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FT8010

延迟时间可配置的复位定时器

特性

- 长延迟可配置为7.5或11.25秒
- 初级和次级输入重置引脚
- 推挽和开路漏极输出引脚
- 1.8 工作范围为V至5.0 V ($T_A = -40^{\circ}\text{C}$ 至 $+85^{\circ}\text{C}$)
- 1.7 工作范围为V至5.0 V ($T_A = -25^{\circ}\text{C}$ 至 $+85^{\circ}\text{C}$)
- 1.65 工作范围为V至5.0 V ($T_A = 0^{\circ}\text{C}$ 至 $+85^{\circ}\text{C}$)
- 提供10引脚UMLP (1.4 mm x 1.8 mm)封装和8引脚MLP (2.0 mm x 2.0 mm)封装

说明

FT8010是定时器，用于复位那些复位时间较长的移动设备。长时延迟可避免因意外按键所引起的非预期复位。可以通过硬接线DSR引脚选择两种延迟：7.5 $\pm 20\%$ 秒或11.25 $\pm 20\%$ 秒。

FT8010有两个输入，用于单按钮或双按钮复位功能。该器件有两个输出：0.5 mA驱动的推挽式输出和0.5 mA下拉驱动的漏极开路输出。

FT8010不工作时消耗的 I_{∞} 电流最少，它可在1.65 V至5.0 V宽电源电压范围内工作

订购信息

器件编号	工作温度范围	封装	包装方法
FT8010UMX	-40°C 至 +85°C	10引脚超薄MLP (1.4 x 1.8 x 0.55 mm封装, 0.40 mm间距)	每卷5000装卷带和卷盘
FT8010MPX	-40°C 至 +85°C	8引脚MLP (2.0 x 2.0 x 0.8 mm封装, 0.5 mm间距)	每卷3000装卷带和卷盘

框图

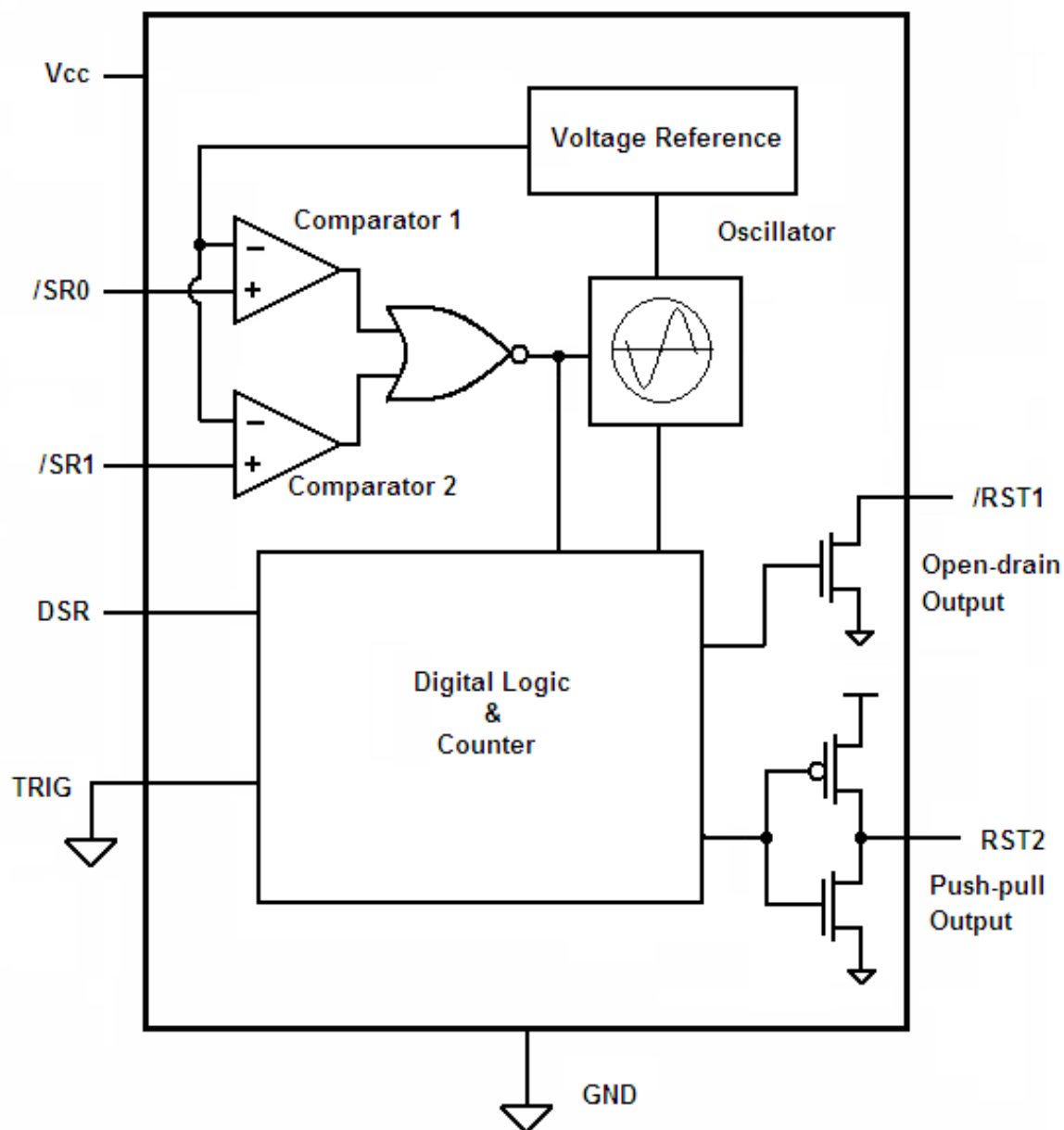


图1.框图

引脚布局

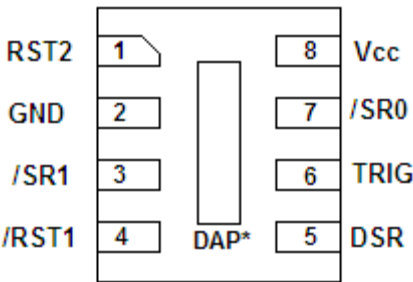


图2.MLP引脚配置⁽¹⁾
(俯视图)

- 注意：
- 1. DAP可以不接，或连接至地。
 - 2. NC =不接线。

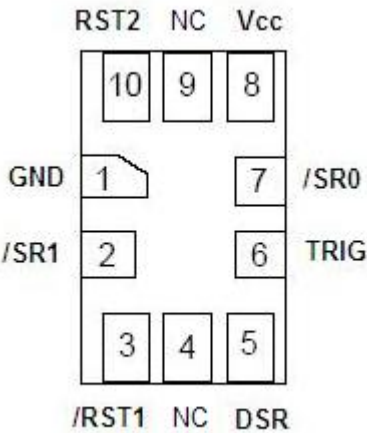


图3.UMLP引脚配置⁽²⁾
(俯视图)

引脚说明

MLP引脚编号	UMLP引脚编号	名称	说明
1	10	RST2	推挽式输出，有源高电平
2	1	GND	接地
3	2	/SR1	次级重置输入，有源低电平
4	3	/RST1	漏极开路输出，低电平有效
5	5	DSR	延迟选择输入（必须直接连接至GND或V _{cc} ； 不使用上拉或下拉电阻）
6	6	TRIG	测试引脚，在正常使用时连接至GND
7	7	/SR0	初级重置输入，有源低电平
8	8	V _{cc}	电源
	4, 9,	NC	未连接

功能说明

FT8010复位定时器包含了一个内部振荡器和一个两级、21位计数器，用于确定输出引脚转换的时间。借助DSR引脚的硬连接逻辑电平，可以设置时间N。当DSR为低时，N为7.5 s±20%，当DSR为高时，N为11.25 s ±20%。

Table 1. FT8010 真值表

DSR	复位定时器 (±20%)
0	7.50 s
1	11.25 s

输入引脚/SR0和/SR1用来驱动电压比较器，比较电压为输入电压和由参考模块设置的电压。/SR0和/SR1的输入信号同时为低时，振荡器启动。振荡器向数字芯片发送数字脉冲，其中包括计数器。有两种计数情景，如下所述：短时持续和长时持续。对于短时持续情况，/RST1 和RST2引脚不受影响。长时持续情况下，输出在时间N后更改状态。/SR0或/SR1的输入信号为高时，输出返回至其原始状态。

/RST1输出为一个开漏驱动器。当计数时间超过时间N后，/RST1输出驱动为低。/RST2输出为一个推挽驱动器。当计数时间超过时间N后，RST2输出驱动为高。

正常使用时，TRIG引脚应该连接到地（GND）或低电平。TRIG引脚为测试模式引脚，用于扫描（SCAN）测试。

应用指南

重要声明： DSR引脚必须连接至V_{cc}或GND，以提供高或低电压电平。DSR引脚的电压电平决定可配置延迟的时间长度。需要指出的是，在正常工作中，DSR引脚的电压电平维持不变。DSR引脚必须在SR0或SR1按键变低之前直接连接至V_{cc}或GND。请勿在DSR引脚上使用上拉或下拉电阻。

短时持续 (t_w < N)

在这种情况下，输入/SR0和/SR1在比时间N短的持续时间t_w均为低电平。当输入变为低电平时，内部定时器开始计数。输入在时间N前变为高电平。定时器停止计数并复位，并且输出无变化（参见图4）。

/SR0	/SR1	/RST1	/RST2	说明
	L	H	L	当两个引脚均低时，定时器开始计数。当任意一个引脚变高时，定时器停止计数。/SR0 和/SR1都需要变低时，才能激活（启动）定时器。
L		H	L	

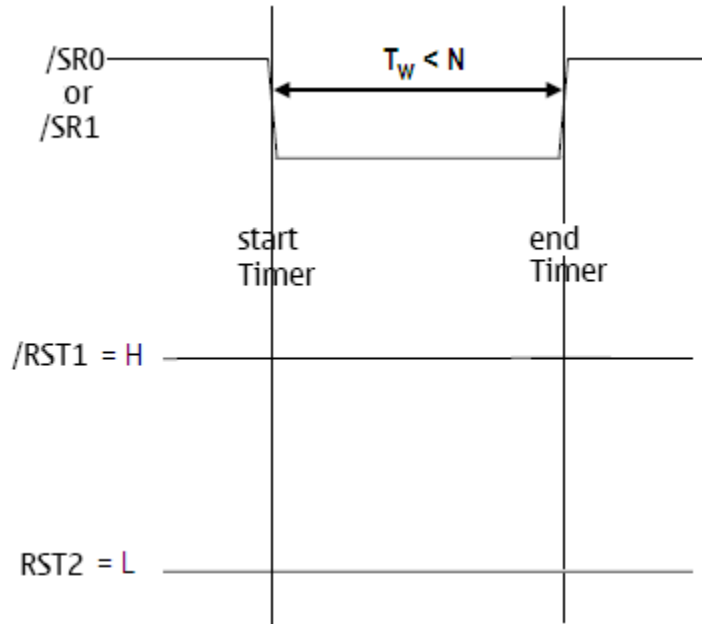


图4.短时持续波形

长时持续 ($t_w > N$)

在这种情况下，输入/SR0和/SR1在比时间N长的持续时间 t_w 均为低电平。当输入变为低电平时，内部定时器开始计数。在时间N之后，各输出转换，定时器停止计数。N秒后的某个时刻，该输入变高。当输入变为高电平时，一段传播延迟后，定时器复位，各输出切换回各自的原始状态（参见图5）。

时，一段传播延迟后，定时器复位，各输出切换回各自的原始状态（参见图5）。

/SR0	/SR1	/RST1	RST2	说明
	L			当两个引脚均低时，定时器开始计数。时间N后，各输出转换。当任意一个输入变高时，定时器复位，各输出转换回到原始状态。/SR0 和 /SR1都需要变低时，才能激活（启动）定时器。
L				

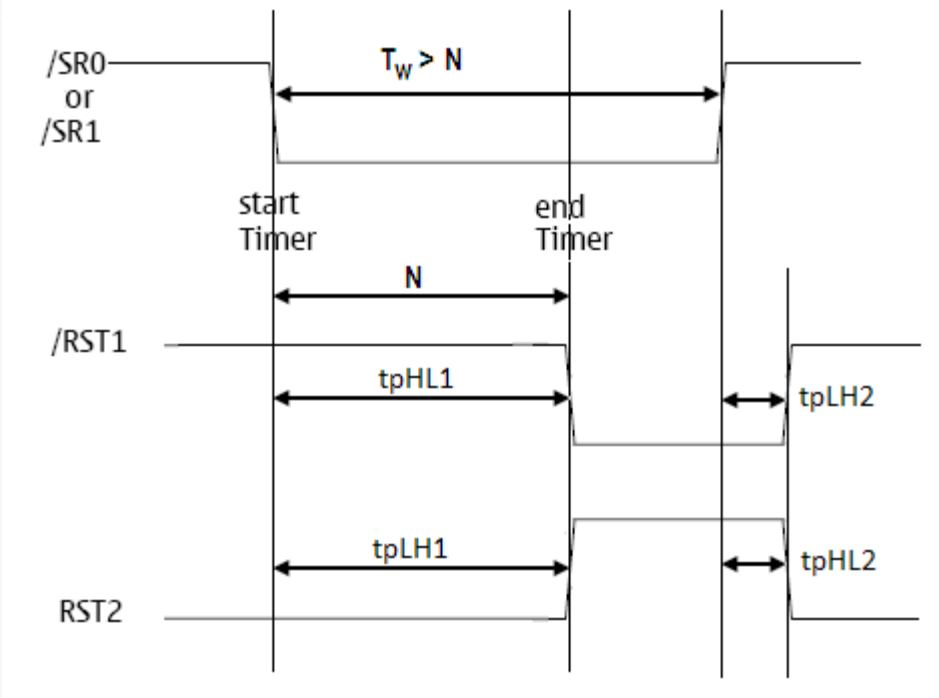


图5.长时持续波形

注意：
3. 波形绘制没有按照比例 ($t_{pHL1}, t_{pLH1} \gg t_{pHL2}, t_{pLH2}$)。

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	条件	最小值	最大值	单位
V_{CC}	电源电压		-0.5	7	V
V_{IN}	DC输入电压	/SR0, /SR1, TRIG, DSR	-0.5	7	V
V_{OUT}	输出电压 ⁴	/RST1高电平或低电平	-0.5	7	V
		RST2高电平或低电平	-0.5	$V_{CC}+0.5$	
		/RST1, RST2, $V_{CC}=0$	-0.5	7	
I_{IK}	直流输入二极管电流	$V_{IN} < 0\text{ V}$		-50	mA
I_{OK}	DC输出二极管电流	$V_{OUT} < 0\text{ V}$		-50	mA
		$V_{OUT} > V_{CC}$		+50	
I_{OH}/I_{OL}	DC输出源/灌电流		-50	+50	mA
I_{CC}	每个电源引脚的DC V_{CC} 或接地电流			± 100	mA
T_{STG}	存储温度范围		-65	+150	°C
T_J	偏压下结温			+150	°C
T_L	结点焊接温度，焊接10秒			+260	°C
P_D	功耗			5	mW
ESD	静电放电能力	人体模式，JESD22-A114		4	kV
		充电器件模式，JESD22-C101		2	

注意：

4. 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	条件	最小值	最大值	单位
V_{CC}	电源电压	-40°C 至+85°C	1.8	5.0	V
		-25°C 至+85°C	1.7	5.0	
		0°C 至+85°C	1.65	5.00	
t_{RFC}	断电后, V_{CC} 恢复时间	$V_{CC}=0$ V断电后, 上升至0.5 V	5		ms
V_{IN}	输入电压	/SR0, /SR1	0	5	V
V_{OUT}	输出电压	/RST1高电平或低电平	0	5	V
		RST2高电平或低电平	0	V_{CC}	
		/RST1、RST2、 $V_{CC}=0$ V	0	5	
I_{OH}	DC输出源电流	RST2, $1.8\text{ V} \leq V_{CC} \leq 3.0\text{ V}$		-0.1	mA
		RST2, $3.0\text{ V} \leq V_{CC} \leq 5.0\text{ V}$		-0.5	
I_{OL}	DC输出灌电流	/RST1, RST2, $V_{CC}=1.8\text{ V}$ to 5.0 V		+0.5	
T_A	空气流通时的工作温度		-40	+85	°C
Θ_{JA}	热阻	MLP-8		245	°C/W
		UMLP-10		200	

注意:

5. 所有未用的输入端必须保持为 V_{CC} 或GND。

直流电气特性

除非另行说明，以下性能特性需满足条件： $T_A=-40$ 至 80 C且 $V_{CC}=1.8 - 5.0$ V或 $T_A=-25$ 至 85 C且 $V_{CC}=1.7 - 5$ V或 $T_A=0$ 至 85 C且 $V_{CC}=1.65 - 5$ V。

符号	参数	条件	最小值	最大值	单位
V_{IH}	输入高电平	/SR0, /SR1	1.2		V
		DSR	$0.65 \times V_{CC}$		
V_{IL}	输入低电平	/SR0, /SR1		0.32	V
		DSR		$0.25 \times V_{CC}$	
V_{OH}	高电平输出电压	RST2, $I_{OH}=-100\text{ }\mu\text{A}$	$0.8 \times V_{CC}$		V
		RST2, $I_{OH}=-500\text{ }\mu\text{A}$ $V_{CC}=3.0$ 至 5.0 V	$0.8 \times V_{CC}$		
V_{OL}	低电平输出电压	RST2, $I_{OL}=500\text{ }\mu\text{A}$		0.3	V
		/RST1, $I_{OL}=500\text{ }\mu\text{A}$		0.3	
I_{IN}	输入漏电流	$0\text{ V} \leq V_{IN} \leq 5.0\text{ V}$		± 1.0	μA
I_{CC}	静态电源电流 (定时器关闭)	/SR0 or /SR1= V_{CC}		20	μA
	动态电源电流 (定时器运行)	/SR0=/SR1=0 V		100	

交流电气特性

除非另行说明，以下性能特性需满足条件： $T_A = -40$ 至 80°C 且 $V_{CC} = 1.8 - 5.0 \text{ V}$ 或 $T_A = -25$ 至 85°C 且 $V_{CC} = 1.7 - 5 \text{ V}$ 或 $T_A = 0$ 至 85°C 且 $V_{CC} = 1.65 - 5 \text{ V}$ 。

符号	参数	工作条件	最小值	典型值	最大值	单位
t_{PHL1}	定时器延迟, /SRn至/RST1, (DSR=0)	$C_L = 5 \text{ pF}$, $R_L = 5 \text{ k}\Omega$ 参见图6	6.0	7.5	9.0	s
	定时器延迟, /SRn至/RST1, (DSR=1)	$C_L = 5 \text{ pF}$, $R_L = 5 \text{ k}\Omega$ 参见图6	9.00	11.25	13.50	s
t_{PLH2}	传播延迟, /SRn至/RST1, (DSR=0或1)	$C_L = 5 \text{ pF}$, $R_L = 5 \text{ k}\Omega$ 参见图6		220	310	ns
t_{PLH1}	定时器延迟, /SRn至/RST2, (DSR=0)	$C_L = 5 \text{ pF}$, $R_L = 10 \text{ k}\Omega$ 参见图7	6.0	7.5	9.0	s
	定时器延迟, /SRn至/RST2, (DSR=1)	$C_L = 5 \text{ pF}$, $R_L = 10 \text{ k}\Omega$ 参见图7	9.00	11.25	13.50	s
t_{PHL2}	传播延迟, /SRn至/RST2, (DSR=0或1)	$C_L = 5 \text{ pF}$, $R_L = 10 \text{ k}\Omega$ 参见图7		210	300	ns

电容规格

$T_A = +25^\circ\text{C}$.

符号	参数	工作条件	典型值	单位
C_{IN}	输入电容	$V_{CC} = \text{GND}$	4.0	pF
C_{OUT}	输出电容	$V_{CC} = 5.0 \text{ V}$	5.0	pF

交流测试电路与波形

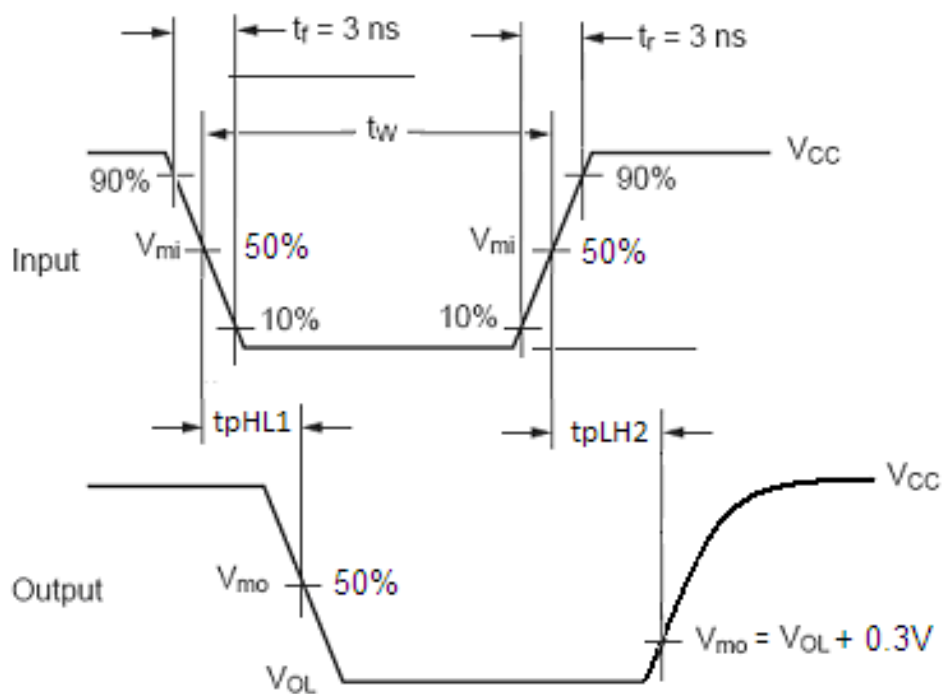
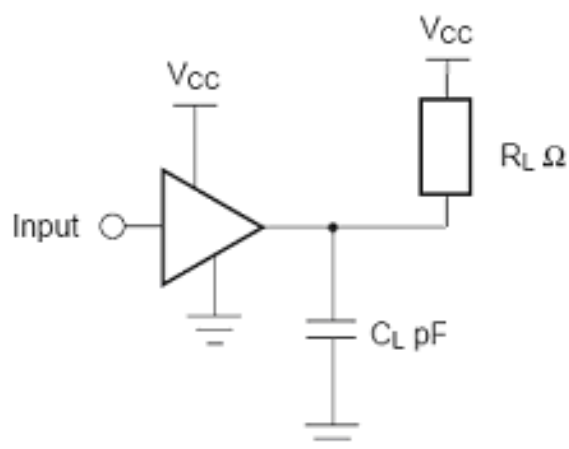


图6./RST1 输出

交流测试电路和波形 (续)

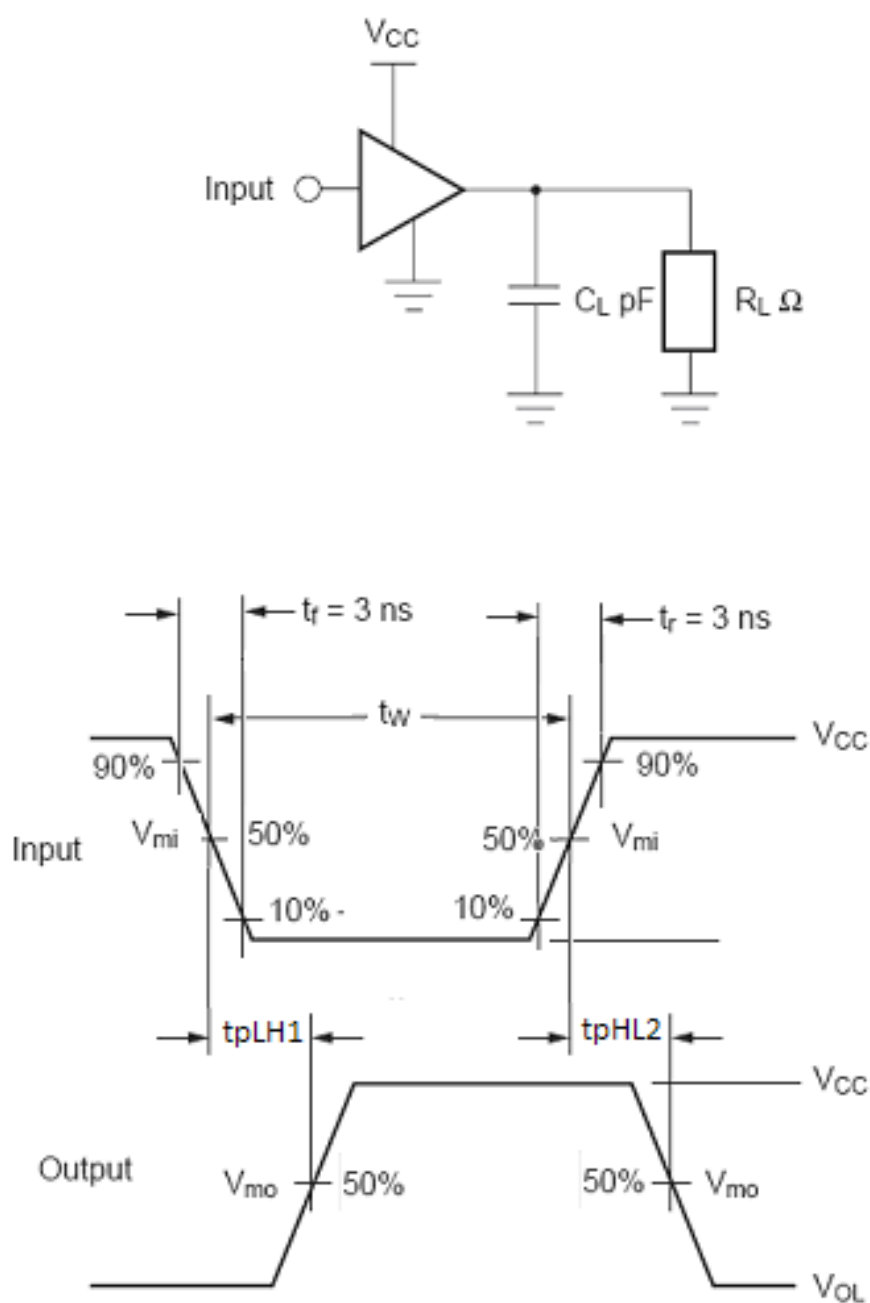


图7.RST2 输出

物理尺寸测试

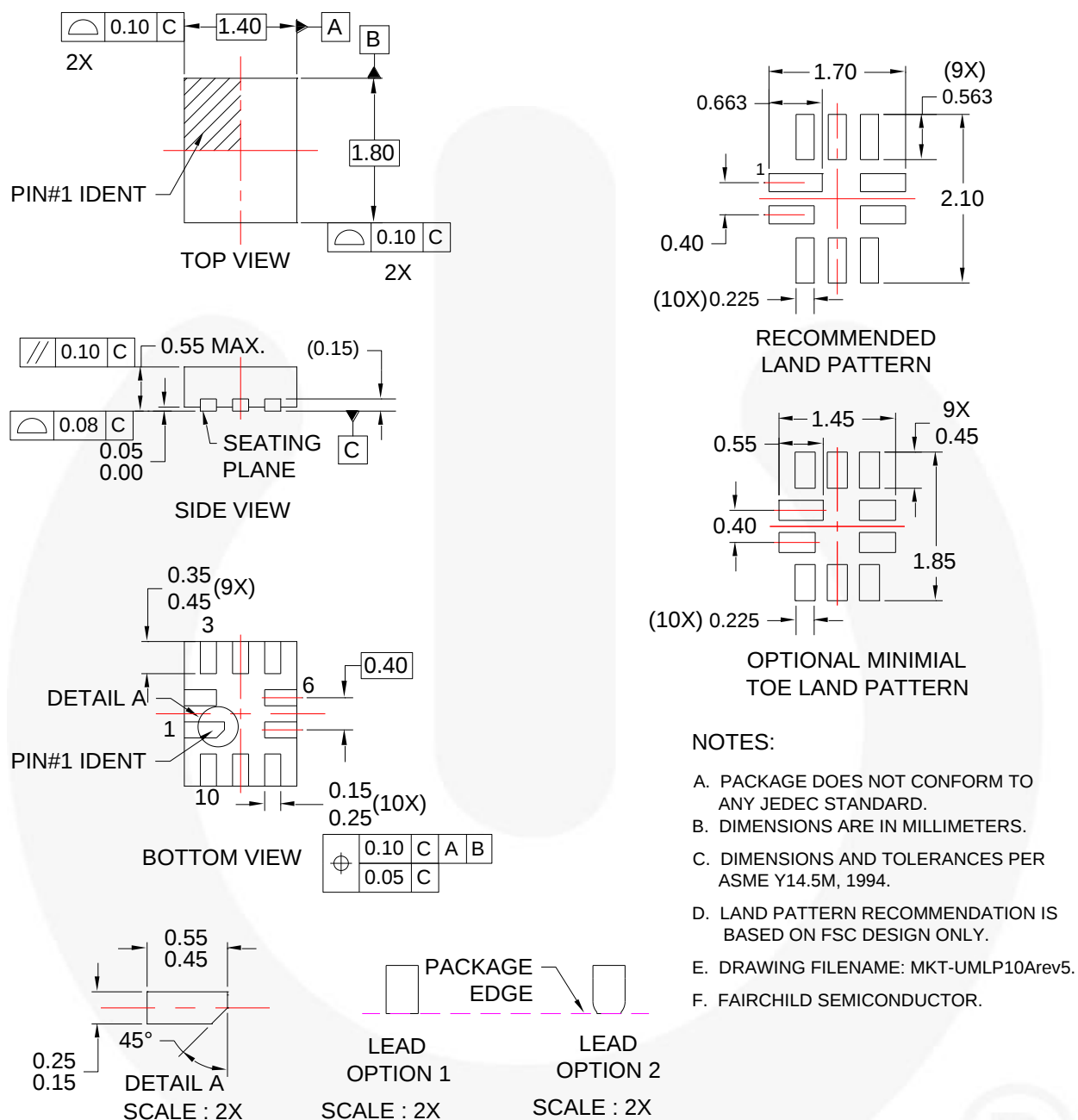


图8.10引脚超薄MLP, 1.4 x 1.8 x 0.55 mm封装

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Definition of Terms

Datasheet Identification	Product Status	Definition
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Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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