/ESG Group/FDD Module Requirements/EA4 Specific

ES005A_TmplMonr

Besilened v2.0 and Released

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ES005A_92	**PwrOutpEnaFb** : A physical feedback input signal to verify that temporal monitor function is properly working.
ES005A_93	**NErr:** An input signal used to decide **PwrOutpEna** hi or low state.
ES005A_106	**StrtUpSt :** Startup State enumeration input is used to decide when Temporal Monitor function should start.
ES005A_13	### 1.1.2 Outputs
ES005A_96	**PwrOutpEna :** This physical output when driven high will enable power to the Gate Drive(s).
ES005A_97	**TmplMonrIninTestCmpl :** An output flag to notify Temporal Monitor Initializaion test completed or not-completed**.**
ES005A_100	### 1.1.3 Internally Defined Terms
ES005A_101	**TmplMonrWdg :** Physical square wave output used for Temporal Monitor verification.
ES005A_102	**SysFlt2A :** An output signal generated to control the power pass of Gate Drive A.
ES005A_103	**SysFlt2B :** An output signal generated to control the power pass of Gate Drive B.

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ES005A_20	# 2 Requirements
ES005A_21	## 2.1 Primary Functional Requirements
ES005A_144	The Temporal Monitor function shall detect an error of ±11% in the Primary Processor clock within 200ms.
ES005A_169	The Temporal Monitor function shall provide a mechanism to store its sequence number (**TmplMonrIninCntr)** into the per-instance menory.
ES005A_22	## 2.2 Hardware Requirements
ES005A_126	None
ES005A_23	## 2.3 Software Requirements
ES005A_24	### 2.3.1 Functional Requirements
ES005A_25	#### 2.3.1.1 Sub Function: Temporal Monitor Signal Generation
ES005A_29	The Temporal Monitor function shall generate **TmplMonrWdg** square wave signal with the following characteristics. Period = 2ms ± 0.12ms Duty Cycle = 50 ± 30% 2V < Vmax < 5 V -0.1 V > Vmin < 0.5 V
ES005A_104	The Temporal Monitor function shall generate **TmplMonrWdg** signal by toggling a GPIO pin from Temporal Monitor Software Function.
ES005A_31	#### 2.3.1.2 Sub Function: Temporal Monitor Initialization
ES005A_32	The Temporal Monitor function shall perform initialization test at Warm Init state once per ignition cycle.
ES005A_108	The Temporal Monitor function shall start Temporal Monitor Initialization when **StrtUpSt** = ELECGLBPRM_STRTUPSTTMPLMONININTESTSTRT_CNT_U08 & TmplMonrIninTestCmplFlg = 1.
ES005A_107	The Temporal Monitor Function shall generate **TmplMonrWdg** for 8 periodic execution followed by a constant LOW value signal for 8 periodic execution as part of Temporal Monitor Initialization.

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ES005A_167	The Temporal Monitor Function shall verify that it has control over **PwrOutpEna** signal by forcing a fault and monitoring the feedback signal.
ES005A_110	The Temporal Monitor function shall issue a FLASH_MODE command through SPI if re-flash is requested.
ES005A_111	The Temporal Monitor function shall issue a WD_RESTART command through SPI to get out of flash mode once re-programming is done.
ES005A_122	**2.3.1.3 Sub Function: Temporal Monitor Run**
ES005A_168	The Temporal Monitor function shall increment the internal valid counter value by 1 if 10 subsequent rising edges of 2 ms ± 0.12 ms square wave pulses are present over a 20 ms moving window after the Temporal Monitor Initialization..
ES005A_125	The Temporal Monitor function shall qualify **TmplMonrWdg** signal when the internal valid counter value reaches to a predefined SPI configured value.
ES005A_124	The Temporal Monitor function shall continue monitoring and qualifying the **TmplMonrWdg** signal during the rest of the ignition cycle.
ES005A_145	**2.4 Diagnostic Requirements**
ES005A_146	**2.4.1 Temporal Monitor Init Test Fault (NTC0x040)**
ES005A_147	**2.4.1.1 Required Debounce Strategy**
ES005A_157	The Temporal Monitor function use the Immediate fault strategy for NTC0x040.
ES005A_149	**2.4.1.2 Requirements to Perform Diagnostic Test Conditions**
ES005A_158	The Temporal Monitor function shall perform the test condition for NTC0x040 during the Temporal Monitor Initialization and only once per ignition cycle.
ES005A_170	The Temporal Monitor function shall perform the test condition for NTC0x040 during the sequence number (**TmplMonrIninCntr**) 8 to 50.
ES005A_150	**2.4.1.3 Test Condition Negative Requirements**
ES005A_163	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 8-10 and **PwrOutpEna** is not High.

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ES005A_171	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 12 and **PwrOutpEna** is not Low.
ES005A_172	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 13-15 and **PwrOutpEna** is not High.
ES005A_173	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 16 and **PwrOutpEna** is not Low.
ES005A_177	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 17 and Watchdog State = Idle or Flash or Test Hunt or Watchdog.
ES005A_176	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 19 and Edge and Valid Counter value is not written properly.
ES005A_175	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 50 and **PwrOutpEna** is LOW and Watchdog State = Watchdog.
ES005A_178	The Temporal Monitor function shall provide a negative result for NTC0x040, when the sequence number is 50 and **PwrOutpEna** is LOW and Watchdog State is not Watchdog.
ES005A_151	**2.4.1.4 Test Condition Positive Requirements**
ES005A_164	The Temporal Monitor function shall provide a positive result to the test condition for NTC 0x040 when none of the negative result requirements are satisfied.
ES005A_152	**2.4.2 Temporal Monitor Run Fault (NTC0x041)**
ES005A_153	**2.4.2.1 Required Debounce Strategy**
ES005A_159	The Temporal Monitor function use the Immediate fault strategy for NTC0x041.
ES005A_154	**2.4.2.2 Requirements to Perform Diagnostic Test Conditions**
ES005A_160	The Temporal Monitor function shall perform the test condition for NTC0x041 in ENABLE..
ES005A_174	The Temporal Monitor function shall perform the test condition for NTC0x041 when the sequesnce number is greater than 50.
ES005A_155	**2.4.2.3 Test Condition Negative Requirements**

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ES005A_165	The Temporal Monitor function shall provide a negative result for NTC0x041, when the sequence number is 51 **PwrOutpEna** is LOW and Watchdog State is Watchdog.
ES005A_179	The Temporal Monitor function shall provide a negative result for NTC0x041, when the sequence number is 51 **PwrOutpEna** is LOW and Watchdog State is not Watchdog.
ES005A_156	**2.4.2.4 Test Condition Positive Requirements**
ES005A_166	The Temporal Monitor function shall provide a positive result to the test condition for NTC 0x041 when none of the negative result requirements are satisfied.
ES005A_161	**2.5 Manufacturing Requirements**
ES005A_162	None.