The TPS3600G12 supply voltage supervisor has been used to monitor the 1.2-V rail. The threshold voltage for this device is 1.12-V, which is outside the published tolerance for the OMAPL137 1.2-V rail (±5%). This has been deemed acceptable for those customers who wish to avoid unnecessary system resets due to short-term transient events. Alternatively, the TPS3885G125 supervisor may be substituted for the 305103; the threshold voltage for the 60/206 is 1.15-V, which is closer to the OMAPL137 (±5%) limit of 1.184-V.
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<th>Description</th>
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<tr>
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<td>TPS73218DBV</td>
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The following test report includes measurements for the following output voltage rails using a 5V input:

This design meets the power sequencing requirements required by OMAP-L137 / C6747 / C6745 / C6743.

Contents
Start Up Waveform

TPS 71701 – LDO (1.2V @ 0.06A)
- output ripple
- load transient response

TPS62353 – DCDC (1.2V @ 0.6A)
- output ripple
- load transient response
- switch node
- efficiency
- load regulation

TPS 62200 – DCDC (3.3V @ 0.165A)
- output ripple
- load transient response
- switch node
- efficiency
- load regulation
START UP WAVEFORM

Ch 1: 1.2V LDO (unloaded); TPS71701
Ch 2: 1.2V DCDC (unloaded); TPS62353
Ch 3: 3.3V DCDC (unloaded); TPS62200
Ch 4: 1.8V LDO (unloaded); TPS 73218

Fig 1: Start Up waveform with outputs unloaded
Ch 1: 1.2V @ 0.06A LDO; TPS71701
Ch 2: 1.2V @ 0.6A DCDC; TPS62353
Ch 3: 3.3V @ 0.165A DCDC; TPS62200
Ch 4: 1.8V @ 0.05A LDO; TPS73218

Fig 2: Start Up waveform with outputs fully loaded
Fig 3: Output Ripple 1.2V @ 0.06A TPS 71701 LDO, 5Vin
LOAD TRANSIENT RESPONSE (TPS 71701)

Fig 4: Load transient response on TPS71701, 1.2V output (Ch1) for load step 20mA to 60mA (Ch4 -33% to 100%), at low line 3.6Vin.

Fig 5: Load transient response on TPS71701, 1.2V output (Ch1) for load step 20mA to 60mA (Ch4 -33% to 100%), at high line 6Vin.
Set to operate in fixed PWM mode in all test cases with 3 MHz. TPS 6235x in fixed PWM mode gives best load and line response, and reduced ripple at the expense of reduced light load efficiency. This default mode is used in these tests.

Using the I2C interface, the control registers can be configured for fast or light pulse frequency modulation mode to increase efficiency at very light load and to reduce quiescent current. Using the control registers, the TPS 6235x is also reconfigurable for adjustable slew rate of the start up ramp; synchronization with external clock; and for active discharge of output capacitor in shutdown, as well as dynamic voltage scaling between active and sleep mode.

**OUTPUT RIPPLE (TPS 62353)**

*Full load, high line*

---

Fig 6: Output Ripple 1.2V (Ch1) @ 0.6A (Ch4) TPS 62353 DCDC, Highline 6Vin
Light load, high line

Fig 7: Output Ripple 1.2V (Ch1) @ 0.05A (Ch4) TPS 62353 DCDC, Highline 6Vin

Full load, low line

Fig 8: Output Ripple 1.2V (Ch1) @ 0.6A (Ch4) TPS 62353 DCDC, Lowline 3.6Vin
Light load, low line

Fig 9: Output Ripple 1.2V (Ch1) @ 0.14A (Ch4) TPS 62353 DCDC, low line 3.6Vin

Fig 10: Output Ripple 1.2V (Ch1) @ 0.05A (Ch4) TPS 62353 DCDC, low line 3.6Vin
LOAD TRANSIENT RESPONSE (TPS 62353)

Highline

Fig 11: Load transient response on TPS62353, 1.2V output (Ch1) for load step 300mA to 600mA (Ch4 - 50% to 100%), at high line 6Vin

Fig 12: Load transient response on TPS62353, 1.2V output (Ch1) for load step 150mA to 600mA (Ch4 - 25% to 100%), at high line 6Vin
Fig 13: Load transient response on TPS62353, 1.2V output (Ch1) for load step 300mA to 600mA (Ch4 - 50% to 100%), at low line 3.6Vin

Fig 14: Load transient response on TPS62353, 1.2V output (Ch1) for load step 80mA to 600mA (Ch4 - 15% to 100%), at low line 3.6Vin
TPS62353 exhibits a characteristic duty cycle jitter. It operates in fixed PWM mode.

Fig 15: Switch node 1.2V @ 0.6A with 5Vin
1.2V@0.6A Efficiency vs. Load Current

Fig 15: Efficiency of TPS62353 in Fixed PWM mode with 5Vin
LOAD REGULATION (TPS 62353)

1.2V@0.66A Output Voltage vs. Load Current

Fig 16: Load Regulation of TPS 62353 running in fixed PWM mode with 5Vin
TPS 62200 has a 1-MHz fixed frequency pulse width modulation (PWM) at moderate to heavy loads. For light loads, it automatically switches to the pulse frequency modulation (PFM) to increase efficiency. The current threshold for which the converter changes operation mode depends on input voltage and also if discontinuous conduction is detected.

**OUTPUT RIPPLE (TPS 62200)**

*No load*

Fig 18: Output Ripple 3.3V (Ch1) @ no load (Ch4) TPS 62200 DCDC, Highline 5Vin, converter in PFM mode
Light load, high line

Fig 19: Output Ripple 3.3V (Ch1) @ 0.05 (Ch4) TPS 62200 DCDC, Highline 6Vin, converter in PFM mode
Heavy load, low line

Fig 20: Output Ripple 3.3V (Ch1) @ 0.165 (Ch4) TPS 62200 DCDC, Low Line 3.6Vin, converter in PWM mode

Light load, low line, worse case

Fig 21: Output Ripple 3.3V (Ch1) @ 0.04 (Ch4) TPS 62200 DCDC, Low Line 3.6Vin, converter in PFM mode
Fig 22: Load transient response on TPS62200, 3.3V output (Ch1) for load step 40mA to 165mA (Ch4 - 25% to 100%), at high line 6Vin
Fig 23: Load transient response on TPS62200, 3.3V output (Ch1) for load step 40mA to 165mA (Ch4 - 25% to 100%), at high line 4Vin
Fig 24: Load transient response on TPS62200, 3.3V output (Ch1) for load step 40mA to 165mA (Ch4 - 25% to 100%), at high line 3.6Vin
Power Save Mode, No load

Fig 25: Switch node, PWM mode 5 V input, 3.3V@0.165A

Fig 26: Switch node 5Vin, 3.3V with no load
3.3V @ 0.165A Efficiency vs. Load Current
5V in

Fig 27: Efficiency of TPS62200 with 5Vin
At light load, TPS 62200 implements dynamic voltage positioning by increasing the output voltage by about 0.8% above its nominal value to mitigate against the voltage drop that may occur during a load transient from light load to full load.

**3.3V @ 0.165A Output Voltage vs. Load Current**

*Fig 28: Load Regulation of TPS 62200 5Vin*
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