

# LTC4219

## 5A Integrated Hot Swap Controller

### DESCRIPTION

Demonstration circuit DC1594A is a +5V or +12V rail with hot swap functionality featuring the LTC4219 - 5A Integrated Hot Swap Controller. As a Controller has two dedicated voltage versions- for 5.0V and 12V operation- the DC1594 also has similar variation-DC1594A-A (5.0V) and DC1594A-B ((12V). The DC1594A allows evaluating performance of the LTC4219 in the transient conditions, such as turning on and off the power rail, in the steady state conditions with different load and in the fault conditions, when Controller interrupts its functions from over-current, nonproprietary voltage level, or thermal condition.

The LTC4219 features 5% accuracy in 5.4A current limit and has a current limiting foldback characteristic. Current limit can be reduced by placing the external resistor be-

tween Iset and GND pins, and it can be adjusted dynamically during transient.

The Controller monitors a load current generating ground reference signal proportional to the sense resistor voltage. Thermal limit and power good signaling increase Controller reliability and options in application.

**Design files for this circuit board are available. Call the LTC factory.**

LT, LTC, LTM, LT, Burst Mode, OPTI-LOOP, Over-The-Top and PolyPhase are registered trademarks of Linear Technology Corporation. Adaptive Power, C-Load, DirectSense, Easy Drive, FilterCAD, Hot Swap, LinearView, µModule, Micropower SwitcherCAD, Multimode Dimming, No Latency ΔΣ, No Latency Delta-Sigma, No RSENSE, Operational Filter, PanelProtect, PowerPath, PowerSOT, SmartStart, SoftSpan, Stage Shedding, SwitcherCAD, ThinSOT, UltraFast and VLDO are trademarks of Linear Technology Corporation. Other product names may be trademarks of the companies that manufacture the products.

### PERFORMANCE SUMMARY Specifications are at TA = 25°C

| SYMBOL                    | PARAMETER                           | CONDITIONS                                       | MIN  | TYP   | MAX  | UNITS          |
|---------------------------|-------------------------------------|--|------|-------|------|----------------|
| V <sub>DD</sub>           | Input Supply Range                  |  | 2.9  |       | 15   | V              |
| V <sub>DD(UVL)</sub>      | Input Supply Undervoltage Lockout   | V <sub>DD</sub> Rising                           | 2.65 | 2.73  | 2.85 | V              |
| V <sub>OUT(PGTH)</sub>    | Output Power Good Threshold         | LTC4219-12 Only V <sub>OUT</sub> Rising          | 10.2 | 10.5  | 10.8 | V <sub>O</sub> |
|                           |                                     | LTC4219-5 Only V <sub>OUT</sub> Rising           | 4.2  | 4.35  | 4.5  | V              |
| V <sub>OUT(PGHYST)</sub>  | Output Power Good Hysteresis        | LTC4219-12 Only                                  | 127  | 170   | 213  | mV             |
|                           |                                     | LTC4219-5 Only                                   | 53   | 71    | 89   | mV             |
| ΔV <sub>GATE</sub> /Δt    | GATE Pin Turn-On Ramp Rate          |  | 0.15 | 0.3   | 0.55 | µA             |
| R <sub>ON</sub>           | MOSFET+Sense Resistor ON Resistance |  | 15   | 33    | 50   | mΩ             |
| I <sub>LIM(TH)</sub>      | Current Limit Threshold             | V <sub>FB</sub> = 1.23V                          | 5.0  | 5.4   | 5.8  | A              |
|                           |                                     | V <sub>FB</sub> = 0V                             | 1.0  | 1.4   | 1.9  | A              |
|                           |                                     | V <sub>FB</sub> = 1.23V, R <sub>SET</sub> = 20kΩ | 2.3  | 2.7   | 3.2  | A              |
| V <sub>TIMER(H)</sub>     | TIMER Pin High Threshold            | V <sub>TIMER</sub> Rising                        | 1.2  | 1.235 | 1.28 | V              |
| V <sub>TIMER(L)</sub>     | TIMER Pin Low Threshold             | V <sub>TIMER</sub> Falling                       | 0.1  | 0.21  | 0.3  | V              |
| I <sub>TIMER(UP)</sub>    | TIMER Pin Pull-Up Current           | V <sub>TIMER</sub> =0                            | 80   | 100   | 120  | µA             |
| I <sub>TIMER(DN)</sub>    | TIMER Pin Pull-Down Current         | V <sub>TIMER</sub> =1.2V                         | 1.4  | 2     | 2.6  | µA             |
| I <sub>TIMER(RATIO)</sub> | TIMER Pin Current Ratio             | I <sub>TIMER(DN)</sub> / I <sub>TIMER(UP)</sub>  | 1.6  | 2     | 2.7  | %              |

## OPERATING PRINCIPLES

The LTC4219A-12 and LTC4219A-5 are suited accordingly for 12V and 5V power control in applications for hot board insertion or removal with electronic circuit breaker function, foldback current limiting, load current monitoring, power good and fault signaling. The LTC4219A has a rich set of features to support hot swap applications including:

- 5% Accurate Current Limit for 5.4A,,
- Adjustable Current Limit for lower than 5.4A,
- Adjustable Inrush Current Control,
- Load Current Monitoring,
- Adjustable duration for Current Limit before switch is turned off,
- Power good and Fault signaling.

---

## QUICK START PROCEDURE

The Demo Board DC1594A includes the LTC4219-12 or LTC4219-5 5A Integrated Hot Swap Controller, four LEDs to indicate input and output voltages (D2, D4), and the state of the fault (D3) and Power Good (D5) pins, three jumpers, and a few associated components.

Demonstration circuit DC1594A is easy to set up to evaluate the performance of the LTC4219. Refer to **Error! Reference source not found.** for proper measurement equipment setup and follow the procedure below:

The performance evaluation for LTC4219-12 and LTC4219-5 is identical. The difference is in a value of the loading components and power supply voltage.

1. Place jumpers in the following positions:

**JP1** CT      OFF,  
**JP2**  $\overline{\text{EN1}}$       DISABLE,  
**JP3**  $\overline{\text{EN2}}$       ENABLE.

2. With power off, connect the power supply terminals to the VDD (E1) and GND (E3) turrets.
3. In all evaluations steps the Demo Board is connected to the appropriate power supply (+12V or +5.0V), Controller is turned on by replacing the jumper head JP2 position from the DISABLE to the ENABLE, and a resetting Controller is achieved by first placing the jumper head JP2 on the DISABLE position and then on the ENABLE.
4. Place a scope probe to the output turret, turn on the Controller, and measure a power-up time with no

load. For LTC4219-12 this time must be in the range (22.0-80.0) ms, and for LTC4219-5 - (9.0-34) ms.

5. Connect a Low Capacitive Load (5600uf for both Controllers-LTC4219-12 and LTC4219-5) to the output of hot swap circuitry (OUT turret). Turn on the controller. This power up should be successful and two LEDs (OUT –green- and PG -orange) lights must indicate this.
6. Connect a High Reset Capacitive Load (6800uf for both Controllers-LTC4219-12 and LTC4219-5) to the output of hot swap circuitry. Turn on a controller. This power up should be unsuccessful, and no light of the two LEDs, - OUT and PG,- and the light of the FLT LED (red) confirms this. Reset controller after a fault.
7. Load the output with a Low Resistive Load (2.5 Ohms for LTC4219-12 and 1.1 Ohms for LTC4219-5) and turn the controller on. Controller should successfully keep this load. Verify performance of the current monitoring.
8. Load the output with a High Resistive Load (2.0 Ohms for LTC4219-12 and 0.8 Ohms for LTC4219-5) and turn the controller on. Controller should fail to keep this load. Reset Controller after a fault.
9. Pay special attention to the MOSFET Safe operating Area, when TIMER period is changed.

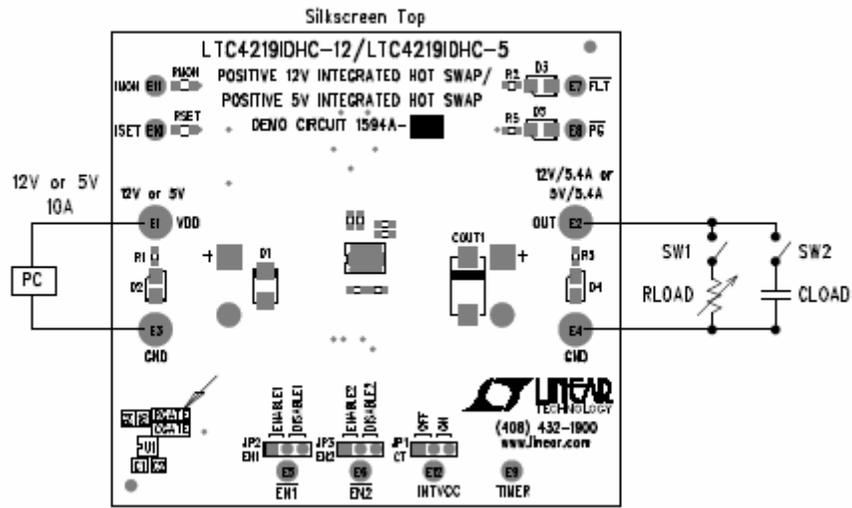


Figure 1. Proper Equipment Measurement Set-Up



Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)