

PWM Step-up DC/DC Converter for PMOLED and General Use with shutdown function

The R1200x Series are CMOS-based PWM step-up DC/DC converters, which are optimized to drive passive matrix OLED or white LEDs with constant current. The R1200x includes an under-voltage lockout circuit (UVLO), a soft-start circuit, and an over-voltage protection circuit (OVP). By simply using an inductor, divider resistors, and capacitors as external components, OLEDs and white LEDs can be driven with high efficiency. At the standby mode, the internal NPN transistor can separate the output from the input. (Shutdown function) By this shutdown function, white LED's current can be completely shutdown, and output voltage for OLED can be completely cut off, therefore, the R1200x does not have bad impact on the life expectancy of OLED. The version with auto-discharge function is available.

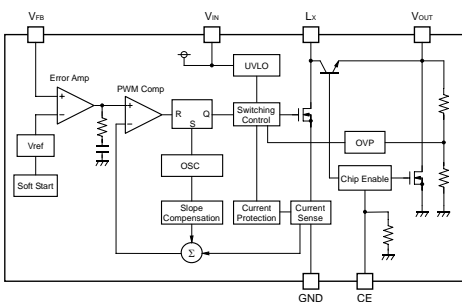
FEATURES

- Supply Current (I_{DD}) Typ. 500 μ A ($V_{IN}=5.5V, V_{FB}=0V, L_x$ at no load)
- Standby Current ($I_{standby}$) Max. 3 μ A ($V_{IN}=5.5V, CE="L"$)
- Input Voltage Range (V_{IN}) 2.3V to 5.5V
(Absolute maximum rating: 6.5V)
- Output Voltage Range (V_{OUT}) Externally adjustable
- Feedback Voltage (V_{FB}) 1.0V
- Feedback Voltage Accuracy $\pm 1.5\%$
- Temp. Coeff. of Feedback Voltage $\pm 150ppm/^{\circ}C$
- Oscillator Frequency (f_{osc}) Typ. 1.2MHz
- Oscillator Maximum Duty Cycle (Maxduty) ... Typ. 91%
- UVLO Detect Voltage (V_{UVLO1}) Typ. 2.0V
- Coil-current Limit Circuit Current limit Typ. 700mA
- Over Voltage Protection Circuit (OVP)
- Soft Start Time (t_{start}) Typ. 1.5ms
- Packages DFN1616-6, DFN(PLP)1820-6, SOT-23-6

BLOCK DIAGRAMS

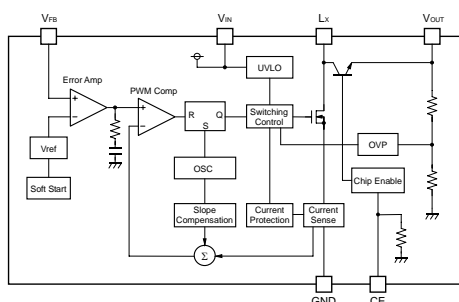
R1200xxxxA

(With Auto-Discharge function)



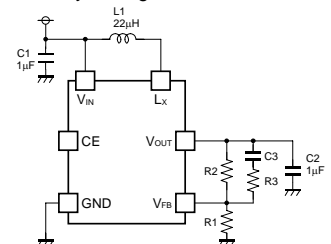
R1200xxxxB

(Without Auto-Discharge function)



TYPICAL APPLICATION

By simply using an inductor, divider resistors and capacitors as external components, a high-efficiency step-up DC/DC converter can be easily configured.



* R1, R2 : For setting Output voltage
R3 : 2k Ω , C3 : 220pF

SELECTION GUIDES

Halogen Free	Package	Q'ty per Reel	Part No.
H/F	DFN1616-6	5,000 pcs	R1200Lxxx\$-TR
H/F	DFN(PLP)1820-6	5,000 pcs	R1200Kxxx\$-TR
H/F	SOT-23-6	3,000 pcs	R1200Nxxx\$-TR-FE

xxx : Specify the OVP voltage.

001: OVP : 17V, 002: OVP : 19V, 003: OVP : 21V

\$: Select from (A) with auto-discharge function or (B) without auto-discharge function

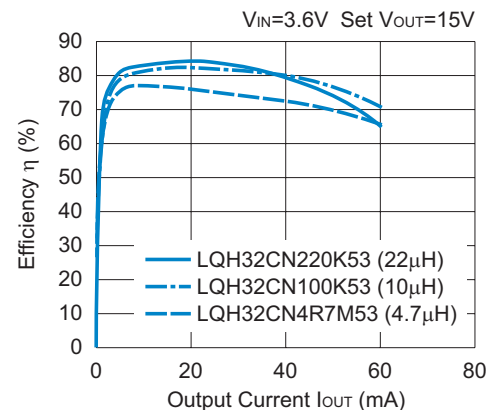
PACKAGES (Top View)

DFN1616-6	DFN(PLP)1820-6	SOT-23-6
1 CE	1 CE	1 CE
2 VFB	2 VFB	2 VOUT
3 Lx	3 Lx	3 VIN
4 GND	4 GND	4 Lx
5 VIN	5 VIN	5 GND
6 VOUT	6 VOUT	6 VFB

*) The tab is substrate level (GND).

TYPICAL CHARACTERISTIC

R1200x Efficiency vs. Output Current



APPLICATIONS

- OLED power supply for hand-held equipment
- White LED driver for hand-held equipment

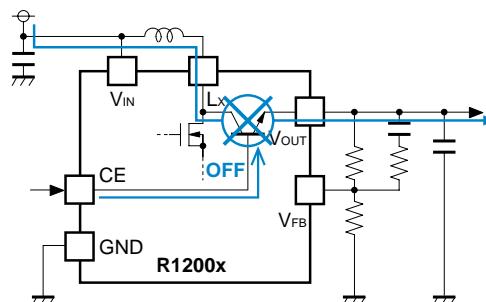
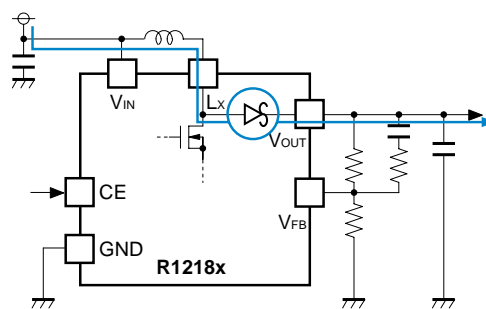
Shutdown Function

Due to the typical step-up DC/DC converter circuit, a voltage may appear at the output of the circuit even if the driver IC is in the standby mode.

A current flows from the battery, through the inductor and diode to the output pins. In case an OLED display is connected, it is powered constantly and it may have an impact to the lifetime of the OLED. In addition, when the input voltage is close to the V_f voltage of a white LED, it is unable to turn these off properly.

The R120xx Series have an internal NPN transistor instead of a diode. In standby mode, the NPN transistor turns off and isolates the current flow from input to output.

The R1213K Series is able to shutdown that controls external P-channel MOSFET by FLAG pin.



For OLED driver Step-up DC/DC Converter Comparison

Product Name	R1200x	R1202xxxxA/B	R1205x8xxA
Control	PWM	PWM	PWM
Input Voltage Range	2.3V to 5.5V	2.3V to 5.5V	2.3V to 5.5V
Output Voltage Range	Ext. adjustable ($V_{FB}=1.0V$)	Ext. adjustable ($V_{FB}=1.0V$)	Ext. adjustable ($V_{FB}=1.0V$)
Feedback Voltage Accuracy	$\pm 1.5\%$	$\pm 1.5\%$	$\pm 1.5\%$
Oscillator Frequency	1.2MHz	1.2MHz	1.2MHz
Output Tr.	Internal	Internal	Internal
Lx Current Limit Protection	700mA	350mA, 700mA	350mA, 700mA
UVLO Detector Threshold	2.0V	2.0V	2.0V
Soft-start Time	✓	✓	✓
OVP Detector Threshold	17V, 19V, 21V	14V, 17V, 19V, 21V, 23V	25V
Package	DFN1616-6, DFN (PLP) 1820-6, SOT-23-6	DFN1616-6B TSOT-23-6	DFN1616-6B TSOT-23-6
Others	Shutdown function	Shutdown function Thermal shutdown circuit	Thermal shutdown circuit

Ricoh Co.,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.



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.

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