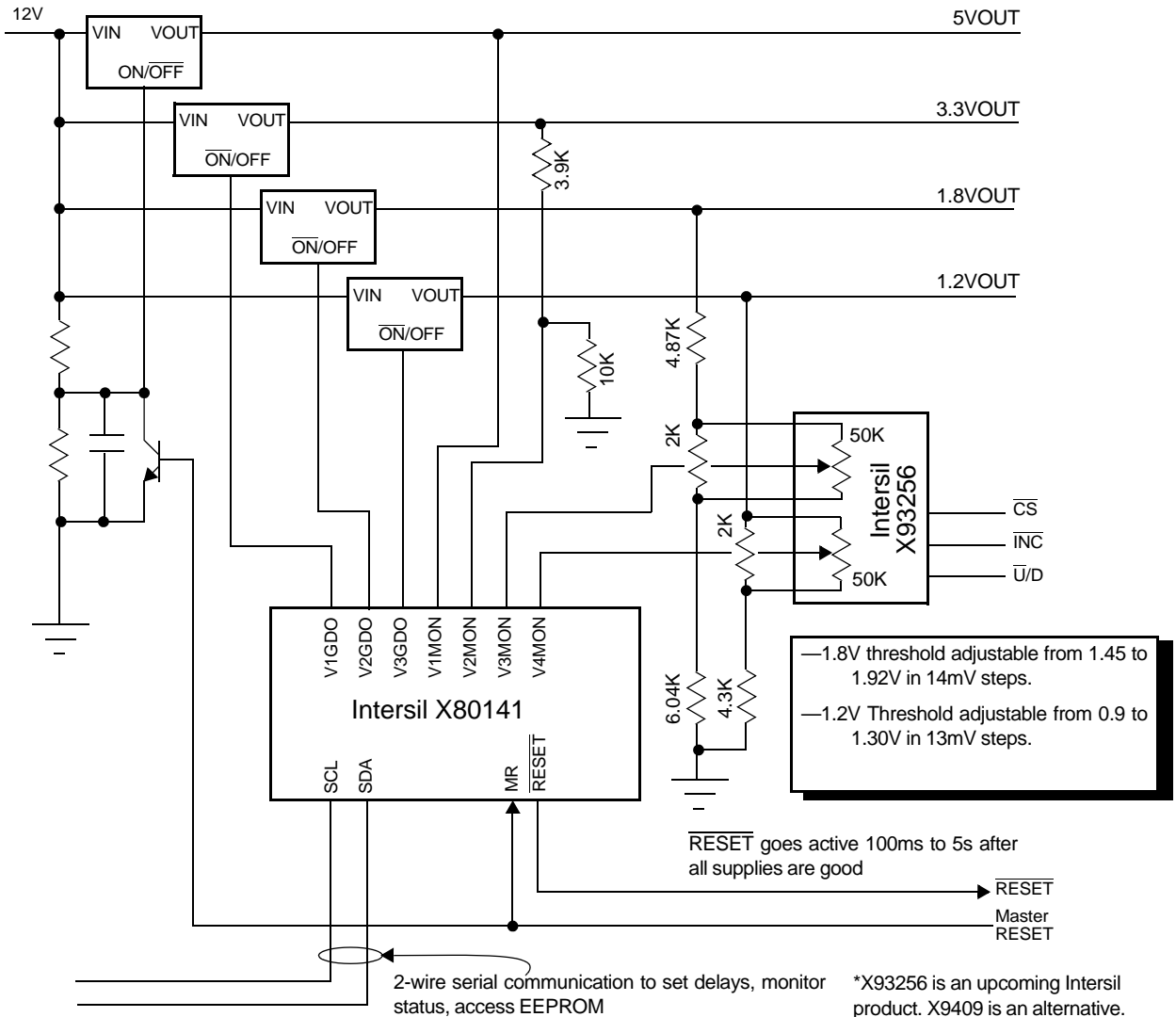In this application, an X80141 provides comparators, internal references and delay circuits to simply control sequencing of multiple DC to DC converters. In this design, a dual digitally controlled potentiometer (DCP) provides adjustment to the thresholds of two low voltage supplies. This allows the power supplies to be trimmed, either up or down, while maintaining a desirable under-voltage margin. A block diagram appears in Figure 1. The X80141 provides undervoltage thresholds for each of the monitored inputs, while the X93256 provides threshold adjustment. The X80141 internal thresholds and adjustable ranges are shown in Table 1. For larger or smaller power distribution schemes, Intersil offers dual, triple and quad sequencers/supervisors.

Table 1. X80141 Input Thresholds

Monitored Voltage	Input	X80141 threshold	Threshold after external control
5V	VMON1	4.50	4.50
3.3V	VMON2	2.25	3.13V
1.8V	VMON3	0.90	1.45-1.92V
1.2V	VMON4	0.90	0.90 - 1.30V

Figure 1. Dual Sequencer with Adjustable Thresholds (Block Diagram)

—1.8V threshold adjustable from 1.45 to 1.92V in 14mV steps.

—1.2V Threshold adjustable from 0.9 to 1.30V in 13mV steps.

$\overline{RESET}$ goes active 100ms to 5s after all supplies are good

2-wire serial communication to set delays, monitor status, access EEPROM

*X93256 is an upcoming Intersil product. X9409 is an alternative.

This application shows the sequencing and monitoring of 4 supplies configured as a "daisy chain" or relay configuration. When the 5V supply reaches its threshold, the X80141 delays for a period of time, then starts the next supply with the V1GDO output. When this second supply reaches the desired threshold, it will signal the next supply to start, and so on. This is shown in Figure 2. For each input there is a selectable delay time. The choice is 100ms, 500ms, 1s, or 5s. A 2-wire interface provides access to registers to allow the value to change. Once programmed, the delay remains in a nonvolatile memory.

Once all supplies reach their desired threshold, and after a selectable delay, a RESET signal goes active to start operation of the system. A master reset input turns off all supplies, and can be connected to system logic, the main controller, or a manual input.

This circuit is physically very small. The two ICs and handful of discrete elements take less board area than a 44-lead TQFP device. A scale size drawing is shown in Figure 3.

In addition to the other features, the X80141 contains a status register that shows the state of the inputs and has 2K bits of general purpose EEPROM for use as board ID, failure tracking, or test parameters.

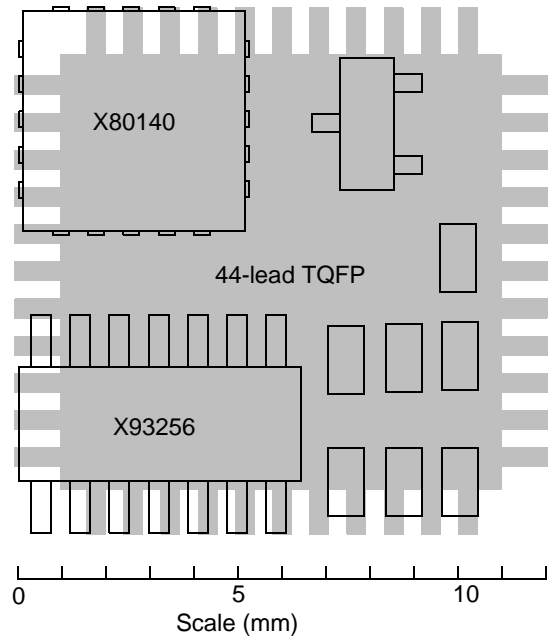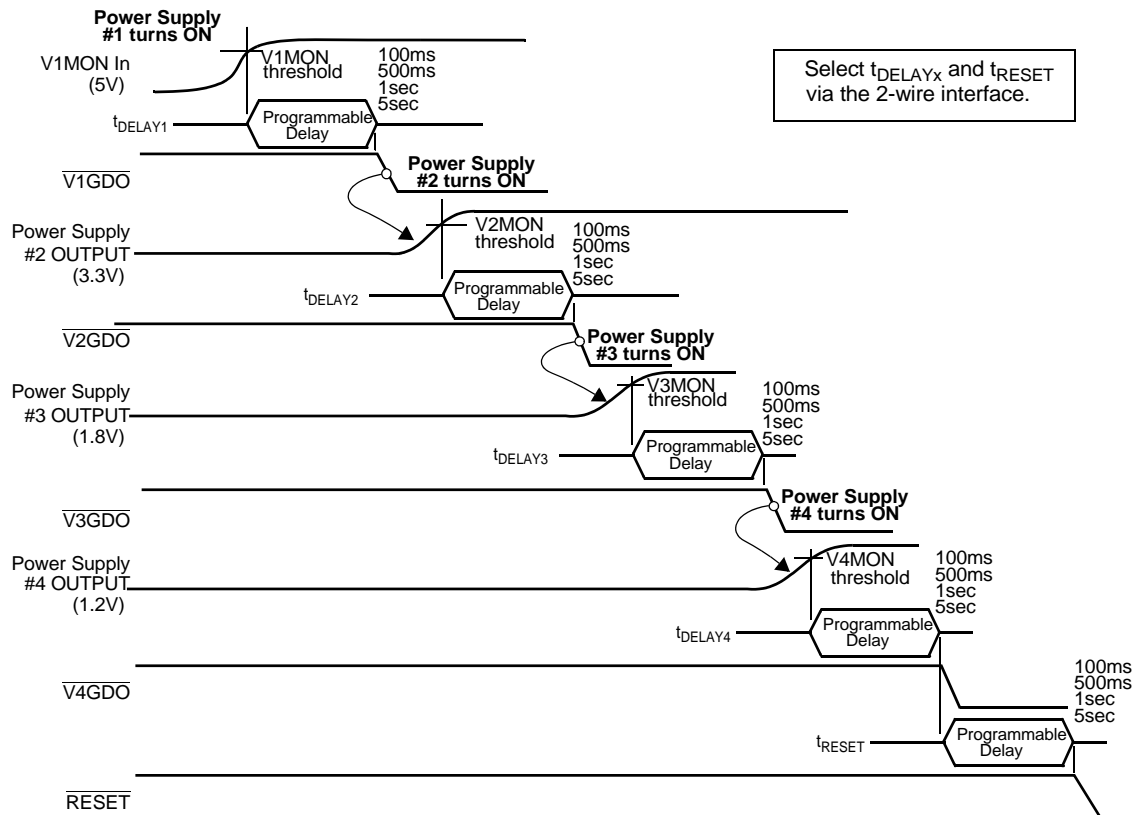**Figure 3. Board Space Requirements for Application**

Figure 2. Sequencer Timing

Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that the Application Note or Technical Brief is current before proceeding.

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