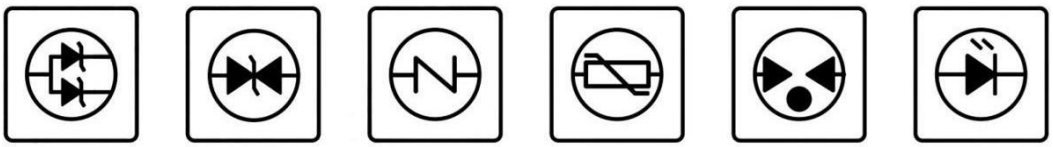
MSKSEMI 美森科
SEMICONDUCTOR



MSDGD2110S16-13

Product specification

产品概述

MSDGD2110S16-13是一款高压、高速的功率 MOSFET 和 IGBT 驱动器，它提供独立的高边、低边输出驱动信号。采用专有的高压集成电路和锁存免疫 CMOS 技术，提供可靠的单芯片驱动方案。逻辑输入电平与标准 CMOS 或 LSTTL 输出兼容，最低支持 3.3V 逻辑。输出驱动器具有高脉冲电流缓冲级，以减小驱动器交叉导通。延时匹配功能方便应用于高频设备。浮动通道可用于驱动高边配置的 N 型沟道功率 MOSFET 或 IGBT，工作电压可以达到 600V。

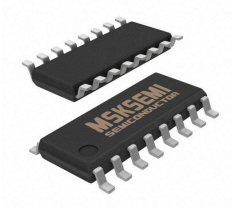
主要特点

- 为自举供电设计的浮动通道
- 工作电压最高达到 600V
- 允许瞬态负电压，不受 dV/dt 影响
- 驱动电源范围从 10V 到 20V
- 高低边欠压锁定
- 3.3V、5V 和 15V 逻辑兼容
- 逻辑地和功率地能承受±5V 偏置
- 防止交叉导通逻辑
- 带有下拉电阻的施密特触发器
- 逐周期边缘触发的关闭逻辑
- 两通道间的传递延时匹配
- 输入输出同相
- 典型驱动电流：2.0A/2.0A
- 典型开启/关闭延时：140ns/140ns
- 符合 RoHS
- SOP-16 封装

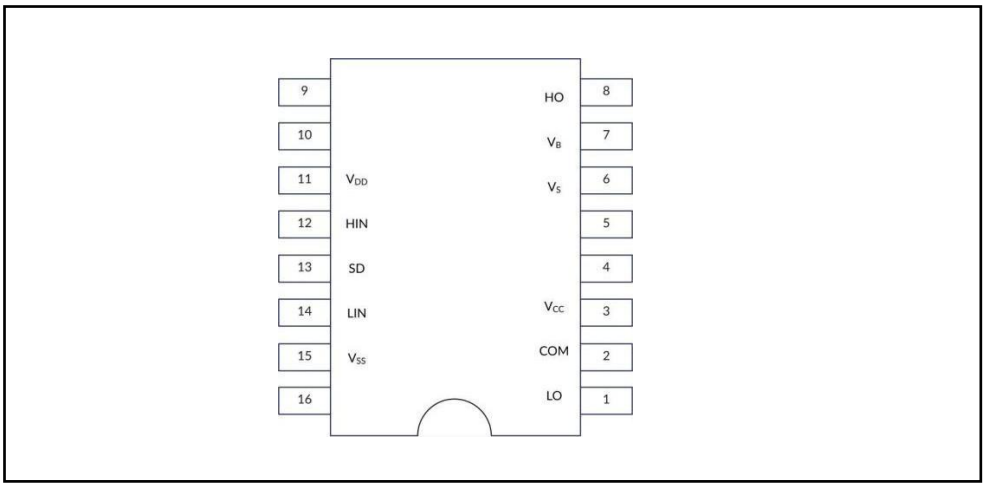
典型应用

- 充电器、电源适配器等
- 通用逆变器
- 电机驱动

封装信息

SOP-16	管体标记
	MSKSEMI R2110S MS**

引脚排列



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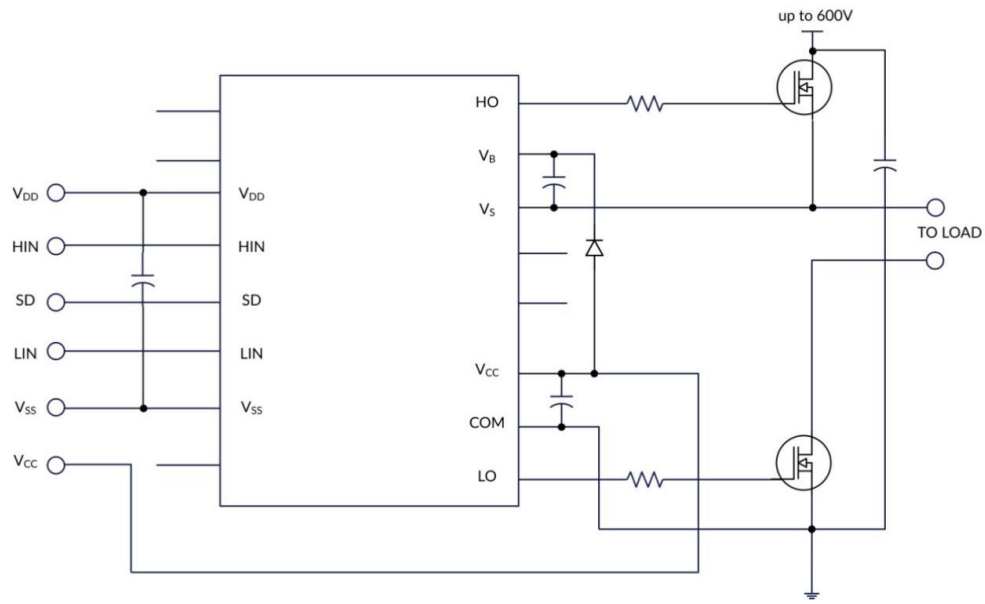
引出端功能

序号	符号	功能描述
1	LO	低端驱动输出
2	COM	低端公共端
3	V_{CC}	低端电源
4	NC	
5	NC	
6	V_S	高端悬浮输出端
7	V_B	高端自举电源
8	HO	高端驱动输出
9	NC	
10	NC	
11	V_{DD}	逻辑电源
12	HIN	高端驱动逻辑输入
13	SD	驱动关闭控制
14	LIN	低端驱动逻辑输入
15	V_{SS}	逻辑地
16	NC	

订货信息

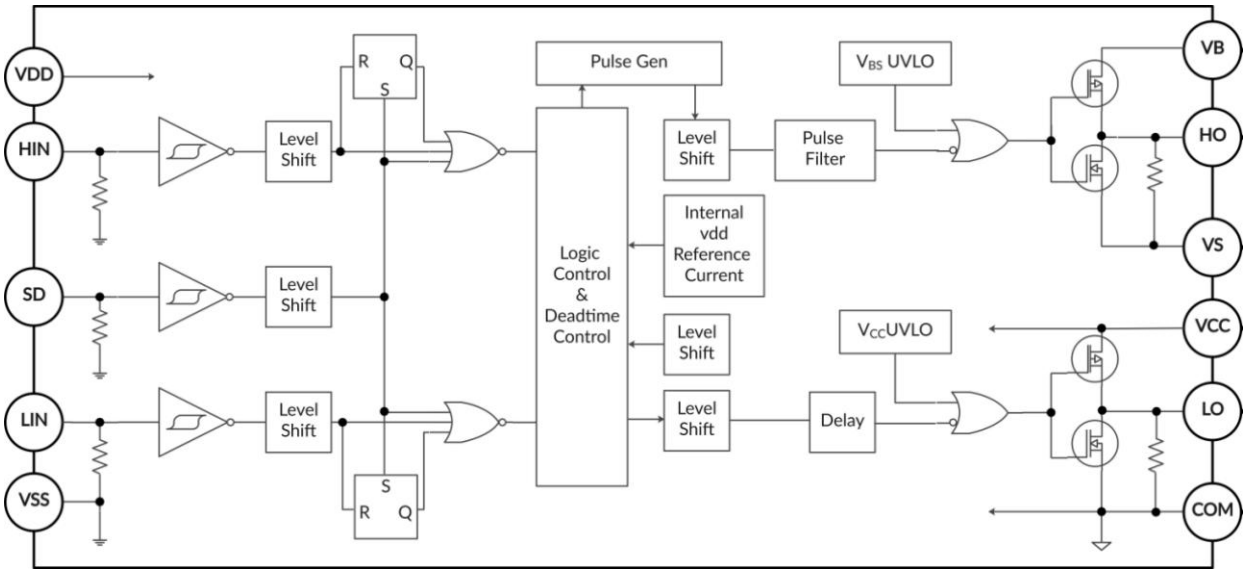
型号	封装形式	QTY
MSDGD2110S16-13	SOP-16	1500PCS

典型应用



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电路方框图


VDD
HIN
SD
LIN
VSS
Level Shift
Level Shift
Level Shift
R Q S
S R Q
Pulse Gen
Logic Control & Deadtime Control
Level Shift
Level Shift
Level Shift
Internal vdd Reference Current
Pulse Filter
Delay
VBS UVLO
VCC UVLO
VB
HO
VS
VCC
LO
COM

最大额定值

无特别说明情况下，COM 为参考地，T_A=25℃

项目	符号	最小值	最大值	单位
高端自举电源电压	V_B	-0.3	625	V
高端悬浮输出端电压	V_S	V_B-25	V_B+0.3	V
高端驱动输出电压	V_{HO}	V_S-0.3	V_B+0.3	V
低端电源电压	V_{CC}	-0.3	25	V
逻辑电源电压	V_{DD}	-0.3	V_{SS}+20	V
逻辑地	V_{SS}	V_{CC}-20	V_{CC}+0.3	V
低端驱动输出电压	V_{LO}	-0.3	V_{CC}+0.3	V
逻辑输入电压（HIN，LIN&SD）	V_{IN}	V_{SS}-0.3	V_{DD}+0.3	V
V_S允许的电压变化斜率	dVs/dt	-	50	V/ns
最大功耗@T_A≤+25℃	P_D	-	1.25	W
PN 结到环境的热阻	θ_{JA}	-	100	℃/W
结温	T_J	-	150	℃
储存温度	T_S	-55	150	℃
焊接温度(焊接，10 秒)	T_L	-	300	℃

注：超最大额定值应用可能会对器件造成永久性损伤。

推荐工作条件

参数说明	符号	最小值	最大值	单位
高端自举电源电压	V_B	V_S+10	V_S+20	V
高端悬浮输出端电压	V_S		600	V
高端驱动输出电压	V_{HO}	V_S	V_B	V
低端电源电压	V_{CC}	10	20	V
逻辑电源电压	V_{DD}	V_{SS}+3	V_{SS}+20	V
逻辑地	V_{SS}	-5	5	V
低端驱动输出电压	V_{LO}	0	V_{CC}	V
逻辑输入电压（HIN，LIN&SD）	V_{IN}	V_{SS}	V_{DD}	V
环境温度	T_A	-40	125	℃

注：输入/输出时序如图 1 所示。VS 和 VSS 偏移值在所有电源偏置在 15 V 的情况下测试。

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电气参数

无特别说明情况下，V_{BIAS}（V_{CC}，V_{BS}，V_{DD}）=15 V，T_A=25° C。

参数说明	符号	测试条件	最小值	典型值	最大值	单位
V_{BS} 静态电流 1	I_{QBS1}	V_{IN}=0V		35	60	uA
V_{CC} 静态电流 1	I_{QCC1}			130	250	uA
V_{DD} 静态电流 1	I_{QDD1}			0.1	1	uA
V_{BS} 静态电流 2	I_{QBS2}	V_{IN}=V_{DD}		370	600	uA
V_{CC} 静态电流 2	I_{QCC2}			450	800	uA
V_{DD} 静态电流 2	I_{QDD2}			0.1	1	uA
偏置电源漏电流	I_{LK}	V_B=V_S=600V			50	uA
逻辑“1”输入偏置电流	I_{IN+}	V_{IN}=15V		25	50	uA
逻辑“0”输入偏置电流	I_{IN-}	V_{IN}=0V		0	5	uA
逻辑“1”输入电平	V_{IH}	V_{DD}=15V	10.0		—	V
逻辑“0”输入电平	V_{IL}		—		5.0	V
高电平输出电压，V_{BIAS}-V_O	V_{OH}	I_O=2mA	—		0.2	V
低电平输出电压，V_O	V_{OL}		—		0.15	V
高端欠压保护正阈值	V_{BSUV+}		7.5	8.6	9.7	V
高端欠压保护负阈值	V_{BSUV-}		7.0	7.9	9.2	V
低端欠压保护正阈值	V_{CCUV+}		7.5	8.6	9.7	V
低端欠压保护负阈值	V_{CCUV-}		7.0	7.9	9.2	V
输出高短路电流	I_{O+}	V_O=0V,VIN=Logic“1”,PW≤10us	—	2.0	—	A
输出低短路电流	I_{O-}	V_O=15V,VIN=Logic“0”,PW≤10us	—	2.0	—	A
开启传递延时	t_{on}	C_L=1000 pF,V_S=0V	—	140	200	ns
关闭传递延时	t_{off}	C_L=1000 pF,V_S=0V	—	140	200	ns
SD 关闭延时	t_{sd}	C_L=1000 pF,V_S=0V	—	130	180	ns
开启上升延时	t_r	C_L=1000 pF	—	10	35	ns
关闭下降延时	t_f	C_L=1000 pF	—	10	35	ns
延时匹配	MT		—	—	10	ns

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特性曲线

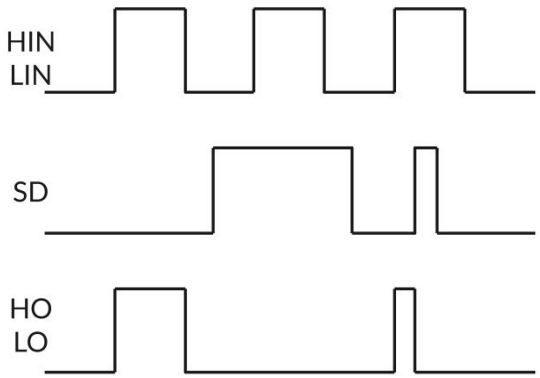


图 1. 输入/输出时序图

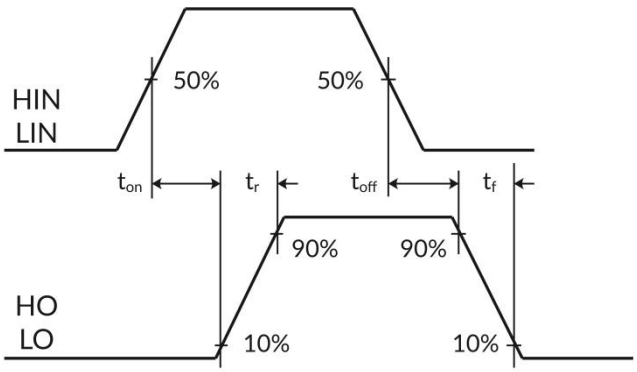


图 2. 信号传递时序图

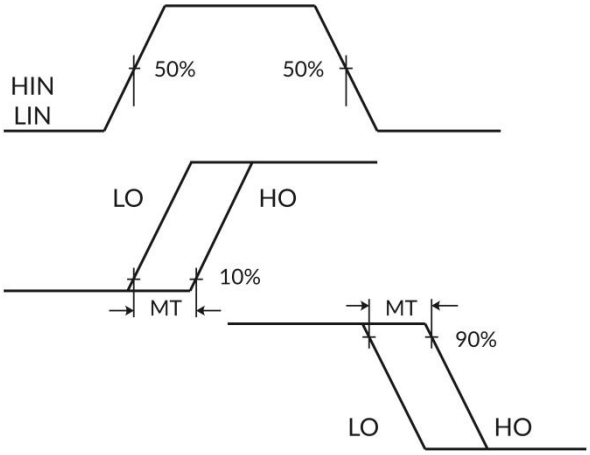


图 3. 延迟匹配波形图

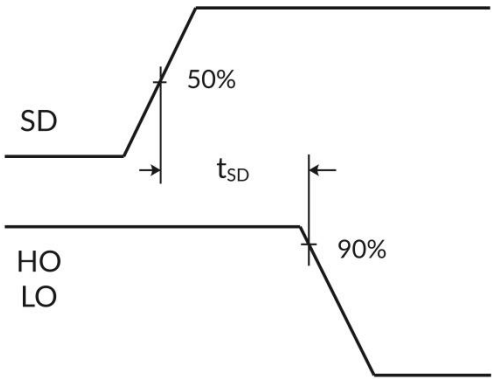


图 4. SD 关闭延时波形图

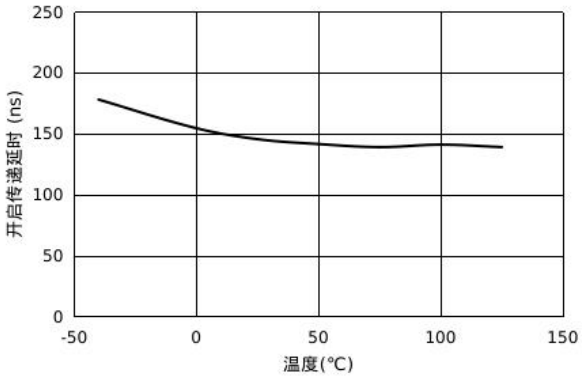


图 5. 开启传递延时 vs. 温度

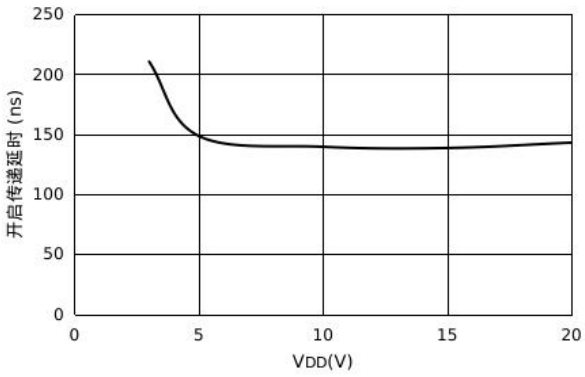


图 6. 开启传递延时 vs. V_{DD}

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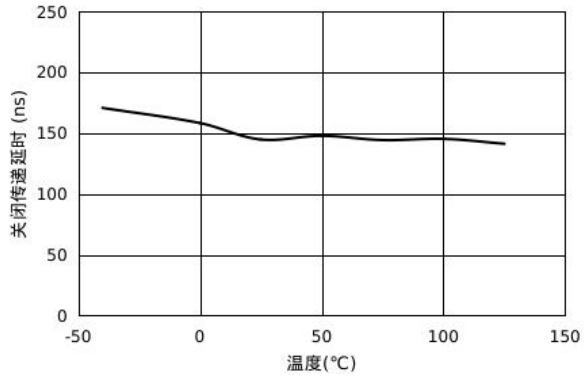


图 7. 关闭传递延时 vs. 温度

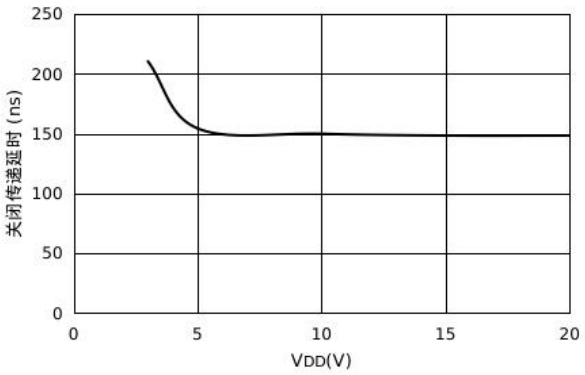


图 8. 关闭传递延时 vs. V_{DD}

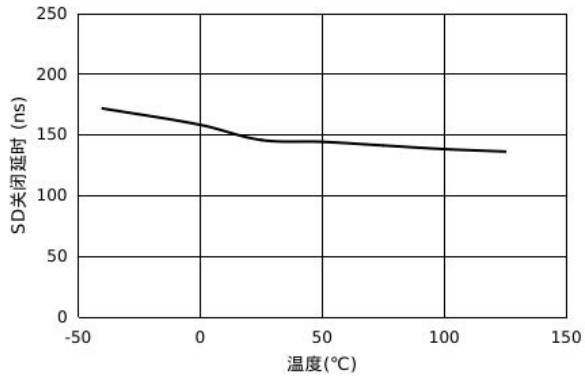


图 9. SD 关闭延时 vs. 温度

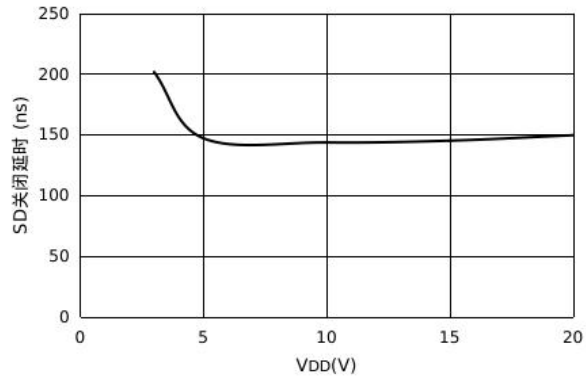


图 10. SD 关闭延时 vs. V_{DD}

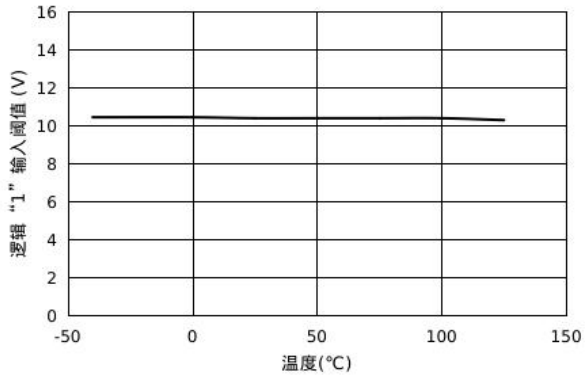


图 11. 逻辑 "1" 输入阈值 vs. 温度

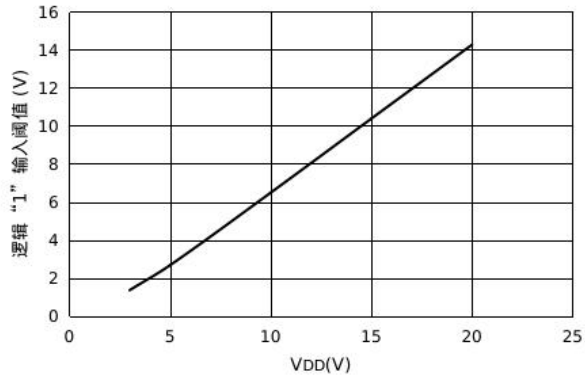


图 12. 逻辑 "1" 输入阈值 vs. V_{DD}

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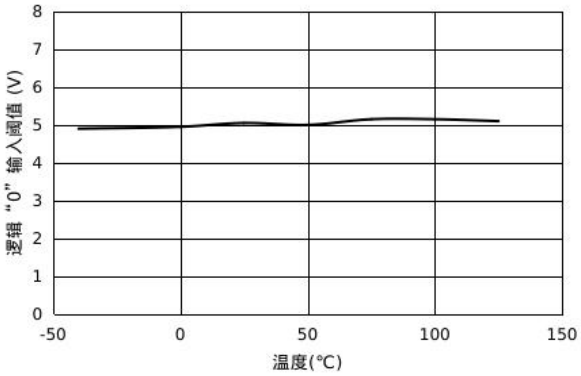


图 13. 逻辑“0”输入阈值 vs. 温度

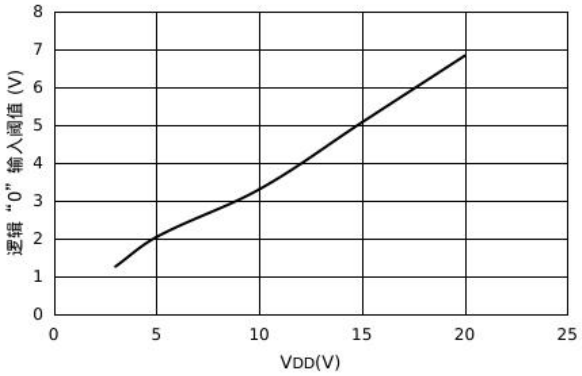


图 14. 逻辑“0”输入阈值 vs. V_{DD}

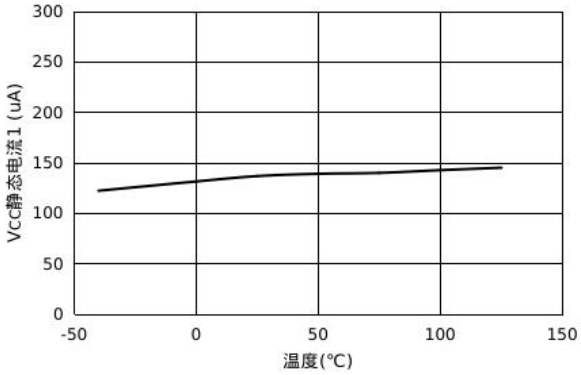


图 15. V_{CC} 静态电流 1 vs. 温度

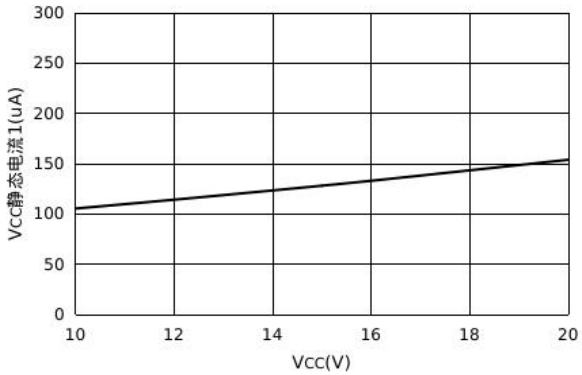


图 16. V_{CC} 静态电流 1 vs. V_{CC}

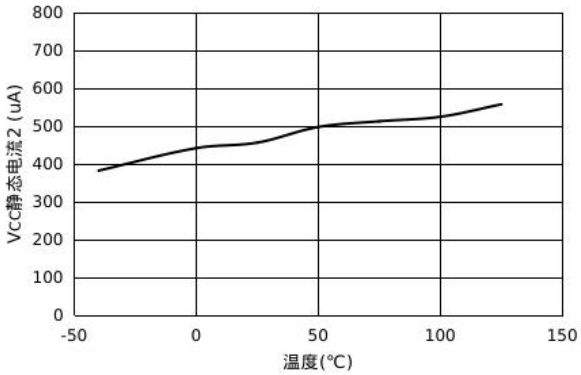


图 17. V_{CC} 静态电流 2 vs. 温度

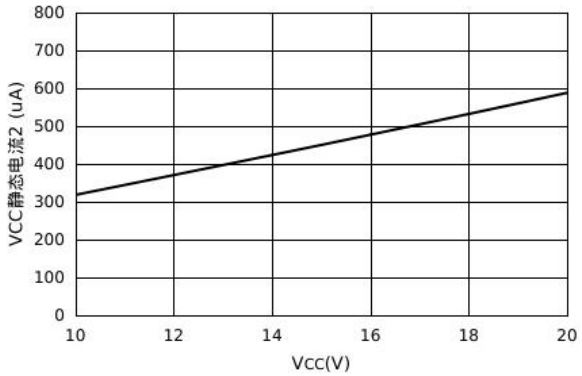


图 18. V_{CC} 静态电流 2 vs. V_{CC}

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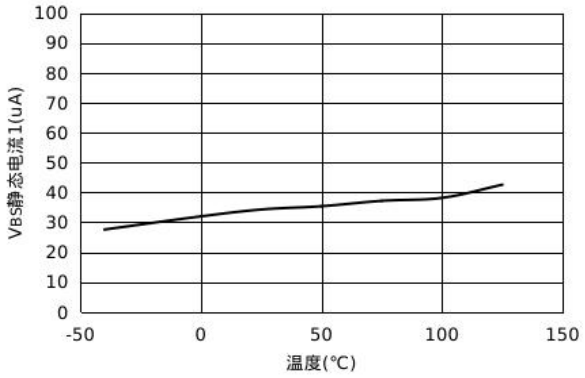


图 19. V_{BS}静态电流 1 vs. 温度

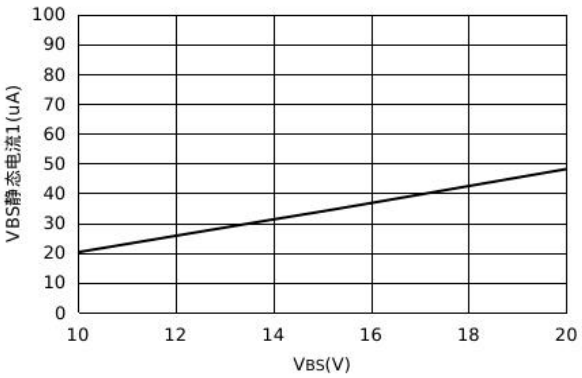


图 20. V_{BS}静态电流 1 vs. V_{BS}

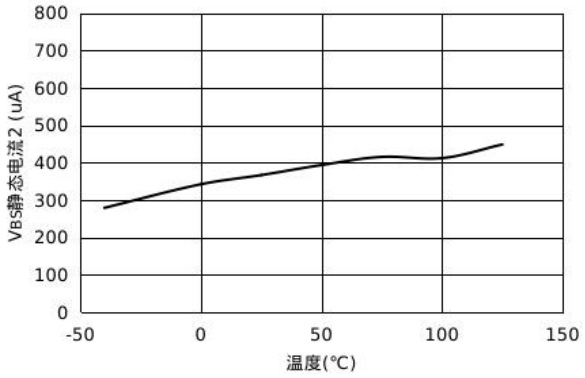


图 21. V_{BS}静态电流 2 vs. 温度

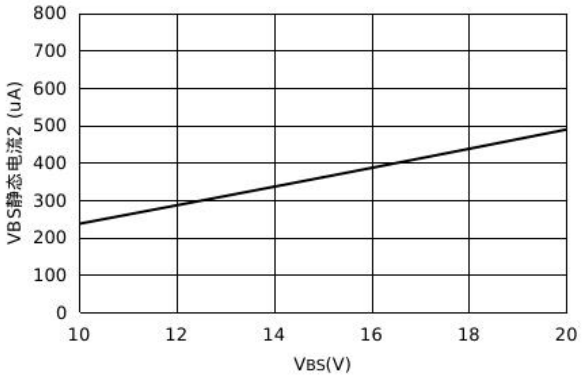


图 22. V_{BS}静态电流 2 vs. V_{BS}

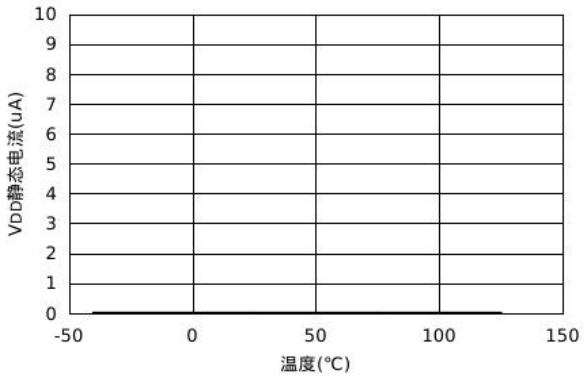


图 23. V_{DD}静态电流 vs. 温度

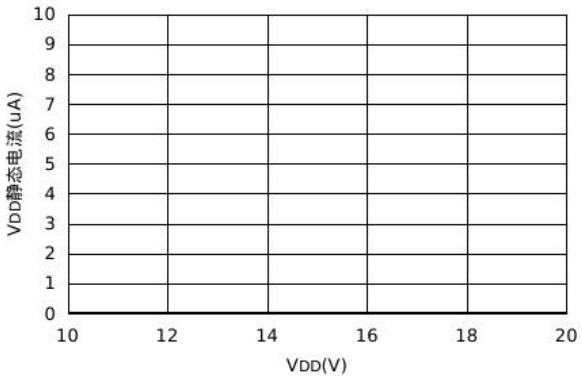


图 24. V_{DD}静态电流 vs. V_{DD}

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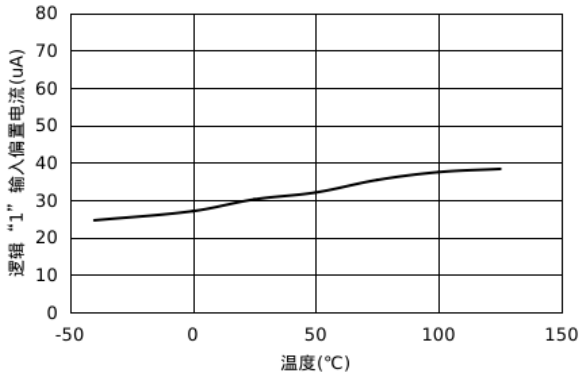


图 25. 逻辑“1”输入偏置电流 vs. 温度

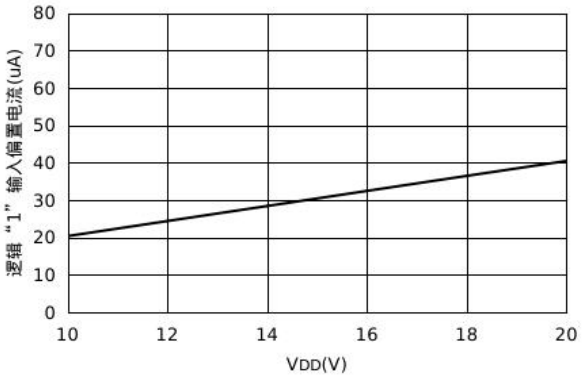


图 26. 逻辑“1”输入偏置电流 vs. V_{DD}

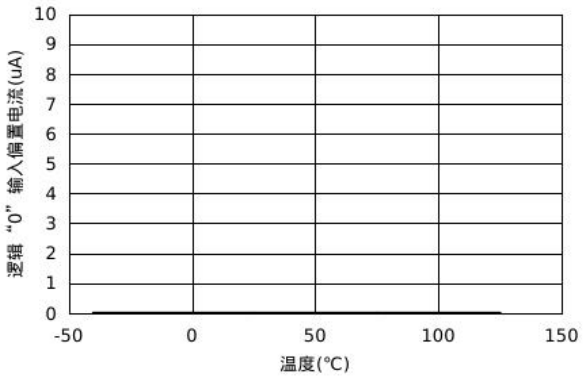


图 27. 逻辑“0”输入偏置电流 vs. 温度

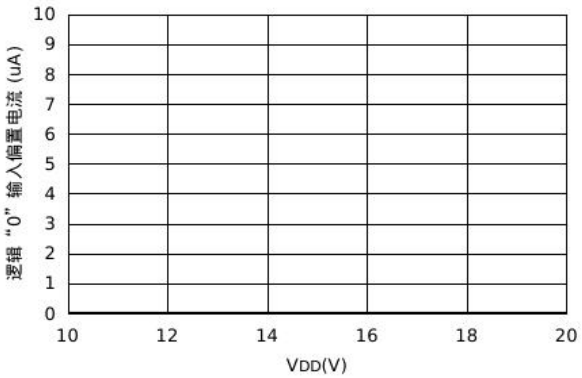


图 28. 逻辑“0”输入偏置电流 vs. V_{DD}

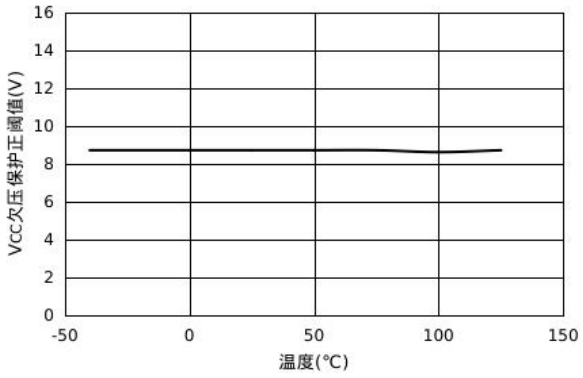


图 29. V_{CC}欠压保护正阈值 vs. 温度

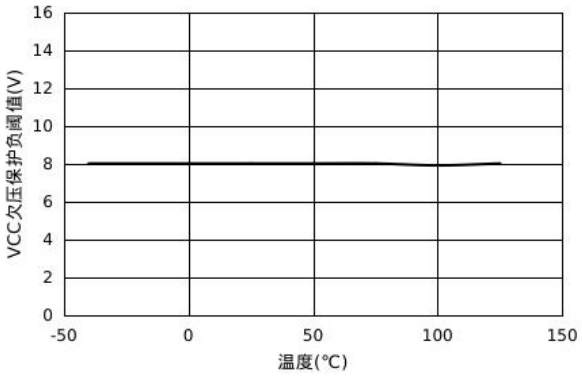


图 30. V_{CC}欠压保护负阈值 vs. 温度

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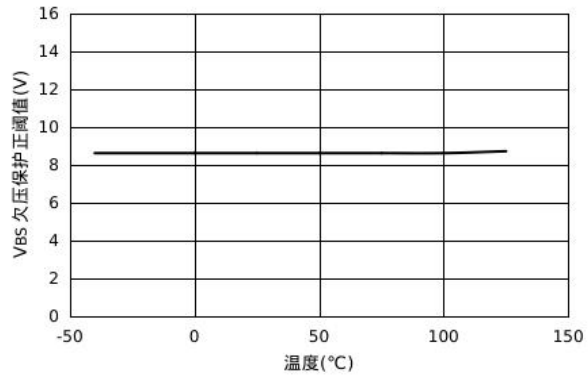


图 31. V_{BS}欠压保护正阈值 vs. 温度

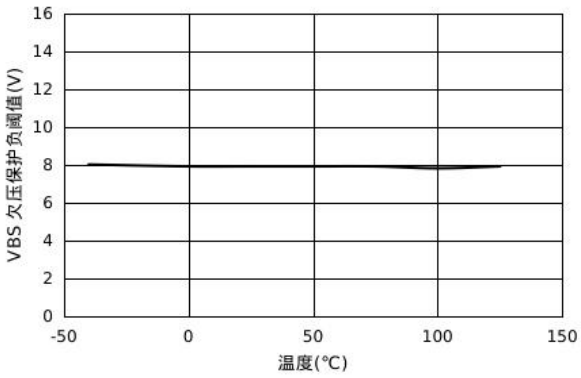
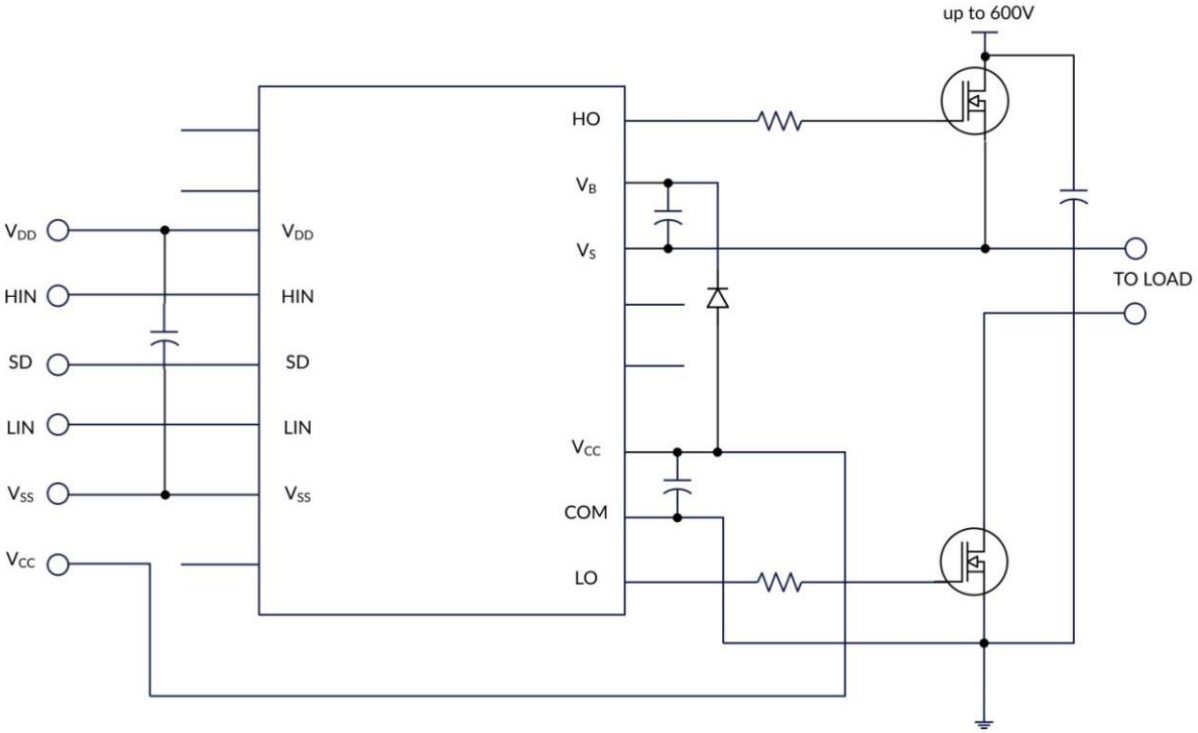


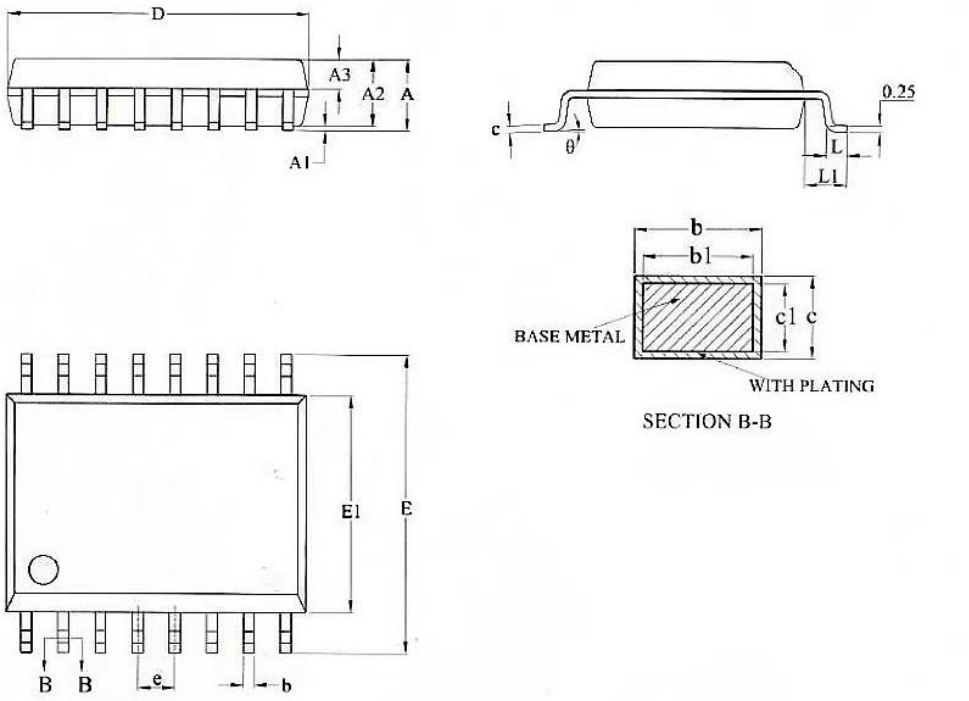
图 32. V_{BS}欠压保护负阈值 vs. 温度

应用电路



封装外形图和尺寸

SOP-16



Symbol	Dimensions In Millimeters		
	Min	Nom	Max
A	—	—	2.65
A1	0.10	—	0.30
A2	2.25	2.30	2.35
A3	0.97	1.02	1.07
b	0.35	—	0.43
b1	0.34	0.37	0.40
c	0.25	—	0.29
c1	0.24	0.25	0.26
D	10.20	10.30	10.40
E	10.10	10.30	10.50
E1	7.40	7.50	7.60
e	1.270(BSC)		
L	0.55	—	0.85
L1	1.40REF		
θ	0	—	8°

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