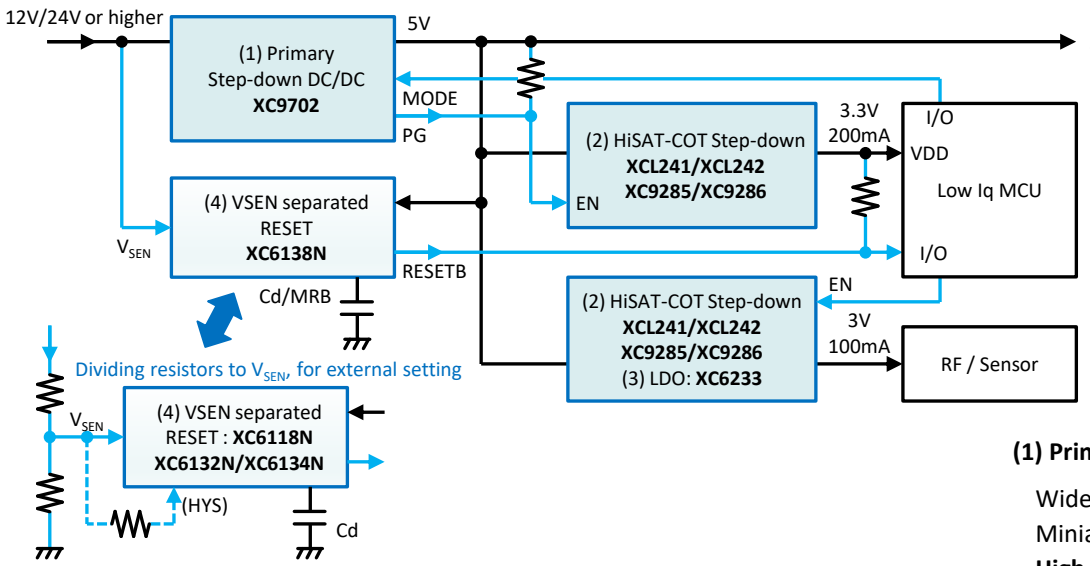
12V/24V ~60V Input : Small Solutions

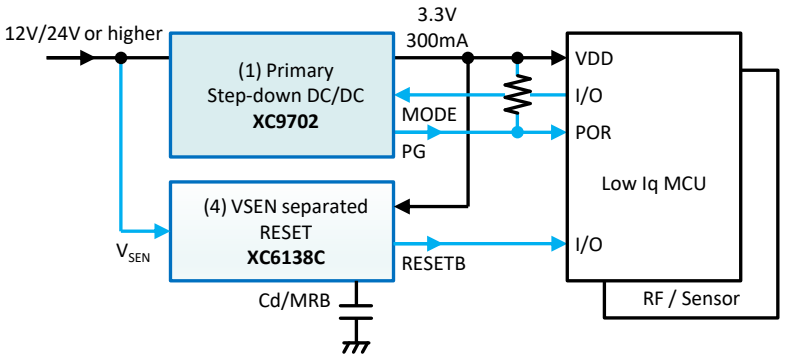
12V/24V and higher input : Small products, modules, industrial sensors, and IoT

● Challenges : High voltage input / Overshoot capability / Monitoring and handling of input voltage fluctuation, Miniaturization / low EMI / Heat dissipation

(a) Step-down to 5V, then create 3.3V and other secondary voltages



(b) Output 3.3V directly



Block	Product	Features
(1) Primary Step-down DC/DC	**XC9702** NEW	60V, MODE: F-PWM, PWM/PFM, 1MHz, 300mA, Low Iq: 12µA Small area/High efficiency at light loads, High step-down ratio
(2) Step-down DC/DC	**XCL241 / XCL242** NEW	Built-in inductor, HiSAT-COT, F-PWM, PWM/PFM 1.2MHz, 500mA, Ultra-low EMI
	XC9285 / XC9286 NEW	HiSAT-COT, F-PWM, PWM/PFM 1.2MHz, 1A
(3) LDO	**XC6233**	High-speed PSRR=75dB, 200mA, Inrush prevention
(4) RESET IC	**XC6138** NEW	High Voltage Sense pin: 76V, Ultra-low Iq V_{DD}: 0.5µA V_{SEN}: 0.15µA, Detect/Release Delay adj, Hysteresis: selectable
	XC6132 / XC6134	Separated Sense pin, Hysteresis adj., Release/Detect Delay adj.
	XC6118	Separated Sense pin, Low Iq, Release Delay external adj.

(1) Primary step-down DC/DC for 12V/24V or higher input

Wide input voltage range to handle **overshoot of 24V line**.
Miniaturization of products by **space-saving** including peripheral components.
High efficiency including light loads.
High step-down ratio enabling direct step-down to 3.3V including overshoot.

(2) Secondary step-down DC/DC for MCU/RF/Sensor

Realizing stable operation, small size, low EMI, and low ripple by placing Built-in inductor Micro DC/DC close to the load as POL converter. **(XCL241/XCL242)**

(3) LDO for RF/Sensor : High-speed LDO **XC6233** is suitable.

(4) 12V/24V input monitoring Voltage Detector : XC6138

- Monitoring with **76V** high-voltage sense pin that supports overshoot.
- **Directly monitors without dividing resistor**, realizing low Iq and high accuracy, as well as supports Release Delay and Detect/Release Hysteresis options.

Space-Saving DC/DC and Voltage Monitoring for Medium and High Voltage Inputs

For fluctuating 12V/24 or higher lines

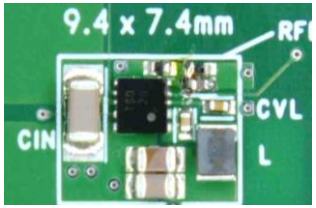
Technical trend and challenges

- Overshooting must be addressed. Power supply inputs of 40 V or higher are also becoming more common, and heat generated by LDOs is also an issue.
- Large fluctuations in the power supply line due to impedance, load fluctuations and induction from motors, etc., must be addressed.

TOREX Proposal : Space-saving step-down DC/DC for high voltage and high step-down ratio, and voltage detector with wide range of release/detection voltage

➢60V 300mA High-voltage Step-down DC/DC : XC9702 NEW

- Supports 60V operation and high step-down ratio.
- Capable of direct step-down from 24V with large fluctuation to 3.3V.
- High efficiency from light loads. F-PWM and PWM/PFM can be selected from MCU by MODE pin.
- Small and Space-saving suitable for replacing LDOs

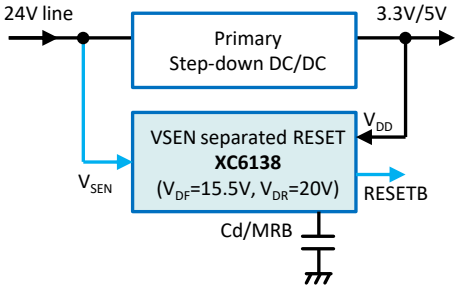


60V 300mA DC/DC : XC9702
World's smallest class of solution size
9.4mm x 7.4mm = 69.6mm²

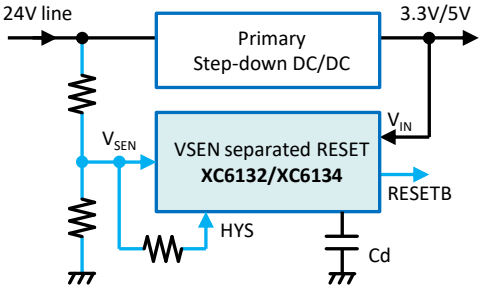
➢Voltage detector with large release/detection difference : XC6138 NEW **, XC6132/XC6134**

- Release voltage is set to a voltage sufficient for rise.
- A large hysteresis is set for Detect voltage, considering large fluctuations in the power supply line. Before the 3.3V/5V line voltage drops, the MCU can be notified to perform stop processing, etc., to ensure stable and safe operation of products.

XC6138 : 76V high-voltage sense pin
Wide hysteresis width selectable



XC6132/XC6134
Hysteresis width set by an external resistor
(**XC6132** : V_{SEN} pin surge voltage protection)



XC6138 : 24V line and voltage monitoring