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IC

ROHM SEMICONDUCTOR

QuiCur™ technology maximizes load response

2.2MHz Automotive Secondary DC-DC Converter IC

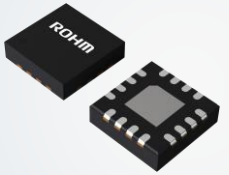
BD9S402MUF-C

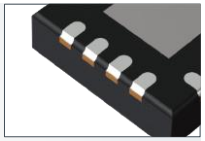
QuiCur™

Nano Pulse Control

- **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

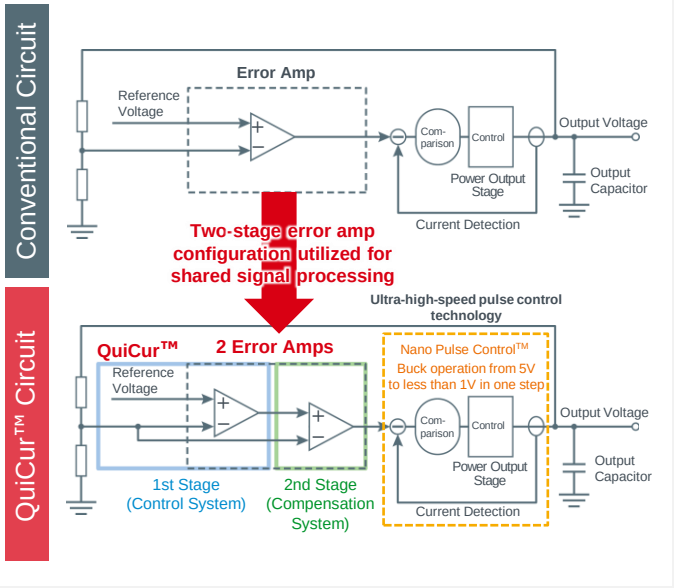




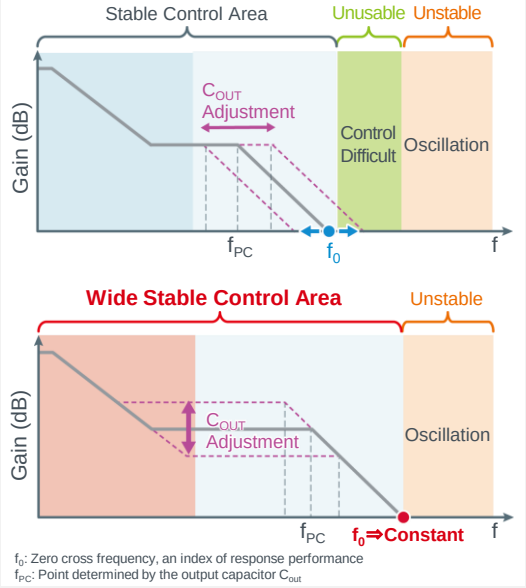
BD9S402MUF-C (3.0×3.0×1.0mm)

■ Details of QuiCur™ High-Speed Load Response Technology

Feedback Circuit (DC-DC Converter IC)

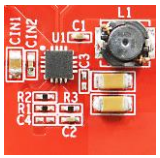
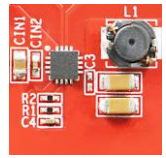
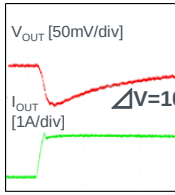
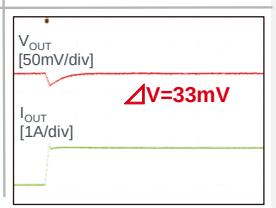


Frequency Response Graphs by Bode Plot



f_0: Zero cross frequency, an index of response performance
f_{PC}: Point determined by the output capacitor C_{out}

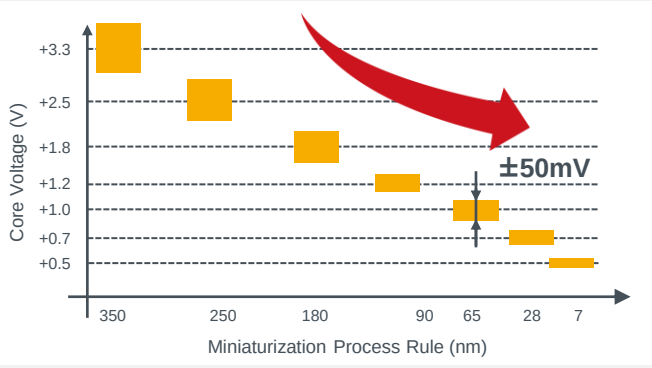
■ Response Performance Comparison

	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_{IN}=5.0V, V_{OUT}=1.0V I_{OUT}=0A→2A (1A/μs)		

Good response performance with minimal voltage fluctuation

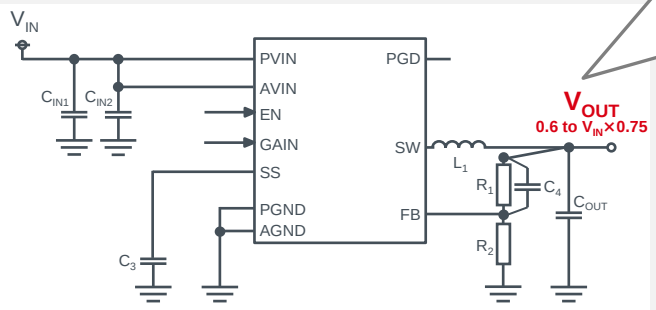
BD9S402MUF-C (QuiCur™ + Nano Pulse Control™) Advantages

Process Miniaturization and Core Voltage Reduction

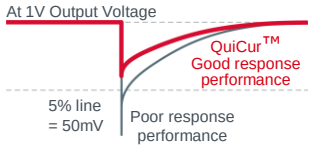


Nano Pulse Control™ technology supports Lower CPU/DSP (load) voltage

Application Circuit (BD9S402MUF-C)



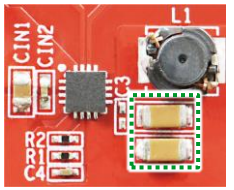
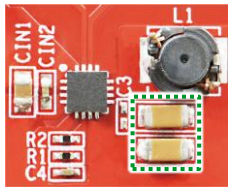
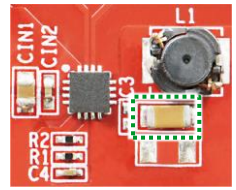
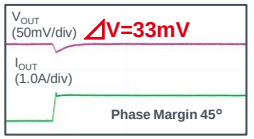
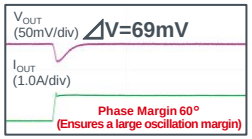
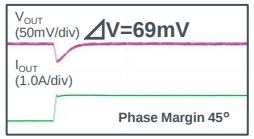
QuiCur™ Technology



Good response performance with minimal voltage fluctuation

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 I_{OUT}=0A→2A (1A/μs) V_{IN}=5.0V, V_{OUT}=1.0V f_{SW}=2.2MHz			

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

ComfySIL Functional Safety

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 (℃)	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}×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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