3A, 23V, 340kHz Synchronous Step-Down Converter

General Description

The RT8293A is a high efficiency, monolithic synchronous step-down DC/DC converter that can deliver up to 3A output current from a 4.5V to 23V input supply. The RT8293A's current mode architecture and external compensation allow the transient response to be optimized over a wide range of loads and output capacitors. Cycle-by-cycle current limit provides protection against shorted outputs and soft-start eliminates input current surge during start-up. The RT8293A also provides output under voltage protection and thermal shutdown protection. The low current (<3μA) shutdown mode provides output disconnection, enabling easy power management in battery-powered systems. The RT8293A is available in an SOP-8 (Exposed Pad) package.

Ordering Information

RT8293A □□□

- Package Type
  SP : SOP-8 (Exposed Pad-Option 1)
- Lead Plating System
  G : Green (Halogen Free and Pb Free)
  Z : ECO (Ecological Element with Halogen Free and Pb free)
- H : UVP Hiccup
  L : UVP Latch-Off

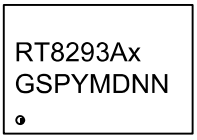
Note :

Richtek products are :

- RoHS compliant and compatible with the current requirements of IPC/JEDEC J-STD-020.
- Suitable for use in SnPb or Pb-free soldering processes.

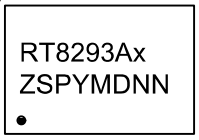
Marking Information

RT8293AxGSP



RT8293AxGSP : Product Number
x : H or L
YMDNN : Date Code

RT8293AxZSP



RT8293AxZSP : Product Number
x : H or L
YMDNN : Date Code

Features

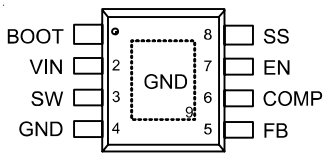
- **±1.5% High Accuracy Feedback Voltage**
- **4.5V to 23V Input Voltage Range**
- **3A Output Current**
- **Integrated N-MOSFET Switches**
- **Current Mode Control**
- **Fixed Frequency Operation : 340kHz**
- **Output Adjustable from 0.8V to 20V**
- **Up to 95% Efficiency**
- **Programmable Soft-Start**
- **Stable with Low-ESR Ceramic Output Capacitors**
- **Cycle-by-Cycle Over Current Protection**
- **Input Under Voltage Lockout**
- **Output Under Voltage Protection**
- **Thermal Shutdown Protection**
- **RoHS Compliant and Halogen Free**

Applications

- Wireless AP/Router
- Set-Top-Box
- Industrial and Commercial Low Power Systems
- LCD Monitors and TVs
- Green Electronics/Appliances
- Point of Load Regulation of High-Performance DSPs

Pin Configurations

(TOP VIEW)



SOP-8 (Exposed Pad)

Typical Application Circuit

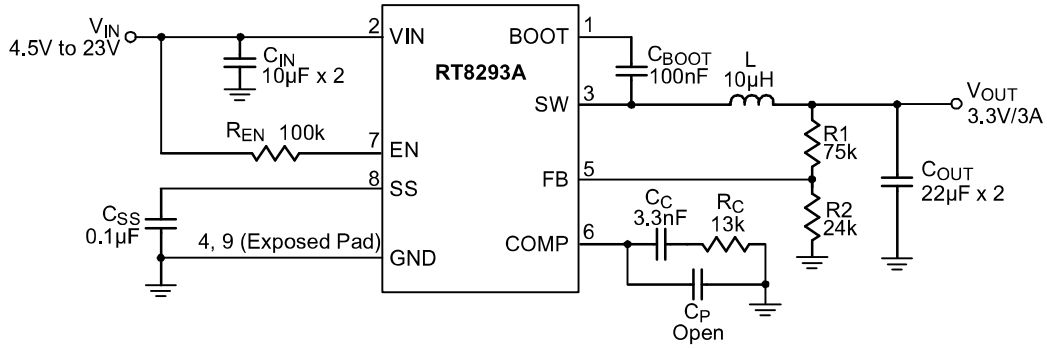


Table 1. Recommended Component Selection

V_{OUT} (V)	R1 (kΩ)	R2 (kΩ)	R_C (kΩ)	C_C (nF)	L (µH)	C_{OUT} (µF)
8	27	3	33	3.3	22	22 x 2
5	62	11.8	20	3.3	15	22 x 2
3.3	75	24	13	3.3	10	22 x 2
2.5	25.5	12	9.1	3.3	6.8	22 x 2
1.5	10.5	12	5.6	3.3	3.6	22 x 2
1.2	12	24	4.3	3.3	3.6	22 x 2
1	3	12	3.6	3.3	2	22 x 2

Functional Pin Description

Pin No.	Pin Name	Pin Function
1	BOOT	Bootstrap for high side gate driver. Connect a 0.1µF or greater ceramic capacitor from BOOT to SW pins.
2	VIN	Input Supply Voltage, 4.5V to 23V. Must bypass with a suitably large ceramic capacitor.
3	SW	Phase Node. Connect to external L-C filter.
4, 9 (Exposed Pad)	GND	Ground. The exposed pad must be soldered to a large PCB and connected to GND for maximum power dissipation.
5	FB	Feedback Input pin. This pin is connected to the converter output. It is used to set the output of the converter to regulate to the desired value via an internal resistive voltage divider. For an adjustable output, an external resistive voltage divider is connected to this pin.
6	COMP	Compensation Node. COMP is used to compensate the regulation control loop. Connect a series RC network from COMP to GND. In some cases, an additional capacitor from COMP to GND is required.
7	EN	Enable Input Pin. A logic high enables the converter; a logic low forces the RT8293A into shutdown mode reducing the supply current to less than 3µA. Attach this pin to VIN with a 100kΩ pull up resistor for automatic startup.
8	SS	Soft-Start Control Input. SS controls the soft-start period. Connect a capacitor from SS to GND to set the soft-start period. A 0.1µF capacitor sets the soft-start period to 13.5ms.

Function Block Diagram