

● Design Support Tools

Online tools to support device selection and purchasing

Power Device Simulator



The Power Device Simulator (free) is a web-based simulation tool for our DC-DC regulator ICs* and switching MOSFETs. This tool allows you to verify the product specifications, to analyze the characteristics, to make a BOM list, and to purchase desired products, thus reducing your time for product selection.

*Currently, DC-DC regulator IC with built-in power MOS only is available.

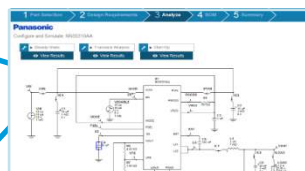
- IC Designer --- Power circuit simulation for DC-DC regulator IC
- Active Datasheet --- Performance simulation for switching MOSFET
- Buck Analyzer --- Power circuit simulation for switching MOSFET

1 Requirement

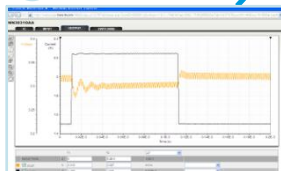
Operation procedure



2 Circuit / Analyze



3 Result



4 BOM list

Ref	Qty	Part Number	Manufacturer	Descrpt
1	U1	NN30310AA	Panasonic	SA Synth
2	C3	ECJ-4GB1A105M	Panasonic	Multilayer
4	L1	ETC-PH1R0BFA	Panasonic	COIL PC
5	R1	ERJ-3EKF1000V	Panasonic	Res Thin
6	R6	ERJ-3EKF4531V	Panasonic	Res Thin
7	R7	ERJ-3EKF1001V	Panasonic	Res Thin

DC-DC Circuit Calculator



The DC-DC Circuit Calculator (free) is a web-based tool that calculates the recommended peripheral circuit constants for our DC-DC regulator IC* to meet your power system design specifications. Use this calculator together with the "Power Device Simulator" to make the simulation more effective.

*Currently, DC-DC regulator IC with built-in power MOS only is available.

Panasonic offers a variety of devices as "Total Power simulations." Please visit the URL below to learn more about coil, capacitor, components for suppressing noise or surge, etc.
http://industrial.panasonic.com/ww/index_e.html

● Evaluation Board

• We have prepared the DC-DC evaluation boards



NN30195A evaluation board
NN30195A-EVB-R2

NN30312A evaluation board
NN30312A-EVB-R2

NN30196A evaluation board
NN30196A-EVB-R2

NN30320A evaluation board
NN30320A-EVB-R2

NN30295A evaluation board
NN30295A-EVB-0

NN30321A evaluation board
NN30321A-EVB-R2

NN30310AA evaluation board
NN30310AA-EVB-R2

Request for your special attention and precautions in using the technical information and semiconductors described in this book

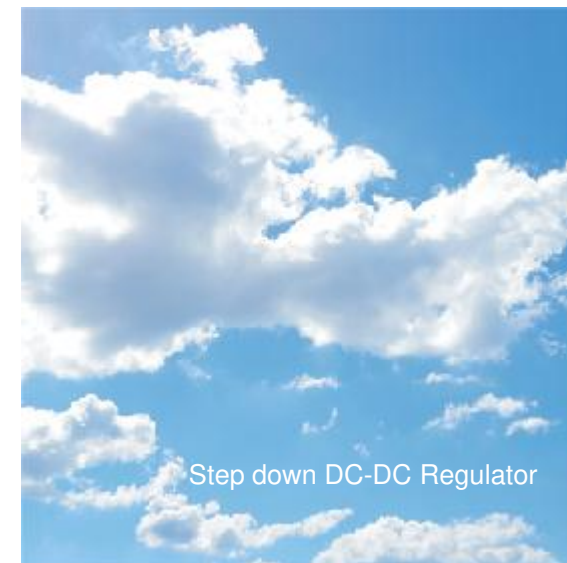
- (1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.
- (2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.
- (3) The products described in this book are intended to be used for general applications (such as office equipment, communications equipment, measuring instruments and household appliances), or for specific applications as expressly stated in this book. Consult our sales staff in advance for information on the following applications: Special applications (such as for airplanes, aerospace, automotive equipment, traffic signaling equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body. It is to be understood that our company shall not be held responsible for any damage incurred as a result of or in connection with your using the products described in this book for any special application, unless our company agrees to your using the products in this book for any special application.
- (4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment. Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.
- (6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.
- (7) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of our company.

Panasonic Semiconductor Solutions Co., Ltd.

1 Kotari-yakemachi, Nagaokakyo City, Kyoto 617-8520, Japan

Tel : 81-75-951-8151

Issued in June, 2014



Step down DC-DC Regulator

www.semicon.panasonic.co.jp/en

Power device solution, ENELEAD

Panasonic provides ENELEAD, the "Total solution of power devices," which supports from power system design to purchasing of components, allowing you to select a suitable small, high-efficiency power device, to easily perform a design and evaluation of power systems by using web-based tools, and to purchase peripheral components.

Power Device Simulator, IPD Design, DCDC Design, Design Support Tools, Power supplies by application, Power Devices

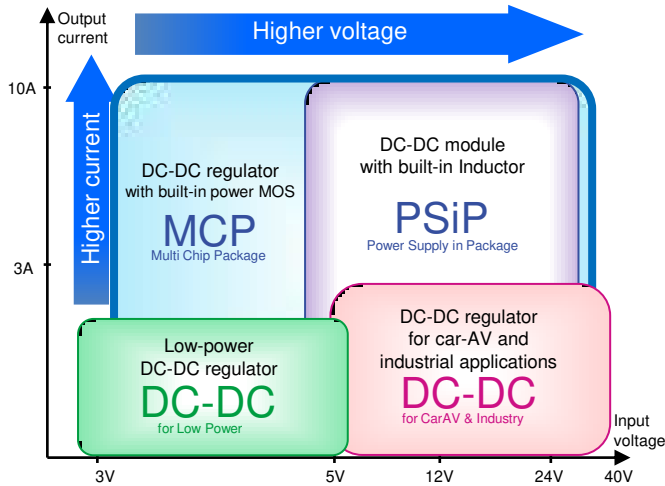
Panasonic will continue to offer the power solutions that satisfy our customers along with the "ENELEAD."

www.semicon.panasonic.co.jp/en/applications/power/

OR [Panasonic power device simulator global](#) [Click](#)

Thank you for your interest in Panasonic Step down DC-DC Regulator. We provide a variety of regulators with wide ranges of input voltage and output current, based on the low power technologies that have been cultivated through the development of customized power supplies for mobile phones. In the next generation, we are going to expand its application for industrial and infrastructure such as server, network and so on with a view to high current not just low power of several hundred mA degree.

Wide product lineup for various applications



Provides DC-DC solutions with high efficiency, fast response, and small size.

High efficiency

Achieves high efficiency for a wide load range (from light to heavy).
Achieves low power consumption and low heat generation.

Fast response

Suppresses the transient variation of load.
Supplies a stable voltage to equipments.

Small size

Reduces the footprint of parts for power supply.
Achieves miniaturization of equipments.

DC-DC Regulator with Built-in Power MOS

DC-DC regulators including both Fast-response control IC with hysteretic control and MOSFET with low ON-resistance in a single package (MCP).

● Feature 1 ~High efficiency~

Core Technology

(1) Built-in MOSFET with low ON-resistance

[Trench-MOSFET] The optimization of the structure reduces the capacity, and improves the Qg/ON-resistance significantly.

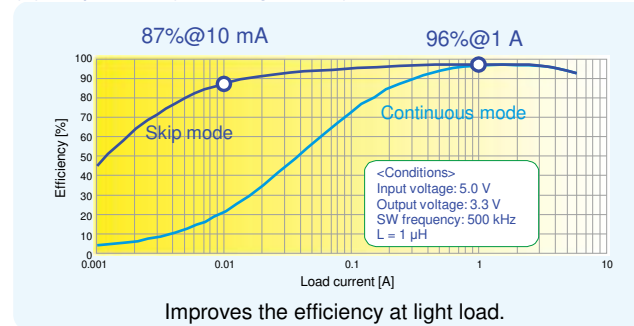
Conventional design
Square Source & Body

New design
Parallel Source & Body

Process rule	250nm	110nm
RDS (on)	1	0.6
Qg	1	0.4
Ron×Qg	1	0.24

Core Technology

(2) Skip mode (Set at light load)



Improves the efficiency at light load.

→ Achieves low power consumption and low heat generation.

Line-up

	NN30195A	NN30295A	NN30297A	NN30196A	NN30310AA	NN30320A	NN30321A	NN30421A	NN30331A	NN30332A	NN30312A	
Input voltage 1	4.5 to 5.6V	4.5 to 5.6V	4.0 to 5.6V	4.5 to 5.6V	6.0 to 30V	4.5 to 28V	4.5 to 28V	4.75 to 24V	4.5 to 24V	4.5 to 24V	4.5 to 30V	
Input voltage 2 (*1)	—	—	—	—	—	—	—	4.5 to 5.5V	4.5 to 5.5V	—	—	
Absolute maximum rating	6V			33V	33V			30V	33V			
Output voltage	0.6 to 3.5V	0.6 to 3.5V	0.6 to 3.5V	0.6 to 3.5V	0.75 to 5.5V		0.75 to 3.6V	0.75 to 3.6V	0.75 to 3.6V	0.75 to 5.5V	0.75 to 5.5V	
Output current (max)	6A		9A	3A			6A	8A		10A		
Control method	Hysteretic											
Ron (Ω)	Hi/Lo	25m/25m	28m/25m	9m/9m	25m/25m	20m/20m	20m/10m	20m/10m	20m/6m	20m/6m	9m/9m	
I2C control (*2)	—	Yes	Yes	—	—	—	—	—	—	—	—	
Synchronous rectification	Yes											
Skip mode (*3)	○											
Package	Type	HQFN24	HQFN24	HQFN24	HQFN40	HQFN24	HQFN24	HQFN24	HQFN24	HQFN24	HQFN24	HQFN40
	Size	4.0x4.0mm	4.0x4.0mm	4.0x4.0mm	6.0x6.0mm	4.0x4.0mm	4.0x4.0mm	4.0x4.0mm	4.0x4.0mm	4.0x4.0mm	4.0x4.0mm	6.0x6.0mm
	Pin-pitch	0.5mm										
Selectable frequency	0.5/1.0 /2.0 MHz	0.5 to 2.0 MHz (*2)	0.5 to 2.0 MHz (*2)	0.5/1.0 /2.0 MHz	0.25/0.75 /1.25 MHz	0.21/0.43 /0.65 MHz	0.21/0.43 /0.65 MHz	0.21/0.43 /0.65 MHz	0.22/0.41 /0.58 MHz	0.43/0.63 MHz	0.43/0.63 MHz	0.25/0.75 /1.25 MHz
Function	OCP, OVD, SCP, UVLO, TSD					OCP, OVD, SCP, UVLO, TSD						
Product life cycle stage	MP											

(*1) Ultra-high efficiency at light load achieved by a 5-V input voltage
(*3) Skip mode: High efficiency mode at light load

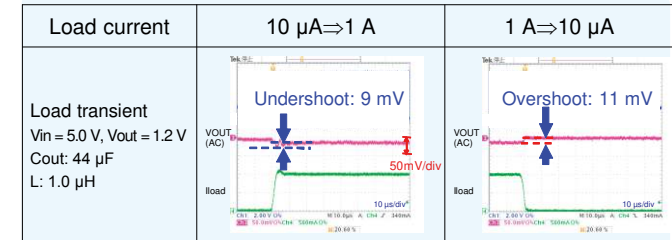
(*2) For NN30295 & NN30297, the I2C interface can be used to select from among seven frequency values and change the output voltage.

● Feature 2

~Fast response~

Core Technology

Hysteretic control method



Reduces the overshoot/undershoot due to load current transient to ±10 mVpp.

→ Ensures stable operation of equipments.

● Feature 3

~Small size~

Core Technology

MCP (Multi-Chip Package)

Footprint : 48 mm² (3 chips) vs Footprint : 16 mm² (1 package). Both DC-DC control IC and MOSFET are included in a single package. Efficiency improvement of 67% is shown.

→ Small footprint, achieving miniaturization of equipments