

User Guide
LX8204 12 V E-Fuse Evaluation Board



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1 **Revision History**

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 **Revision 1.0**

Revision 1.0 was published in August 2017. It was the first publication of this document.

2 Product Description

The LX8204 is a fast-acting E-Fuse switch designed to protect circuitry connected to its output (VOUT) from transient input voltage surges on its input (VCC), and to protect VCC from overload current events coming from the load on VOUT.

Voltage protection features include under-voltage lockout (UVLO), and over-voltage clamping. This clamp limits VOUT voltage allowing continued circuit operation during an input over-voltage transient condition, while UVLO ensures that VOUT remains off until VCC reaches its minimum operating threshold. On the current side, the LX8204 protects the input from output short circuit and/or over-current condition with a 2 A–3.5 A current limit circuit. Additionally, the LX8204 protects the subsequent systems from hot-swap condition.

Another protection feature is latching thermal shutdown of VOUT, with a fault flag output on the combined EN/FAULT pin. Once thermal shutdown threshold is reached and the E-Fuse switch opens, the tri-state EN/FAULT pin will be pulled to about 1.6 V, signaling to the system and potentially other connected E-Fuse switches that a fault has occurred.

2.1 Applications

- Hard-disk drive
- Solid-state drive
- Hot swap
- PC cards

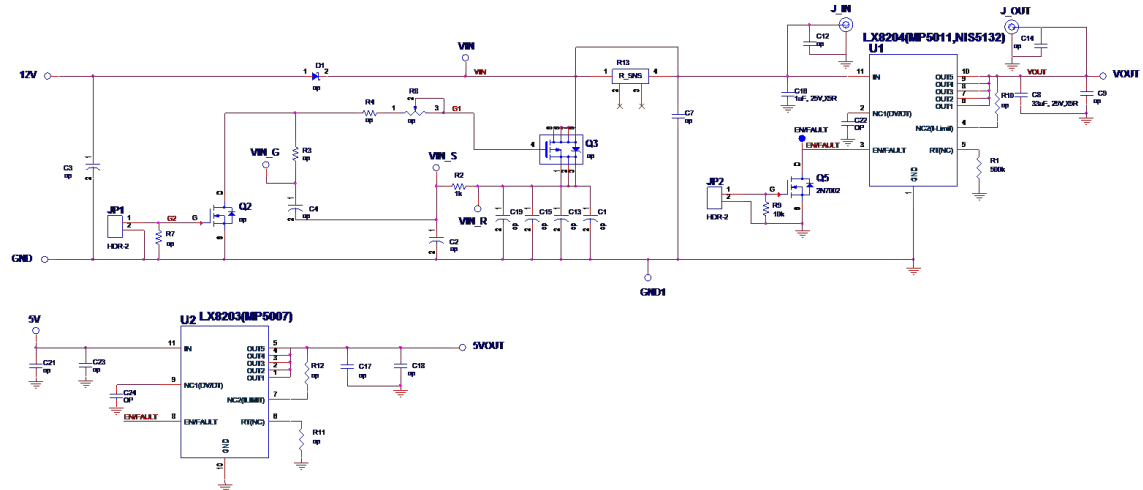
2.2 Key Features

- Protected from hot-swap condition
- 50 mΩ(typical) RDS(on) internal E-Fuse FET protected from 24 V
- Up to 24 V transient input range
- <15 V output voltage clamp including dynamic transient
- Continuous operation during VCC surge
- 2 A–3.5 A current limit at overloading
- Over-temperature protection
- 13 ms and 1.4 ms/3.5 ms soft start rise time
- Current limit during output soft start
- UVLO detection
- 3 mm × 3 mm DFN available

3 Evaluation Board Schematic

The following illustration shows the evaluation board schematic.

Figure 1 • Evaluation Board Schematic



4 Recommended Operating Conditions

The following table lists the recommended operating conditions for the LX8204 evaluation board.

Table 1 • Recommended Operating Conditions

Description	Symbol	Min	Max	Unit
Input voltage	V _{IN}	10.8	18	V
Output current	I _{OUT}	0	3.5	A
Junction temperature	T _A	–40	125	°C

5 PCB Layout of Evaluation Board

The LX8204 evaluation board is a four-layer board. The following illustrations depict each of the board's four layers.

Figure 2 • Layer 1: Top Layer

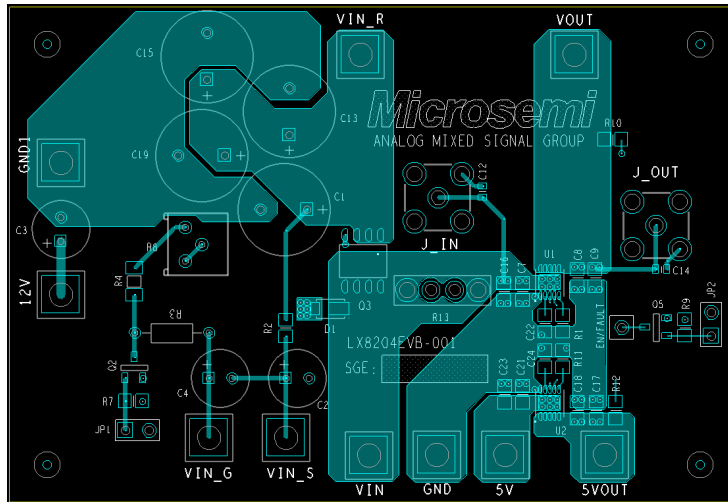


Figure 3 • Layer 2: Ground Layer

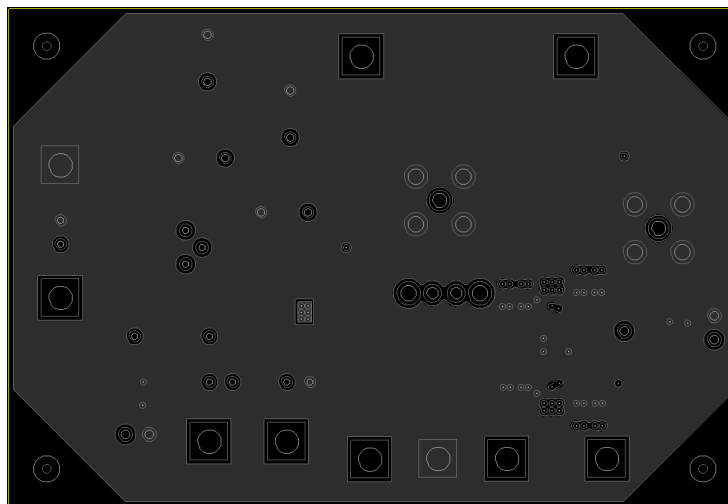
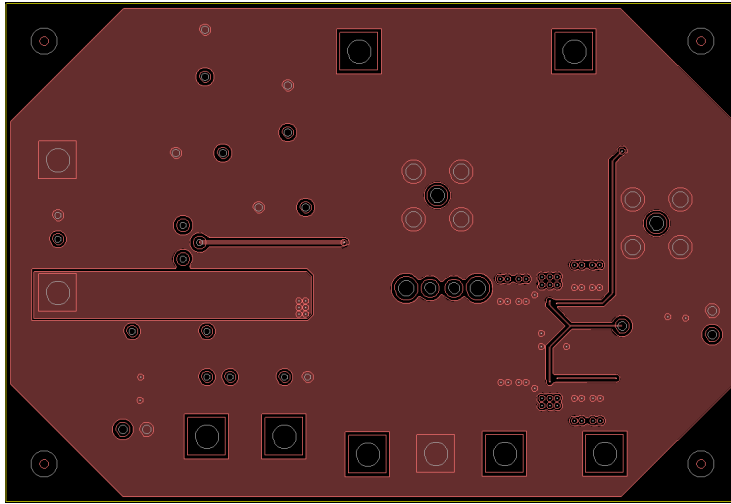
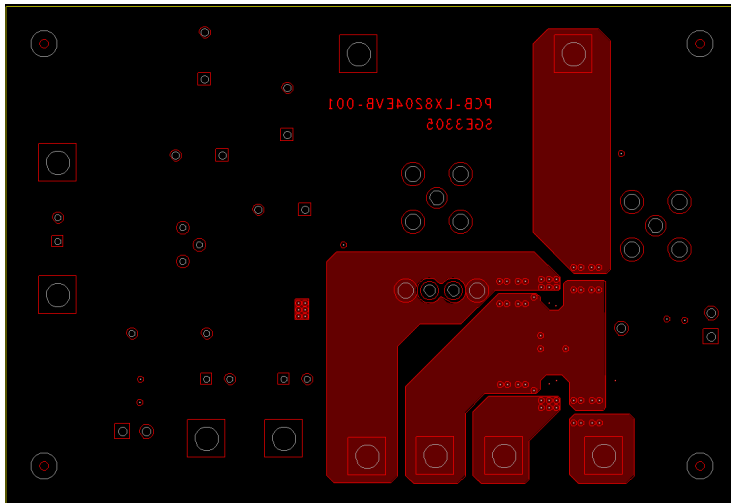


Figure 4 • Layer 3: Third Layer**Figure 5 • Layer 4: Bottom Layer**

6 Bill of Materials

The following table lists the bill of materials for the LX8204 evaluation board.

Table 2 • Bill of Materials

Item	Part Type	Part Description	Reference	Qty
1	Miscellaneous Components	Microsemi IC—LX8204	U1	1
2	Miscellaneous Components	Test point (J3)	EN/FAULT	1
3	Miscellaneous Components	Terminal	VIN, VOUT, GND	3
4	Miscellaneous Components	Jumper/2-pin	J2	1
5	Miscellaneous Components	2N7002	Q5	1
6	Capacitors	1 μ F/50 V/10%/0805/X5R	C16	1
7	Capacitors	33 μ F/25 V/10%/0805/X5R	C8	1
8	Resistors	500 k Ω /1%/0805	R1	1
9	Resistors	100 k Ω /1%/0805	R9	1

7 Test Procedure

The following lists the LX8204 evaluation board test point connections.

Table 3 • Test Point Connections

Name	Description
VIN	Device power input connector.
VOUT	Device power output connector.
GND	Ground pin for both input and output.

The following steps describe the test procedure.

1. Before connecting the power supply to the VIN and GND connector pins, set the power supply voltage to 12 V.
2. Turn on the power supply. Use the oscilloscope to measure the soft start output voltage. The soft start time should be 1.2 ms.
3. Start to increase the load current up to trigger thermal shutdown. Check the over-current level and EN pin voltage. EN voltage should be around 1.7 V. Over current limit is around 3.5 A.

8 Ordering Information

The following table lists the ordering information for the LX8204 evaluation board.

Table 4 • Ordering Information

Part Order Number	Description
LX8204-xyyILD	DFN 3 mm × 3 mm 10L
LX8204 EVAL BOARD	Evaluation PCB for LX8204

Note: “x” is the soft start time with RT= GND (1= 1.4 ms, 3= 3.5 ms). “yy” is the current limit (20= 2 Amps, 25= 2.5 Amps, 30= 3 Amps, 35= 3.5 Amps).

**Microsemi Corporate Headquarters**

One Enterprise, Aliso Viejo,
CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Fax: +1 (949) 215-4996
Email: sales.support@microsemi.com
www.microsemi.com

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