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ISL706xRH Evaluation Board User's Guide

Introduction

The ISL706xRHEVAL1Z evaluation board is a design platform featuring all three versions of the rad hard 3.3V supervisory circuits. It includes all the circuitry needed to characterize critical performance parameters and enables evaluation of basic functional operation and common application implementations. Figures 1 and 2 illustrate the ISL706xRHEVAL1Z in photographic and schematic forms, respectively.

FIGURE 1. ISL706xRHEVAL1Z

Evaluation Board Key Features

The ISL706xRHEVAL1Z is divided into three sections; each section having one of the three available reset output versions. The left position has the ISL706ARH and is set-up as a +5V and +3.3V UV monitor with reset signal. The middle position features the ISL706BRH set up as 3.3V window detector. The right section contains the ISL706CRH in a bipolar voltage sensing application.

Section 1

In the left position (Section 1), the ISL706ARH is configured to monitor undervoltage conditions on a +3.3V supply through the V_{DD} pin and on a +5V supply through the PFI pin. The PFI allows monitoring of any voltage above the 0.6V PFI reference and with a resistor divider is used to monitor the +5V. The rising threshold for the +5V auxiliary voltage is set to 3V via the R1, R2 divider, when this condition is met PFO will be high driving on a green LED. When the +5V auxiliary voltage falls below 3V, PFO is pulled low and a red LED will be turned on. There is an option to add hysteresis to the power fail comparator by adding a resistor on pad R13. The active low reset signal maybe monitored through the $\overline{RST}$ test point. There is also a $\overline{MR}$ test point in order to drive the $\overline{MR}$ low to test its functionality.

Section 2

The middle position (Section 2), has the ISL706BRH installed and is set-up as a 3.3V window detector. The V_{DD} monitors for UV and the PFI for OV via the R5, R6 divider. The PFO output is inverted and connected to the manual reset input (MR) via U4. Hence, a reset signal is generated when 3.06V < V_{DD} > 3.45V. If J4 is not installed, the PFO will be an OV indicator but no reset signal will be generated. There is also a LED indicator for an overvoltage condition, when V_{DD} > 3.45V PFO is a high and a LED will turn on indicating an OV condition. The active high reset signal for the an UV condition maybe monitored through the RST test point.

Section 3

The right position (Section 3), features the ISL706CRH in a negative voltage sensing application. A +3.3V supply is monitored through the V_{DD} pin and a -5V supply is monitored on the PFI pin with use of the R7, R8 resistor divider network. Both pins are sensing for an under voltage condition. When the -5V supply rail drops below -4.5V, PFO will be high driving on the N3904 NPN transistor. As the NPN turns on, the manual reset ($\overline{MR}$) pin will be pull low initiating a reset. An UV condition on the +3.3V supply may be monitored on the $\overline{RST\_OD}$ pin, which has a 3.01kΩ pull-up resistor to V_{DD}.

Watchdog Timer Functionality

All of these positions have independent Watchdog input (WDI) and Watchdog output (WDO) test points to evaluate the functionality the watchdog timer. A waveform generator may be used to apply a square wave signal to the WDI test points and the output monitored through the WDO test points. The WDI may also be left open and WDO is now a low line indicator of the voltage on V_{DD}.

Power Supplies

External power connections are made through the VDD, 5V, -5V and GND connections on the evaluation board. All three sections share a common VDD test point with a decoupling capacitor C1, C2 and C3 placed close to each IC. The PFI pins in sections 1 and 2 have a unpopulated component pad to add decoupling capacitors C2 and C3 if needed.

Reference Documents

ISL705xRH Data Sheet, FN7662

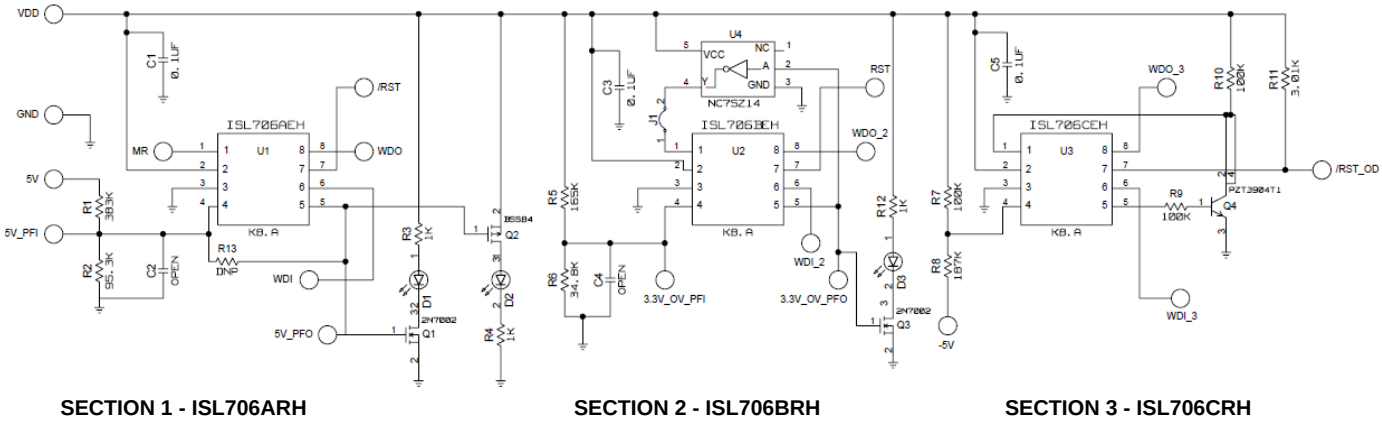

FIGURE 2. ISL706xRHEVAL1Z SIMPLIFIED SCHEMATIC

Bill of Materials

TABLE 1. ISL706XRHEVAL1Z COMPONENTS PARTS LIST

DEVICE #	DESCRIPTION	COMMENTS
C1, C3, C5	CAP, SMD, 0603, 0.1µF, 50V, 10%, X7R, ROHS	Power Supply Decoupling
C2, C4	CAP, SMD, 0603, DNP, ROHS	User selectable capacitors - not populated
D1, D2, D3	LED, SMD, ROHS	Power Fail Indicator
Q1, Q3	N-Channel EMF Effect Transistor, SMD, SOT-23,ROHS	Power Fail Detector
Q2	P-Channel EMF Effect Transistor, SMD, SOT-23,ROHS	Power Fail Detector
Q4	NPN General Purpose Transistor, SMD, SOT-223, ROHS	
R1	RES, SMD, 0603, 383kΩ, 1/16W, 1%, ROHS	PFI Voltage Divider Network
R2, R6	RES, SMD, 0603, 49.9kΩ, 1/10W, 1%, ROHS	PFI Voltage Divider Network
R3, R4, R12	RES, SMD, 0603, 1kΩ, 1/10W, 1%, ROHS	LED Current Limiting Resistor
R5	RES, SMD, 0603, 165kΩ, 1/16W, 1%, ROHS	PFI Voltage Divider Network
R7, R9, R10	RES, SMD, 0603, 100kΩ, 1/16W, 1%, ROHS	PFI Voltage Divider Network
R11	RES, SMD, 0603, 5.1kΩ, 1/16W, 1%, ROHS	ISL705CRH Reset Pull-up Resistor
R13	RES, SMD, 0603, DNP	Placeholder for Addition of Hysteresis
U1	ISL706ARH, 8 Ld Flatpack, 3.3V Supervisory Circuit	Supervisory Circuit with Active Low RESET
U2	ISL706BRH, 8 Ld Flatpack, 3.3V Supervisory Circuit	Supervisory Circuit with Active High RESET
U3	ISL706CRH, 8 Ld Flatpack, 3.3V Supervisory Circuit	Supervisory Circuit with Open Drain RESET
U4	UHS Inverter with Schmitt Trigger Input, SC70, ROHS	

ISL706xEVAL1Z Board Layout

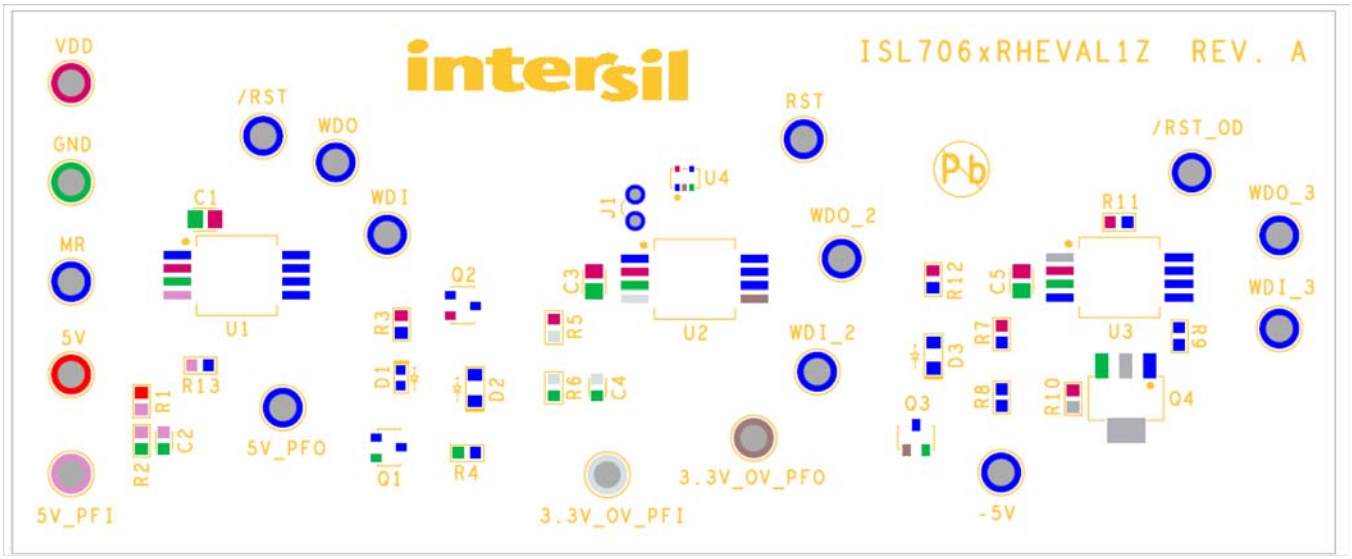

FIGURE 3. ISL706xEVAL1Z TOP VIEW

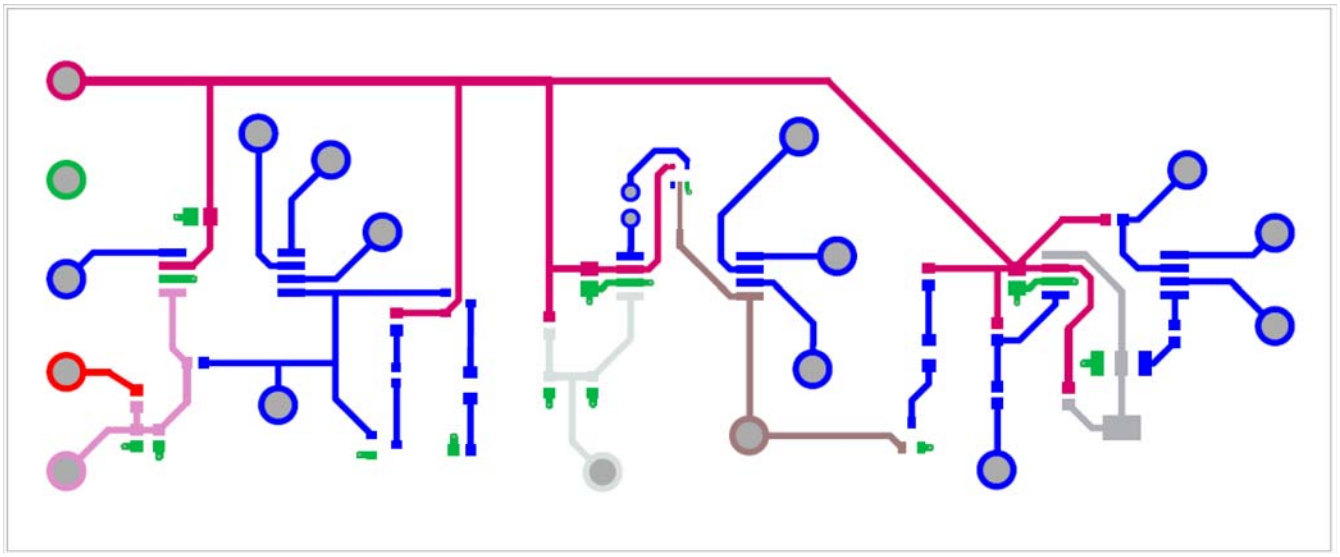

FIGURE 4. ISL706xEVAL1Z TOP LAYER