

Automatic Mode shift 300mA 36V Input VR with VD

The R1510S Series are CMOS-based auto mode switching voltage regulators featuring 300mA output current with voltage detector. The R1510S has a 36V maximum input voltage VR and VD on a single chip. As the voltage regulator is an automatic mode shift type, the operation can switch automatically to a fast response mode or a low power mode of the ECO function according to output current. (Automatic switching to fast response mode under $I_{OUT} > 12mA$ conditions or to low power mode under $I_{OUT} < 3mA$ conditions.) R1510S with a built-in voltage detector is available in four versions. The differences between these versions are in CE pin, points to be detected, and delay function.

*) R1510S Series are suitable for automotive applications. For details, please refer to our "ELECTRONIC DEVICE PRODUCT CATALOG FOR AUTOMOTIVE" or contact us.

FEATURES

- Supply Current (I_{SS2}) Typ. 110 μ A (Fast mode, $V_{IN}=14.0V$)
- Supply Current (I_{SS1}) Typ. 12.5 μ A (Low power mode, same as above)
- Standby Current ($I_{standby}$) Typ. 10 μ A (Same as above, CE="L", only A Version)
- Dropout Voltage (V_{DIF}) Typ. 1.0V ($I_{OUT}=300mA$, $V_{SET}=5.0V$)
- Input Voltage Range (V_{IN}) 3.5V to 36.0V (Absolute maximum rating: 50.0V)
- Output Voltage Range (V_{OUT}) 2.5V to 12.0V* (Internally fixed)
- Output Voltage Accuracy $\pm 1.6\%$
- Temp. coeff. of Output Voltage Typ. $\pm 150ppm/^{\circ}C$
- Line Regulation Typ. 0.01%/V
- Fold-back Protection Circuit Current limit Typ. 50mA
- Thermal Shutdown Circuit Stops at 140 $^{\circ}C$

- Products for high temperature environment -40 $^{\circ}C$ to 105 $^{\circ}C$
(Operating Temperature Range)

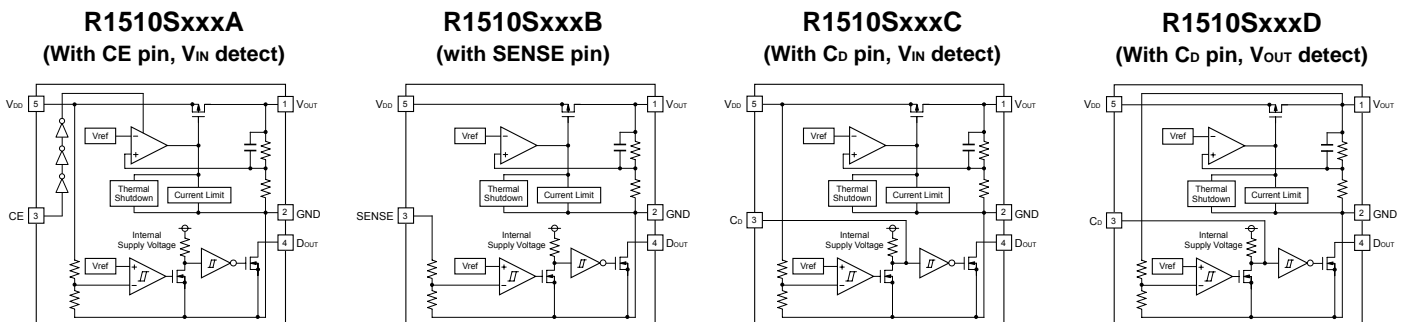
< Voltage Detector >

- Detector Threshold Range ($-V_{DET}$) 2.3V to 12.0V* (Internally fixed)
(D Version : 2.3V to 10.6V)
- Detector Threshold Accuracy $\pm 1.7\%$
- Temp. coeff. of Detector Threshold Typ. $\pm 100ppm/^{\circ}C$
- Output Delay Time Setting Pin (C/D Versions)
- Output Delay Time (t_{delay}) = $7.0 \times C_D (F) \times 10^5 (s)$
- Package HSOP-8E
- Ceramic capacitors can be used. 6.8 μ F or more

(The above shows specification at $T_{opt}=25^{\circ}C$. Design assurance value at $-40^{\circ}C \leq T_{opt} \leq 105^{\circ}C$ is also available. For details, please refer to the datasheet.)

*) For information about combination of output voltage and detector threshold, please check our website.

BLOCK DIAGRAMS



SELECTION GUIDE

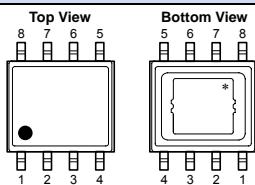
| Halogen Free | Package | Q'ty per Reel | Part No. |
|--------------|---------|---------------|------------------|
| H/F | HSOP-8E | 1,000 pcs | R1510Sxxx*-E2-FE |

xxx : Specify a combination of output voltage and detector threshold using serial numbers.

* : Select from (A) with CE pin and V_{IN} detect, (B) with SENSE pin, (C) with C_D pin and V_{IN} detect, or (D) with C_D pin and V_{OUT} detect.

PACKAGE

HSOP-8E

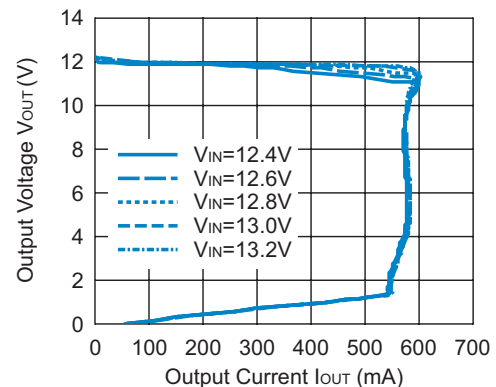


| | | | |
|---|---------------|---|----------------------|
| 1 | V_{OUT} | 5 | CE or SENSE or C_D |
| 2 | NC | 6 | TP (Test pin) |
| 3 | TP (Test pin) | 7 | GND |
| 4 | D_{OUT} | 8 | V_{DD} |

*) The tab is substrate level (GND).

TYPICAL CHARACTERISTIC

R1510S (VR=12.0V) Output Voltage vs. Output Current



APPLICATIONS

- Power source for home appliances (refrigerators, rice cookers, electric water warmers, etc.) and reset circuits
- Power source for laptop personal computers, digital TVs, cordless phones, and private LAN systems for home, and reset circuits
- Power source for copiers, printers, facsimiles, scanners, and reset circuits



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, fire containment 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 is committed to reducing the environmental loading materials in electrical devices with a view to contributing to the protection of human health and the environment.

Ricoh has been providing RoHS compliant products since April 1, 2006 and Halogen-free products since April 1, 2012.

RICOH RICOH ELECTRONIC DEVICES CO., LTD.

<http://www.e-devices.ricoh.co.jp/en/>

Sales & Support Offices

RICOH ELECTRONIC DEVICES CO., LTD.

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 DJ Amstelveen, The Netherlands
Phone: +31-20-5474-309

RICOH ELECTRONIC DEVICES KOREA CO., LTD.

3F, Haesung Bldg. 504, Teheran-ro, Gangnam-gu, Seoul, 135-725, Korea
Phone: +82-2-2135-5700 Fax: +82-2-2051-5713

RICOH ELECTRONIC DEVICES SHANGHAI CO., LTD.

Room 403, No.2 Building, No.690 Bilbo Road, Pu Dong New District, Shanghai 201203,
People's Republic of China
Phone: +86-21-5027-3200 Fax: +86-21-5027-3299

RICOH ELECTRONIC DEVICES CO., LTD.

Taipei office
Room 109, 10F-1, No.51, Hengyang Rd., Taipei City, Taiwan (R.O.C.)
Phone: +886-2-2313-1621/1622 Fax: +886-2-2313-1623