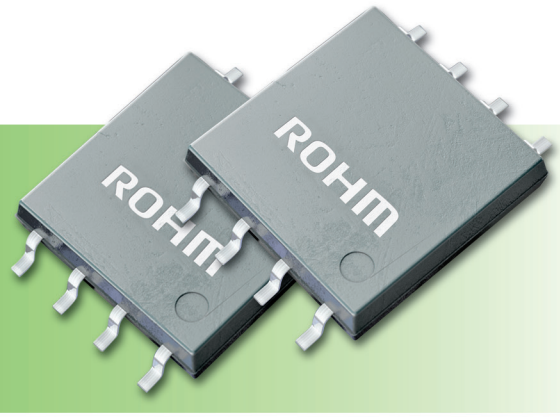
ROHM SEMICONDUCTOR

Innovations Embedded

IC *Power Management*

Current Mode Step-Down Regulators

for point-of-load applications



■ Home Electronics ■ Handheld ■ Portable ■ Mobile ■ Disk Drives

ROHM Marketing USA

Selection Guide

Current Mode Step-Down Regulators
from ROHM Semiconductor

Point-of-load, step-down voltage regulators play an essential role in the power distribution and management in a wide range of electronic devices. The new BD91x Series of regulators from ROHM Semiconductor offers designers an exceptional choice due to their high efficiency over full load to light load conditions, fast load response, a wide range of input voltages, available adjustable output voltage down to 1V and available chip-scale packaging.

High-frequency PWM voltage output control is enhanced using current mode feedback to provide exceptional load response. In addition, light load efficiency is maintained using ROHM's innovative Simple Light Load Mode (SLLM) control. BD91x Series devices are designed to seamlessly transfer between full PWM and SLLM based on load current requirements.

Current Mode Feedback

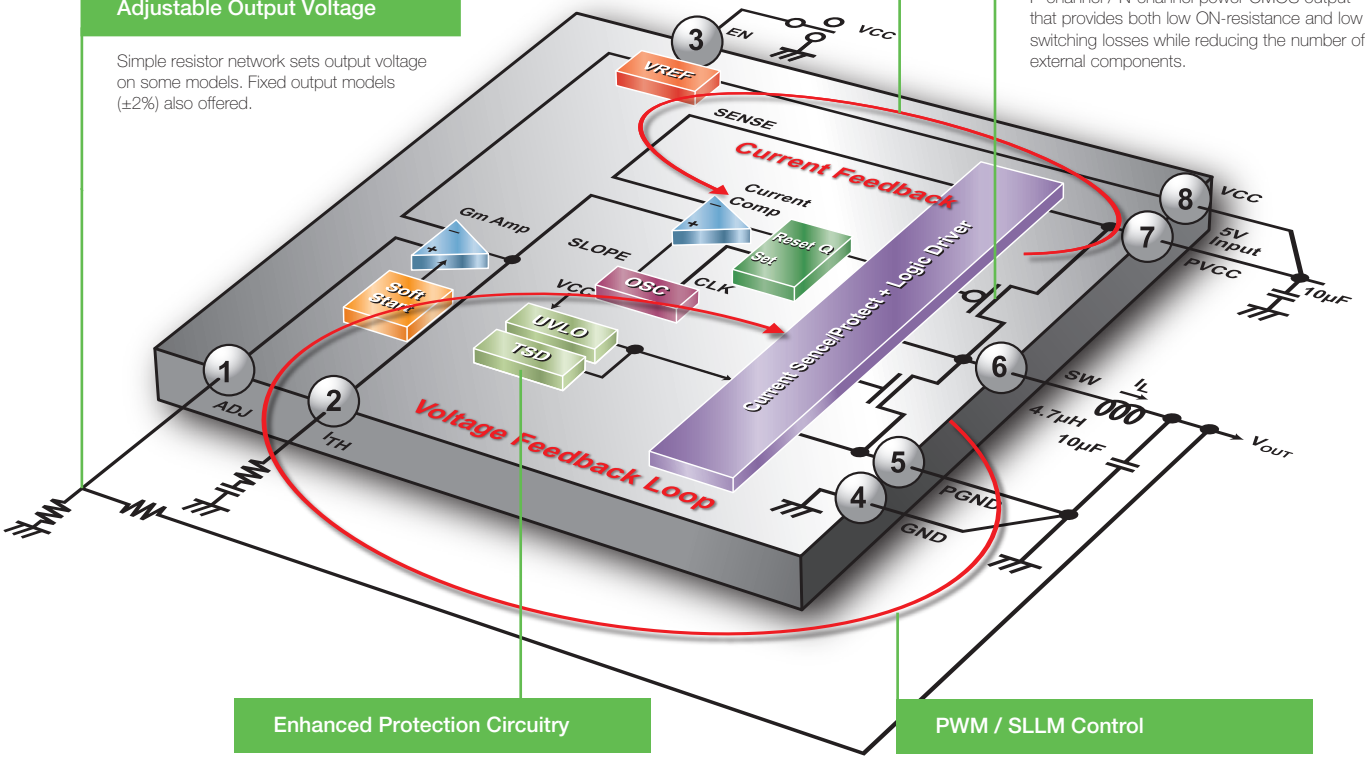
Current mode feedback assures stable voltage regulation during rapid load changes.

High Efficiency CMOS Output

BD91x Series devices all incorporate ROHM's P-channel / N-channel power CMOS output that provides both low ON-resistance and low switching losses while reducing the number of external components.

Adjustable Output Voltage

Simple resistor network sets output voltage on some models. Fixed output models (±2%) also offered.



Enhanced Protection Circuitry

Built-in thermal shut-down, over-current and under-voltage lockout protection assure system reliability.

PWM / SLLM Control

Two-tier control strategy maximizes power efficiency over a full range of load conditions.

Designed for Efficiency and Reliability

Low ON-resistance MOSFETs (using DMOS process) results high efficiency buck regulation with a minimum of external components.

Current Mode PWM control maintains stable output voltage during load transients.

Simple Light Load Mode control sustains high efficiency operation during lightly loaded conditions.

Most internal circuits are turned off during standby, reducing standby current to virtually zero and improving battery life in portable applications.

Output stabilization simply requires a small low ESR ceramic capacitor, saving space and increasing efficiency.

Smaller output inductor size reduces overall circuit footprint.

Protection from ESD voltage of up to 4 kV Human Body Model (HBM) has been achieved through optimization of processes and circuitry.

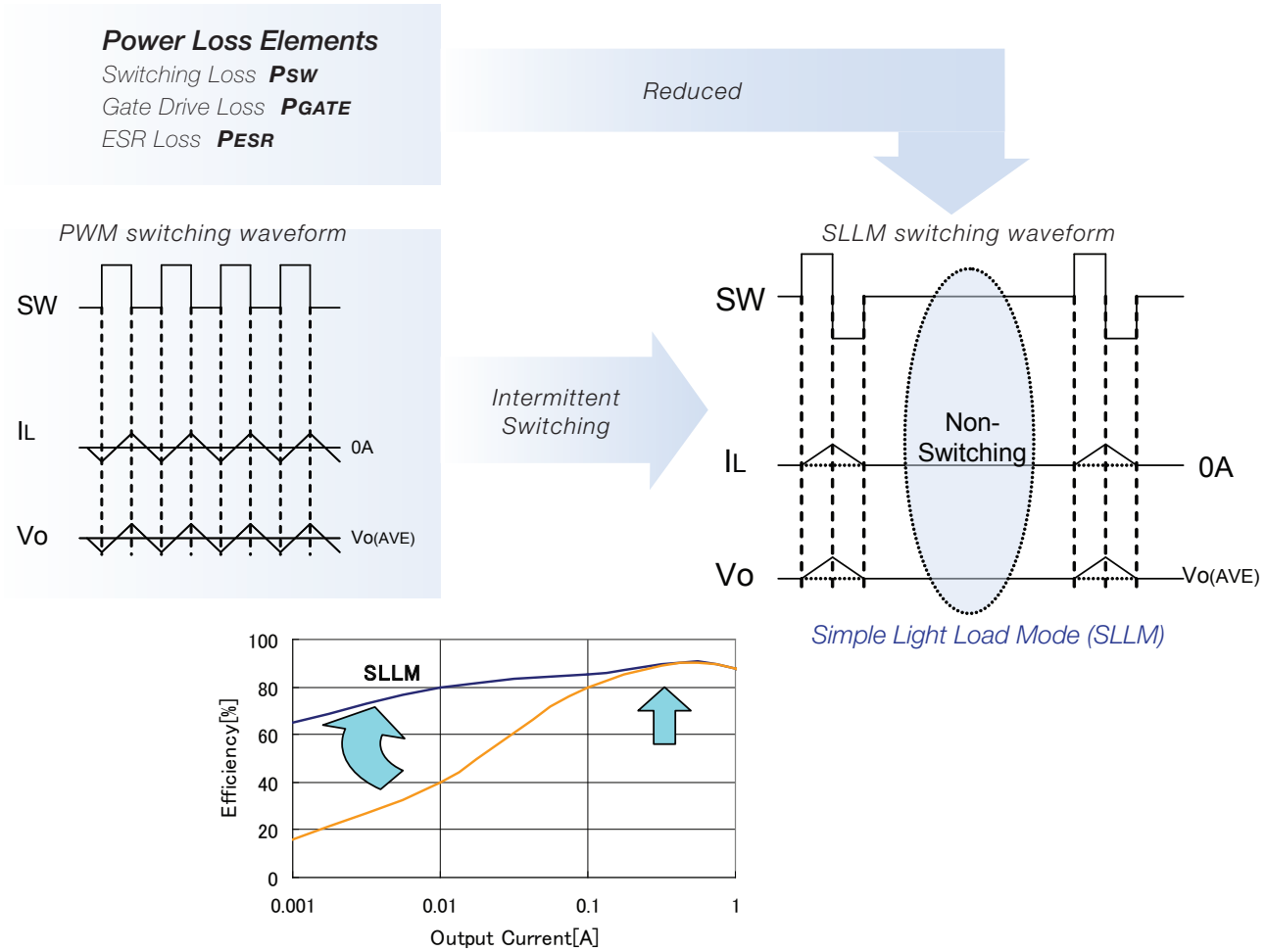
Built-in protection circuits guard against over-current, over-temperature and under-voltage.

Wide operating temperature range makes these devices suitable for a wide range of applications.

Simple Light Load Mode Control (SLLM)

Efficiency ratings for power supplies at full load do not adequately reflect the unit's power consumption under actual operation conditions. To extend the length of operation of portable products on a single battery charge, power must be reduced in all operating modes. Improved efficiency at all operating points including more typical situations such as very light loads is an important concern in the design of next generation "green" products.

The BD91X Series of step-down regulators incorporates a two-stage regulation technique designed to seamlessly and efficiently deliver power to the load under widely varying load conditions. Under large load conditions, conventional PWM control is employed; under light load conditions, Simple Light Load Mode control is used.



To download an informative white paper providing more details on ROHM's innovative SLLM control, click on this link: "Optimizing Power Efficiency in POL Switching Regulators Using SLLM (Simple Light Load Mode) Control."

Current Mode Step-Down Regulators
Part Selection Guide

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Lower Current Models – *Output Current (Io)<1A*

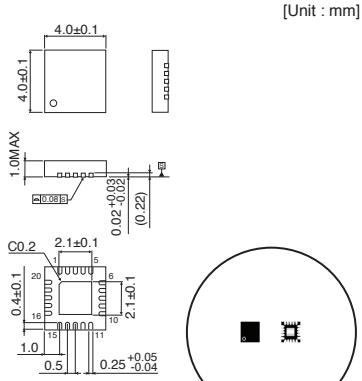
	Number of Outputs	Input Voltage	Output Voltage	Output Current	Operating Temperature	Operating Frequency	Feature	Package
BD9122GUL	1	2.5 ~ 5.5V	Adj (1.0~2.0V)	0.3A	-30~ 85°C	1MHz	Small package (WL-CSP)	VCSP50L2 (1.1×2.5)
BD9180GUL	1	2.3 ~ 5.5V	1.875V±1.5%	0.3A	-30~ 85°C	2MHz	Ultra Small package	VCSP50L1 (1.1×1.6)
BD9192GUL	2	2.3 ~ 5.5V	1.2V±1.5% 1.8V±1.5%	0.3A	-30~ 85°C	2MHz	2ch DC/DC Output Ultra Small package	VCSP50L2 (1.1×2.5)
BD9161FVM	1	2.5 ~ 4.5V	Adj (1.0~3.3V)	0.6A	-25~ 85°C	1MHz	100% Max Duty Function	MSOP (2.9×4.0)
BD9102FVM	1	4.0 ~ 5.5V	1.24V ±2%	0.8A	-25 ~ 85°C	1MHz	No Output Resistors Required	MSOP8 (2.9×4.0)
BD9106FVM	1	4.0 ~ 5.5V	Adj (1.0~2.5V)	0.8A	-25 ~ 85°C	1MHz	Fast Transient Response High Efficiency	MSOP8 (2.9×4.0)
BD9109FVM	1	4.5 ~ 5.5V	3.30V ±2%	0.8A	-25 ~ 85°C	1MHz	No Output Resistors Required	MSOP8 (2.9×4.0)
BD9120HFN	1	2.7 ~ 4.5V	Adj (1.0~1.5V)	0.8A	-25 ~ 85°C	1MHz	Fast Transient Response High Efficiency	HSON8 (2.9×3.0)
BD9151MUV	2	2.8 ~ 5.5V	1.2V±1.5% 1.8V±1.5%	0.8A 0.8A	-40 ~ 85°C	1MHz	Start-up Sequence Pch Switch Control	VQFN020V4040 (4.0×4.0)
BD9104FVM	1	4.5 ~ 5.5V	3.30V ±2%	0.9A	-25 ~ 85°C	1MHz	No Output Resistors Required	MSOP8 (2.9×4.0)

Higher Current Models – *Output Current (Io)>1A*

	Number of Outputs	Input Voltage	Output Voltage	Output Current	Operating Temperature	Operating Frequency	Feature	Package
BD9107FVM	1	4.0 ~ 5.5V	Adj (1.0~1.8V)	1.2A	-25 ~ 85°C	1MHz	Fast Transient Response High Efficiency	MSOP8 (2.9×4.0)
BD9150MUV	2	4.75 ~ 5.5V	3.30V±1.5% Adj (0.8~2.5V)	1.5A	-40 ~ 85°C	1.5MHz	2ch DC/DC Output Small package	VQFN020V4040 (4.0×4.0)
BD9152MUV	2	4.5 ~ 5.5V	3.30V±1.5% Adj (0.8~2.5V)	1.5A	-40 ~ 85°C	1MHz	2ch DC/DC Output with Start-up Sequence	VQFN020V4040 (4.0×4.0)
BD9110NV	1	4.5 ~ 5.5V	Adj (1.0~2.5V)	2.0A	-25 ~ 105°C	1MHz	Low Ripple Output	SON008V5060 (5.0×6.0)
BD9111NV	1	4.5 ~ 5.5V	3.30V±1.5%	2.0A	-25 ~ 105°C	1MHz	Fast Transient Response High Efficiency	SON008V5060 (5.0×6.0)
BD9130NV	1	2.7 ~ 5.5V	Adj (1.0~2.5V)	2.0A	-25 ~ 105°C	1MHz	Fast Transient Response High Efficiency	SON008V5060 (5.0×6.0)
BD9130EFJ	1	2.7 ~ 5.5V	Adj (1.0~2.5V)	2.0A	-25 ~ 105°C	1MHz	Fast Transient Response High Efficiency	HTSOP-J8 (5.0×6.0)
BD9132MUV	1	2.7 ~ 5.5V	Adj (1.0~2.5V)	3.0A	-40 ~ 105°C	1MHz	Very High Efficiency	VQFN020V4040 (4.0×4.0)
BD9139MUV	1	2.7 ~ 5.5V	Adj (1.0~3.3V)	3.0A	-40 ~ 105°C	1MHz	Very High Efficiency Small Package	VQFN016V3030 (3.0×3.0)
BD9134MUV	1	4.5 ~ 5.5V	3.30V±1.5%	3.0A	-40 ~ 105°C	1MHz	No Output Resistors Required	VQFN020V4040 (4.0×4.0)
BD9137MUV	1	2.7 ~ 5.5V	Adj (1.0~3.3V)	4.0A	-40 ~ 105°C	1MHz	Excellent Efficiency PWM/SLLM select	VQFN020V4040 (4.0×4.0)
BD9141MUV	1	4.5~13.2V	Adj (3.0~6.0V)	2.0A	-40 ~ 105°C	500 kHz	High Input Voltage	VQFN020V4040 (4.0×4.0)

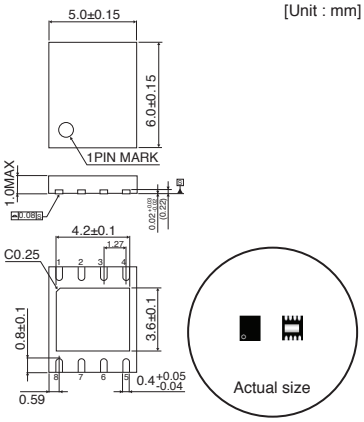
VQFN020V4040

[Unit : mm]



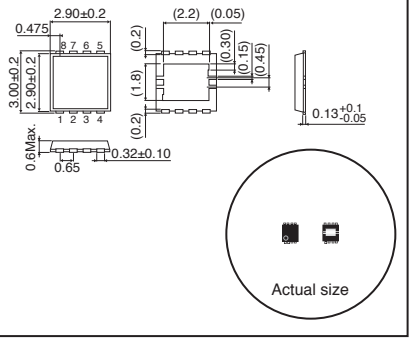
SON008V5060

[Unit : mm]



HSON8

[Unit : mm]



MSOP8

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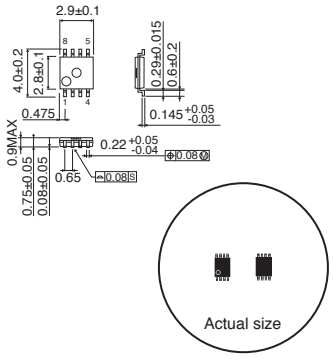
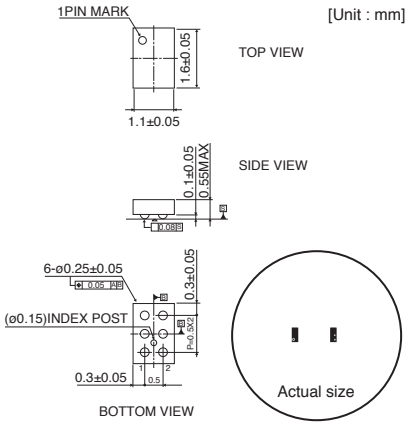


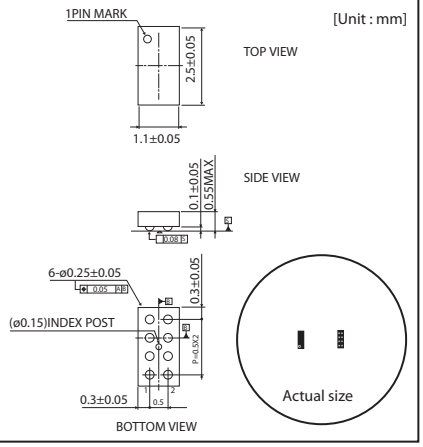
VCSP50L1

[Unit : mm]



VCSP50L2

[Unit : mm]



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