

Featured Products



QuiCur™ technology maximizes load response

2.2MHz Automotive Secondary DC-DC Converter IC

BD9S402MUF-C

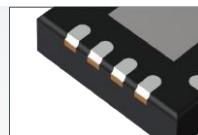
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QuiCur™



- QuiCur™ technology provides outstanding output characteristics**
(QuiCur™ is a trademark name for ROHM's original Quick Current circuit that achieves high-speed load response)
Role-sharing using two error amps improves both output stability and response performance
- Delivers low voltage output via Nano Pulse Control™**
Low voltage output of less than 1V from 5V input is possible while maintaining a high switching frequency of 2.2MHz
- Built-in gain selection function increases design flexibility**
Gain settings can be optimized to meet set specifications

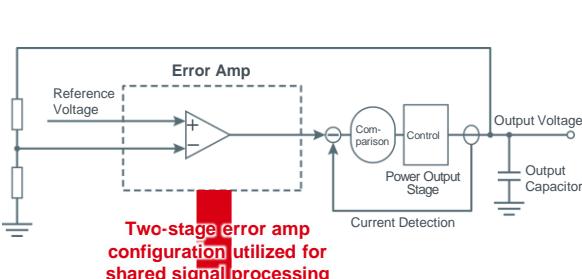
Wettable Flank Design



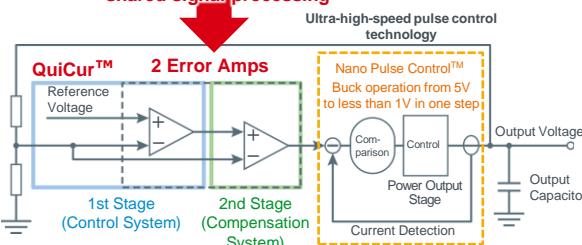
BD9S402MUF-C (3.0×3.0×1.0mm)

Details of QuiCur™ High-Speed Load Response Technology

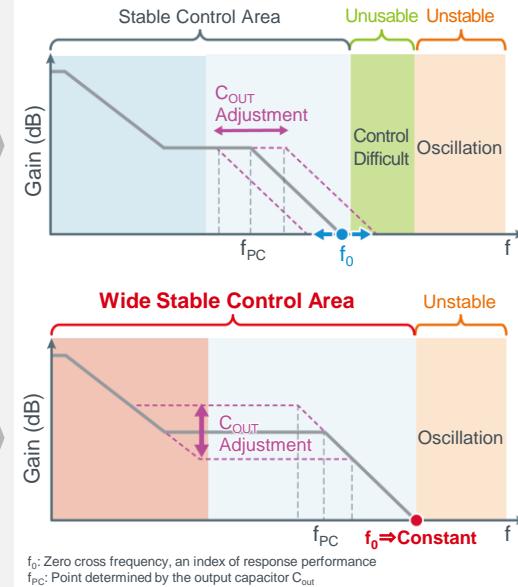
Conventional Circuit



QuiCur™ Circuit



Frequency Response Graphs by Bode Plot



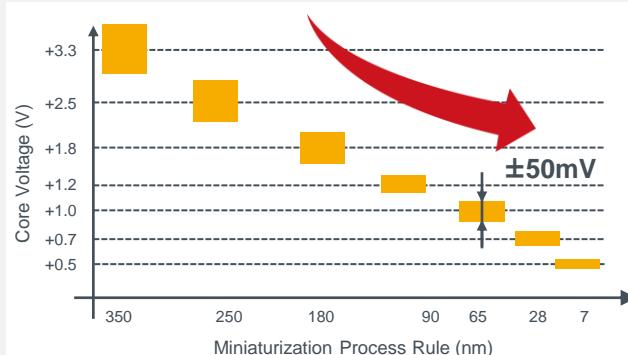
Response Performance Comparison

| | Conventional DC-DC Converter IC | QuiCur™ -Equipped BD9S402MUF-C |
|----------------------------|--|---|
| Output Capacitance | 44μF (22μF×2) | 44μF (22μF×2) |
| Board Image | | |
| Zero Cross Frequency f_0 | 100kHz | 300kHz |
| Load Response Waveforms | V_{out} [50mV/div] I_{out} [1A/div] $\Delta V=100mV$ | V_{out} [50mV/div] I_{out} [1A/div] $\Delta V=33mV$ |

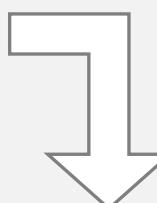
Good response performance with minimal voltage fluctuation

■ BD9S402MUF-C (QuiCur™ + Nano Pulse Control™) Advantages

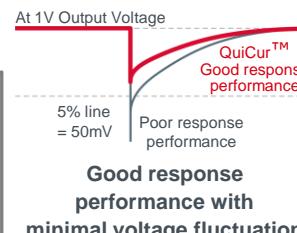
Process Miniaturization and Core Voltage Reduction



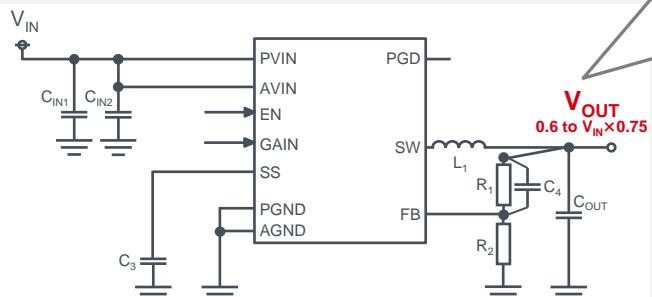
Nano Pulse Control™ technology supports Lower CPU/DSP (load) voltage



QuiCur™ Technology



Application Circuit (BD9S402MUF-C)



■ 2.2MHz Automotive Secondary DC-DC Converter IC BD9S402MUF-C Specifications

| Part No. | Rated Voltage (V) | Output Current (Max) (A) | Input Voltage (V) | Output Voltage (V) | Output Voltage Accuracy (%) | Switching Frequency (MHz) | ON Resistance (Typ) (mΩ) | | Operating Temperature (°C) | ComfySIL™ Functional Safety Category | Package (mm) |
|--|-------------------|--------------------------|-------------------|-------------------------------------|-----------------------------|---------------------------|--------------------------|---------|----------------------------|--------------------------------------|--|
| | | | | | | | Pch FET | Nch FET | | | |
| New BD9S402MUF-C  | 7.0 | 4.0 | 2.7 to 5.5 | Adj. (0.6 to $V_{IN} \times 0.75$) | ±1 | 2.2±10% | 60 | 35 | -40 to +125 | FS supportive* |  VQFN16FV3030 (3.0×3.0×1.0) |

ComfySIL™ is a trademark or registered trademark of ROHM Co., Ltd.

*FS supportive: A product that has been developed for automotive use and is capable of supporting safety analysis with regard to the functional safety.

 Click on the icon to access the product page on ROHM's website.  Click on the icon to access the product datasheet on ROHM's website.

The information contained in this document is current as of August 1, 2022.



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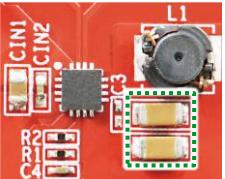
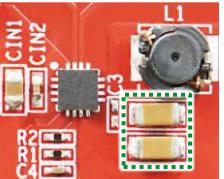
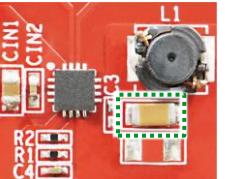
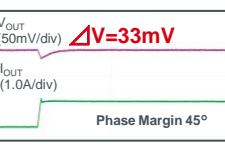
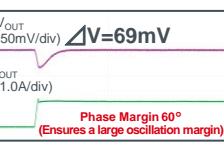
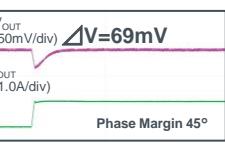
21 Saini Mizonaki-cho, Ukyo-ku,
Kyoto 615-8585 Japan

www.rohm.com

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■ Gain Setting Accommodates Various Set Specifications

Mode selection function contributes to design optimization and reduced man-hours

| Mode | Prioritizing Voltage Fluctuation | Prioritizing Stability | Prioritizing Capacitor Reduction |
|-------------------------|---|--|---|
| Gain Terminal Setting | High | Low | Low |
| Output Capacitance | 44µF (22µF×2) | 44µF (22µF×2) | 22µF (22µF×1) |
| Board Image |  |  |  |
| Load Response Waveforms |  V_{OUT} (50mV/div) $\Delta V = 33mV$ I_{OUT} (1.0A/div) |  V_{OUT} (50mV/div) $\Delta V = 69mV$ I_{OUT} (1.0A/div) Phase Margin 60° (Ensures a large oscillation margin) |  V_{OUT} (50mV/div) $\Delta V = 69mV$ I_{OUT} (1.0A/div) Phase Margin 45° |

3-mode selection based on set specifications contributes to optimal design and reduced man-hours

