TPSM8D6C24 SIMPLIS Transient Model Features and Limitations

A. Features have been modelled
1. Programmable Output Voltages
2. Compensation configuration using parameters
3. Switch current limits(Average positive and negative current limits).
4. Frequency, Soft start time, TON_Delay, TOFF_Delay, Soft stop time setting using parameters.
5. FREQUENCY_SWITCH using MSEL1
6. IOUT_OC_FAULT_LIMIT and TON_RISE configuration using MSEL2
7. STACK_CONFIG using MSEL2
8. SYNC_CONFIG, INTERLEAVE using ADDRSEL

B. Features have not been modelled
1. Pinstrapping using pins MSEL1, MSEL2, ADRSEL, VSEL
2. Operating Current, Shutdown Current and Temperature dependent characteristics are not modelled.
3. Ground pins have been tied to 0V internally. Therefore, this model cannot be used for inverting topologies.

C. Application Notes

1. In this model, use parameter STEADY_STATE=0 to run the Startup Simulation.
2. To run the simulation directly in steady state without going through startup in order to see steady state information like ripple, switching freq, load and line transients, set STEADY_STATE=1 and use appropriate initial conditions.
3. The PMBUS interface has not been implemented in the model. However, the model has several parameters that are used to mimic the behaviour of the PMBUS. The user must carefully enter these values in accordance with the datasheet.
   The description of these parameters are as below:
   Extract the Compensation values from the code obatined using Compensatio calculator.
   - GMV sets the Transconductance gain of voltage error amplifier
   - RVV sets the output resistance of voltage error amplifier
   - CPV, CZV set the internal compensation capacitors of voltage error amplifier
   - GMI sets the Transconductance gain of current error amplifier
   - RVI sets the output resistance of current error amplifier
   - CPI, CZI set the internal compensation capacitors of current error amplifier
   - RINTI sets the internal resistance for current error amplifier
   - VOUT_COMMAND sets the output voltage. Also change VOSL appropriately
   - VOSL sets the VOUT_SCALE_LOOP value. This needs to be set appropriately to get the proper VOUT
   - PHASE is used to shift the input obtained from SYNC. It is only applicable when SYNC is programmed as input
   - IGNORE_TOFF, Setting this to 1 disables Soft stop time and TOFF_DELAY
   - TON_RISE sets the soft start time. To use this, PINSTRAP must be set to 0.
   - TON_DELAY sets the internal delay from Enable High to device enable
   - TOFF_FALL sets the soft stop time
   - TOFF_DELAY sets the internal delay from device disable to VOUT disable.

- Please check Figure 'TPS546D24 Startup and Shutdown' from the datasheet for the TON, TOFF parameters.
- FAULT_IGNORE; Setting this to 1 disables all fault checks. Set 0 to check for faults
- IOUT_OC_FAULT_LIMIT sets the average current limit for across the inductor. It also sets the peak current limit.
- IOUT_NEG_LIMIT programs the Negative OC Fault
- VOUT_OV_LIMIT sets the overvoltage limit for the device.