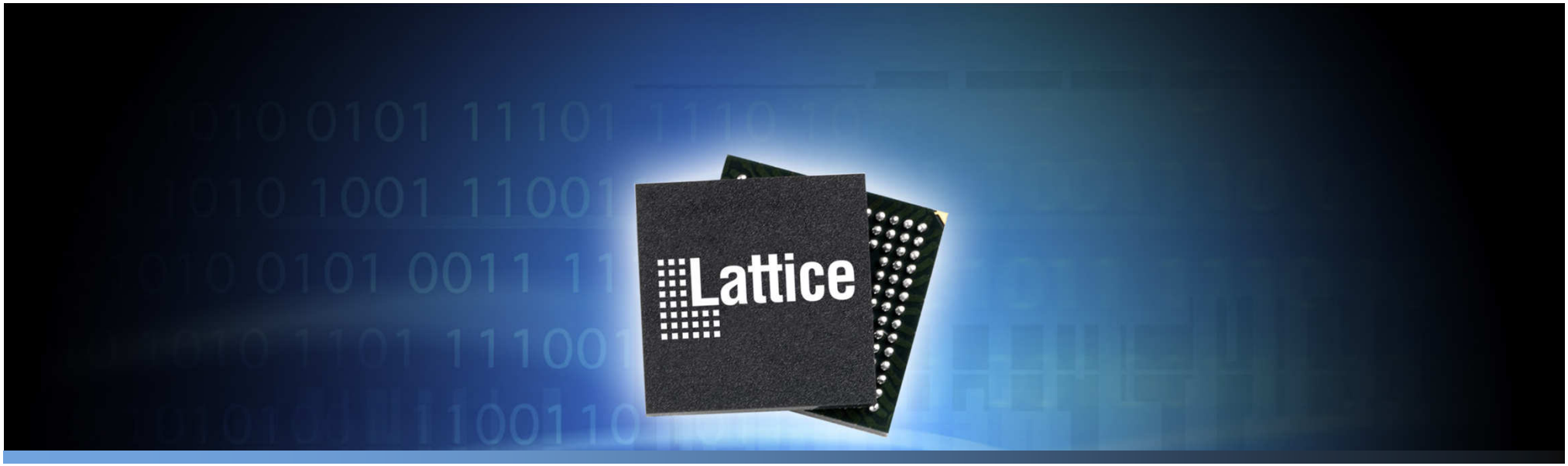


POWER MANAGER DESIGN EXAMPLES

Lattice Applications Group

DESIGN POWR1014-2
Features

Implemented Functions

File: POWR1014-2-HS-Controller.PAC

- 5V and 3.3V Hot-swap Controller
  - Operate MOSFETs in Safe Operating Area (SOA)
  - Short Circuit Protection
  - Protection Against Over Current Faults During Operation
- Measure Voltage and Current Feed Individually on Both Supplies Through I^2C

Programmable Features

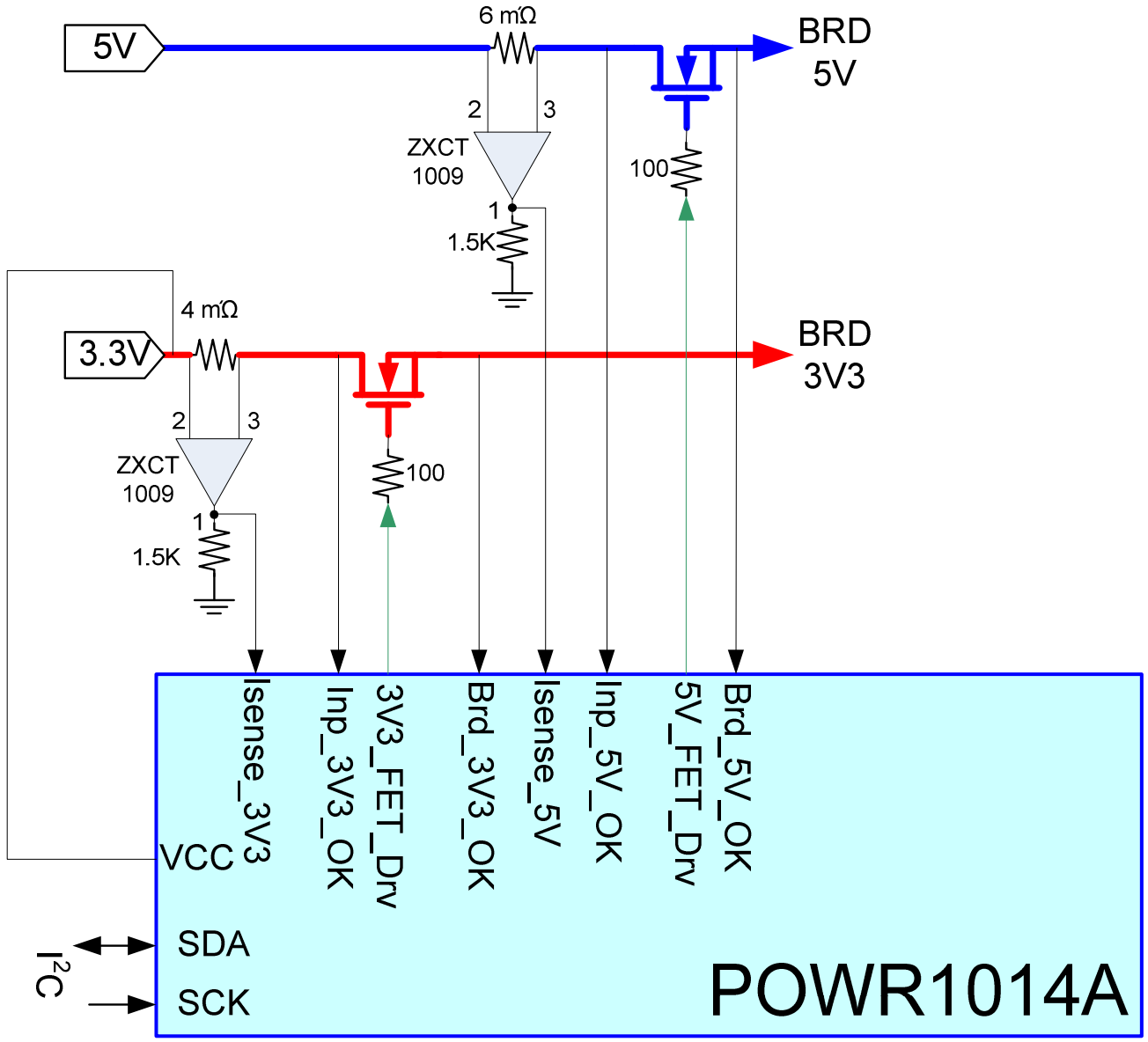
- SOA and Over Current Levels are Independently Programmable
- Customize the Design to Suit Most MOSFETs
- Initial Contact De-bounce Period Programmable From 32 µs to 2 Seconds
- Short Circuit Timeout During Start up Programmable From 32 µs to 2 Seconds

Possible Additions

- Hot-swap Retry Operation After Clearing of Fault
- Monitor and Sequence up to 5 Board Supplies
- Reset Generation With Pulse Stretch and Manual Reset Input
- Watchdog Timer
- Brownout Interrupt Generation

5V AND 3.3V HOT-SWAP CONTROLLER

File: POWR1014-2-HS-Controller.PAC



DESIGN POWR1014-2 Algorithm

File: POWR1014-2-HS-Controller.PAC

Main Sequence

- Disable Hot-swap Operation
- Wait for 5V and 3.3V Rails to Stabilize After Contact Bounce
- Enable Hot-swap Operation, Operate MOSFETs in SOA
  <Actual MOSFET Hot-swap Operation Control is Performed By the Supervisory Logic Section>
- Wait for 5V and 3.3V Output From the MOSFET to Reach Acceptable Thresholds Within Short Circuit Timeout Period
- If Short Circuit Timer Expires, Jump to Step 8 for Shut Down
  Else Jump to 6
- Turn MOSFETs On Fully and Start to Monitor For Voltage and Current Faults
- If Voltage or Current Fault Occurs Jump to 8 Else Jump to 6
- Shut the MOSFETs Off

Parallel Operation (Through Exception Section)

1. If Over Current Condition is Detected Jump to Step 8

Parallel Operation (Through Supervisory Logic Section)

1. Limit 3.3V MOSFET Operation in SOA Until 3.3V Rail Reaches Acceptable Level, After That Turn the MOSFET on Fully, Also Turn MOSFET on Fully When Commanded by the Sequence Controller
2. Limit 5V MOSFET Operation in SOA Until 3.3V Rail Reaches Acceptable Level, After That Turn the MOSFET on Fully, Also Turn MOSFET on Fully When Commanded by the Sequence Controller
3. Turn-off 3.3V and 5V MOSFETs When Over Current Condition is Detected