RICOH

RP200x Series

Manual/Automatic Mode Shift Low Voltage 300mA LDO

The RP200x Series are CMOS-based manual/automatic mode shift LDO regulators featuring 300mA output. In auto switching mode, the operation can switch automatically to fast response mode or low power mode of the ECO function according to output current. (Automatic switching to fast response mode under I_{OUT}>8mA conditions or to low power mode under I_{OUT}<1mA conditions.) In low power mode, supply current is as low as 1.5µA. In fast response mode, ripple rejection is 70dB and noise is low. By inputting control signal into the AE pin, the mode of the regulator can be fixed with fast response mode. In addition to SOT-23-5 packages, a 0.69mm square WLCSP-4-P5 package and a 1.2mm square DFN(PLP)1212-6 are also available.

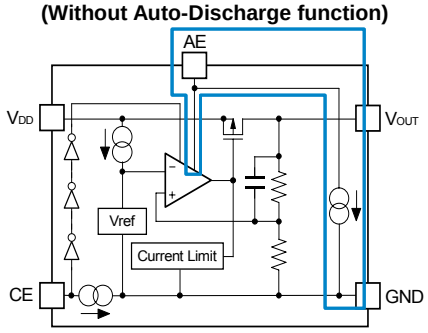
FEATURES

- Supply Current (I_{SS2}) ····· Typ. 55µA (Fast mode, V_{IN}=SET V_{OUT}+1.0V)
- Supply Current (I_{SS1}) ····· Typ. 1.5µA (Low power mode, same as above)
- Standby Current ($I_{standby}$) ····· Typ. 0.1µA (Same as above, CE="L")
- Dropout Voltage (V_{DIF}) ····· Typ. 0.23V (I_{OUT}=300mA, V_{OUT}=2.8V)
- Ripple Rejection (RR) ····· Typ. 70dB (f=1kHz, Fast mode)
- Input Voltage Range (V_{IN}) ····· 1.4V to 5.25V
- Output Voltage Range (V_{OUT}) ····· 0.8V to 4.0V (internally fixed)
- Output Voltage Accuracy ····· ± 1%
- Temp. coeff. of Output Voltage ····· Typ. ± 50ppm/°C
- Line Regulation ····· Typ. 0.02%/V (Fast mode)
- Fold-back Protection Circuit ····· Current limit Typ. 50mA
- Auto-Discharge function ····· D Version
- Packages ····· WLCSP-4-P5, DFN(PLP)1212-6, SOT-23-5
- Ceramic capacitor can be used. ····· 1µF or more

(The above shows specification at Topt=25°C. Design assurance value at -40°C ≤ Topt ≤ 85°C is also available. For details, please refer to the datasheet.)

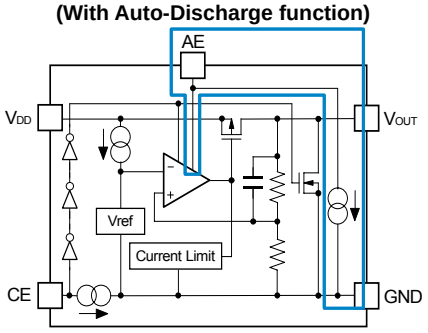
BLOCK DIAGRAMS

RP200xxx1B
(Without Auto-Discharge function)



WLCSP-4-P5 type does not have □.

RP200xxx1D
(With Auto-Discharge function)



WLCSP-4-P5 type does not have □.

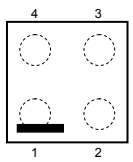
SELECTION GUIDES

Halogen Free	Package	Q'ty per Reel	Part No.
H/F	WLCSP-4-P5	5,000 pcs	RP200Zxx1∗-TR-F
H/F	DFN(PLP)1212-6	5,000 pcs	RP200Kxx1∗-TR
H/F	SOT-23-5	3,000 pcs	RP200Nxx1∗-TR-FE

xx : Specify the output voltage within the range of 0.8V (08) to 4.0V (40) in 0.1V steps
∗ : Select from (B) without auto-discharge function or (D) with auto-discharge function

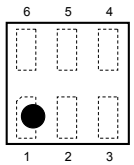
PACKAGES (Top View)

WLCSP-4-P5



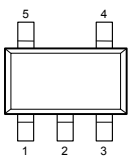
1	VDD
2	CE
3	GND
4	VOUT

DFN(PLP)1212-6



1	AE
2	GND
3	CE
4	VDD
5	NC
6	VOUT

SOT-23-5

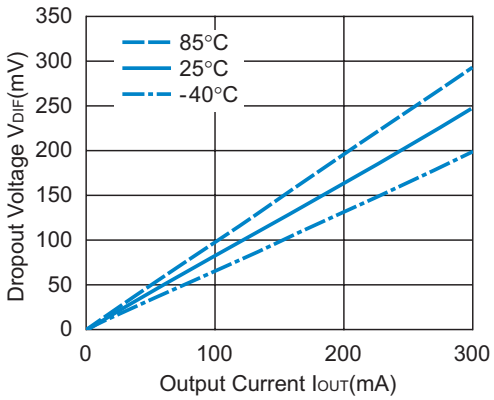


1	VDD
2	GND
3	CE
4	AE
5	VOUT

∗) WLCSP-4-P5 does not have AE pin.

TYPICAL CHARACTERISTIC

RP200x261x Dropout Voltage vs. Output Current



APPLICATIONS

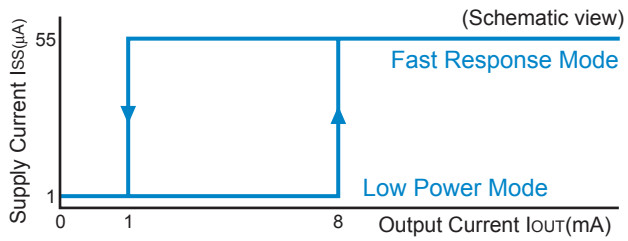
- Power source for hand-held communication equipment, camera and VCRs
- Power source for home appliances and digital home appliances
- Power source for battery-powered equipment

Manual/Automatic Mode Shift Low Voltage 300mA LDO

WHAT IS ECO Function

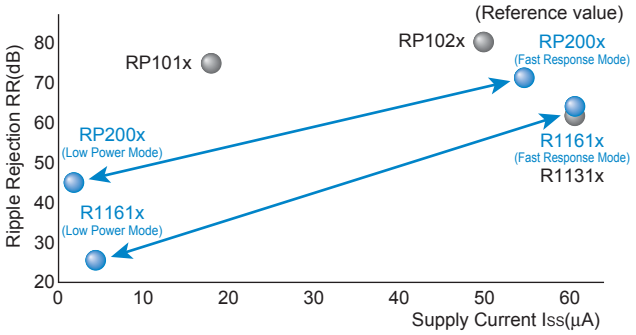
An increasing number of devices such as mobile phones do not have only talk mode (active mode) and off mode status, but also standby mode (sleep mode) etc.
However during the active mode and sleep mode the regulator must satisfy very different requirement. The regulators are required to have fast response and high ripple rejection in the active mode, but consume low supply current in the sleep mode. To satisfy these conflicting requirements, Ricoh's regulators include an ECO function that allows switching between fast mode and low power mode.
There are some types of switching between fast mode and low power mode. As RP200x Series are automatic mode shift types, they can switch the modes automatically depending on system load.
By inputting control signal into the AE pin, the mode of the regulator can be fixed with fast response mode.

Automatic Mode Shift
The regulator automatically switches mode depending on system load.



∗ To select "H" in AE pin is fixed in fast mode.
∗ To select "L" in AE pin is maintained in Automatic Mode Shift.

1μA supply current in low power mode



300mA LDO Regulator Comparison

	RP200x	R1161N	RP101x	RP102x
Input voltage Range	1.4V to 5.25V	1.4V to 6.0V	1.7V to 5.25V	1.7V to 5.25V
Output voltage Range	0.8V to 4.0V	0.8V to 3.3V	1.2V to 3.3V	1.2V to 3.3V
Output Voltage Accuracy	±1%	±2%	**±0.6%**	±0.8%
Output Current	300mA	300mA	300mA	300mA
Supply Current	55μA (Fast mode) **1.5μA** (Low power mode)	60μA (Fast mode) 4.5μA (Low power mode)	18μA	50μA
Standby Current	0.1μA	0.1μA	0.1μA	0.1μA
Ripple Rejection	70dB (Fast mode)	65dB (Fast mode)	75dB	80dB
Output Capacitor	1μF	1μF	1μF	1μF
Dropout Voltage (Typ.)	0.23V (300mA/2.8V)	0.23V (300mA/2.8V)	0.13V (150mA/2.8V)	0.12V (300mA/2.8V)
Line Regulation	0.02%/V	0.01%/V	0.02%/V	0.02%/V
Load regulation	35mV (300mA)	40mV (300mA)	20mV (150mA)	20mV (300mA)
Package	WLCSP-4-P5 DFN(PLP)1212-6 SOT-23-5	SOT-23-5	DFN(PLP)1612-4 DFN(PLP)1612-4B SOT-23-5	WLCSP-4-P2 DFN(PLP)1820-6 SOT-23-5
etc.	Automatic Mode Shift	Manual Mode Shift	No ECO Mode	No ECO Mode

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/

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