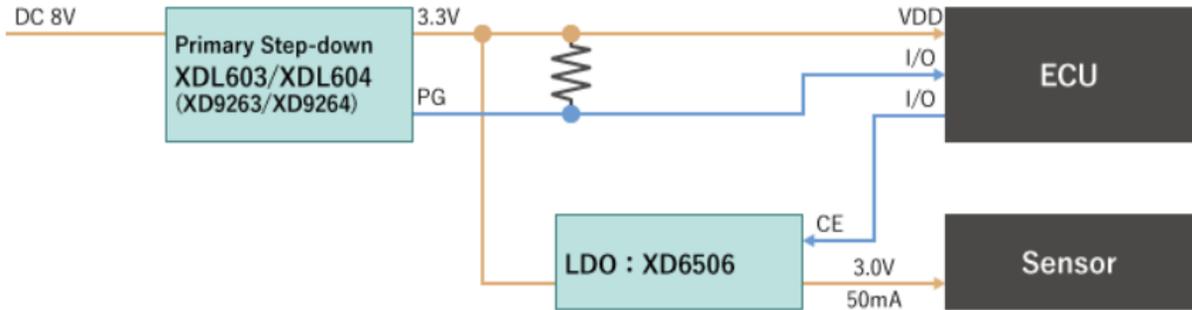


Applications and Solutions for Automotive Compact units connected to 8V secondary rail

Examples of various types of sensors and modules operated by a power supply of roughly 8V, generated from 12V battery through a primary power supply.
Simple, ultra-compact power supplies with low noise are introduced.



Block Diagram	Power Supply Requirements	Recommended Products	Features
Step-down DC 8V to unit internal	<p>Specifications V_{IN}: 8V V_{OUT}: 3.3V I_{OUT}: 500mA f_{osc} > 2MHz</p> <p>Other points •Compact size / high heat dissipation / low noise</p>	XDL603 / XDL604 (XD9263 / XD9264)	<p>Inductor built-in step-down DC/DC, PWM (XDL603), PWM/PFM (XDL604) •Integration of IC and coil achieves high space-saving capabilities, high efficiency, high heat dissipation, and low EMI •Pch SW supports 100% duty ratio to correspond V_{IN} decrease •XD9263 (PWM) and XD9264 (PWM/PFM) with external coil are also available</p> <p>AEC-Q100 Grade-2 V_{IN}: 3~18V (Absolute maximum rating of 20V) V_{OUT}: 1.8V~5V (Set using external resistance. XD9263 / XD9264: 1~15V) I_{OUT}: 500mA f_{osc}: 2.2MHz Maximum Duty ratio: 100% (Pch SW) Soft-start: Can be externally adjusted Power Good Package compatible with wettable flanks (XDL603 / XDL604)</p>
Step-down / LDO For sensors	<p>Specifications V_{OUT}: 3.0V I_{OUT}: 100mA</p> <p>Other points •ON/OFF control from ECU •Low noise</p>	XD6506	<p>Low consumption ,low noise voltage regulator •Low level of high-frequency noise, suitable for sensors</p> <p>AEC-Q100 Grade-2 V_{IN}: 1.5~6.0V V_{OUT}: 1.2V~5.0V I_q: 0.8μA I_{OUT}: 150mA</p>

Solution Overview

There are many cases where various sensors and modules connected to main units for infotainment are supplied by a power supply of roughly 8V created by a primary DC/DC within those main units.

Primary step-down DC/DC

The voltage is already stabilized to a constant value of 8V and then input, so it can be directly decreased to the ECU voltage of 3.3V. Since there are some cases where the harness will be longer, in such cases use a DC/DC with a switching frequency of 2MHz or greater in consideration for EMI.

If a light load condition will be experienced for a long time, and a decrease in frequency during that time is allowed, select the PWM/PFM automatic switching type. If it is desired to keep the operating frequency constant regardless of the load condition, select the PWM fixed type.

Also, during cold cranks, due to a decrease of this 8V and fluctuations caused by long harnesses, the Pch SW type, which supports a duty ratio of 100% and can easily maintain the output voltage even when there is a drop in input voltage, is suitable in such cases.

Step-down DC/DCs, 18V operation (Absolute maximum rating of 20V)

- XDL603: Inductor built-in PWM
- XDL604: Inductor built-in PWM/PFM
- XD9263: PWM
- XD9264: PWM/PFM

The PG (Power Good) pin of the primary DC/DC can be used as the RESET output for monitoring the power supply voltage of the ECU.

By signaling that the voltage has risen up sufficiently before starting operation of the ECU, and also signaling when there is a drop in voltage, ECU malfunctions can be prevented.

LDO for sensor

Obtaining power supplies for sensors in this way from the power rail for the ECU using LDOs is a simple and efficient method of controlling heat generation characteristics.

Since low noise and ripple are important, LDOs which have low power and low noise are ideal.

Voltage regulator

- XD6506: Low consumption

The sensor is only turned ON when necessary, so the CE signal is controlled by the ECU.

In simple units like this, simple configurations using only voltage regulators have been used for some time up until now, but heat generation caused by an increase in the number of ECUs installed in automobiles, as well as their associated miniaturization and advancements in performance, is becoming an important issue, so their replacement with DC/DCs is proceeding.