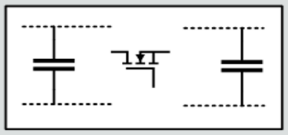
pSemi®
A Murata Company

Power Management

Charge Pump Switched Capacitor Converters

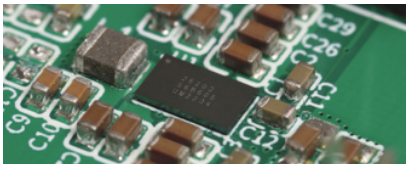


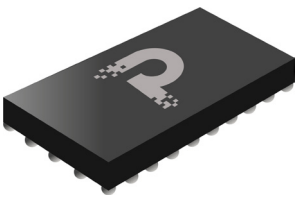
✓ Unique, patented architecture to enable higher overall system, power conversion efficiency

✓ Fully integrated solutions from 15W to 160W

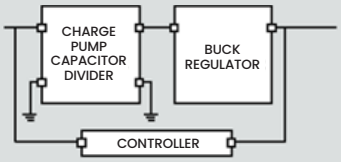
✓ Virtually lossless (up to 99% peak) conversion and soft-switching topology

✓ Parallel operation to higher power levels





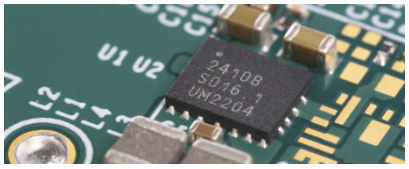
2-Stage Buck Regulators

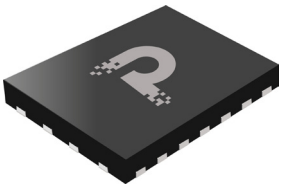


✓ Family of 10-20A, DC-DC buck voltage regulators ICs and modules for telecoms, datacoms, server and storage applications

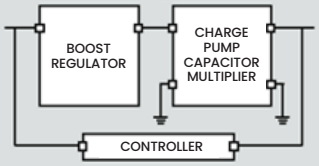
✓ Compact solution size offering best-in-class efficiencies for low profile applications (<1.2mm)

✓ Fully programmable via I²C and with accurate on-board telemetry





2-Stage Buck Regulators LED Backlight Drivers



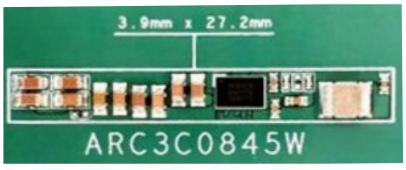
✓ Ultra-high efficiency (up to 96%) LED boosts for LCD displays

✓ Product family includes products for 1-cell, 2-cell, and 3-cell inputs such as tablets, notebooks and 2-in-1 convertibles

✓ Enables very low profile (<0.7 mm) solutions and halves power-conversion losses compared to leading alternatives

✓ Up to 15-bit resolution via I²C or PWM control

✓ High accuracy with tight matching at low LED current



Technology – Based on capacitive switching architectures
Target – Low profile, space-constrained, high efficiency applications

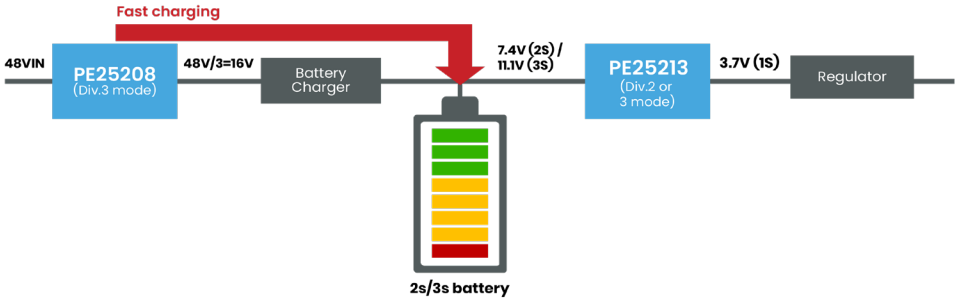
Charge Pump Capacitor Dividers

pSemi's patented, adiabatic charge pump technology reduces capacitive redistribution losses during switching transitions, resulting in industry best-in-class efficiency (up to 99% peak), and solution size reduction. These devices are available in a range of step-down ratios in the 15W to 160W power range.

Part Number	V_{IN} (V)	V_{OUT} Z(V)	I_{OUT} (A)	Efficiency (%)	Package	EVK Part Number
PE25200	5.5-10	$V_{IN}/2$ & $V_{IN}/3$	10	97	WLCSP	EK25200
PE25203	5.7-15	$V_{IN}/2$ & $V_{IN}/3$	4	99	WLCSP*	EK25203
PE25213	5.7-15	$V_{IN}/2$ & $V_{IN}/3$	10	99	WLCSP*	EK25213
PE25204	18-60	$V_{IN}/4$	6	96.8	WLCSP	EK25204
PE25208	18-60	$V_{IN}/2$ & $V_{IN}/3$	8	98.2	WLCSP*	EK25208

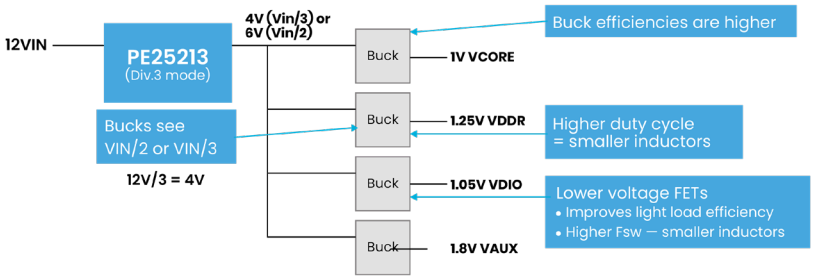
Note: * Type III PCB-compatible.

Battery Application



Fast charging = Shorter charging time
More efficient = Longer battery life

Intermediate Bus Application



More efficient = Save power consumption
Smaller input/output filters = smaller overall size

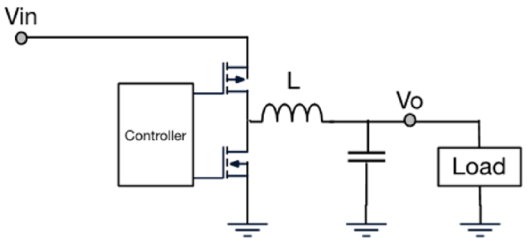
Two-stage Buck Regulators

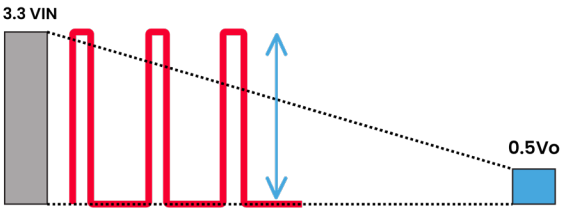
Our unique two-stage, step-down architecture provides best-in-class efficiency performance for low-profile applications (< 1.2 mm). These devices come in 3.3V and 12V input ranges with an optional I²C interface.

Part Number	V_{IN} (V)	V_{OUT} (V)	I_{OUT} (A)	Efficiency (%)	Package	EVK Part Number
PE24108	3.0-3.6	0.4-1.0	10	88.5 (V_{OUT} = 0.5V)*	QFN	EK24108
PE24110	3.0-3.6	0.35-0.7	12	89 (V_{OUT} = 0.5V)*	QFN	EK24110
PE24111	3.0-3.6	0.35-0.7	20	90 (V_{OUT} = 0.5V)*	QFN	EK24111

Note: * Low-profile solutions ≤ 1.2 mm.

Single Stage Buck Regulator

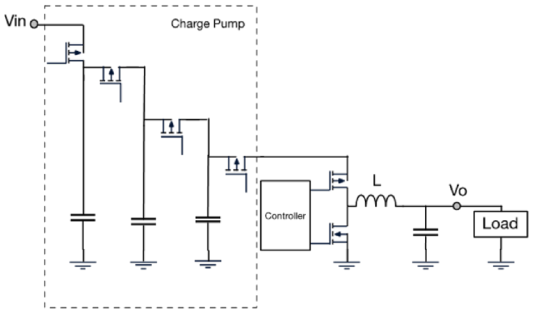


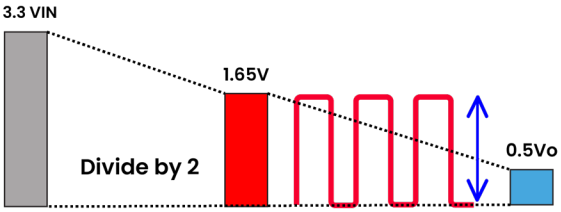


Buck Regulator

Large voltage swing & Low duty cycle force to use
- High voltage FETs
- Large inductor
- Many input/output filtering

2-Stage Buck Regulator





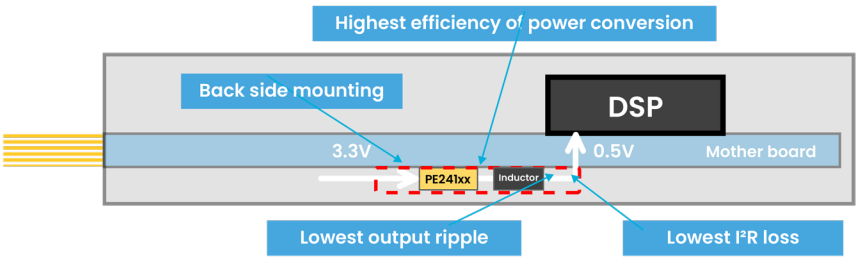
Charge Pump

Virtually lossless charge pump, Capacitor does most of work

Buck Regulator

Smaller voltage swing & Better duty cycle enable to use
- Lower voltage FETs
- Smaller inductor
- Less input/output filtering

Implementation Example



Two-stage Boost Regulators (LED Backlight Drivers)

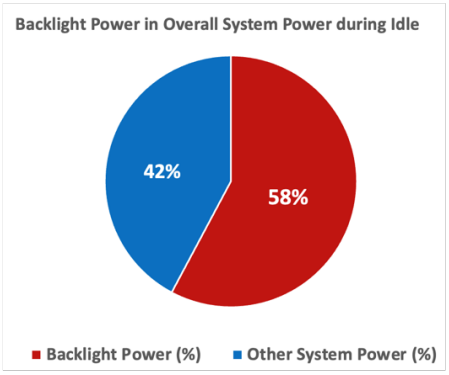
Our range of LED backlight drivers is based on a two-stage step-up to achieve the highest efficiency (up to 96%) to increase application battery runtime. The architecture results in very low-profile solutions (< 0.7 mm) for the latest low-profile display panels. These devices are available for 1-cell, 2-cell, and 3-cell battery input voltages with up to 15-bit resolution via I²C or PWM control.

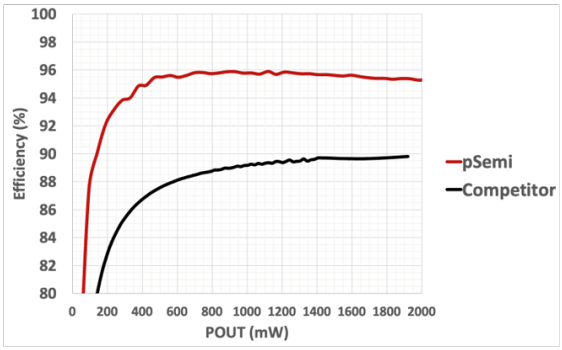
Part Number[1]	V_{IN} (V)	V_{OUT} (V)	Strings	I_{OUT} per String (mA)	Dynamic Range (Bits)	Efficiency (%)	Package
ARC1C0605	2.5-5.5	30	6	25	12	95	WLCSP
ARC1C0608	2.5-5.5	30	6	25	12	95	WLCSP
ARC3C0845W	4.5-15	45	8	43	15	95	WLCSP
PE23108[2]	4.5-15	42	8	33	15	96	WLCSP

Note 1: Low-profile solutions ≤ 1 mm. **Note 2:** Type III PCB-compatible.

Highest Efficiency

LED backlight consume most power in modern laptops. Any saving is significant to extent battery runtime.





Smallest Size Lowest Height

pSemi 2-stage boost enables small, low-profile inductor which allows low-profile LED driver solutions (to 0.7mm).