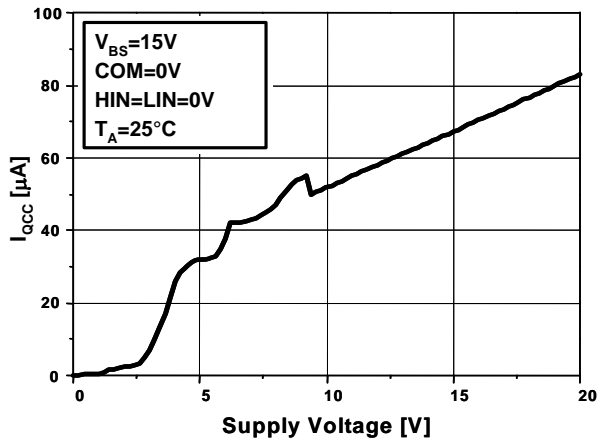


图 18. I_{QCC} 与电源电压的关系

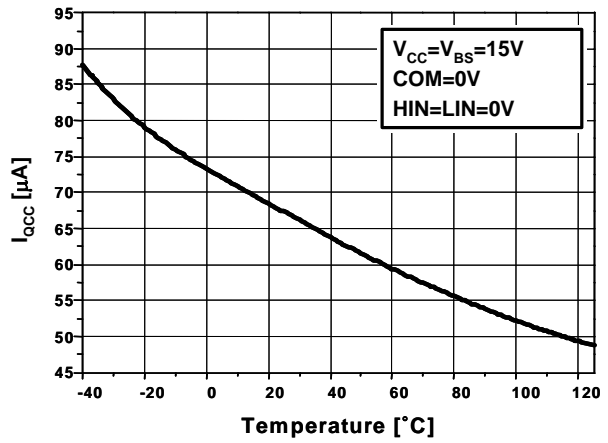


图 19. I_{QCC} 与温度的关系

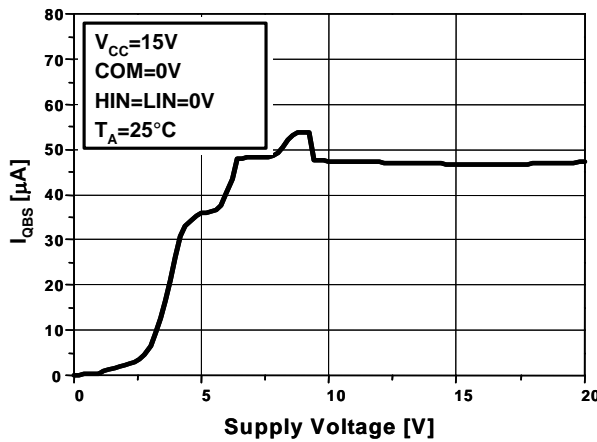


图 20. I_{QBS} 与电源电压的关系

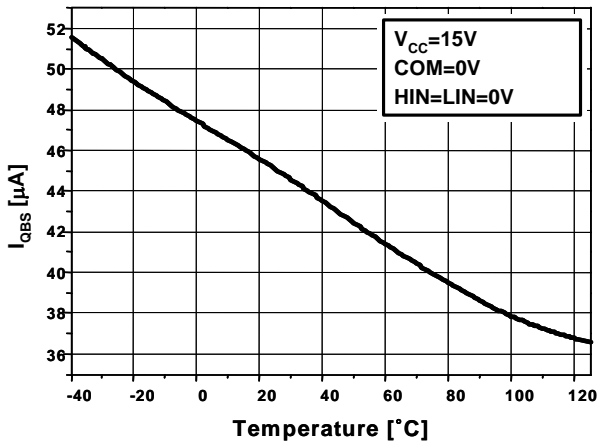


图 21. I_{QBS} 与温度的关系

典型特性 (续)

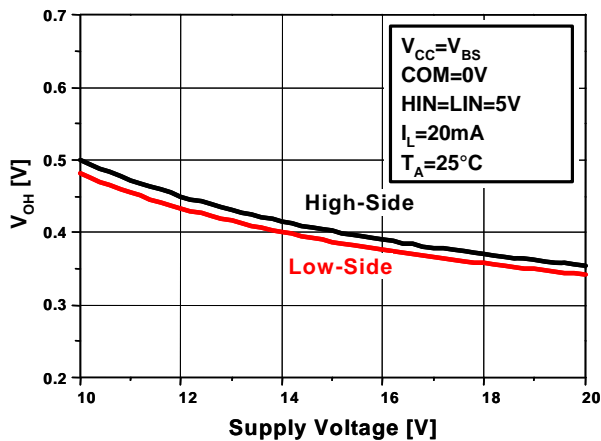


图 22. 高电平输出电压与电源电压的关系

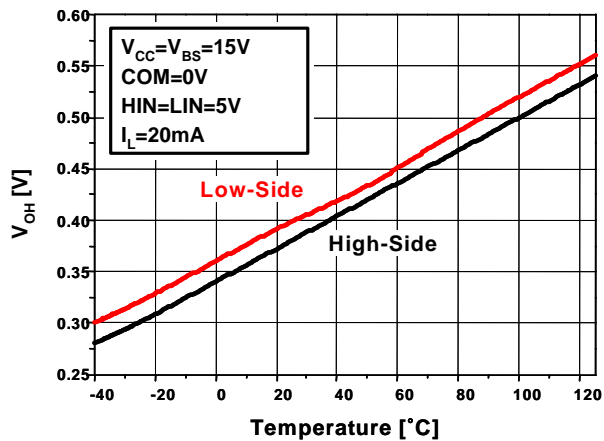


图 23. 高电平输出电压与温度的关系

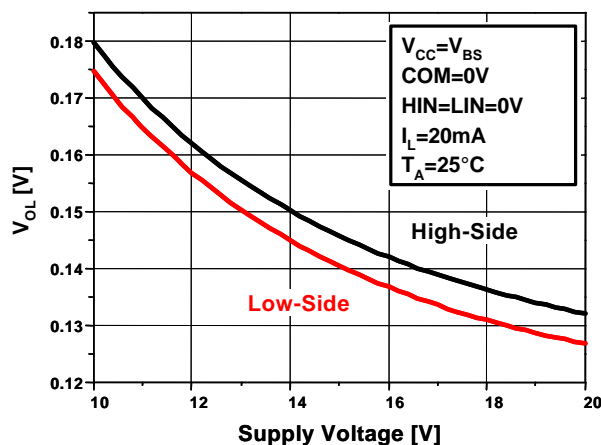


图 24. 低电平输出电压与电源电压的关系

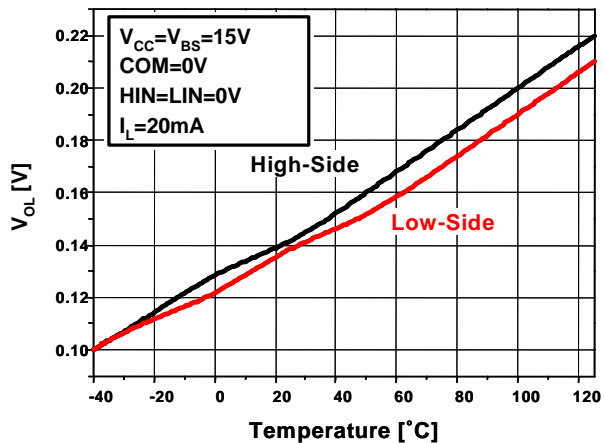


图 25. 低电平输出电压与温度的关系

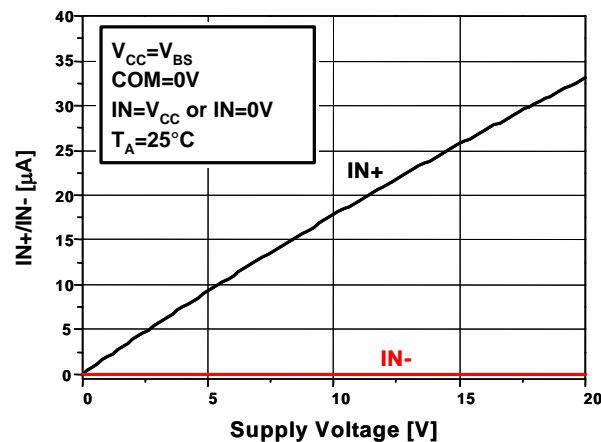


图 26. 输入偏置电流与电源电压的关系

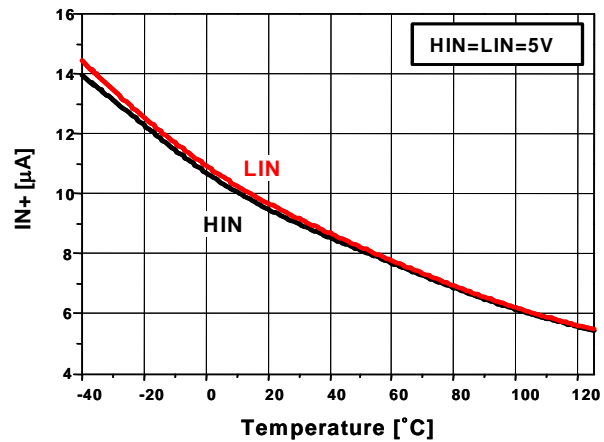


图 27. 输入偏置电流与温度的关系

典型特性 (续)

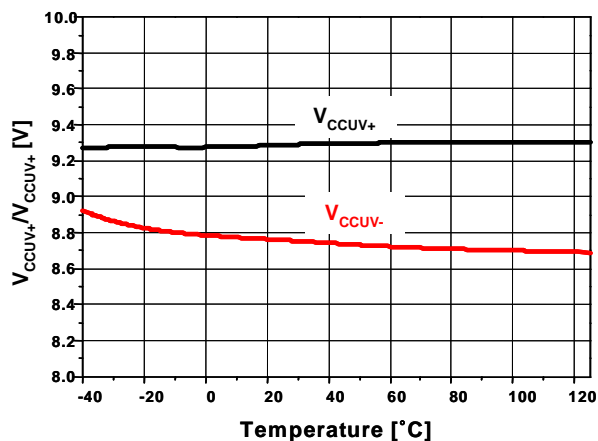


图 28. V_{CC} 欠压锁定阈值电压与温度的关系

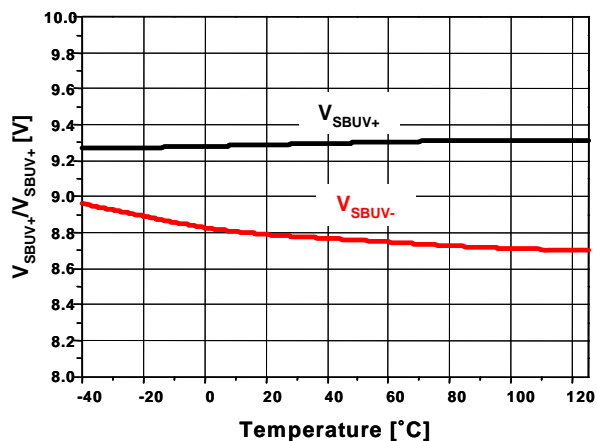


图 29. V_{BS} 欠压锁定阈值电压与温度的关系

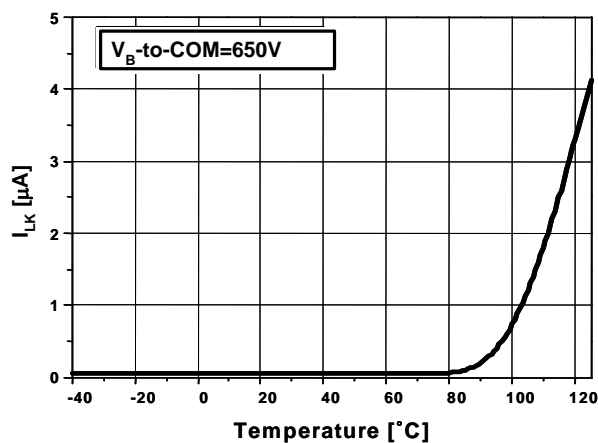


图 30. V_B 至 COM 漏电流与温度的关系

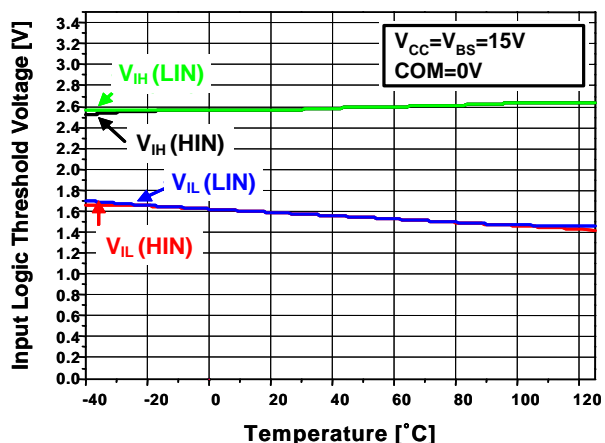


图 31. 输入逻辑阈值电压与温度的关系

典型特性 (续)

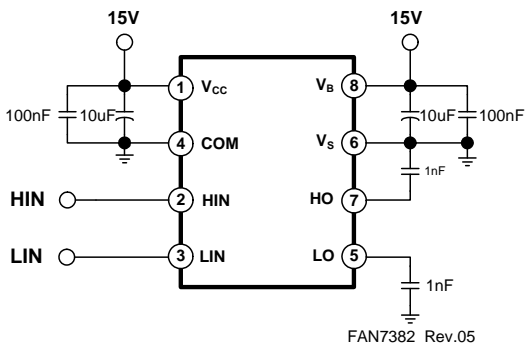


图 32. 开关时间测试电路

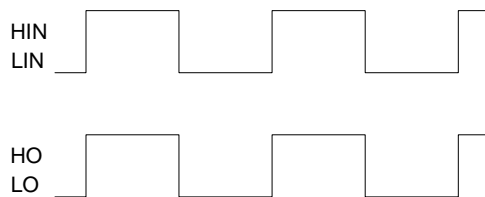


图 33. 输入 / 输出时序图

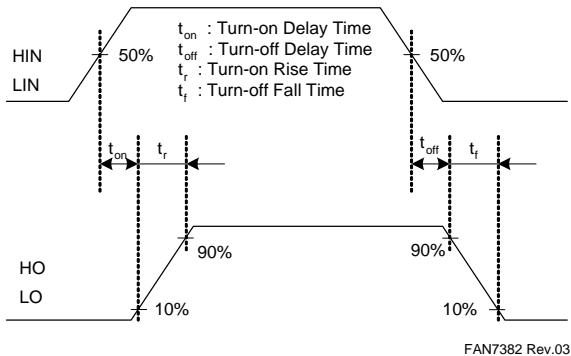


图 34. 开关时间波形定义

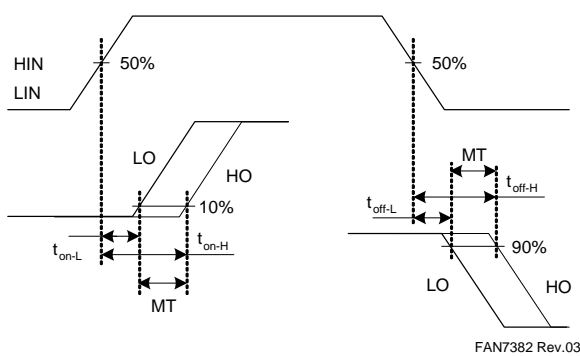
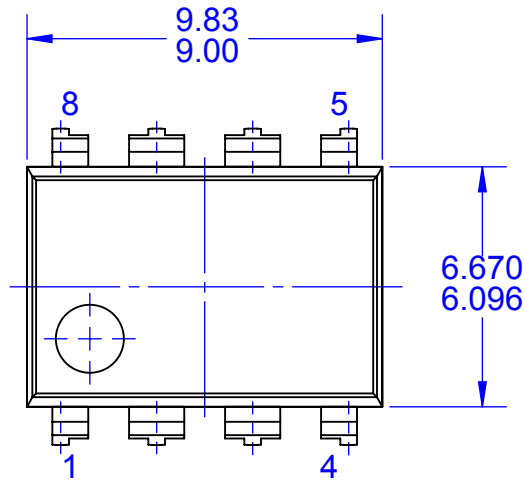
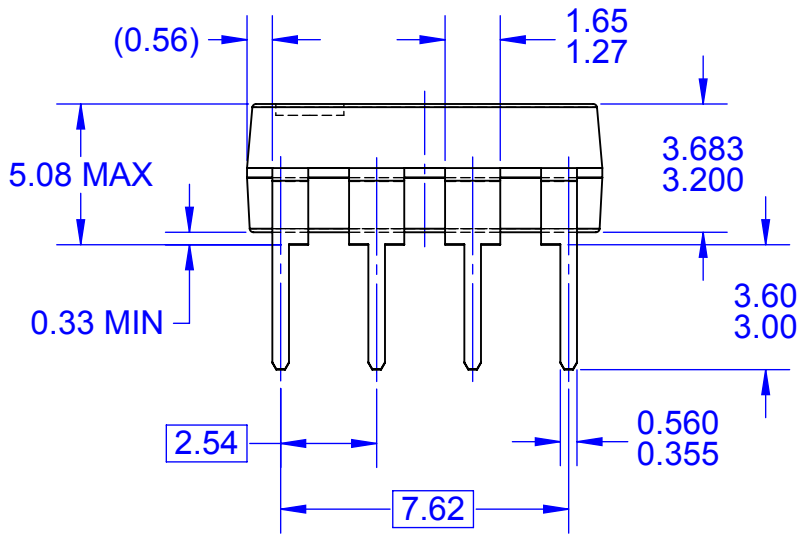


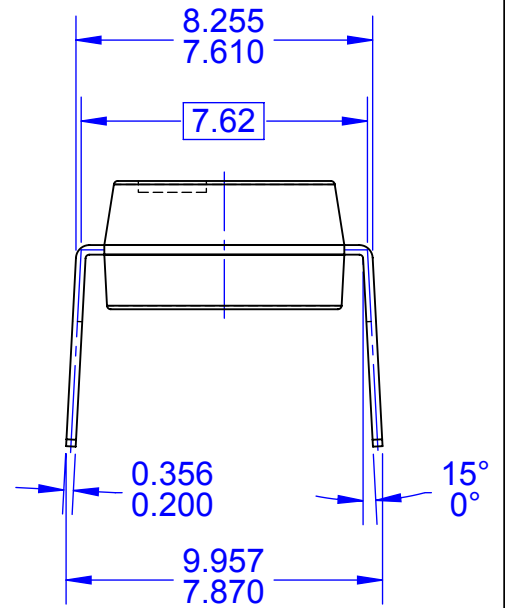
图 35. 延时匹配波形定义



TOP VIEW



FRONT VIEW

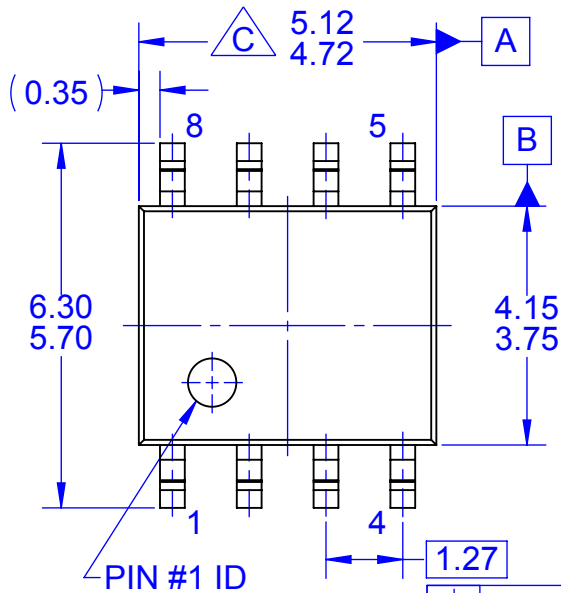


SIDE VIEW

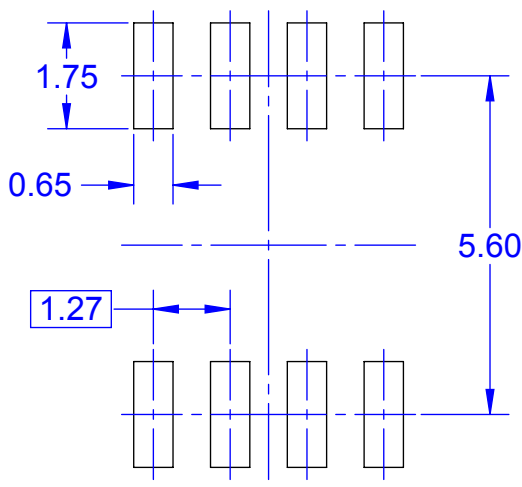
NOTES:

- A. CONFORMS TO JEDEC MS-001, VARIATION BA
- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS
- D. DIMENSIONS AND TOLERANCES PER ASME Y14.5M-2009
- E. DRAWING FILENAME: MKT-N08Frev3

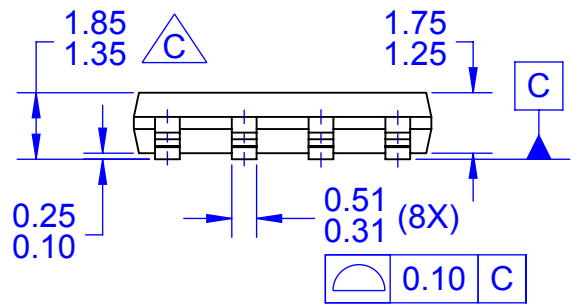




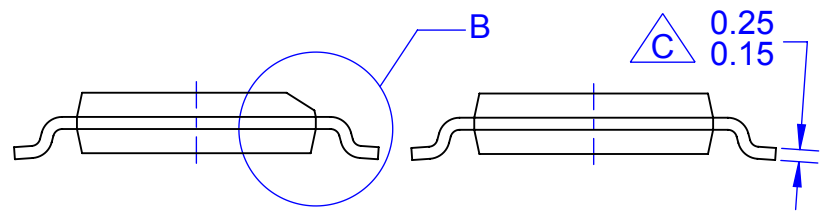
TOP VIEW



LAND PATTERN RECOMMENDATION



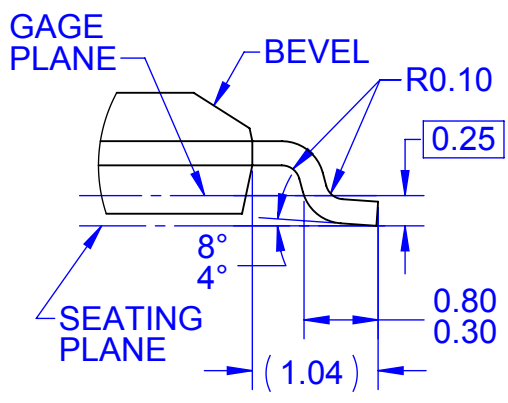
FRONT VIEW



OPTION A
BEVEL EDGE

OPTION B
NON-BEVEL EDGE

SIDE VIEW

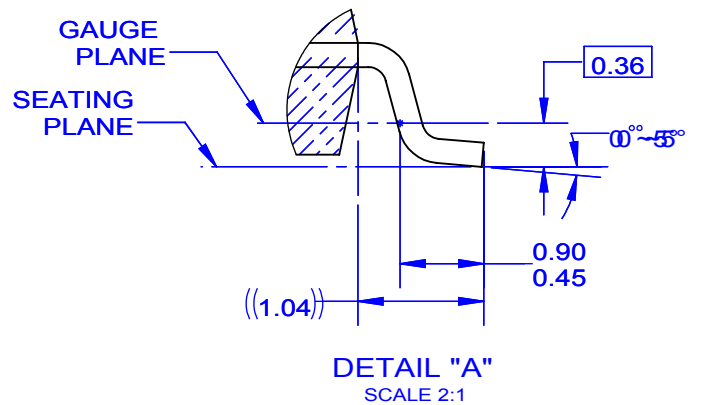
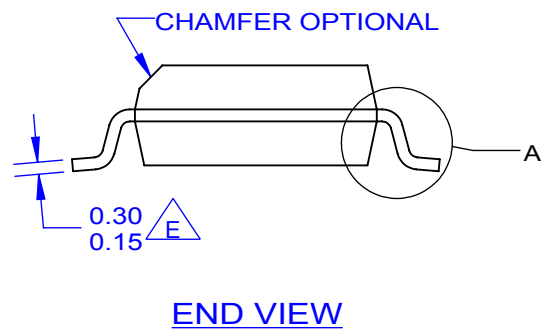
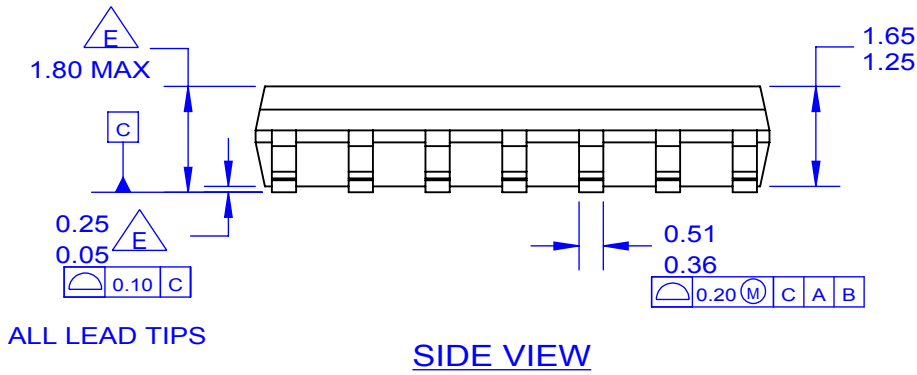
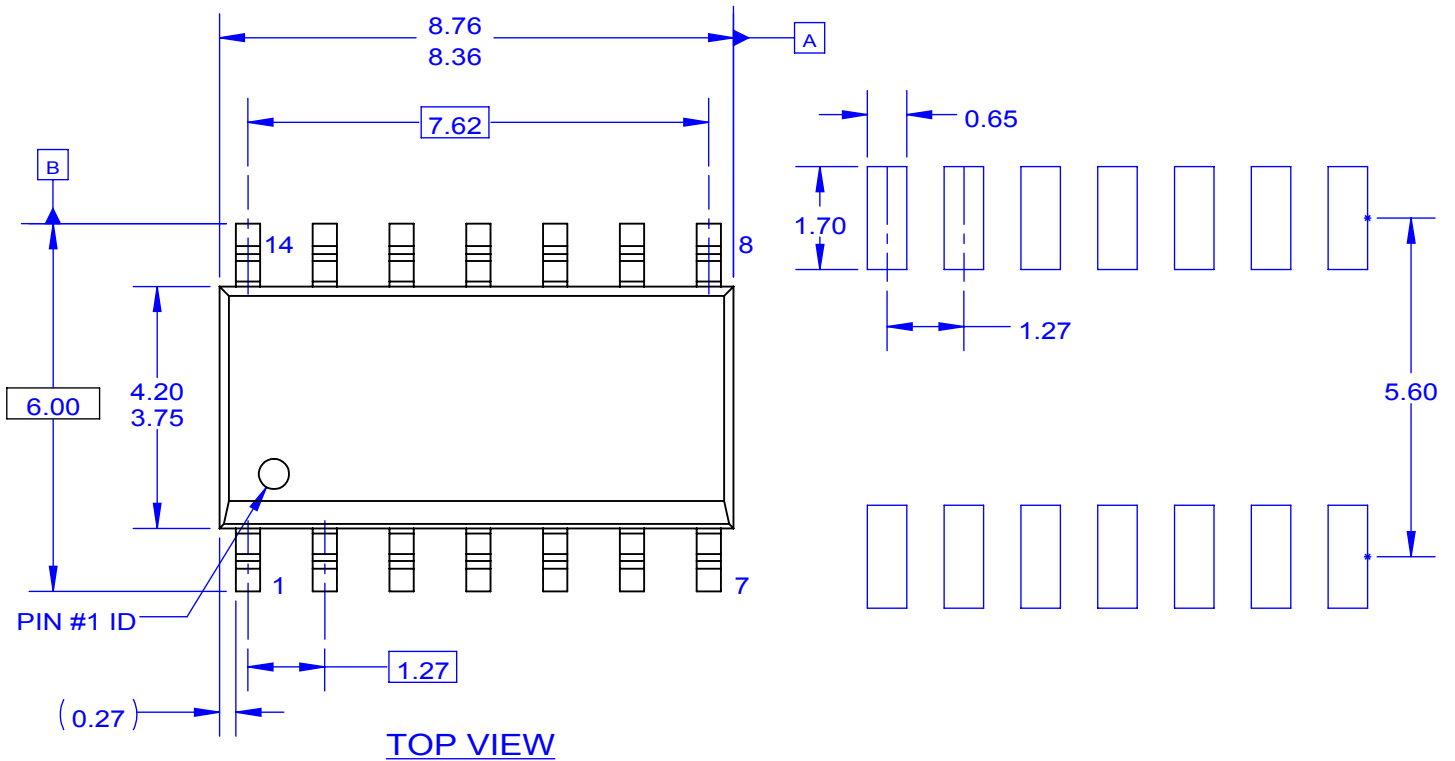


DETAIL "B"
SCALE 2:1

NOTES: UNLESS OTHERWISE SPECIFIED

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- B. ALL DIMENSIONS ARE IN MILLIMETERS
- C. OUT OF JEDEC STANDARD VALUE
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- E. LAND PATTERN AS PER IPC SOIC127P600X175-8M
- F. DRAWING FILENAME: MKT-M08Brev2





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C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.

D. DIMENSIONS AND TOLERANCES AS PER ASME Y14.5-1994.

E. OUT OF JEDEC STANDARD VALUE.

F. LAND PATTERN STANDARD: SOIC127P600X145-14M.

G. FILE NAME: MKT-M14C REV2

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