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<th>Title</th>
<th>DC-DC converters for portable applications</th>
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<td>Author(s)</td>
<td>Sng, Chin Guan</td>
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What is a DC-DC converter?
A DC converter provides a constant DC voltage specified by the user at the output regardless of the varying line and load conditions at the input with the assumption that these values are within the operating range of the DC converter.

Why DC-DC converters are important for battery operated devices?
Batteries do not give a constant voltage over the entire discharge circle. DC converters are needed to ensure that voltages do not fall within the operating range of typical electronic circuits. DC converters can drastically affect thermal dissipation, operating duration, weight and tolerance parameters of the final product.

5000 mAh Cell Discharge Curves

What are characteristics of good DC converters?
- Efficient
- Low EMI/EMC
- Tight Line Regulation
- Low Dropout
- Tight Load Regulation
- Small
- Light

Objectives
Design a miniature opto-isolated, FCC class B compliant dc to dc converter with input voltage between 6V to 8.4V, output voltage of 5V, efficiency rating of more than 90% with a current limit of 3A and a footprint of 900mm². Line and Load Regulation tolerances are within 1%.

Design Approach
Five Dimensions
- EMI Reduction
- Footprint Reduction
- Efficiency Maximization
- Transient Response
- Thermal Management

How does SSFM reduce EMI?
By spreading the radiated EMI over the range of frequencies, a 4% dither can result in 25dB attenuation in peak amplitude.