Data taken from PMP2562 Rev_C reference design

1 Conversion and Total Efficiency

The efficiency comprises two values:
Eff1 is the Conversion Efficiency: Input power in U3 (pin1) divided by USB output power
Eff2 is the Total Efficiency: Output power divided by USB output power

Two measurements were taken:
The first measurement was performed with no distance between the two PCBs.
In the second measurement a 0.5mm spacer was inserted between the two PCBs.

Efficiency table and graph without any spacer inserted between the two PCBs.

<table>
<thead>
<tr>
<th>Iusb</th>
<th>Pin</th>
<th>Iout</th>
<th>VinU3</th>
<th>VoutU3</th>
<th>Pout1</th>
<th>Pout2</th>
<th>Eff1</th>
<th>Eff2</th>
</tr>
</thead>
<tbody>
<tr>
<td>mA</td>
<td>mW</td>
<td>mA</td>
<td>Volt</td>
<td>Volt</td>
<td>mW</td>
<td>mW</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>26.0</td>
<td>130</td>
<td>0</td>
<td>10.40</td>
<td>5.519</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>36.1</td>
<td>180.5</td>
<td>5</td>
<td>10.14</td>
<td>5.519</td>
<td>50.7</td>
<td>27.6</td>
<td>28.1</td>
<td>15.3</td>
</tr>
<tr>
<td>46.4</td>
<td>232</td>
<td>10</td>
<td>9.73</td>
<td>5.518</td>
<td>97.3</td>
<td>55.2</td>
<td>41.9</td>
<td>23.8</td>
</tr>
<tr>
<td>56.8</td>
<td>284</td>
<td>15</td>
<td>9.41</td>
<td>5.516</td>
<td>141.2</td>
<td>82.7</td>
<td>49.7</td>
<td>29.1</td>
</tr>
<tr>
<td>66.7</td>
<td>333.5</td>
<td>20</td>
<td>9.07</td>
<td>5.515</td>
<td>181.5</td>
<td>110.3</td>
<td>54.4</td>
<td>33.1</td>
</tr>
<tr>
<td>75.6</td>
<td>378</td>
<td>25</td>
<td>8.67</td>
<td>5.513</td>
<td>216.8</td>
<td>137.8</td>
<td>57.3</td>
<td>36.5</td>
</tr>
</tbody>
</table>

![Graph of Efficiency vs. Output Current](image_url)
Efficiency table and graph with a 0.5mm spacer inserted between the two PCBs.

<table>
<thead>
<tr>
<th>Iusb (mA)</th>
<th>Pin (mW)</th>
<th>Iout (mA)</th>
<th>VINU3 (Volt)</th>
<th>VOUTU3 (Volt)</th>
<th>POUT1 (mW)</th>
<th>POUT2 (mW)</th>
<th>Eff1 (%)</th>
<th>Eff2 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.2</td>
<td>126</td>
<td>0</td>
<td>10.47</td>
<td>5.519</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>34.1</td>
<td>170.5</td>
<td>5</td>
<td>8.89</td>
<td>5.519</td>
<td>44.5</td>
<td>27.6</td>
<td>26.1</td>
<td>16.2</td>
</tr>
<tr>
<td>43.4</td>
<td>217</td>
<td>10</td>
<td>8.72</td>
<td>5.517</td>
<td>87.2</td>
<td>55.2</td>
<td>40.2</td>
<td>25.4</td>
</tr>
<tr>
<td>52.7</td>
<td>263.5</td>
<td>15</td>
<td>8.51</td>
<td>5.516</td>
<td>127.7</td>
<td>82.7</td>
<td>48.4</td>
<td>31.4</td>
</tr>
<tr>
<td>61.3</td>
<td>306.5</td>
<td>20</td>
<td>8.14</td>
<td>5.514</td>
<td>162.8</td>
<td>110.3</td>
<td>53.1</td>
<td>36.0</td>
</tr>
<tr>
<td>63.2</td>
<td>316</td>
<td>25</td>
<td>6.53</td>
<td>5.513</td>
<td>163.3</td>
<td>137.8</td>
<td>51.7</td>
<td>43.6</td>
</tr>
</tbody>
</table>

---

Conversion Efficiency (Eff1)  Total Efficiency (Eff2)
2 Output Voltage Load Regulation

The output voltage variation with load is plotted below.

![Output Voltage Load Regulation Graph](image)

3 Output Ripple Voltage

The U3 input voltage ripple is shown in the plot below.

Load was set to 25mA

Channel 2: VinU3 (ac coupled) 50mV/div
4  Q1 Drain Switching Waveform with No Load

![Waveform with No Load](image)

5  Q1 Drain Switching Waveform with Full Load

![Waveform with Full Load](image)
IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

<table>
<thead>
<tr>
<th>Products</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Automotive and Transportation</td>
</tr>
<tr>
<td>Amplifiers</td>
<td>Communications and Telecom</td>
</tr>
<tr>
<td>Data Converters</td>
<td>Computers and Peripherals</td>
</tr>
<tr>
<td>DLP® Products</td>
<td>Consumer Electronics</td>
</tr>
<tr>
<td>DSP</td>
<td>Energy and Lighting</td>
</tr>
<tr>
<td>Clocks and Timers</td>
<td>Industrial</td>
</tr>
<tr>
<td>Interface</td>
<td>Medical</td>
</tr>
<tr>
<td>Logic</td>
<td>Security</td>
</tr>
<tr>
<td>Power Mgmt</td>
<td>Space, Avionics and Defense</td>
</tr>
<tr>
<td>Microcontrollers</td>
<td>Video and Imaging</td>
</tr>
<tr>
<td>RFID</td>
<td></td>
</tr>
<tr>
<td>OMAP Mobile Processors</td>
<td></td>
</tr>
<tr>
<td>Wireless Connectivity</td>
<td></td>
</tr>
</tbody>
</table>

TI E2E Community Home Page e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2012, Texas Instruments Incorporated