LTC4218CGN / LTC4218CDHC-12
2.9V to 26.5V POSITIVE HOT SWAP CONTROLLER

DESCRIPTION

Demonstration circuit board DC1052 includes two separate circuits for performance evaluation of the LTC4218 Hot Swap Controller. The standard version of the Controller (LTC4218) is intended to operate with 2.9V to 26.5V rails, while the LTC4218-12 has present threshold for 12V applications.

The circuit of DC1052A is assembled with the LTC4218CGN and LTC4218CDHC-12. Circuit breaker thresholds in both circuits are adjusted to 7.5A.

The LTC4218 features accurate current limiting with foldback and a ground-referred current monitor. The current monitor sources a current that is proportional to the sense voltage and it may be converted to a voltage signal with the appropriate resistor.

Current limit may be reduced by placing the external resistor between GND and the Iset pin.

The DC1052 design lets the LTC4218 operate through turn-on and turn-off transients as well as in the steady state mode.

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

PERFORMANCE SUMMARY

Specifications are at TA = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{DD}	Input Supply Range		2.9		25.5	V
$V_{DD(UVL)}$	Input Supply Undervoltage Lockout	V_{DD} Rising	2.65	2.73	2.85	V
$\Delta V_{SNS(TH)}$	Current Limit Sense Voltage Threshold (V_{SENSE+}-V_{SENSE-})	V_{FB} = 1.23V	14.25	15	15.7	mV
		V_{FB} = 0V	2.8	3.75	7.7	mV
		V_{FB} = 1.23, R_{SET} =20k	6.7	7.5	8.32	mV
$V_{(TH)}$	OV, UV, FB Pin Threshold Voltage	V_{IN} Rising	1.21	1.235	1.26	V
V_{GATE}	External N-Channel Gate Drive (V_{GATE}-V_{SOURSE})	V_{DD} = 2.9V, to 26.5V, I_{GATE}=0,. -1µA	5	6.15	6.5	V
$I_{GATE(UP)}$	External N-Channel Gate Pull-Up Current	Gate Drive On, (V_{GATE}=V_{SOURSE}= 12V	19	24	29	µA
$I_{GATE(FST)}$	External N-Channel Gate Pull-Up Fast PulldownCurrent	Fast Turn Off, V_{GATET}=18V , V_{SOURSE}=12V	120	170	220	
$I_{GATE(DN)}$	External N-Channel Gate Pulldown Current	V_{IN} = 3.6V, 80µA < I_{LOAD} < 1A	200	250	340	µA
R_{ISET}	I_{SET} Pin Output Resistor		19.5	20	20.5	kΩ
$I_{MON(FS)}$	I_{MON} Fullscale Output Current	V_{SENSE+}-V_{SENSE} =15mV	94	100	106	µA

OPERATING PRINCIPLES

The LTC4218 is suited for low voltage power control in applications for hot board insertion or removal with electronic circuit breaker function, foldback current limit and load current monitoring. The LTC4218 has a rich set of features to support hot swap applications including:

- 2% accurate Undervoltage Overvoltage Protection
- Adjustable 5% Accurate (15mV) Current Limit
- Adjustable Inrush Current Control
- Load Current Monitoring
- Adjustable Current Limit Timer before Fault
- Powergood and Fault Signaling

QUICK START PROCEDURE

Demonstration circuit 1052 is easy to set up to evaluate the performance of the LTC4218CGN and LTC4218CDHC-12. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below.

For the 24V board:

1. Place jumpers in the following positions:

JP1	FAULT	Signal
JP2	AUX_UV	ON

2. With power off, connect the 24V power supply terminals to the 24VIN (E1) and GND (E4) turrets.

3. Turn on the 24V supply and verify output voltage at the VOUT (E2) and GND (E3) turrets. Green LEDs 24VIN (D2), PG (D6), and VOUT (D4) light.

4. Check the current limit by providing an electronic or resistive load. It should be in the range of 7.3-8.0A. During this measurement verify current monitor performance. Monitor signal related to the current limit level should be (2.0±0.17) V.

5. Using an oscilloscope, check the output slew rate with no load applied. It should be in the range of 980 to 1380 V/s. Add an 8000uF capacitive load to the output. This will cause the current limit timer to expire before the output reaches 24V, and the red FAULT LED (D5) should light.

For the 12V board:

6. Place jumpers in the following positions:

JP3	FAULT	Signal
JP4	AUX_UV	ON

7. With power off, connect the 12V power supply terminals to the 12VIN (E9) and GND (E10) turrets.

8. Turn on the 12V supply and verify output voltage at the VOUT (E10) and GND (E11) turrets. Green LEDs 12VIN (D9), PG (D13), and VOUT (D11) light.

9. Check the current limit providing an electronic or resistive load. It should be in the range of 7.3-8.0A. During this measurement verify current monitor performance. Monitor signal related to the current limit level should be (2.0±0.17) V.

10. Using an oscilloscope, check the output slew rate with no load applied. It should be in the

range of 980 to 1380 V/s. Add an 8000uF capacitive load to the output. This will cause the current limit timer to expire before the output reaches 12V, and the red FAULT LED (D12) should light.

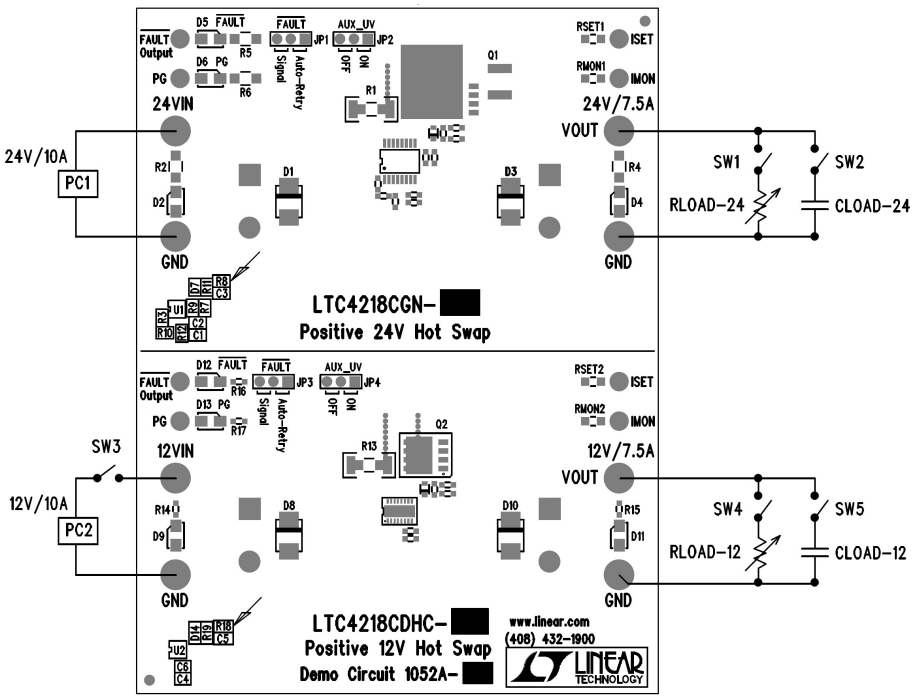


Figure 1. Proper Measurement Equipment Setup

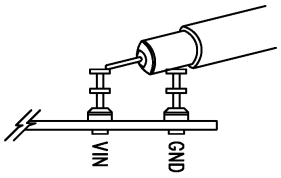
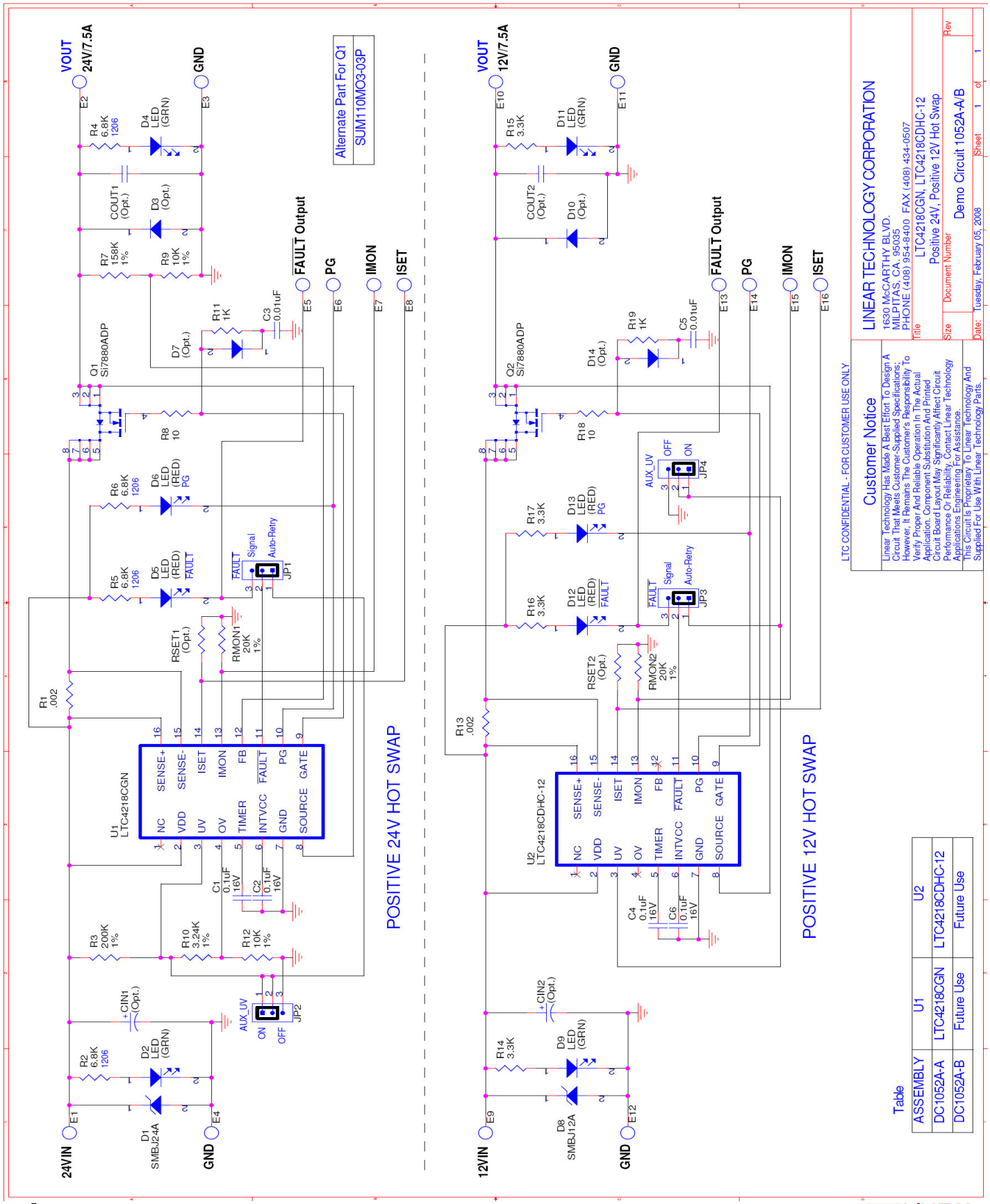


Figure 2. Measuring Input or Output Ripple



Table

ASSEMBLY	U1	U2
DC1052A-A	LTC4218CGN	LTC4218CDHC-12
DC1052A-B	Future Use	Future Use