



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.



FXMA2102

I²C应用的双电源2-位电平转换器/缓冲器/重复器/隔离器

产品特性

- 介于任意两个电平之间的双向接口：1.65 V至5.5 V
- 无需方向控制
- OE连接到V_{CCA}时，无需系统GPIO资源。
- I²C 400 pF缓冲器/中继器
- I²C总线隔离
- A/B端口V_{OL} = 175 mV（典型值），V_{IL} = 150 mV，I_{OL} = 6 mA
- 开漏输入/输出
- 适应标准模式和快速模式I²C-总线设备
- 支持I²C时钟延展和多个主机
- 完全可配置：输入和输出跟踪V_{CC}
- 参考V_{CCA}的控制输入(OE)。
- 非优先上电，任一V_{CC}可以先行上电
- 如果任一V_{CC}接地，各输出转变为3态
- 容许的输出启用开启：5 V
- 采用8引脚无铅MicroPak™ (1.6 mm x 1.6 mm) 和超薄MLP (1.2 mm x 1.4 mm)封装
- ESD保护超出：
 - 8 kV HBM ESD (符合JESD22-A114)
 - 2 kV CDM (符合JESD22-C101)

说明

FXMA2102是一种高性能可配置的双电压源转换器，支持宽范围输入与输出电压电平的双向电平转换。

旨在为兼容I²C-Bus®的主机和从机提供电压转换。

该器件是专为A端口跟踪V_{CCA}电平，B端口跟踪V_{CCB}电平而设计的。

从而可以在1.65 V至5.5 V的任意两个电平之间进行双向A/B端口电压转换。从1.65V至5.5V，V_{CCA}可等于V_{CCB}。OE引脚由V_{CCA}供电。

任一V_{CC}都可以先行上电。

如果取消任一V_{CC}电压，则内部掉电控制电路会将该器件置于3态模式中。

该器件的两个端口具有自动检测方向的功能。

任一端口都可以检测输入信号，并将其作为输出信号传输至其他端口。

订购信息

| 器件型号 | 工作温度范围 | 顶标 | 封装 | 包装方法 |
|-------------|--------------|----|---------------------------|--------------------|
| FXMA2102L8X | -40 至 +85° C | XN | 8引脚MicroPak™, 1.6 mm宽 | 卷带和卷盘形式 提供5000个 |
| FXMA2102UMX | | | 8引脚超薄MLP, 1.2 mm x 1.4 mm | |

框图

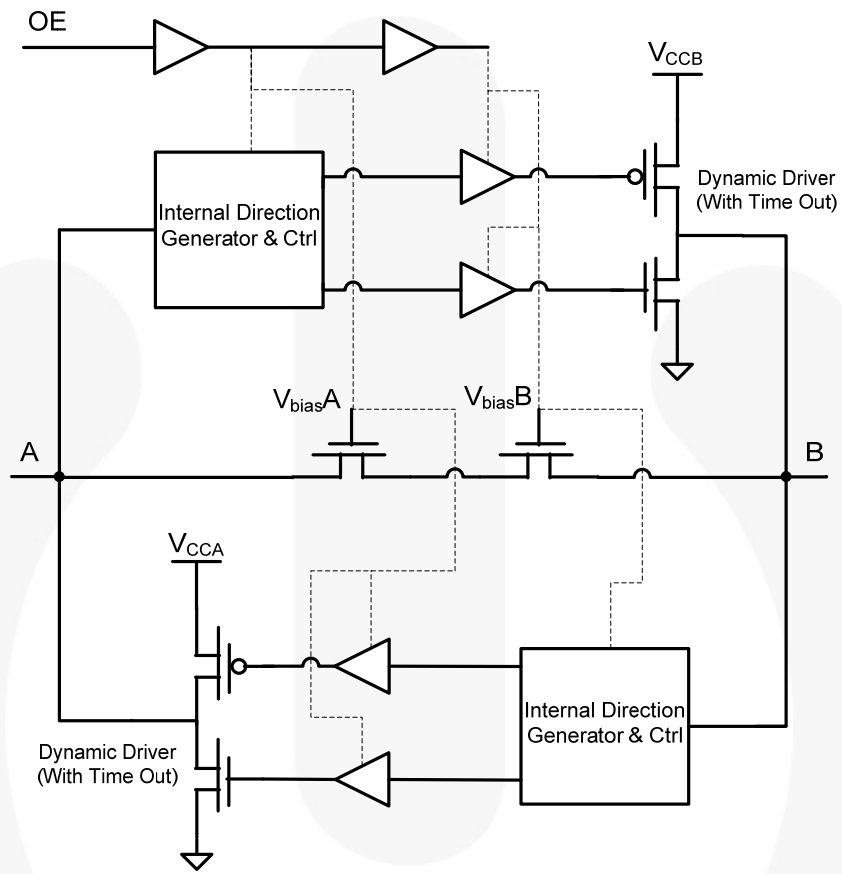


图 1. 框图，双通道之一

引脚布局

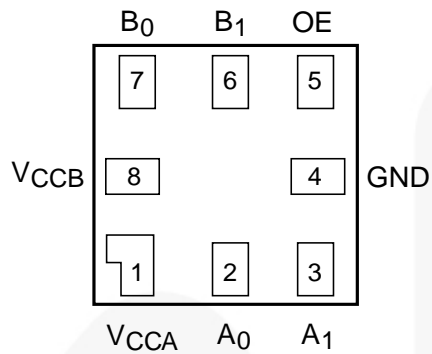


图 2. MicroPak™ (顶视图)

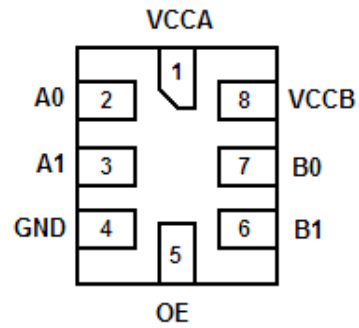


图 3. UMLP (顶视图)

引脚说明

| 引脚号 | 名称 | 说明 |
|------|------------|-------------------------|
| 1 | V_{CCA} | A端电源 |
| 2, 3 | A_0, A_1 | A端输入或3态输出 |
| 4 | GND | 接地 |
| 5 | OE | 输出使能输入 (由 V_{CCA} 供电) |
| 6, 7 | B_1, B_0 | B端输入或3态输出 |
| 8 | V_{CCB} | B端电源 |

真值表

| 控制 | 输出 |
|-------|------|
| OE | |
| 低逻辑电平 | 3态 |
| 高逻辑电平 | 正常操作 |

注意:

- 如果OE引脚驱动为低，则FXMA2102被禁用，A0、A1、B0 和B1 引脚（包括动态驱动器）强制进入三态。

绝对最大额定值

应力超过绝对最大额定值，可能会损坏设备。

在超出推荐的工作条件的情况下，该器件可能无法正常运行或操作，且不建议让器件在这些条件下长期工作。此外，过度暴露在高于推荐的工作条件下，会影响器件的可靠性。绝对最大额定值仅是额定应力值。

| 符号 | 参数 | | 最小值 | 最大值 | 单位 |
|--------------------|-------------------------|---------------------|------|------------------|----|
| V_{CCA}, V_{CCB} | 电源电压 | | -0.5 | 7.0 | V |
| V_{IN} | DC输入电压 | A端口 | -0.5 | 7.0 | |
| | | B端口 | -0.5 | 7.0 | |
| | | 控制输入(OE) | -0.5 | 7.0 | |
| V_O | 输出电压 (²) | A _n 输出3态 | -0.5 | 7.0 | V |
| | | B _n 输出3态 | -0.5 | 7.0 | |
| | | A _n 输出有效 | -0.5 | $V_{CCA} + 0.5V$ | |
| | | B _n 输出有效 | -0.5 | $V_{CCB} + 0.5V$ | |
| I_{IK} | 直流输入二极管电流 | $V_{IN} < 0 V$ 时 | | -50 | mA |
| I_{OK} | DC输出二极管电流 | $V_O < 0 V$ 时 | | -50 | mA |
| | | $V_O > V_{CC}$ 时 | | +50 | |
| I_{OH} / I_{OL} | 直流输出源电流/灌电流 | | -50 | +50 | mA |
| I_{CC} | 每个电源引脚的直流 V_{CC} 或地电流 | | | ±100 | mA |
| P_D | 功耗 | 400 KHz时 | | 0.129 | mW |
| T_{STG} | 存储温度范围 | | -65 | +150 | °C |
| ESD | 静电放电能力 | 人体模式, JESD22-A114 | | 8 | kV |
| | | 充电器件模式, JESD22-C101 | | 2 | |

注意:

2. 必须注意 I_O 绝对最大额定值。

推荐工作条件

推荐的操作条件表定义了器件的真实工作条件。指定推荐的工作条件，以确保设备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_{CCA}, V_{CCB} | 工作电源 | | 1.65 | 5.50 | V |
| V_{IN} | 输入电压 | A端口 | 0 | 5.5 | V |
| | | B端口 | 0 | 5.5 | |
| | | 控制输入(OE) | 0 | V_{CCA} | |
| Θ_{JA} | 热阻 | 8引脚MicroPak™ | | 279.0 | C° /W |
| | | 8引脚超薄MLP | | 301.5 | |
| T_A | 空气流通时的工作温度 | | -40 | +85 | °C |

注意:

3. 所有未用到的输入与I/O引脚必须保持在VCCI 或GND。

功能说明

上电/断电顺序

FXM转换器具有一个优点，即任一V_{CC}都可以先行上电。

该优势来源于芯片设计。

如果任一V_{CC}为0 V，各输出进入高阻态。

控制输入(OE)引脚的设计就是跟踪V_{CCA}电源。

下拉电阻限制OE至地，在上电或断电过程中，可以确保不发生总线争端、过电流或振荡。

下拉电阻的阻值应该基于器件驱动OE引脚的灌电流能力。

推荐的上电顺序为：

1. 施加电源到第一个V_{CC}。
2. 施加电源到第二个V_{CC}。
3. 驱动OE输入为高，启用该器件。

推荐的断电顺序为：

1. 驱动OE输入为低，禁用该器件；
2. 去除任一V_{CC}电源。
3. 去除另一V_{CC}电源。

注意：

4. 或者，将OE引脚硬连接至V_{CCA}，可以节省GPIO引脚。
如果OE硬连接至V_{CCA}，任一V_{CC}都可以先行上电和断电。

应用电路

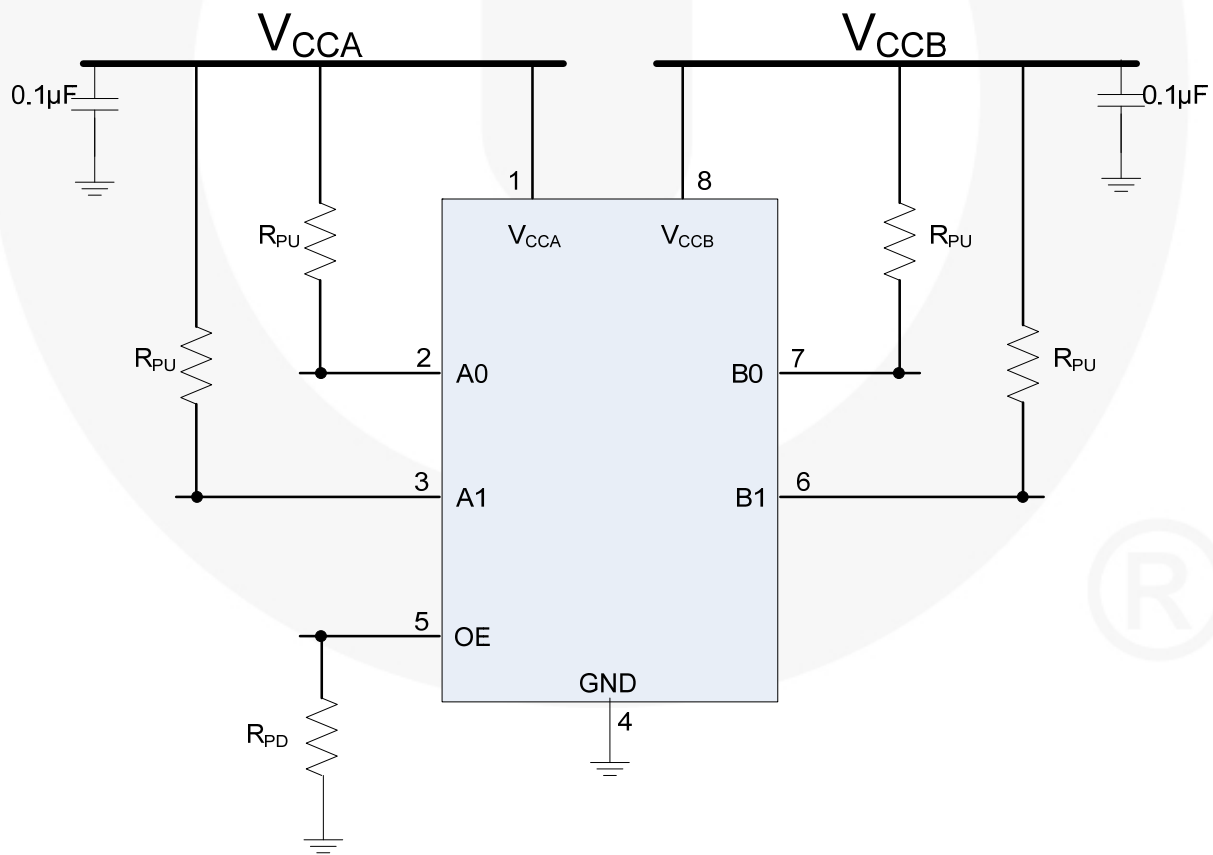


图 4. 应用电路

缓冲器/重复器性能

FXMA2102动态驱动器具有足够的源电流能力驱动400 pF的容性总线。

这对于需要I²C缓冲器/中继器的情况较为有利。

I²C规范明确规定总线最大电容为400 pF。

如果I²C段超过400 pF，则需使用I²C缓冲器/中继器将该段分割为两段，每段低于400 pF。图

5为FXMA2102驱动600 pF总负载的示波器图。注意(30% - 70%)上升时间仅为112 ns ($R_{PU} = 2.2 \text{ K}$)。

它远低于300 ns的最大边沿速率。

FXMA2102不仅能驱动400 pF，它还提供I²C规范中300 ns最大边沿速率以下出色的动态余量。

V_{OL}与 I_{OL}

I²C规范强制规定最大V_{IL} (I_{OL}为3 mA) 为V_{CC} · 0.3，以及最大V_{OL}为0.4 V。

如果I²C转换器的A端口上存在一个主机，其V_{CC}为1.65 V，I²C转换器的B端口上存在一个从机，其V_{CC}为3.3 V，则主机的最大V_{IL}为(1.65 V × 0.3) 495 mV。

从机可以合法地向主机发送一个0.4 V的有效逻辑低电平。

如果I²C转换器的通道阻抗过高，转换器的压降可能给主机发送一个大于495 mV的V_{IL}。

更复杂的问题是，I²C规范表明：当总线电容接近400 pF时，建议I_{OL}采用6 mA。

I_{OL}增加越多，I²C转换器的压降越高。

当I²C转换器表现出较低的V_{OL}性能时，则I²C应用较为有利。图6描述了典型FXMA2102 V_{OL}性能与竞争产品的对比 (V_{IL}为0.4 V条件下)。

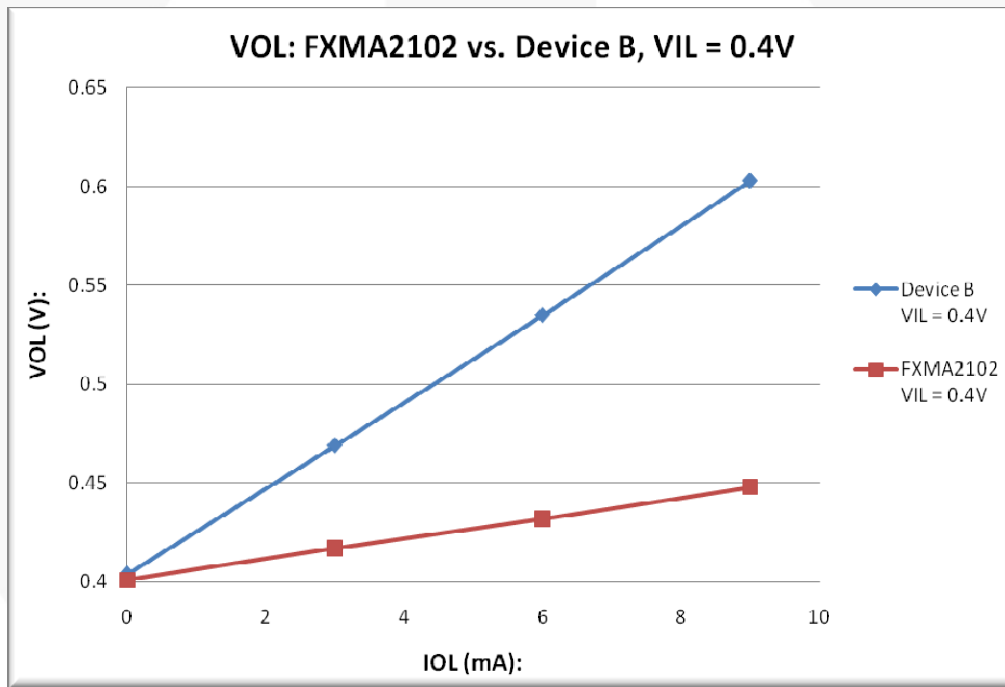


图 6. V_{OL}与 I_{OL}

I²C-Bus®隔离

FXMA2102支持以下条件的I²C总线隔离：

- 总线隔离 (针对总线清除状况)
- 总线隔离 (针对任一V_{CC}接地状况)

总线清除

由于I²C规范定义了直流的最低SCL频率，SCL信号可以始终保持低电平。然而，该条件将关断I²C总线。I²C规范将该条件称为“总线清除”。在图7中，如果2号从机始终压低SCL，则主机和1号从机无法通信，因为FXMA2102作为主机将SCL低电平卡位条件从2号从机传递至1号从机。

但是，如果OE引脚被拉低（遭禁用），全部两个

(A与B) 端口进入三态。

FXMA2102将从机2#隔离于主机和从机1#，允许主机与从机1#之间进行完全通信。

任一V_{CC}接地

如果2号从机为一架相机，突然脱离I²C总线，将导致V_{CCB}从有效V_{CC} (1.65 V - 5.5 V)

切换至0 V，FXMA2102自动强迫A与B端口的SCL和SDA进入3态。

一旦V_{CCB}达到零，则主机与从机1#之间的完全I²C通信保持不受干扰。

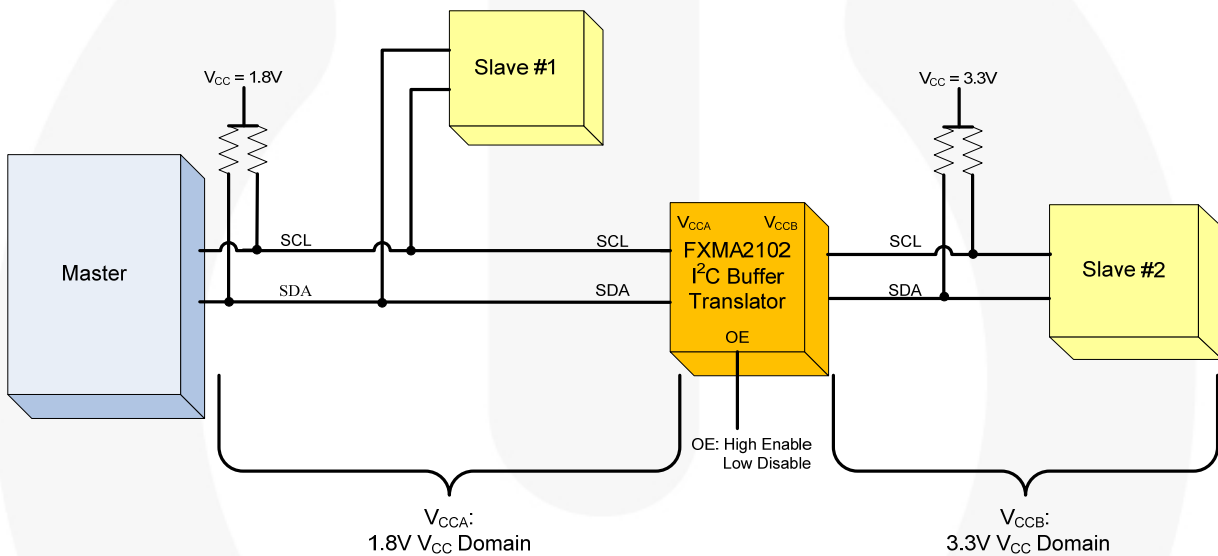


图 7. 总线隔离

直流电气特性

T_A = -40° C 至 +85° C.

| 符号 | 参数 | 条件 | V _{CCA} (V) | V _{CCB} (V) | 最小值 | 最大值 | 单位 |
|--------------------|--------------------------|---|----------------------|----------------------|------------------------|------------------------|----|
| V _{IHA} | 高电平输入电压A | 数据输入A _n | 1.65 - 5.50 | 1.65 - 5.50 | V _{CCA} - 0.4 | | V |
| | | 控制输入OE | 1.65 - 5.50 | 1.65 - 5.50 | 0.7 × V _{CCA} | | |
| V _{IHB} | 高电平输入电压B | 数据输入B _n | 1.65 - 5.50 | 1.65 - 5.50 | V _{CCB} - 0.4 | | V |
| V _{ILA} | 低电平输入电压A | 数据输入A _n | 1.65 - 5.50 | 1.65 - 5.50 | | 0.4 | V |
| | | 控制输入OE | 1.65 - 5.50 | 1.65 - 5.50 | | 0.3 × V _{CCA} | |
| V _{ILB} | 低电平输入电压B | 数据输入B _n | 1.65 - 5.50 | 1.65 - 5.50 | | 0.4 | V |
| V _{OL} | 低电平输出电压 | V _{IL} = 0.15 V | 1.65 - 5.50 | 1.65 - 5.50 | | 0.4 | V |
| | | I _{OL} = 6 mA | | | | | |
| I _L | 输入漏电流 | 控制输入OE, V _{IN} = V _{CCA} 或GND | 1.65 - 5.50 | 1.65 - 5.50 | | ±1.0 | μA |
| I _{OFF} | 断电漏电流 | A _n , V _{IN} 或V _O = 0 V至5.5 V | 0 | 5.50 | | ±2.0 | μA |
| | | B _n , V _{IN} 或V _O = 0 V至5.5 V | 5.50 | 0 | | ±2.0 | |
| I _{OZ} | 3态输出漏电流 ⁽⁶⁾ | A _n , B _n , V _O = 0 V至5.5 V, OE = V _{IL} | 5.50 | 5.50 | | ±2.0 | μA |
| | | A _n , V _O = 0 V至5.5 V, OE = 无关 | 5.50 | 0 | | ±2.0 | |
| | | B _n , V _O = 0 V至5.5 V, OE = 无关 | 0 | 5.50 | | ±2.0 | |
| I _{CCA/B} | 静态电源电流 ^(7, 8) | V _{IN} = V _{CC1} 或GND, I _O = 0 | 1.65 - 5.50 | 1.65 - 5.50 | | 5.0 | μA |
| I _{CCZ} | 静态电源电流 ⁽⁷⁾ | V _{IN} = V _{CC1} 或GND, I _O = 0, OE = V _{IL} | 1.65 - 5.50 | 1.65 - 5.50 | | 5.0 | μA |
| I _{CCA} | 静态电源电流 ⁽⁶⁾ | V _{IN} = 5.5 V或GND, I _O = 0, OE = 无关, B _n 至A _n | 0 | 1.65 - 5.50 | | -2.0 | μA |
| | | | 1.65 - 5.50 | 0 | | 2.0 | |
| I _{CCB} | 静态电源电流 ⁽⁶⁾ | V _{IN} = 5.5 V或GND, I _O = 0, OE = 无关, A _n 至B _n | 1.65 - 5.50 | 0 | | -2.0 | μA |
| | | | 0 | 1.65 - 5.50 | | 2.0 | |

说明:

- 该表格包含了静态条件下的输出电压。动态驱动规范参见动态输出电气特性部分
- “无关”表示任何有效逻辑电平。
- V_{CC1}表示与输入侧关联的V^{CC}
- 反映每路电源的电流, V_{CCA} 或V_{CCB}

动态输出电气特性

输出上升/下降时间

输出负载： $C_L = 50 \text{ pF}$ ， $R_{PU} = 2.2 \text{ k}\Omega$ ，推/挽驱动器， $T_A = -40^\circ \text{ C}$ 至 $+85^\circ \text{ C}$ 。

| 符号 | 参数 | $V_{CC0}^{(10)}$ | | | | 单位 |
|------------|--------------------------------|------------------|-----------|-----------|-------------|----|
| | | 4.5至5.5 V | 3.0至3.6 V | 2.3至2.7 V | 1.65至1.95 V | |
| | | 典型值 | 典型值 | 典型值 | 典型值 | |
| t_{RISE} | 输出上升时间，A端口，B端口 ⁽¹¹⁾ | 3 | 4 | 5 | 7 | ns |
| t_{FALL} | 输出下降时间，A端口，B端口 ⁽¹²⁾ | 1 | 1 | 1 | 1 | ns |

说明：

9. 输出上升/下降时间均由设计仿真和验证来保证，未经生产测试。
10. V_{CC0} 表示与输出侧关联的 V_{CC}
11. 请参见。图 12
12. 请参见。图 13

最大数据速率⁽¹³⁾

输出负载： $C_L = 50 \text{ pF}$ ， $R_{PU} = 2.2 \text{ k}\Omega$ ，推/挽驱动器， $T_A = -40^\circ \text{ C}$ 至 $+85^\circ \text{ C}$ 。

| V_{CCA} | 方向 | V_{CCB} | | | | 单位 |
|---------------|-----|-----------|-----------|-----------|-------------|-----|
| | | 4.5至5.5 V | 3.0至3.6 V | 2.3至2.7 V | 1.65至1.95 V | |
| | | 最小值 | 最小值 | 最小值 | 最小值 | |
| 4.5 V至5.5 V | A至B | 37 | 26 | 19 | 10 | MHz |
| | B至A | 37 | 36 | 35 | 32 | |
| 3.0 V至3.6 V | A至B | 36 | 25 | 18 | 10 | MHz |
| | B至A | 25 | 25 | 25 | 24 | |
| 2.3 V至2.7 V | A至B | 35 | 25 | 18 | 10 | MHz |
| | B至A | 18 | 18 | 18 | 17 | |
| 1.65 V至1.95 V | A至B | 32 | 24 | 17 | 10 | MHz |
| | B至A | 10 | 10 | 10 | 10 | |

注意：

13. F-toggle (F-反复、F-翻转) 由设计仿真保证，未经生产测试。

交流特性

输出负载： $C_L = 50 \text{ pF}$, $R_{PU} = 2.2 \text{ k}\Omega$, $T_A = -40^\circ \text{ C至} +85^\circ \text{ C}$ 。

| 符号 | 参数 | V_{CC} | | | | | | | | 单位 |
|---|--------------------------|-----------|------|-----------|------|-----------|------|-------------|------|----|
| | | 4.5至5.5 V | | 3.0至3.6 V | | 2.3至2.7 V | | 1.65至1.95 V | | |
| | | 典型值 | 最大值 | 典型值 | 最大值 | 典型值 | 最大值 | 典型值 | 最大值 | |
| $V_{CC} = 4.5$至5.5 V | | | | | | | | | | |
| t _{plh} | A至B | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | ns |
| | B至A | 1 | 3 | 2 | 4 | 3 | 5 | 4 | 7 | |
| t _{phl} | A至B | 2 | 4 | 3 | 5 | 4 | 6 | 5 | 7 | ns |
| | B至A | 2 | 4 | 2 | 5 | 2 | 6 | 5 | 7 | |
| t _{pZL} | OE至A | 4 | 5 | 6 | 10 | 5 | 9 | 7 | 15 | ns |
| | OE至B | 3 | 5 | 4 | 7 | 5 | 8 | 10 | 15 | |
| t _{PLZ} | OE至A | 65 | 100 | 65 | 105 | 65 | 105 | 65 | 105 | ns |
| | OE至B | 5 | 9 | 6 | 10 | 7 | 12 | 9 | 16 | |
| t _{skew} | A端口, B端口 ⁽¹⁴⁾ | 0.50 | 1.50 | 0.50 | 1.00 | 0.50 | 1.00 | 0.50 | 1.00 | ns |
| $V_{CC} = 3.0$至3.6 V | | | | | | | | | | |
| t _{plh} | A至B | 2.0 | 5.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | ns |
| | B至A | 1.5 | 3.0 | 1.5 | 4.0 | 2.0 | 6.0 | 3.0 | 9.0 | |
| t _{phl} | A至B | 2.0 | 4.0 | 2.0 | 4.0 | 2.0 | 5.0 | 3.0 | 5.0 | ns |
| | B至A | 2.0 | 4.0 | 2.0 | 4.0 | 2.0 | 5.0 | 3.0 | 5.0 | |
| t _{pZL} | OE至A | 4.0 | 8.0 | 5.0 | 9.0 | 6.0 | 11.0 | 7.0 | 15.0 | ns |
| | OE至B | 4.0 | 8.0 | 6.0 | 9.0 | 8.0 | 11.0 | 10.0 | 14.0 | |
| t _{PLZ} | OE至A | 100 | 115 | 100 | 115 | 100 | 115 | 100 | 115 | ns |
| | OE至B | 5 | 10 | 4 | 8 | 5 | 10 | 9 | 15 | |
| t _{skew} | A端口, B端口 ⁽¹⁴⁾ | 0.5 | 1.5 | 0.5 | 1.0 | 0.5 | 1.0 | 0.5 | 1.0 | ns |
| $V_{CC} = 2.3$至2.7 V | | | | | | | | | | |
| t _{plh} | A至B | 2.5 | 5.0 | 2.5 | 5.0 | 2.0 | 4.0 | 1.0 | 3.0 | ns |
| | B至A | 1.5 | 3.0 | 2.0 | 4.0 | 3.0 | 6.0 | 5.0 | 10.0 | |
| t _{phl} | A至B | 2.0 | 5.0 | 2.0 | 5.0 | 2.0 | 5.0 | 3.0 | 6.0 | ns |
| | B至A | 2.0 | 5.0 | 2.0 | 5.0 | 2.0 | 5.0 | 3.0 | 6.0 | |
| t _{pZL} | OE至A | 5.0 | 10.0 | 5.0 | 10.0 | 6.0 | 12.0 | 9.0 | 18.0 | ns |
| | OE至B | 4.0 | 8.0 | 4.5 | 9.0 | 5.0 | 10.0 | 9.0 | 18.0 | |
| t _{PLZ} | OE至A | 100 | 115 | 100 | 115 | 100 | 115 | 100 | 115 | ns |
| | OE至B | 65 | 110 | 65 | 110 | 65 | 115 | 12 | 25 | |
| t _{skew} | A端口, B端口 ⁽¹⁴⁾ | 0.5 | 1.5 | 0.5 | 1.0 | 0.5 | 1.0 | 0.5 | 1.0 | ns |
| $V_{CC} = 1.65$至1.95 V | | | | | | | | | | |
| t _{plh} | A至B | 4 | 7 | 4 | 7 | 5 | 8 | 5 | 10 | ns |
| | B至A | 1.0 | 2.0 | 1.0 | 2.0 | 1.5 | 3.0 | 5.0 | 10.0 | |
| t _{phl} | A至B | 5 | 8 | 3 | 7 | 3 | 7 | 3 | 7 | ns |
| | B至A | 4 | 8 | 3 | 7 | 3 | 7 | 3 | 7 | |
| t _{pZL} | OE至A | 11 | 15 | 11 | 14 | 14 | 28 | 14 | 23 | ns |
| | OE至B | 6 | 14 | 6 | 12 | 6 | 12 | 9 | 16 | |
| t _{PLZ} | OE至A | 75 | 115 | 75 | 115 | 75 | 115 | 75 | 115 | ns |
| | OE至B | 75 | 115 | 75 | 115 | 75 | 115 | 75 | 115 | |
| t _{skew} | A端口, B端口 ⁽¹⁴⁾ | 0.5 | 1.5 | 0.5 | 1.0 | 0.5 | 1.0 | 0.5 | 1.0 | ns |

注意:

14. 偏斜是输出信号之间传播延时的变化，仅适用于同一端口的输出信号（A_n或B_n），且以相同的极性切换（低电平至高电平或高电平至低电平）（见 图 15）。偏差（Skew）得到保证，但是未经测试。

电容值

TA = +25°C.

| 符号 | 参数 | 条件 | 典型值 | 单位 |
|-----------|---------------------|--|------|----|
| C_{IN} | 输入电容控制引脚 (OE) | $V_{CCA} = V_{CCB} = GND$ | 2.2 | PF |
| $C_{I/O}$ | 输入/输出电容, A_n, B_n | $V_{CCA} = V_{CCB} = 5.0\text{ V}$, $OE = GND$, $V_A = V_B = 5.0\text{ V}$ | 13.0 | PF |
| C_{pd} | 功率耗散电容 | $V_{CCA} = V_{CCB} = 5.0\text{ V}$, $V_{IN} = 0\text{ V}$ 或 V_{CC} , $f = 400\text{ KHz}$ | 13.5 | PF |

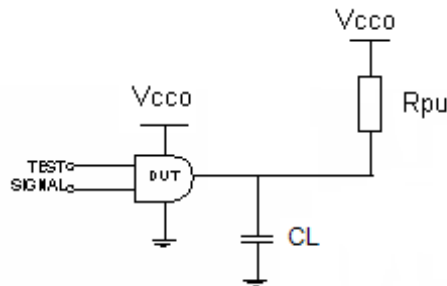


图 8. 测试电路

表1. 传播延迟表

| 测试 | 输入信号 | 输出使能控制 |
|-----------------------------|------|-----------|
| t_{PLH} , t_{PHL} | 数据脉冲 | V_{CCA} |
| t_{PZL} (OE至 A_n, B_n) | 0 V | 低电平至高电平开关 |
| t_{PLZ} (OE至 A_n, B_n) | 0 V | 高电平至低电平开关 |

表2. 交流负载表

| V_{CCO} | C_L | R_L |
|-------------------------|-------|----------------|
| $1.8 \pm 0.15\text{ V}$ | 50 pF | 2.2 k Ω |
| $2.5 \pm 0.2\text{ V}$ | 50 pF | 2.2 k Ω |
| $3.3 \pm 0.3\text{ V}$ | 50 pF | 2.2 k Ω |
| $5.0 \pm 0.5\text{ V}$ | 50 pF | 2.2 k Ω |

时序图

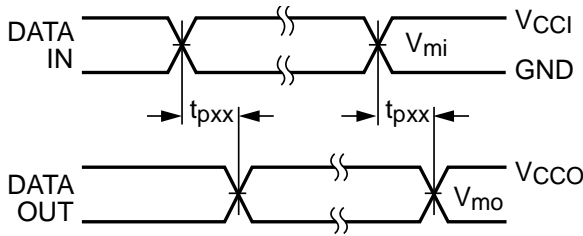


图 9. 反相与同相功能的波形⁽¹⁵⁾

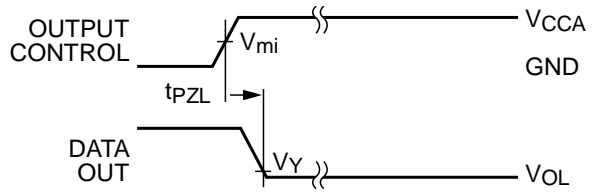


图 10. 3态输出低电平使能时间⁽¹⁵⁾

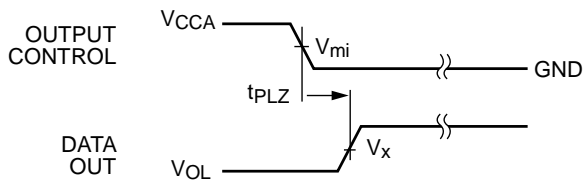


图 11. 3态输出高电平使能时间⁽¹⁵⁾

| 符号 | VCC |
|-----------------|----------------------|
| $V_{mi}^{(16)}$ | $V_{CC1} / 2$ |
| V_{mo} | $V_{CC0} / 2$ |
| V_x | $0.5 \times V_{CC0}$ |
| V_Y | $0.1 \times V_{CC0}$ |

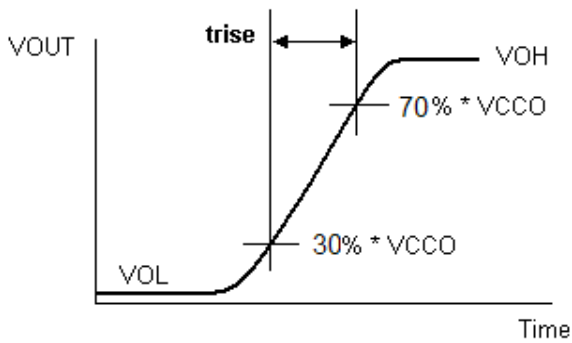


图 12. 有效输出上升时间

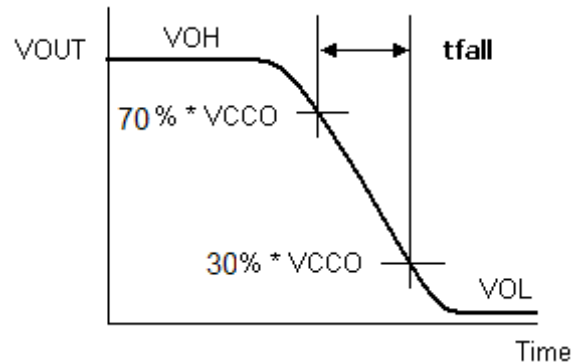


图 13. 有效输出下降时间

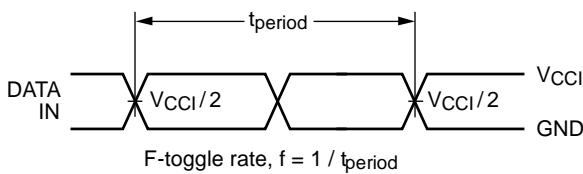
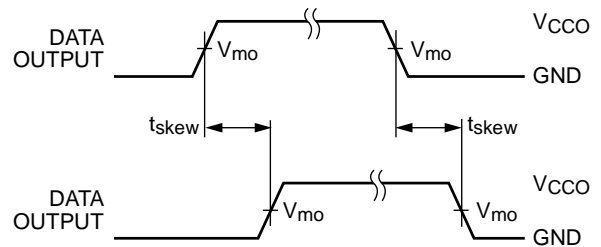


图 14. F-Toggle速率



$$t_{skew} = (t_{pHLmax} - t_{pHLmin}) \text{ or } (t_{pLHmax} - t_{pLHmin})$$

图 15. 输出偏差 (SKEW) 时间

说明:

- 15. 输入 $t_r = t_f = 2.0 \text{ ns}$, 10%至90% (当 $V_{IN} = 1.65 \text{ V}$ 至 1.95 V 时) ;
- 输入 $t_r = t_f = 2.0 \text{ ns}$, 10%至90% (当 $V_{IN} = 2.3$ 至 2.7 V 时) ;
- 输入 $t_r = t_f = 2.5 \text{ ns}$, 10%至90% (仅当 $V_{IN} = 3.0 \text{ V}$ 至 3.6 V 时) ;
- 输入 $t_r = t_f = 2.5 \text{ ns}$, 10%至90% (仅当 $V_{IN} = 4.5 \text{ V}$ 至 5.5 V 时) 。
- 16. 对于控制引脚(OE) $V_{CC1} = V_{CCA}$, 或 $V_{mi} = (V_{CCA} / 2)$

8引脚超薄 MLP 产品规格尺寸

| JEDEC MO-220的符号 | 说明 | NOM值 |
|-----------------|----------|-------|
| A | 总高度 | 0.55 |
| A1 | 封装离板高度 | 0.012 |
| A3 | 引脚厚度 | 0.15 |
| b | 引脚宽度 | 0.2 |
| D | 器件长度 (X) | 1.4 |
| E | 器件宽度 (Y) | 1.2 |
| L | 引脚长度 | 0.3 |
| E | 引脚间距 | 0.4 |

封装图纸是作为一项服务而提供给考虑选用飞兆半导体产品的客户。具体参数可进行改动，且无需做出相应通知。

请注意图纸上的版本和/或日期，并联系飞兆半导体代表核实或获得最新版本。

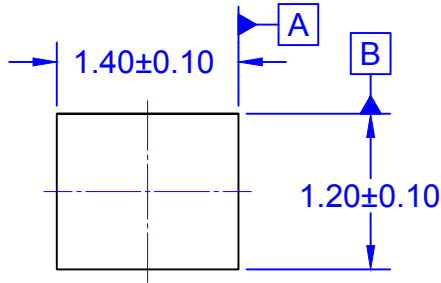
封装规格并不超出飞兆公司全球范围内的条款与条件，尤其指保修，保修涉及飞兆半导体的全部产品。

随时访问飞兆半导体在线封装网页，可以获得最新的封装图：<http://www.fairchildsemi.com/packaging/>。

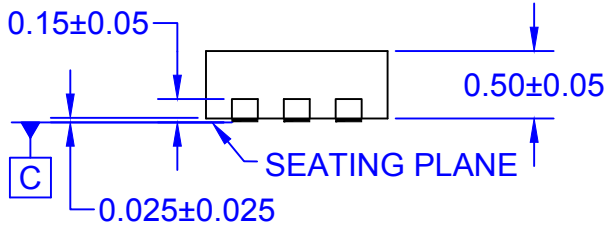
MicroPak™ 的卷带和卷盘格式

随时访问飞兆半导体在线封装网页，获取最新的卷带和卷盘规格：

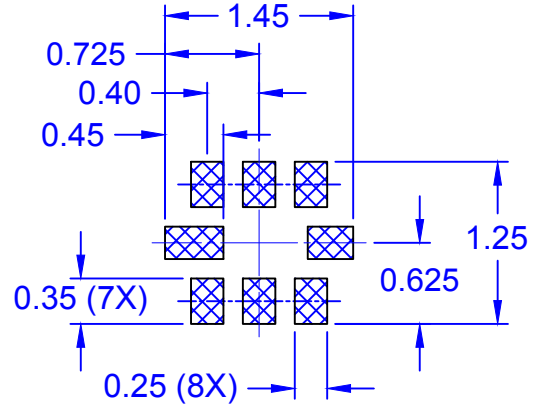
<http://www.fairchildsemi.com/dwg/UM/UMLP08A.pdf>。



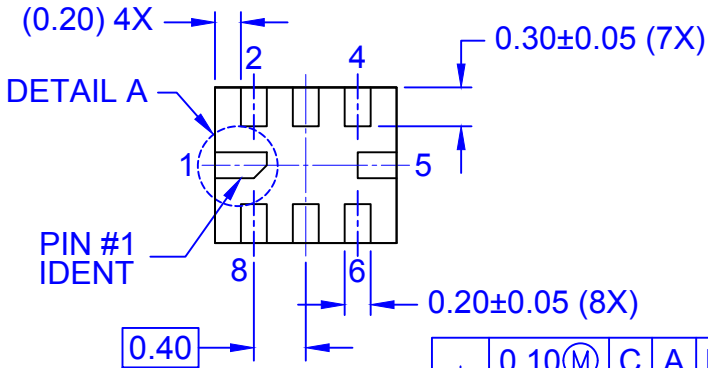
TOP VIEW



SIDE VIEW

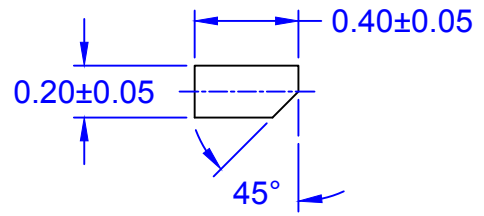


RECOMMENDED LAND PATTERN



BOTTOM VIEW

| | | | | |
|---|---------|---|---|---|
| ⌀ | 0.10(M) | C | A | B |
| | 0.05(M) | C | | |

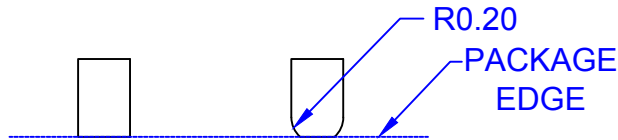


DETAIL A
SCALE : 2X

NOTES:

- A. PACKAGE DOES NOT FULLY CONFORM TO JEDEC STANDARD.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.
- D. DRAWING FILENAME: MKT-UMLP08ArevD

LEAD SHAPE AT PACKAGE EDGE

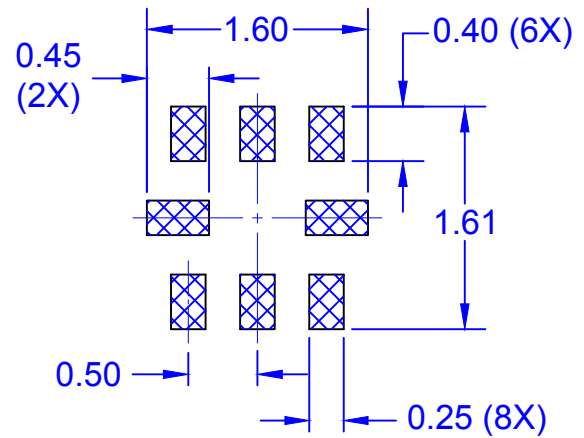
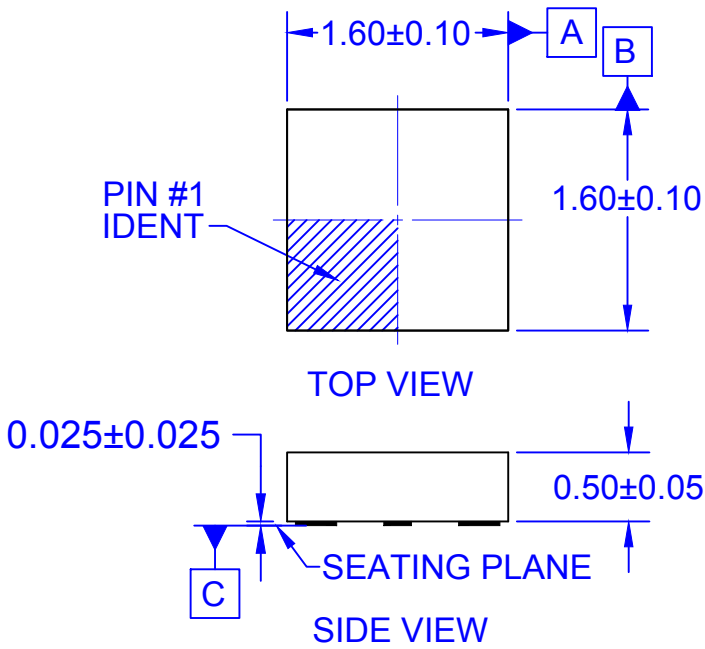


LEAD
OPTION 1
SCALE : 2X

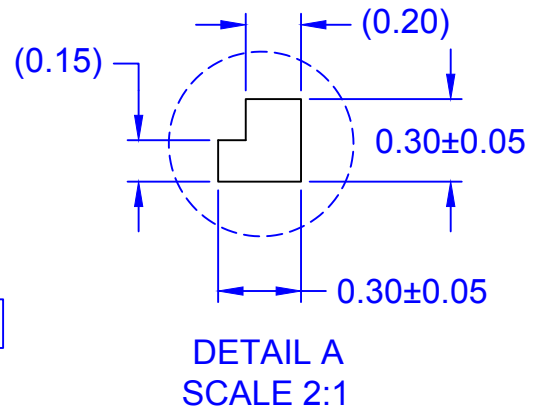
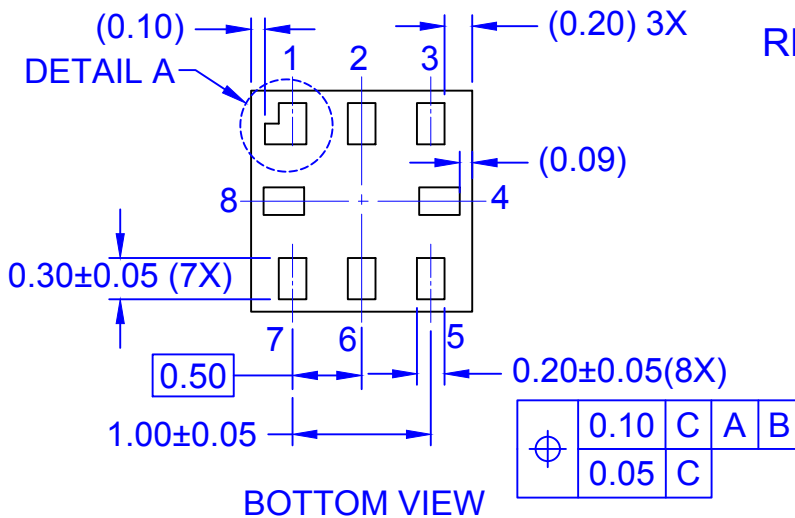
LEAD
OPTION 2
SCALE : 2X

ON Semiconductor





RECOMMENDED LAND PATTERN



NOTES:

- A. PACKAGE CONFORMS TO JEDEC MO-255 VARIATION UAAD.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.
- D. DRAWING FILENAME: MKT-MAC08ArevE.

ON Semiconductor



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