**A Buck Mode Charge Pump Operating under Large Current Output**

### Background
Need a device to transfer voltage from high to low voltage

![Diagram](image)

- Li-ion Battery with 4.2V(max) and 3.3V(min)
- DC-DC Voltage converter
- Mobile Device (Loading) 1.2V

### Efficiency Improved Methods
- Clock blocking technique
- Clock boosting technique
- Fractional conversion gains switch array

### Specification
- **Working range**: 3.3-5.5V
- **Max. power efficiency**: 60% @ 250mA (input: 3.3-5.5V)
- **Loading ability**: 250mA
- **Output voltage accuracy**: 1.2V ± 4%
- **Output ripple**: 30mV @ 250mA
- **Process**: TSMC 0.35 μm

### Architecture

- **V_in**
- **V_out**
- **C_{in}**
- **C_{fly1**, **C_{fly2}, **C_{fly3}, **C_{fly4}}**
- **C_{out}**
- **C_{out}**
- **GND**

### Measurement Result
- **Load regulation**: 0.133 mV/mA (@4V, 0~90mA)
- **Line regulation**: 36mV (1.1%/V) (@3mA)

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**PCB & Chip**

![Image of PCB and Chip]