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FT7521

带固定延迟和复位脉冲的复位定时器

特性

- 固定复位延迟：7.5 秒
- 一个输入复位引脚
- 漏极开路输出引脚，带固定400ms脉冲
- 1.8 V到5.0 V的操作 ($T_A = -40^{\circ}\text{C}$ 到 $+85^{\circ}\text{C}$)
- 1.7 V到5.0 V的操作 ($T_A = -25^{\circ}\text{C}$ 到 $+85^{\circ}\text{C}$)
- 1.65 V到5.00 V的操作 ($T_A = -0^{\circ}\text{C}$ 到 $+85^{\circ}\text{C}$)
- $<1\ \mu\text{A}$ 的 I_{OQ} 耗电量
- 零秒测试模式使能
- /SR0上的集成式上拉电阻

应用

- 手机
- 便携式媒体播放器
- 平板电脑
- 移动设备
- 消费类医疗器械

说明

FT7521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。它有 $7.5 \pm 20\%$ 秒的固定延迟。DSR引脚通过直接强制/RST1 LOW以便进行出厂测试实现了测试模式操作。

FT7521具有一个用于单按钮复位功能的输入。该器件有一个单漏极开路输出，具备0.5mA的下拉驱动能力。

FT7521不工作时消耗的 I_{OQ} 电流最少，它可在1.65 V到5.0 V的电源电压范围下工作。

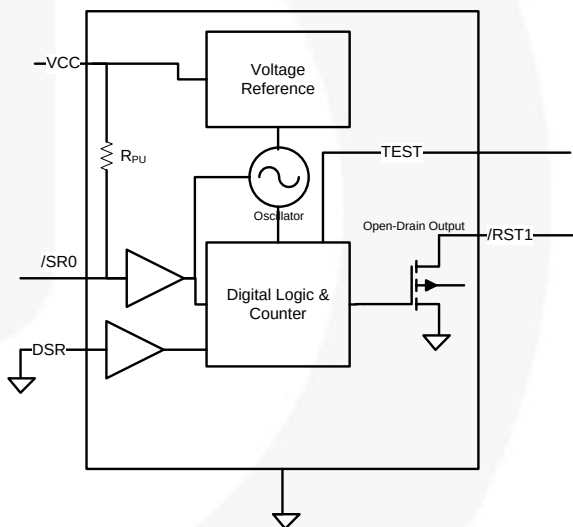


图 1. 框图

订购信息

部件编号	工作温度范围	封装	包装方法
FT7521L6X	-40°C 至 +85°C	6引脚, MicroPak™ 1.0 x 1.45 mm, JEDEC MO-252	卷带和卷盘 (每卷5000装)
FT7521FHX		6引脚, MicroPak2™ 1.0 x 1.0 mm尺寸, 0.35 mm间距	

推荐应用框图

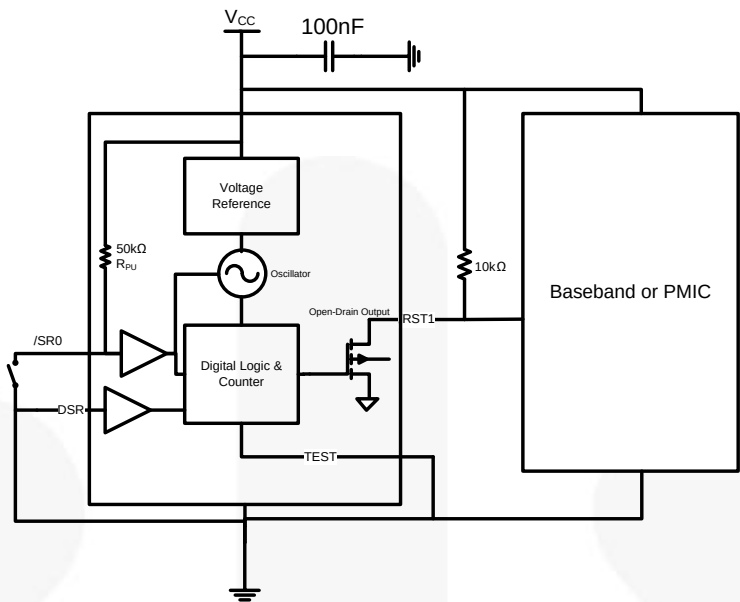


图 2. 推荐应用框图

引脚布局

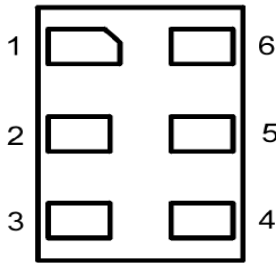


图 3. 焊盘分配（顶视图）

引脚说明

引脚号	名称	说明	
		正常运行	零秒出厂测试模式
1	/RST1	漏极开路输出，低电平有效	漏极开路输出，低电平有效
2	GND	GND	GND
3	/SR0	带集成式上拉的复位输入，低电平有效	带集成式上拉的复位输入，低电平有效
4	Vcc	电源	电源
5	DSR	延迟选择输入；正常操作时连接到GND。 ⁽¹⁾	延迟选择输入。拉至高电平使能零秒延迟，以进行出厂测试。
6	测试	用于器件测试，正常操作时连接到GND。	用于器件测试，正常操作时连接到GND。

注意：

1. 该引脚必须始终连接至 GND 或 VCC。该引脚不可浮置。

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	7.0	V
V_{IN}	DC输入电压	/SR0, DSR	-0.5	7.0	V
V_{OUT}	输出电压 ⁽²⁾	/RST1	-0.5	7.0	V
I_{IK}	直流输入二极管电流	$V_{IN} < 0V$		-50	mA
I_{OK}	DC输出二极管电流	$V_{OUT} < 0V$		-50	mA
I_{OL}	DC输出灌电流			+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：

2. 必须遵守所有输出电流的绝对最大额定值。

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 ⁽³⁾	-40°C到+85°C	1.8	5.0	V
		-25°C到+85°C	1.7	5.0	
		0°C到+85°C	1.65	5.00	
t_{RFC}	断电后， V_{CC} 恢复时间	$V_{CC}=0V$ 电源关断后上升到0.5 V	5		ms
V_{IN}	输入电压 ⁽³⁾	/SR0	0	5	V
V_{OUT}	输出电压	/RST1	0	5	V
I_{OL}	DC输出灌电流	/RST1, $V_{CC}=1.8V$ 到5.0 V		+3	mA
T_A	常压工作温度		-40	+85	°C
Θ_{JA}	热阻			350	°C/W

注意：

3. 输入引脚被驱动时， V_{CC} 电源不可浮动。

直流电气特性

在 $T_A=-40$ 到 80°C 且 $V_{CC}=1.8 - 5.0\text{ V}$ 或 $T_A=-25$ 到 85°C 且 $V_{CC}=1.7 - 5\text{ V}$ 或 $T_A=0$ 到 85°C 且 $V_{CC}=1.65 - 5\text{ V}$ 的条件下会产生以下性能特性。

符号	参数	条件	最小值	典型值	最大值	单位
V_{IH}	输入高电平	DSR, /SR0	$0.65 \times V_{CC}$			V
V_{IL}	输入低电平	DSR, /SR0			$0.25 \times V_{CC}$	V
V_{OL}	低电平输出电压	RST, $I_{OL}=500\text{ }\mu\text{A}$			0.3	V
		RST, $I_{OL}=3\text{ mA}$, $V_{CC}=3.0\text{ V}$		0.3		
R_{PU}	/SR0上的集成式上拉电阻			50		$k\Omega$
I_{IN}	输入漏电流/SR0	$V_{IN}=V_{CC}$			± 1.0	μA
	输入漏电流DSR	$0\text{ V} \leq V_{IN} \leq 5.0\text{ V}$			± 1.0	
I_{CC}	静态电源电流 (定时器关闭)	/SR0= V_{CC}			1	μA
	动态电源电流 (定时器运行)	/SR0=0 V			200	

交流电气特性

在 $T_A=-40$ 到 80°C 且 $V_{CC}=1.8 - 5.0\text{ V}$ 或 $T_A=-25$ 到 85°C 且 $V_{CC}=1.7 - 5\text{ V}$ 或 $T_A=0$ 到 85°C 且 $V_{CC}=1.65 - 5\text{ V}$ 的条件下会产生以下性能特性。

符号	参数	条件	最小值	典型值	最大值	单位
t_{PHL1}	定时器延迟, /SR0 到 RST (DSR = 0)	$C_L=5\text{ pF}$, $R_L=5\text{ K}\Omega$, 参见 图 4.	6.0	7.5	9.0	S
t_{REC}	复位超时延迟		320	400	480	ms

电容规格

$T_A=+25^{\circ}\text{C}$ 。

符号	参数	条件	典型值	单位
C_{IN}	输入电容	$V_{CC}=\text{GND}$	4	pF
C_{OUT}	输出电容	$V_{CC}=5.0\text{ V}$	5	pF

功能说明

默认运行时间 N 为7.5 s。如果DSR引脚在 V_{cc} 斜坡前被拉至高电平,则FT7521会进入测试模式并且复位输出/RST1会被立即拉至低电平以进行出厂测试。正常工作时,DSR引脚必须被强制接到GND。正常工作时,DSR引脚不能被驱高或悬置。设备运行时,DSR引脚的状态不能改变;它必须在为 V_{cc} 供电前被偏置。如果需要使用DSR = VCC测试模式,在DSR引脚由低电平变成高电平以进入零秒出厂测试模式时,/SR0必须处在高电平。要恢复到标准的7.5秒复位时间,必须对DSR = GND进行同样的操作。当/SR0引脚处于低电平时,DSR引脚的状态不能改变。其他输入引脚被驱动时,VCC电源引脚不可浮动。如果VCC引脚可以浮动,则应当注意确保/SR0被驱动至的电压不得大于GND。

工作模式

/SR0的输入信号为低电平时,振荡器启动。计数方式有两种:短时持续和长时持续。短时情况下,输出/RST1不会受到影响。长时情况下,输出/RST1会在/SR0保持为低电平的7.5 s后变为低电平。无论/SR0的状态如何,

在超过时间 t_{REC} 后的400ms,/RST1输出会返回其初始的高电平状态。/RST1输出为一个开漏驱动器。计数时间超过7.5 s时,/RST1输出会被拉至低电平。

短时($t_H < 7.5$ s)

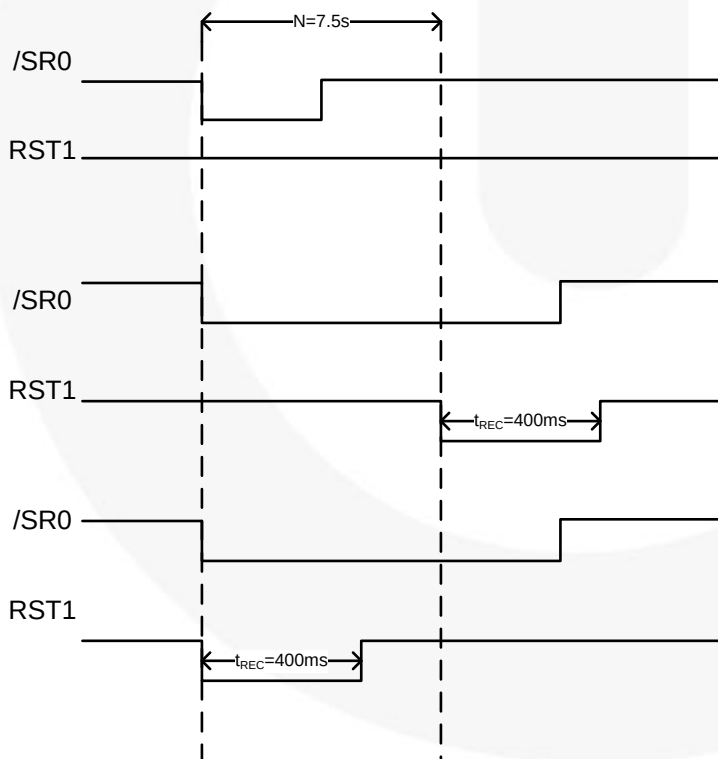
/SR0输入变为低电平时,内部定时器会开始计数。如果在7.5 s过去之前/SR0输入变为高电平,则定时器会停止计数并复位,并且输出上无变化。

长时($t_H > 7.5$ s)

/SR0输入变为低电平时,内部定时器会开始计数。如果/SR0输入保持为低电平的时间不少于7.5 s,则RST输出会被使能并被拉至低电平。无论/SR0引脚的状态如何,只要满足7.5 s的复位时间,输出RST就会保持为低电平,持续时间为400 ms的 t_{REC} 。/SR0输入返回到高电平且 t_{REC} 超时,内部定时器会复位并等待下一复位事件。

零秒测试模式

/SR0变低后,RST1立即变低。



**Short-Duration,
Normal Operation**
/RST1 never goes LOW because /SR0 LOW duration does not meet requirement: Reset Time $N=7.5s$

**Long-Duration,
Normal Operation**
/RST1 goes LOW because /SR0 LOW duration exceeded requirement: Reset Time $N=7.5s$

Zero-Second Factory-Test Mode
/RST1 goes LOW immediately after /SR0 goes LOW

图 4. 复位计时波形

交流测试电路与波形

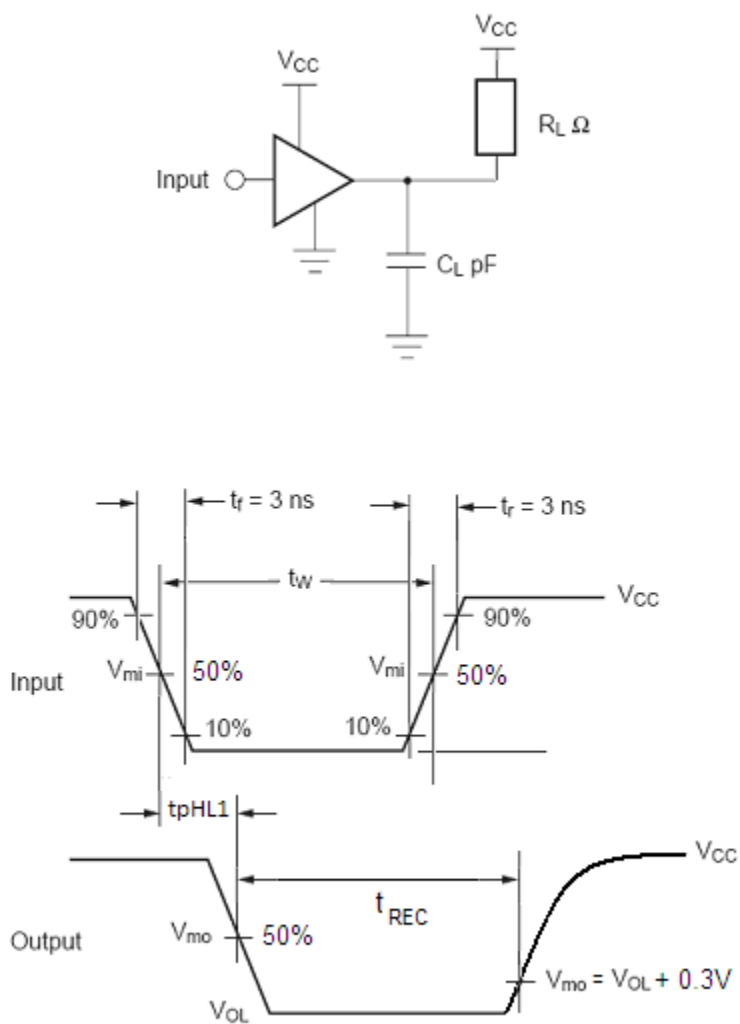
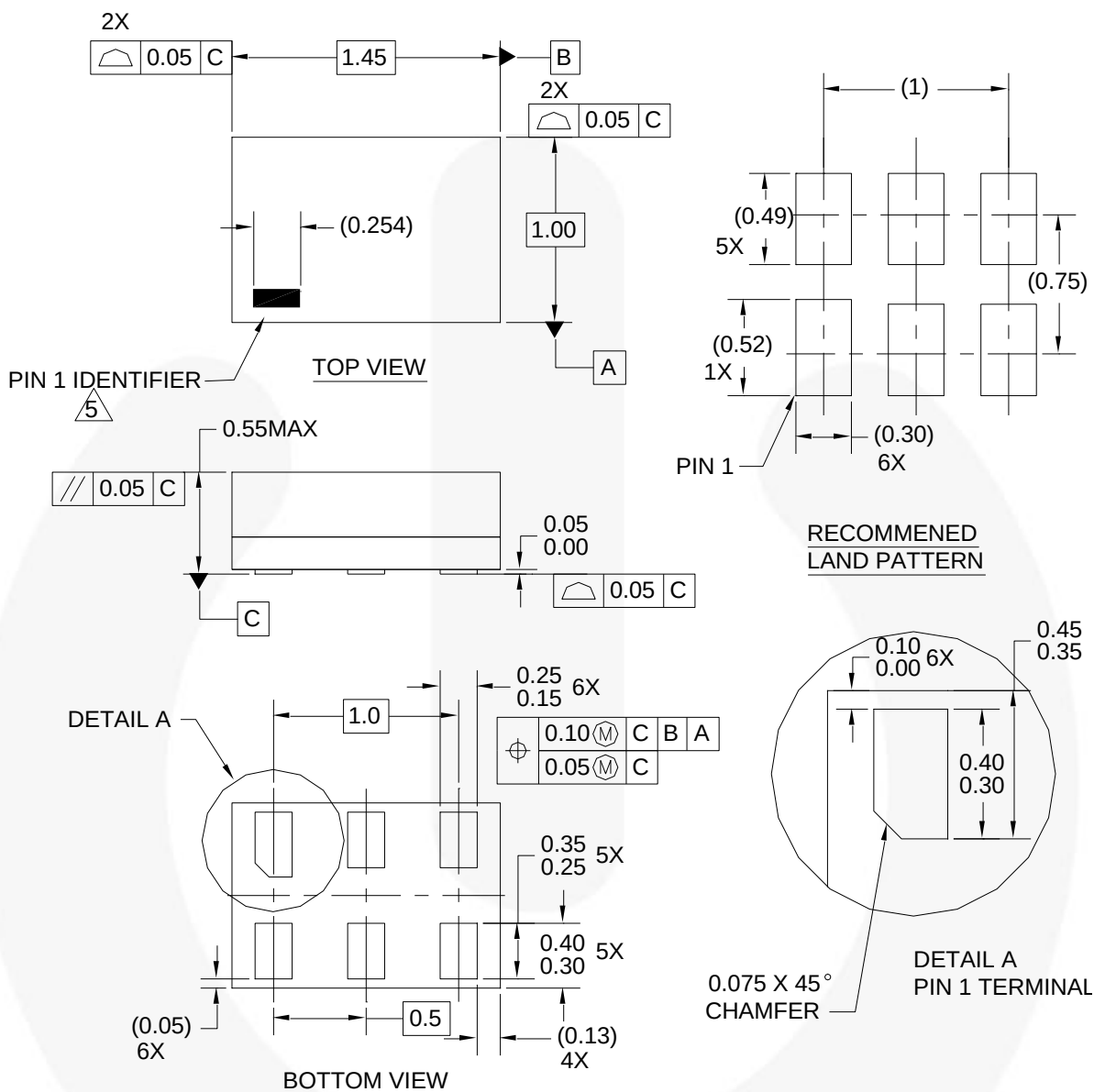


图 5. /RST1输出的AC测试电路和波形ST输出

物理尺寸测试



Notes:

1. CONFORMS TO JEDEC STANDARD M0-252 VARIATION UAAD
2. DIMENSIONS ARE IN MILLIMETERS
3. DRAWING CONFORMS TO ASME Y14.5M-1994
4. FILENAME AND REVISION: MAC06AREV4
5. PIN ONE IDENTIFIER IS 2X LENGTH OF ANY OTHER LINE IN THE MARK CODE LAYOUT.

图 6. 6引脚, MicroPak™ 1.0 x 1.45 mm, JEDEC M0-252

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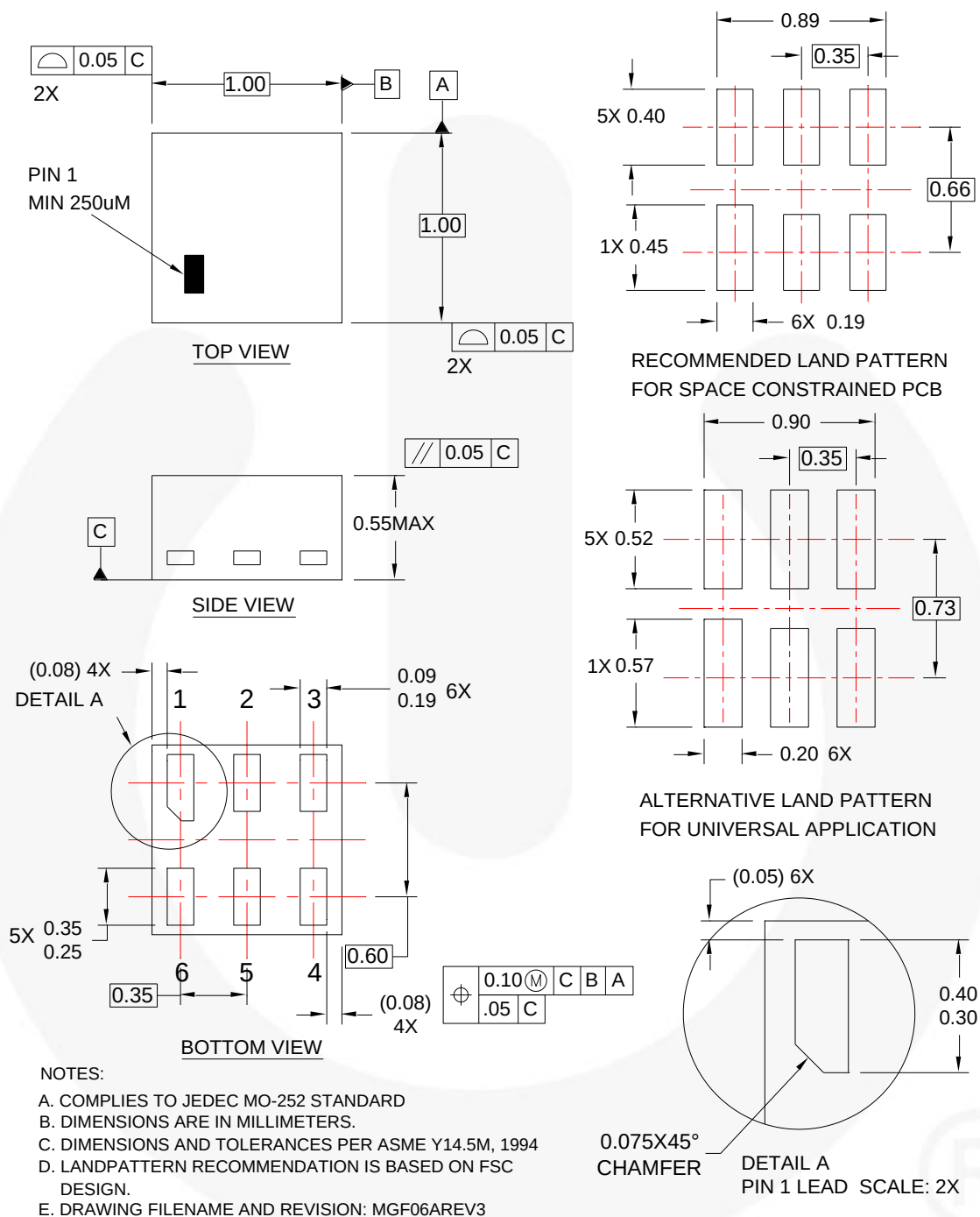


图 7. 6引脚, MicroPak2™ 1.0 x 1.0 mm尺寸, 0.35 mm间距

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