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FAIRCHILD SEMICONDUCTOR®

February 2013

FT7521
Reset Timer with Fixed Delay and Reset Pulse

Features

- Fixed Reset Delay: 7.5 Seconds
- One Input Reset Pin
- Open-Drain Output Pin with Fixed 400ms Pulse
- 1.8 V to 5.0 V Operation (T_A=-40°C to +85°C)
- 1.7 V to 5.0 V Operation (T_A=-25°C to +85°C)
- 1.65 V to 5.00 V Operation (T_A=0°C to +85°C)
- <1 µA I_{CCQ} Consumption
- Zero-Second Test-Mode Enable
- Integrated Pull-Up Resistor on /SRO

Applications

- Cell Phones
- Portable Media Players
- Tablets
- Mobile Devices
- Consumer Medical

Description

The FT7521 is a timer for resetting a mobile device where long reset times are needed. The long delay helps avoid unintended resets caused by accidental key presses. It has a fixed delay of 7.5 ±20% seconds. The DSR pin enables Test Mode operation by immediately forcing /RST1 LOW for factory testing.

The FT7521 has one input for single-button resetting capability. The device has a single open-drain output with 0.5 mA pull-down drive.

FT7521 draws minimal I_{CC} current when inactive and functions over a power supply range of 1.65 V to 5.0 V.

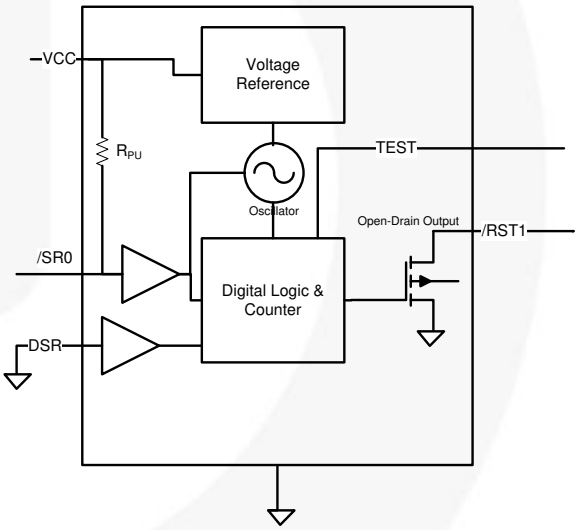


Figure 1. Block Diagram

Ordering Information

Part Number	Operating Temperature Range	Package	Packing Method
FT7521L6X	-40°C to +85°C	6-Lead, MicroPak™ 1.0 x 1.45 mm, JEDEC MO-252	5000 Units on Tape and Reel
FT7521FHX		6-Lead, MicroPak2™ 1.0 x 1.0 mm Body, .35 mm Pitch	

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Recommended Application Diagram

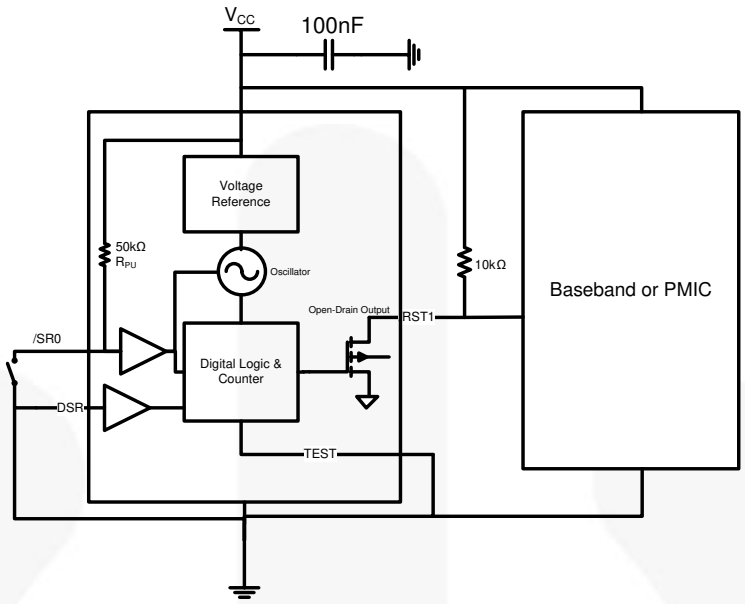


Figure 2. Recommended Application Diagram

Pin Configuration

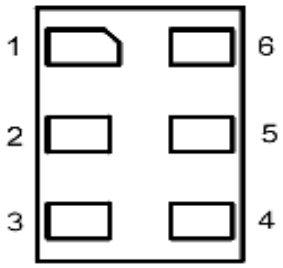


Figure 3. Pad Assignments (Top-Through View)

Pin Definitions

Pin #	Name	Description	
		Normal Operation	Zero-Second Factory-Test Mode
1	/RST1	Open-drain output, active LOW	Open-drain output, active LOW
2	GND	GND	GND
3	/SR0	Reset Input with Integrated pull-up, active LOW	Reset input with integrated pull-up, active LOW
4	VCC	Power supply	Power supply
5	DSR	Delay selection input; tie to GND during normal operation.(1)	Delay selection input. Pull HIGH to enable zero-second delay for factory test.
6	TEST	Used for device testing; tie to GND during normal operation.	Used for device testing; tie to GND during normal operation.

Note:

1. This pin must always be tied to either GND or VCC. It must not float.

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Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameter	Condition	Min.	Max.	Unit
V_{CC}	Supply Voltage		-0.5	7.0	V
V_{IN}	DC Input Voltage	/SR0, DSR	-0.5	7.0	V
V_{OUT}	Output Voltage[2]	/RST1	-0.5	7.0	V
I_{IK}	DC Input Diode Current	V_{IN} < 0V		-50	mA
I_{OK}	DC Output Diode Current	V_{OUT} < 0V		-50	mA
I_{OL}	DC Output Sink Current			+50	mA
I_{CC}	DC V_{CC} or Ground Current per Supply Pin			±100	mA
T_{STG}	Storage Temperature Range		-65	+150	°C
T_J	Junction Temperature Under Bias			+150	°C
T_L	Junction Lead Temperature, Soldering 10 Seconds			+260	°C
P_D	Power Dissipation			5	mW
ESD	Electrostatic Discharge Capability	Human Body Model, JESD22-A114		4	kV
		Charged Device Model, JESD22-C101		2	

Note:
2. All output current Absolute Maximum Ratings must be observed.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Condition	Min.	Max.	Unit
V_{CC}	Supply Voltage[3]	-40°C to +85°C	1.8	5.0	V
		-25°C to +85°C	1.7	5.0	
		0°C to +85°C	1.65	5.00	
t_{RFC}	V_{CC} Recovery Time After Power Down	V_{CC}=0 V After Power Down, Rising to 0.5 V	5		ms
V_{IN}	Input Voltage[3]	/SR0	0	5	V
V_{OUT}	Output Voltage	/RST1	0	5	V
I_{OL}	DC Output Sink Current	/RST1, V_{CC}=1.8 V to 5.0 V		+3	mA
T_A	Free-Air Operating Temperature		-40	+85	°C
Θ_{JA}	Thermal Resistance			350	°C/W

Note:
3. V_{CC} supply should never be allowed to float while input pins are driven.

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DC Electrical Characteristics

Conditions of T_A=-40 to 80°C with V_{CC}=1.8 - 5.0 V OR T_A=-25 to 85°C with V_{CC}=1.7 – 5 V OR T_A=0 to 85°C with V_{CC}=1.65 – 5 V produce the performance characteristics below.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
V_{IH}	Input High Voltage	DSR, /SR0	0.65 x V_{CC}			V
V_{IL}	Input Low Voltage	DSR, /SR0			0.25 x V_{CC}	V
V_{OL}	Low Level Output Voltage	RST, I_{OL}=500 µA			0.3	V
		RST, I_{OL}=3 mA, V_{CC}=3.0 V		0.3		
R_{PU}	Integrated Pull-Up Resistor on /SR0			50		kΩ
I_{IN}	Input Leakage Current /SR0	V_{IN}= V_{CC}			±1.0	µA
	Input Leakage Current DSR	0V ≤ V_{IN} ≤ 5.0 V			±1.0	
I_{CC}	Quiescent Supply Current (Timer Inactive)	/SR0=V_{CC}			1	µA
	Dynamic Supply Current (Timer Active)	/SR0=0 V			200	

AC Electrical Characteristics

Conditions of T_A=-40 to 80°C with V_{CC}=1.8 - 5.0 V OR T_A=-25 to 85°C with V_{CC}=1.7 – 5 V OR T_A=0 to 85°C with V_{CC}=1.65 – 5 V produce the performance characteristics below.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
t_{PHL1}	Timer Delay, /SR0 to RST (DSR=0)	C_L=5 pF, R_L=5 KΩ, *see* Figure 4	6.0	7.5	9.0	s
t_{REC}	Reset Timeout Delay		320	400	480	ms

Capacitance Specifications

T_A=+25°C.

Symbol	Parameter	Condition	Typ.	Unit
C_{IN}	Input Capacitance	V_{CC}=GND	4	pF
C_{OUT}	Output Capacitance	V_{CC}=5.0 V	5	pF

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Functional Description

Default operation time N is 7.5 s. If the DSR pin is pulled HIGH prior to V_{CC} ramp, the FT7521 enters Test Mode and the reset output, /RST1, is immediately pulled LOW for factory testing. The DSR pin MUST be forced to GND during normal operation. The DSR pin should never be driven HIGH or left to FLOAT during normal operation. The DSR PIN state should never be changed during device operation; it must be biased prior to supplying the V_{CC} supply. If there is a need to use the DSR=VCC Test Mode, the /SR0 must be HIGH when the DSR pin is moved from LOW to HIGH to enter Zero-Second Factory-Test Mode. To return to the standard 7.5-second reset time, the same procedure must be followed with DSR=GND. The DSR pin should never be allowed to change state while the /SR0 pin is LOW. The VCC supply pin should never be left to float while other input pins are driven. If the VCC pin is allowed to float, care should be taken to ensure that /SR0 is not driven to any voltage greater than GND.

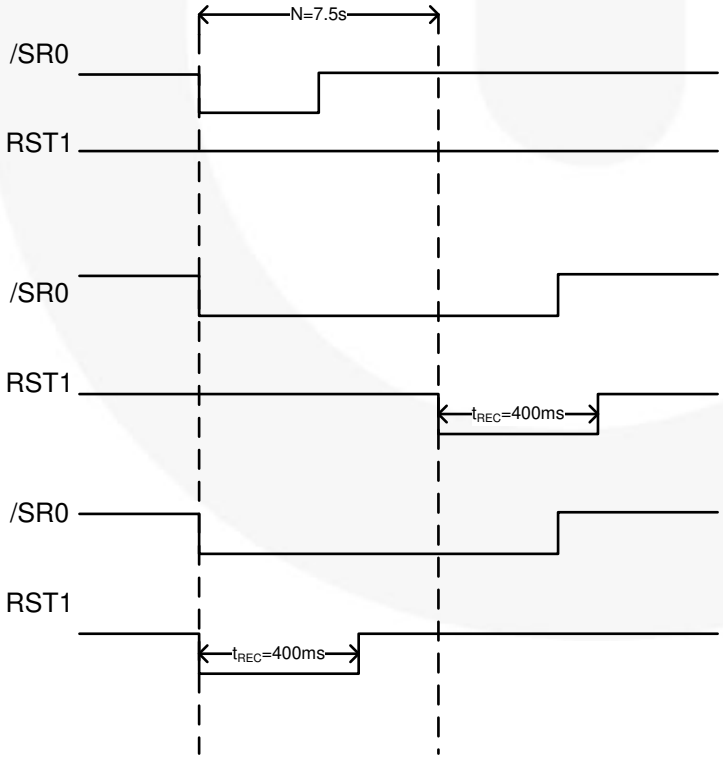
Operation Modes

A low input signal on /SR0 starts the oscillator. There are two scenarios for counting: short duration and long duration. In the short-duration scenario, output /RST1 is not affected. In the long-duration scenario, the output /RST1 goes LOW after /SR0 has been held LOW for ≥7.5 s. The /RST1 output returns to its original HIGH state 400ms after time t_{REC} has expired, regardless of the state of /SR0. The /RST1 output is an open-drain driver. When the count time exceeds time 7.5 s, the /RST1 output pulls LOW.

Short Duration (t_W < 7.5 s)
When the /SR0 input goes LOW, the internal timer starts counting. If the /SR0 input goes HIGH before 7.5 s has elapsed, the timer stops counting and resets and no changes occur on the outputs.

Long Duration (t_W > 7.5 s)
When the /SR0 input goes LOW, the internal timer starts counting. If the /SR0 input stays LOW for at least 7.5 s, the RST output is enabled and pulled LOW. The output RST is held LOW for t_{REC}, 400 ms, as soon as the reset time of 7.5 s is met, regardless of the state of the /SR0 pin. When the /SR0 input has returned HIGH and the t_{REC} has expired, the internal timer resets and awaits the next RESET event.

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



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

Figure 4. Reset Timing Waveforms

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AC Test Circuit and Waveforms

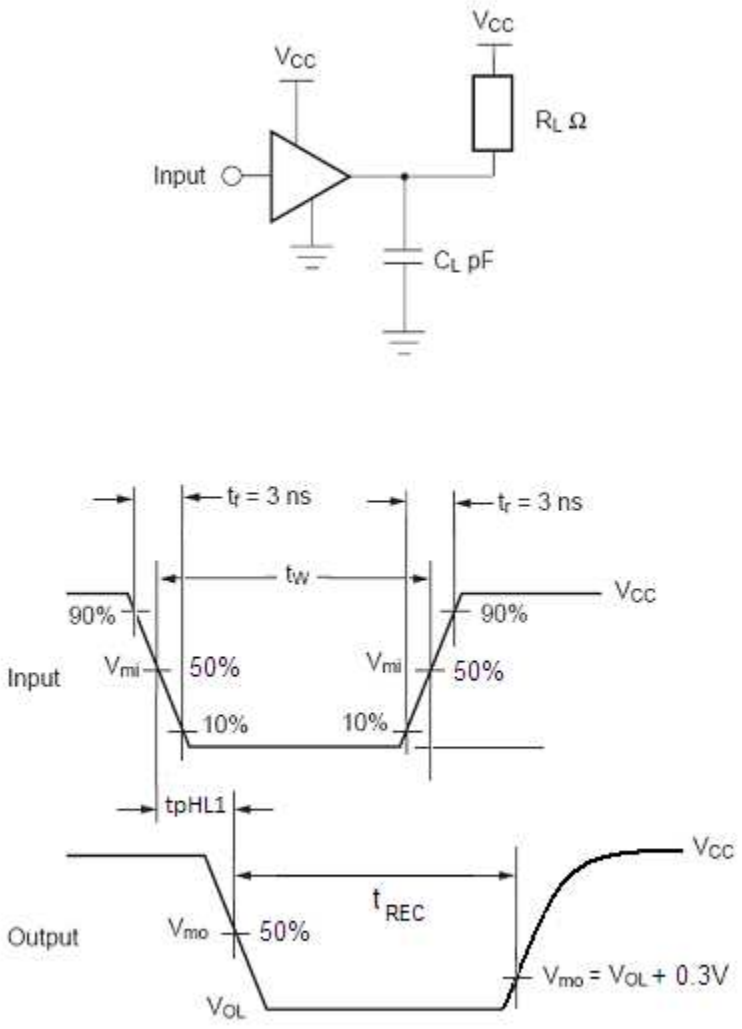
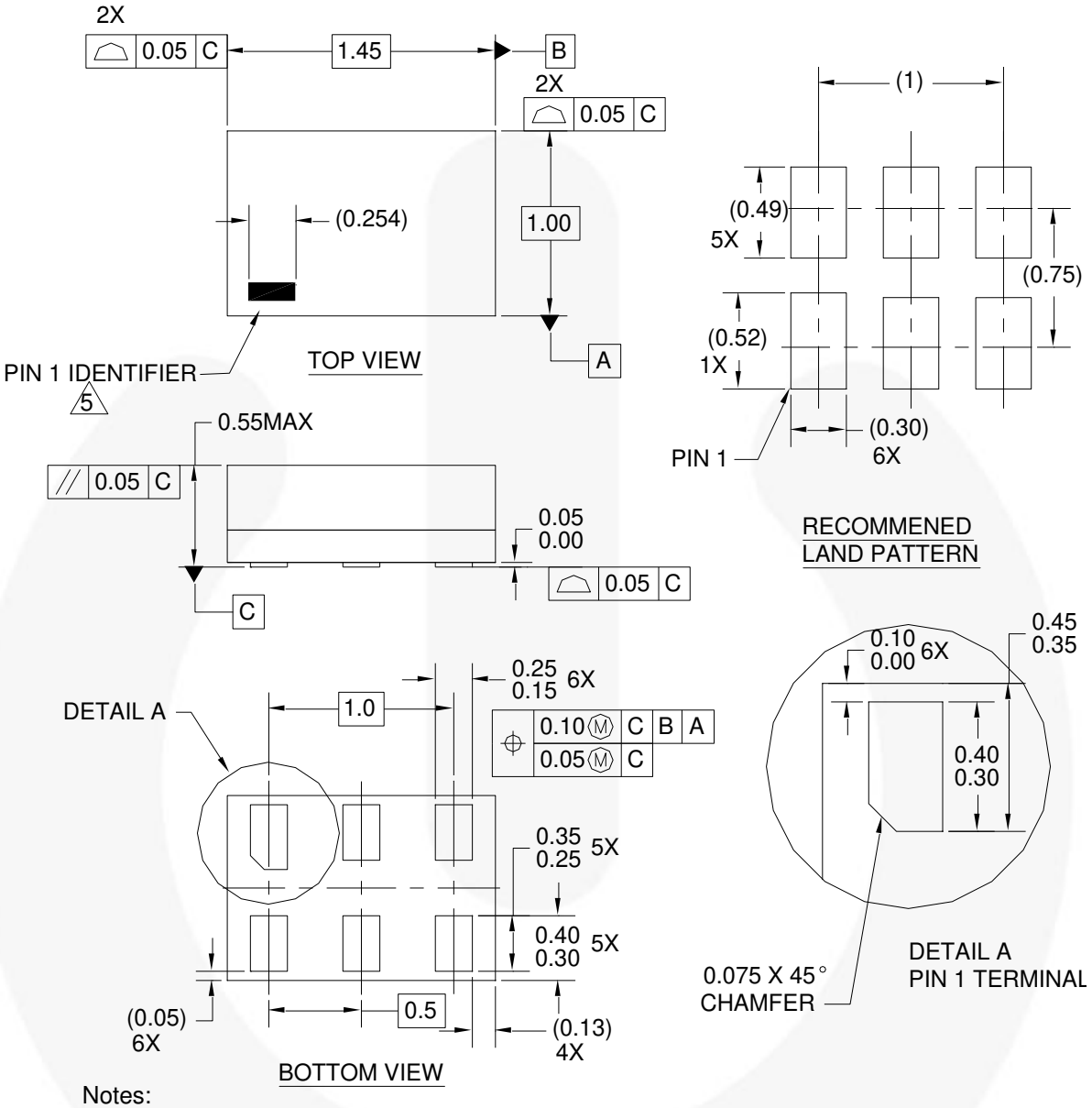


Figure 5. AC Test Circuit and Waveforms for /RST1 Output ST Output

Physical Dimensions



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.

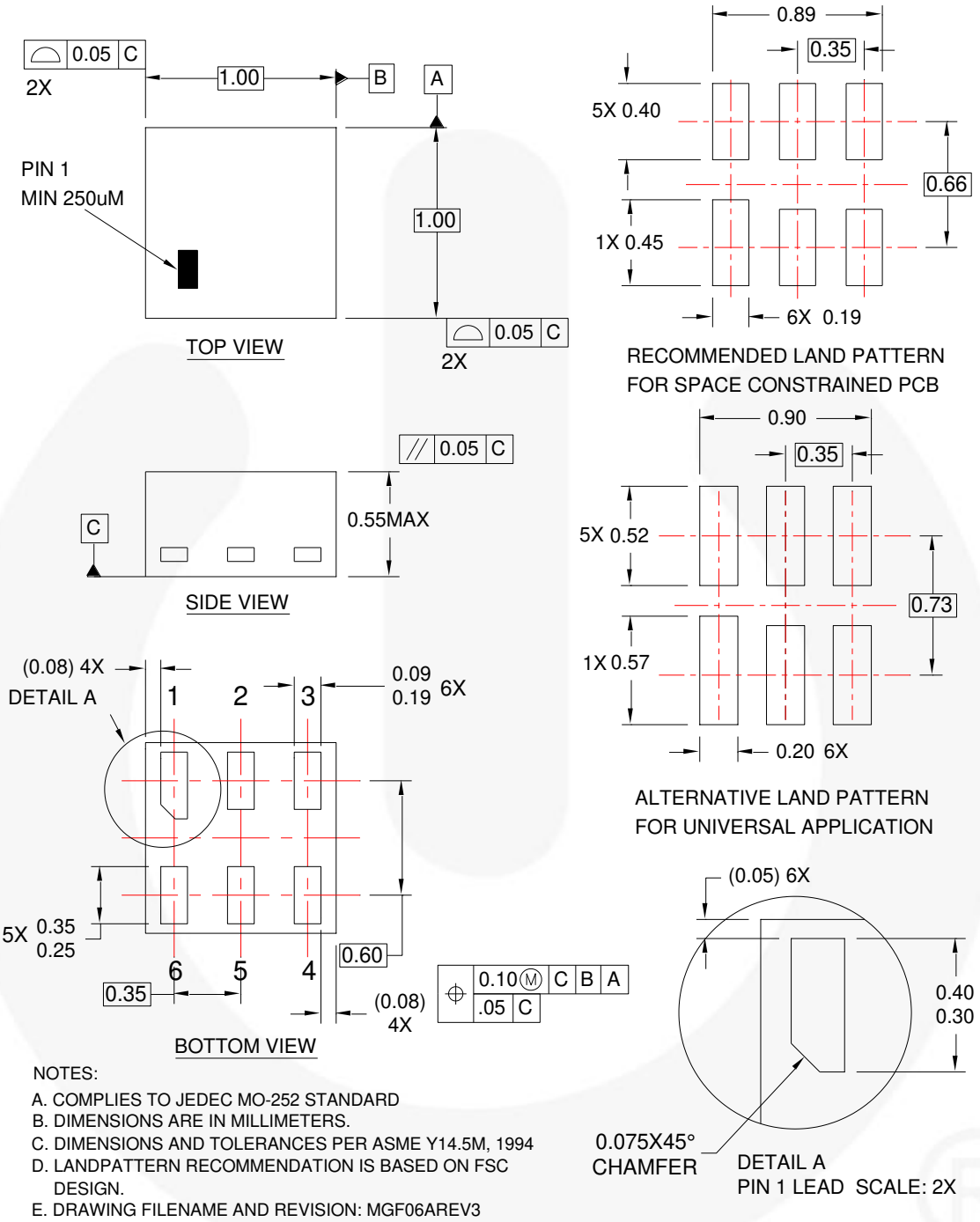
Figure 6. 6-Lead, MicroPak™ 1.0 x 1.45 mm, JEDEC MO-252

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Physical Dimensions



NOTES:

A. COMPLIES TO JEDEC MO-252 STANDARD
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994
D. LANDPATTERN RECOMMENDATION IS BASED ON FSC DESIGN.
E. DRAWING FILENAME AND REVISION: MGF06AREV3

Figure 7. 6-Lead, MicroPak2™ 1.0 x 1.0 mm Body, .35 mm Pitch

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