



New Product Announcement

AP61406Q

I²C 5.5V, 4A, Synchronous Buck Converter Provides a Versatile High Power Density Automotive POL Solution

The AP61406Q is a new 5.5V, 4A, automotive-compliant* synchronous buck converter. Its I²C interface allows for low quiescent current (I_Q) and the programming of various parameters, enabling the device to meet the growing demands for compact designs and high efficiency in automotive point-of-load (POL) applications.

The device features an I²C-compatible, two-wire serial interface consisting of a bidirectional serial-data line (SDA), and a serial-clock line (SCL) with supported rates up to 3.4MHz.

The AP61406Q operates with an input voltage range of 2.3V to 5.5V. It integrates a 75mΩ high-side and a 33mΩ low-side power MOSFET to provide high-efficiency step-down DC-DC conversion. Its adoption of constant on-time (COT) control minimizes external component count, facilitates loop stabilization, and results in a low output voltage ripple.

For high power density, the AP61406Q is available in the tiny W-QFN1520-8/SWP (Type UX) package.

A standard-compliance version, AP61406, is available and suitable for industrial and commercial applications.

**Automotive-compliant - AEC qualified, manufactured in facilities certified to IATF 16949, supporting PPAP documents.*

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The DIODES Advantage

The AP61406Q's I²C interface, low I_Q , inclusion of constant on-time control allows for programmable parameters in a highly efficient, small form factor design.

- **I²C Interface with up to 3.4MHz SCL Clock Rates to Program PFM/PWM, f_{SW} (1MHz, 1.5MHz, 2MHz, 2.5MHz), I_{OUT} (1A/2A/3A/4A), V_{OUT} (20mV steps), and Fault Status Reporting**
Provides increased versatility and ease of design
- **Operates at 4A Maximum Output Current in the Tiny W-QFN1520-8/SWP (Type UX)**
Provides high power density for high ambient temperature operation in automotive POL applications
- **Accurate PG with $\pm 5\%$ window comparator and Internal 5MΩ Pull-up**
Accurate fault detection while reducing BOM costs
- **Multi-Function EN Controls PFM/PWM Modes of Operation**
Provides flexibility for low I_Q high-light-load efficiency or equal ripple across load conditions in fixed PWM
- **High-Side and Low-Side Current Sense Protection During Output Short**
Increases robustness in automotive POL applications

Applications

Automotive 5V and 3.3V POL in:

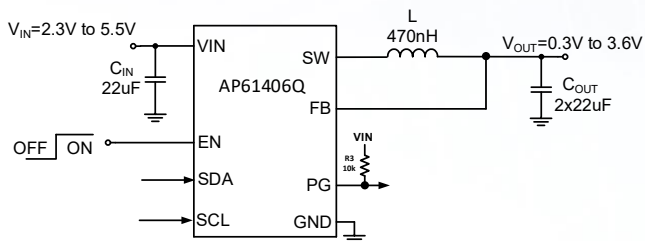
- Infotainment
- Instrument clusters
- Telematics
- Advanced Driver Assistance Systems (ADAS)



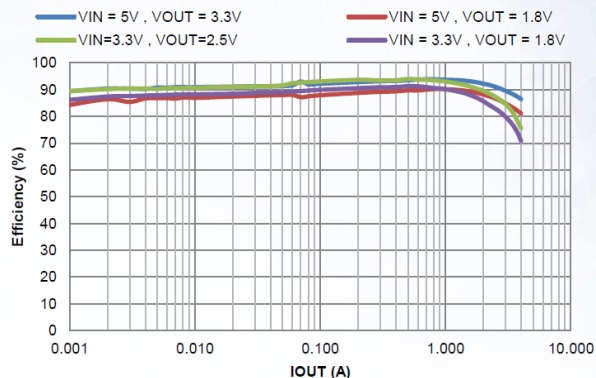
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Typical Application Schematic



Efficiency vs. Output Current



5.5V Automotive-Compliant DC-DC Buck Converter Portfolio

| Part Number | V _{IN} Range | V _{OUT} Range | Output Current A | HS/LS R _{DS(ON)} mΩ | Adj. PFM/ PWM | Switching Frequency | I _Q µA | Ambient Temperature | PG | Package |
|--------------------------|-----------------------|------------------------|---------------------|------------------------------------|------------------|---------------------|----------------------|---------------------|-----|---------------------------|
| | V | V | | | | MHz | | °C | | |
| AP61406Q | 2.3 to 5.5 | 0.3 to 3.6 | 4 | 75 / 33 | Yes | 1/1.5/2/2.5 | 20 | -40 to +125 | Yes | W-QFN1520-8/SWP (Type UX) |
| AP61402Q | 2.4 to 5.5 | 0.5 to 5.5 | 4 | 75/33 | Yes | 2 | 20 | -40 to +125 | Yes | V-DFN1515-6/SWP (Type UX) |
| AP61302Q | 2.4 to 5.5 | 0.6 to VIN | 3 | 70/50 | Yes | 2.2 | 19 | -40 to +125 | Yes | SOT563 |
| AP61300Q | 2.4 to 5.5 | 0.6 to VIN | 3 | 70/50 | Yes | 2.2 | 19 | -40 to +125 | No | SOT563 |
| AP61204Q | 2.4 to 5.5 | 0.6 to VIN | 2 | 70/50 | Yes | 2.4 | 19 | -40 to +125 | Yes | SOT563 |
| AP61102Q | 2.3 to 5.5 | 0.6 to 3.6 | 1 | 110 / 80 | Yes | 2.2 | 15 | -40 to +125 | Yes | SOT563 |
| AP61100Q | 2.3 to 5.5 | 0.6 to 3.6 | 1 | 110 / 80 | Yes | 2.2 | 15 | -40 to +125 | No | SOT563 |
| AP61062Q | 2.4 to 5.5 | 0.6 to 3.6 | 0.6 | 110 / 80 | Yes | 2.2 | 19 | -40 to +125 | Yes | SOT563 |

Ordering Information

| Orderable Part Number | Compliance (Only Automotive Supports PPAP) | Package | Identification Code | Moisture Sensitivity | Packing | |
|---------------------------------|---|---------------------------|---------------------|----------------------|----------|----------------|
| | | | | | Quantity | Carrier |
| AP61406QFCBW8-7 | Automotive | W-QFN1520-8/SWP (Type UX) | H3Q | MSL-1 | 3,000 | 7" Tape & Reel |