Multi-Phase Bidirectional Buck-Boost Converter for 12 V / 48 V System

- **AC/DC inverter**
  - Charge
  - DC
  - 48 V battery
- **Starter generator**
- **48 V Load**
- **DC/DC converter**
  - Buck mode
  - Boost mode
  - DC
- **12 V battery**
- **Infotainment, wiper, etc.**
- **12 V Load**

- **Example: 4 phase (120 A)**
  - 4.7 ~ 10 µH
  - 30 A or more per phase

- **Solutions**
  - MPXV1D12xx solutions for size reduction
  - MPXV1D1770 MPXV1D2213 solutions for quantity reduction

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② Adaptive Driving Beam (ADB) Headlamp System (LED Head-Lighting)

Battery → 12 V input → Boost power supply → IC → Multi channel buck converter

- EMI-filter spec 4.7 µH ~
  - MPXV1D06xx
  - MPXV1D08xx
  - MPEV1D0630

- Boost converter spec 22 ~ 100 µH
  - MPXV1D1054
  - MPXV1D1254
  - MPEV1D1040

- Buck converter spec 10 ~ 47 µH
  - MPXV1D05xx
  - MPXV1D06xx
  - MPEV1D0630

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### Heating Ventilation and Air Conditioning (HVAC)

- **Battery (12 V)**
- **Control panel**
- **CAN line**
- **TVS**
- **Low voltage battery 12 VDC**
- **Buck converter**
- **Power supply**
  - MCU
- **Inverter (brushless)**
  - Inverter (brushless)
  - Inverter (brushless)
- **Reverse battery protection/load switch**
- **System image**
- **To each parts**
- **MCD**
- **MCD (stepping)**
- **Motor valve**
- **Flap motor**
- **Blower motor**
- **Compressor motor**

**Components (MP)**
- MPXV1D06xx
- MPXV1D08xx
- MPEV1D0630
- MCD: Motor control driver
- MPXV1D1054
- MPXV1D1250
- MPEV1D1040

**Battery and Converter**
- 6 or 8 mm
- CMC SCF19XV
- CMC SCT19XV
- Buck converter
- 16 or 12 mm
Battery Management System (BMS)

- **Isolated signal I/O**
- **MCU, signal conditioning**
- **Buck converter**
- **Cell balance**
- **Battery monitor**
- **Isolated signal I/O**
- **Pre-charge resistance**
- **Battery monitor**

**EV/HEV battery**
- 200 ~ 800 V

**System image**
- Buck converter spec 0.22 ~ 10 µH
- MPXV1D1054
- MPXV1D1250
- MPEV1D1040
- MPGV1D1054

**Other control**
- ECU

**Fail-safe shut-down circuit**

**Low voltage**
- battery 12 V
Electric Oil Pump & Water Pump

Reverse battery protection

Battery (12 V)

Other ECU

Status setup circuit

Power supply

MCU

Pre-drive

Motor

System image

Input filter requires low DCR
- MPCV series recommended
- Advantage: flat wire

Buck converter spec 0.47 ~ 1.5 µH

MPCV1060
MPCV1260
MPXV1D10xx
MPXV1D12xx
MPEV1D1040
MPGV1D1054
6 Wiper System

Solutions for replacing ferrite SMD inductors for downsizing

Motor control

Pre-driver

Relay drive

Relay

Power supply spec 0.22 ~ 4.7 µH

MPXV1D06xx  MPXV1D08xx  MPHV1D1054
Electric Parking Brake (EPB)

Battery (12 V)

Power supply

Pre-driver

Motor control

Motor

Semiconductor relay

Power supply spec 0.22 ~ 4.7 µH

MPXV1D06xx
MPXV1D08xx
MPEV1D0630

Disk brake caliper

Drum brake
Electric Power Steering (EPS)

Input filter requires low DCR
- MPCV series recommended
- Advantage: flat wire

Solutions for size reduction

12 to 14 VDC

Low voltage battery

Buck converter spec 0.47 ~ 1.5 \( \mu \text{H} \)

MPCV1060, MPCV1260, MPXV1D10xx, MPXV1D12xx, MPEV1D1040, MPEV1D1054, MPPV1D1054

Motor

Gate driver

Control IC

Wheel speed & G sensor I/O

CAN
Head Up Display (HUD)

Power supply
spec 1 ~ 10 µH

Battery (12 V)

Protection

Power supply
Power Management

LED lighting
LED back light

Signal control

Video interface

Motor drive

CAN bus

Ethernet PHY

MCU

LCD panel module

Display

Mirror & motor

MPXV1D05xx
MPXV1D06xx
MPEV1D0630

Power supply

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