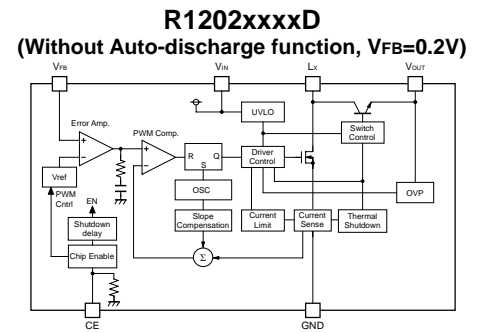
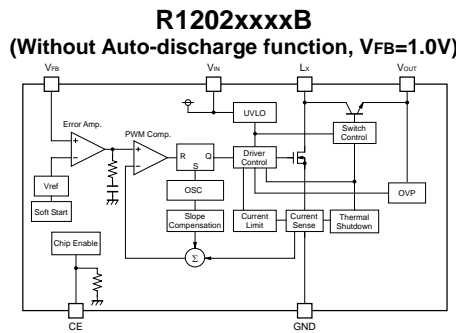
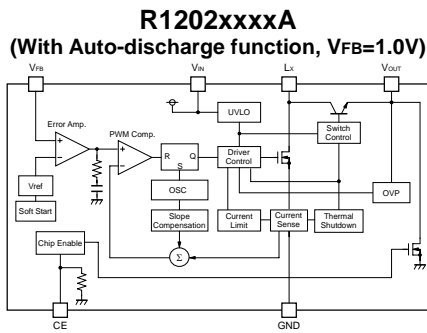


The R1202x Series are CMOS-based PWM step-up DC/DC converters, which are optimized to drive white LEDs and PMOLED with constant current. There are two types. The A/B versions are optimized for the general use or the drive of PMOLED, and the D version is optimized for the serial drive of white LED with constant current. The R1202x includes an under-voltage lockout circuit (UVLO), a soft-start circuit, and an over-voltage protection circuit (OVP), a thermal shutdown circuit. By simply using an inductor, divider resistors, and capacitors as external components, PMOLED 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) The A/B version with auto-discharge function is selectable. D Version can set the LED current with feedback resistor (R1). The brightness of the LEDs and the soft-start time can be adjusted by applying a PWM signal (200Hz to 300kHz) to the CE pin. In addition to DFN1616-6B, 0.95mm thickness TSOT-23-6 is available.

### FEATURES

- Supply Current ( $I_{DD}$ ) ..... Typ. 800 $\mu$ A (No switching)
- Standby Current ( $I_{standby}$ ) ..... Typ. 1 $\mu$ A (CE="L")
- Input Voltage Range ( $V_{IN}$ ) ..... 2.3V to 5.5V  
(A/B Version, Absolute maximum rating: 6.5V)  
1.8V to 5.5V  
(D Version, Absolute maximum rating: 6.5V)
- Feedback Voltage ( $V_{FB}$ ) ..... 1.0V (A/B Version)  
0.2V (D Version)
- Feedback Voltage Accuracy .....  $\pm 15$ mV (A/B Version)  
 $\pm 10$ mV (D Version)
- Oscillator Frequency ( $f_{osc}$ ) ..... 1.2MHz
- Oscillator Maximum Duty Cycle (Maxduty) ..... Min. 86%, Typ. 91%
- UVLO Detect Voltage ( $V_{UVLO}$ ) ..... Typ. 2.0V (A/B Version)  
Typ. 1.6V (D Version)
- Coil-current Limit Circuit ..... Current Limit Typ. 350mA  
/ Typ. 700mA selectable
- Over Voltage Protection Circuit (OVP)
- Soft Start Time ( $t_{start}$ ) ..... Typ. 2ms (A/B Version)  
Controllable by PWM signal to the CE pin (D Version)
- Thermal Shutdown Circuit ..... Stops at 150°C
- Auto-discharge Function ..... A Version
- Shutdown Function
- LED High-speed Dimming Control ..... D Version
- Packages ..... DFN1616-6B, TSOT-23-6

### BLOCK DIAGRAMS



### SELECTION GUIDES

Halogen Free	Package	Q'ty per Reel	Part No.
H/F	DFN1616-6B	5,000 pcs	R1202Lx\$1*-TR R1202Ly\$1#-TR
H/F	TSOT-23-6	3,000 pcs	R1202Nx\$3*-TR-FE R1202Ny\$3#-TR-FE

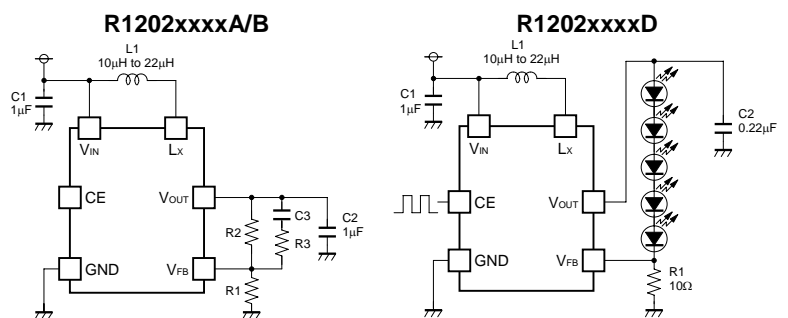
- x: Specify the OVP voltage.  
(3) 14V, (4) 17V, (5) 19V, (6) 21V, (7) 23V
- y: Specify the OVP voltage.  
(3) 14V, (7) 23V
- \$: Specify the Coil Current limit.  
(1) Typ. 350mA, (2) Typ. 700mA
- \*: (A) with auto-discharge function,  $V_{FB}=1.0V$ .  
(B) without auto-discharge function,  $V_{FB}=1.0V$ .
- #: (D) without auto-discharge function,  $V_{FB}=0.2V$ .

### PACKAGES (Top View)

DFN1616-6B			TSOT-23-6				
1	CE	4	GND	1	CE	4	Lx
2	V <sub>FB</sub>	5	V <sub>IN</sub>	2	V <sub>OUT</sub>	5	GND
3	Lx	6	V <sub>OUT</sub>	3	V <sub>IN</sub>	6	V <sub>FB</sub>

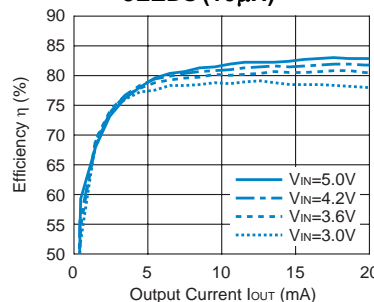
\* The tab is substrate level (GND).

### TYPICAL APPLICATIONS

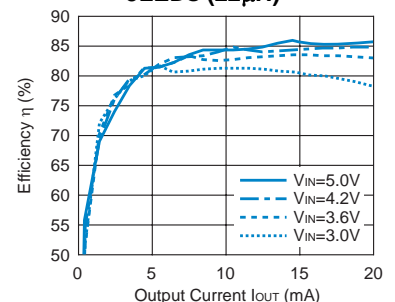


### TYPICAL CHARACTERISTICS

**R1202N713D Efficiency vs. Output Current 5LEDs (10 $\mu$ H)**



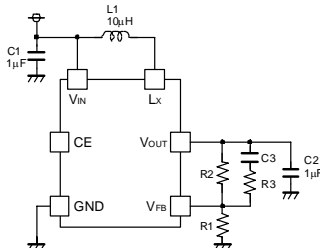
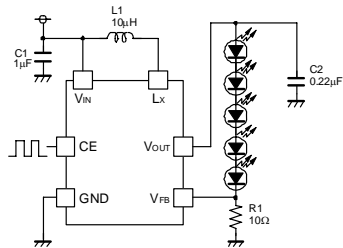
**5LEDs (22 $\mu$ H)**



### APPLICATIONS

- PMOLED power supply for hand-held equipment
- White LED backlight for hand-held equipment

#### R1202x Version Lineup

Product Name	R1202xxxxA/B	R1202xxxxD
Application	PMOLED, General Use	White LED (Serial drive)
V <sub>FB</sub> Voltage	1.0V	0.2V
Input Voltage Range	2.3V to 5.5V	1.8V to 5.5V
OVP Voltage	Select from 14V, 17V, 19V, 21V, 23V	Select from 14V, 23V
Function	Thermal Shutdown Circuit Shutdown Function Auto-Discharge Function	Thermal Shutdown Circuit Shutdown Function
Output Capacitor	1μF to 4.7μF	0.22μF to 1μF
Comment	<p><b>The Method of Output Voltage Setting</b></p> <p>Output Voltage= (R1+ R2) / R1</p>  <p>The total value of R1 and R2 should be equal or less than 300kΩ. Voltage rating of capacitor (C2) is recommended to use 1.5 times or more the output setting voltage.</p> <p><b>Soft-Start Time</b> The soft start time is set to Typ. 2ms within the IC.</p>	<p><b>LED Current setting</b> When CE pin input is "H" (Duty=100%), LED current can be set with feedback resistor (R1).</p> $I_{LED} = 0.2 / R1$  <p><b>LED Dimming Control</b> The LED brightness can be controlled by inputting the PWM signal to the CE pin. The current of LEDs when High-Duty of the CE input is "Hduty" reaches the value as in next formula.</p> $I_{LED} = Hduty \times V_{FB} / R1$ <p>The frequency of the PWM signal is using the range between 200Hz to 300kHz. When controlling the LED brightness by the PWM signal of 20kHz or less, the increasing or decreasing of the inductor current might be make a sounds in the hearable sound wave area. In that case, please use the PWM signal in the high frequency area.</p>

In case of 6 lights or more, we recommends the R1205x Series and R1218x Series\*.

More than 5 lights of R1218x Series requires an external diode and OVP Voltage is set up to 31.5V. (Maximum rating of V<sub>OUT</sub> pin is 34V)

\*) For detail, please check our website.



**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.

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