RP501K Series

1A* PWM/VFM Step-down DC/DC Converter with Synchronous Rectifier

The RP501K Series are low supply current CMOS-based PWM/VFM step-down DC/DC converters with synchronous rectifier. RP501K can be selected from two control types by input signal to the MODE pin - fixed PWM control or PWM/VFM auto switching control in which mode automatically switches to high-efficiency VFM mode in low output current. RP501K includes a soft start circuit, an under-voltage lockout circuit (UVLO), and a latch protection circuit. By simply using an inductor and capacitors as external components, a high-efficiency step-down DC/DC converter can be easily configured. The small inductor (2.2µH) can be used by the switching of 2.25MHz. The frequency accuracy improved to ±10%.

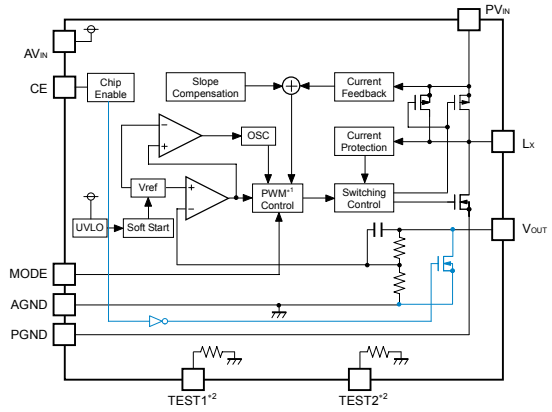
FEATURES

- Supply Current (I_{DD1}) ····· Typ. 450µA (V_{IN}=V_{CE}=5.5V, V_{OUT}=0V)
- Supply Current (I_{DD2}) ····· Typ. 140µA (V_{IN}=V_{CE}=V_{OUT}=5.5V)
- Standby Current ($I_{standby}$) ····· Max. 5µA (V_{IN}=5.5V, CE="L")
- Input Voltage Range (V_{IN}) ····· 2.5V to 5.5V
- Output Voltage Range (V_{OUT}) ····· 1.0V to 3.3V (internally fixed)
- Output Voltage Accuracy ····· ± 1.5%
- Output Current (I_{OUT}) ····· 1A*
- Oscillator Frequency (f_{osc}) ····· 2.25MHz
- Oscillator Maximum Duty Cycle (Maxduty) ·· Min. 100%
- UVLO Detect Voltage (V_{UVLO}) ····· Typ. 2.2V
- Soft Start Time (t_{start}) ····· Typ. 0.14ms
- Coil-current Limit Circuit ····· Current limit Typ. 1.5A
- Latch Protection Circuit ····· Delay time for protection Typ. 2ms
- Auto-Discharge function ····· B Version
- MODE Pin ····· "H": PWM/VFM auto switching control, "L": PWM fixed
- Package ····· DFN(PLP)2527-10

*) This is an approximate value, because output current depending on conditions and external parts.

BLOCK DIAGRAM

RP501Kxx1A

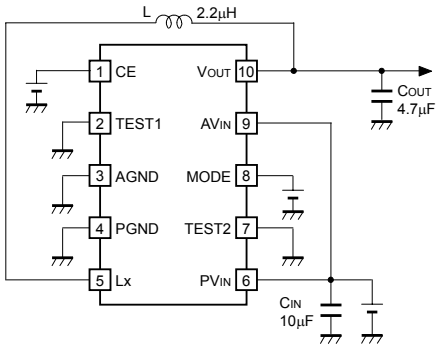


*1) MODE pin="H": PWM/VFM auto switching control, "L": PWM fixed

Blue line : RP501Kxx1B only

TYPICAL APPLICATION

RP501K



L : NR3010T2R2M (TAIYO YUDEN)
CIN : C1608JB0J106K (TDK)
COUT : C1608JB1A475K (TDK)

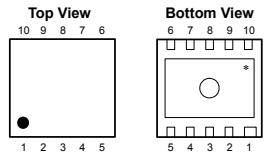
SELECTION GUIDE

Halogen Free	Package	Q'ty per Reel	Part No.
H/F	DFN(PLP)2527-10	5,000 pcs	RP501K xx1* -TR

xx : Specify the output voltage within the range of 1.0V (10) to 3.3V (33) in 0.1V steps.
* : Select from (A) without auto-discharge function or (B) with auto-discharge function.

PACKAGE

DFN(PLP)2527-10

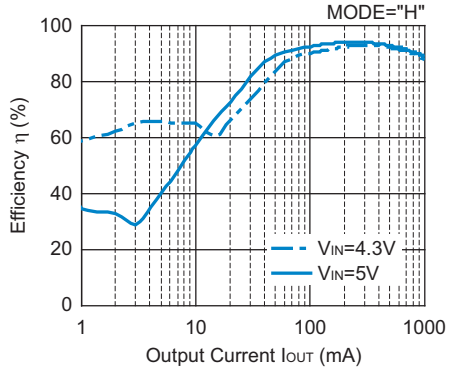


1	CE	6	PV_{IN}
2	TEST1*2	7	TEST2*2
3	AGND	8	MODE
4	PGND	9	AV_{IN}
5	Lx	10	V_{OUT}

*) The tab is substrate level (GND).
*2) TEST pins must be connected to GND.

TYPICAL CHARACTERISTIC

RP501K331x (PWM/VFM auto switching control)
Efficiency vs. Output Current



APPLICATIONS

- Power source for battery-powered equipment
- Power source for compact HDD
- Power source for hand-held communication equipment, cameras, and VCRs

1. The products and the product specifications described in this document are subject to change or discontinuation of production without notice for reasons such as improvement. Therefore, before deciding to use the products, please refer to Ricoh sales representatives for the latest information thereon.
2. The materials in this document may not be copied or otherwise reproduced in whole or in part without prior written consent of Ricoh.
3. Please be sure to take any necessary formalities under relevant laws or regulations before exporting or otherwise taking out of your country the products or the technical information described herein.
4. The technical information described in this document shows typical characteristics of and example application circuits for the products. The release of such information is not to be construed as a warranty of or a grant of license under Ricoh's or any third party's intellectual property rights or any other rights.
5. The products listed in this document are intended and designed for use as general electronic components in standard applications (office equipment, telecommunication equipment, measuring instruments, consumer electronic products, amusement equipment etc.). Those customers intending to use a product in an application requiring extreme quality and reliability, for example, in a highly specific application where the failure or misoperation of the product could result in human injury or death (aircraft, spacevehicle, nuclear reactor control system, traffic control system, automotive and transportation equipment, combustion equipment, safety devices, life support system etc.) should first contact us.
6. We are making our continuous effort to improve the quality and reliability of our products, but semiconductor products are likely to fail with certain probability. In order to prevent any injury to persons or damages to property resulting from such failure, customers should be careful enough to incorporate safety measures in their design, such as redundancy feature, firecontainment feature and fail-safe feature. We do not assume any liability or responsibility for any loss or damage arising from misuse or inappropriate use of the products.
7. Anti-radiation design is not implemented in the products described in this document.
8. Please contact Ricoh sales representatives should you have any questions or comments concerning the products or the technical information.

RICOH COMPANY., LTD. Electronic Devices Company

■Ricoh presented with the Japan Management Quality Award for 1999.
Ricoh continually strives to promote customer satisfaction, and shares the achievements of its management quality improvement program with people and society.

■Ricoh awarded ISO 14001 certification.
The Ricoh Group was awarded ISO 14001 certification, which is an international standard for environmental management systems, at both its domestic and overseas production facilities. Our current aim is to obtain ISO 14001 certification for all of our business offices.

RoHS Compliant
Ricoh completed the organization of the Lead-free production for all of our products. After Apr. 1, 2006, we will ship out the lead free products only. Thus, all products that will be shipped from now on comply with RoHS Directive.

http://www.ricoh.com/LSI/

RICOH COMPANY, LTD.
Electronic Devices Company
● Higashi-Shinagawa Office (International Sales)
3-32-3, Higashi-Shinagawa, Shinagawa-ku, Tokyo 140-8655, Japan
Phone: +81-3-5479-2857 Fax: +81-3-5479-0502

RICOH EUROPE (NETHERLANDS) B.V.
● Semiconductor Support Centre
Prof. W.H.Keesomlaan 1, 1183 DL Amstelveen, The Netherlands
P.O.Box 114, 1180 AC Amstelveen
Phone: +31-20-5474-309 Fax: +31-20-5474-791

RICOH ELECTRONIC DEVICES KOREA Co., Ltd.
11 floor, Haesung 1 building, 942, Daechidong, Gangnamgu, Seoul, Korea
Phone: +82-2-2135-5700 Fax: +82-2-2135-5705

RICOH ELECTRONIC DEVICES SHANGHAI Co., Ltd.
Room403, No.2 Building, 690#Bi Bo Road, Pu Dong New district, Shanghai 201203, People's Republic of China
Phone: +86-21-5027-3200 Fax: +86-21-5027-3299

RICOH COMPANY, LTD.
Electronic Devices Company
● Taipei office
Room109, 10F-1, No.51, Hengyang Rd., Taipei City, Taiwan (R.O.C.)
Phone: +886-2-2313-1621/1622 Fax: +886-2-2313-1623