

The R1224N Series are low supply current CMOS-based PWM/VFM step-down DC/DC controller with an external output transistor. By simply using a power transistor, an inductor, a diode, and a capacitor as external components, a high-efficiency step-down DC/DC converter can be easily configured. The PWM/VFM alternative circuit automatically switches to VFM control in the smaller output current range and provides high efficiency even in the smaller output current range. The version with fixed PWM control and adjustable output voltage with an external resistor is also available. The reset type protection circuit embedded into the device limits output current by repeatedly triggering the soft start circuit when the oscillator maximum duty cycle continues for a predetermined period of time. When the oscillator maximum duty cycle ends, normal operation is resumed automatically. R1224N also includes an under-voltage lockout circuit (UVLO) that stops DC/DC operation and prevents malfunction when the supply voltage falls below the UVLO detect voltage and reduces supply current.

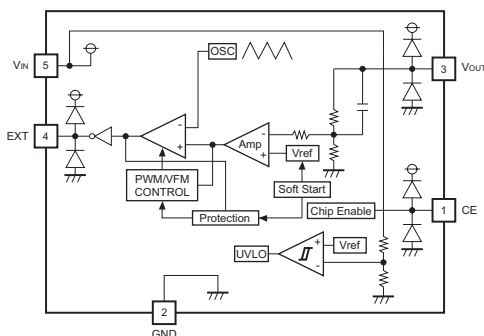
FEATURES

- Supply Current (I_{DD1}) Typ. 20 μ A (E, F, L, M Versions),
Typ. 30 μ A (G Version),
Typ. 40 μ A (H Version) (No switching)
- Standby Current ($I_{standby}$) Max. 0.5 μ A (CE="L")
- Input Voltage Range (V_{IN}) 2.3V to 18.5V
- Output Voltage Range (V_{OUT}) 1.2V to 6.0V (Internally fixed)
Externally adjustable (Feedback voltage : 1.0V)
- Output Voltage Accuracy $\pm 2\%$
- Oscillator Frequency (f_{osc}) 180kHz, 300kHz, 500kHz
- Oscillator Maximum Duty Cycle (Maxduty) ... Min. 100%
- UVLO Detect Voltage (V_{UVLO}) Typ. 2.0V
- Soft Start Time (t_{start}) Typ. 10ms
- Reset Protection Circuit Delay time for protection Typ. 15ms
- Package SOT-23-5

BLOCK DIAGRAMS

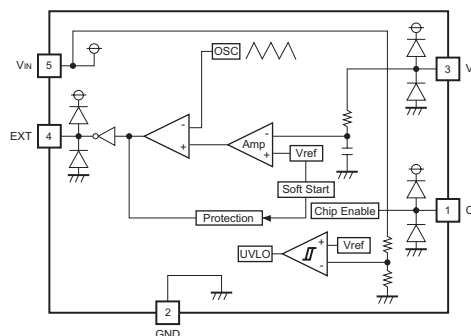
R1224Nxx2E/F/G/H/L/M

(Internally fixed output voltage type)



R1224N102G/H/M

(Externally adjustable output voltage type)



SELECTION GUIDE

Halogen Free	Package	Q'ty per Reel	Part No.
H/F	SOT-23-5	3,000 pcs	R1224Nxx2*-TR-FE

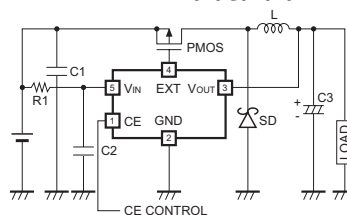
xx : Specify the output voltage within the range of 1.2V (12) to 6.0V (60) in 0.1V steps.
(For externally adjustable output voltage type, feedback voltage of 1.0V(10))

***** : Specify the oscillator frequency, modulation method, output voltage setting method.

- E** : 300kHz, PWM/VFM, internally fixed
- F** : 500kHz, PWM/VFM, internally fixed
- G** : 300kHz, fixed PWM, internally fixed/externally adjustable
- H** : 500kHz, fixed PWM, internally fixed/externally adjustable
- L** : 180kHz, PWM/VFM, internally fixed
- M** : 180kHz, fixed PWM, internally fixed/externally adjustable

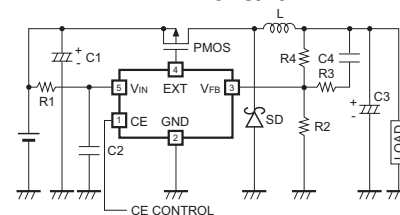
TYPICAL APPLICATIONS

R1224Nxx2E/F/G/H/L/M



PMOS : HAT1044M, L : 27 μ H,
SD : RB063L-30, C1 : 10 μ F, C2 : 0.1 μ F,
C3 : 47 μ F, R1 : 10 Ω

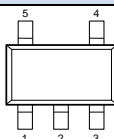
R1224N102G/H/M



PMOS : HAT1044M, L : 27 μ H,
SD : RB063L-30, C1 : 10 μ F, C2 : 0.1 μ F,
C3 : 47 μ F, C4 : 1000pF, R1 : 10 Ω , R3 : 2.7k Ω ,
Output voltage at 2.5V--R2 : 22k Ω , R4 : 33k Ω

PACKAGE (Top View)

SOT-23-5



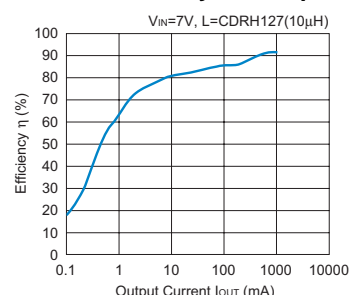
1	CE
2	GND
3	V _{OUT} or V _{FB}
4	EXT
5	V _{IN}

APPLICATIONS

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

TYPICAL CHARACTERISTIC

R1224N332E Efficiency vs. Output Current





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For the conservation of the global environment, Ricoh is advancing the decrease of the negative environmental impact material.
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.
Basically after Apr. 1, 2012, we will ship out the Power Management ICs of the Halogen Free products only. (RicoH Halogen Free products are also Antimony Free.)

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