



# EV3425DL-00A

Boost Converter With a 55V, 3.5A Switch

### **DESCRIPTION**

The MP3425 is a current mode step-up converter with a 3.5A,  $90m\Omega$  internal switch to provide a highly efficient regulator with fast response. The MP3425 operates at a programmed fix frequency up to 2MHz allowing for easy filtering and low noise. An external compensation pin gives the user flexibility in setting loop dynamics, which allows the use of small, low-ESR ceramic output capacitors. Soft-start results in small inrush current and can be programmed with an external capacitor. The MP3425 operates from an input voltage as low as 3.0V and can generate 48V at up to 350mA from a 12V supply.

The MP3425 includes under-voltage lockout, current limiting and thermal overload protection to prevent damage in the event of an output overload. The MP3425 is available in a low profile 14-pin QFN package with exposed pad.

### **ELECTRICAL SPECIFICATIONS**

| Parameter      | Symbol           | Value   | Units |
|----------------|------------------|---------|-------|
| Input Voltage  | $V_{IN}$         | 10 – 22 | V     |
| Output Voltage | V <sub>out</sub> | 48      | V     |
| Output Current | I <sub>OUT</sub> | 350     | mA    |

## **FEATURES**

- 3.5A, 90mΩ, 55V Power MOSFET
- Uses Tiny Capacitors and Inductors
- Wide input range: 3V to 22V
- Output Voltage as High as 55V
- Programmable F<sub>SW</sub>: 300kHz 2 MHz
- Programmable UVLO, Soft-Start
- Micro power shutdown : I<sub>q</sub> < 1uA</li>
- Thermal Shutdown 150 Deg C
- Available in an 8-Pin SOIC and 14-Pin QFN Package with Exposed Pad

### **APPLICATIONS**

- Audio Microphone and Tuner Bias
- Telecom Power Supply
- Automotive Battery Charger

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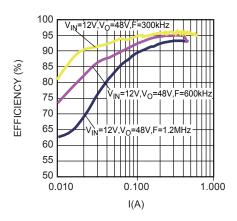
#### **EV3425DL-00A EVALUATION BOARD**



L×W (2.5" X 2.5")

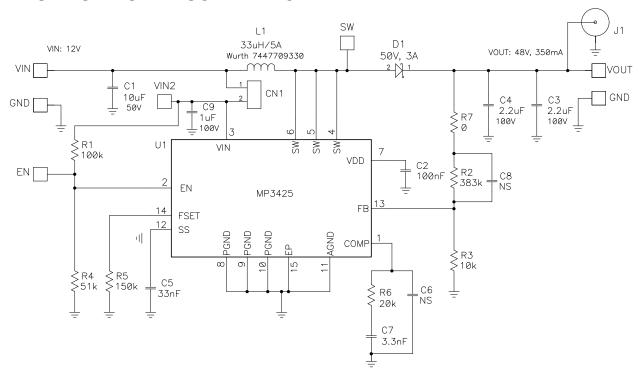
| Board Number | IC Number |  |
|--------------|-----------|--|
| EV3425DL-00A | MP3425DL  |  |

#### **Efficiency**





# **EVALUATION BOARD SCHEMATIC**

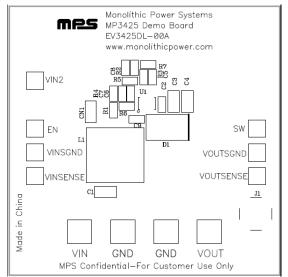


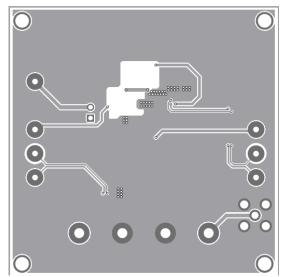
# **EV3425DL-00A BILL OF MATERIALS**

| Qty | Ref   | Value   | Description                   | Package         | Manufacturer | Manufacturer P/N |
|-----|-------|---------|-------------------------------|-----------------|--------------|------------------|
| 1   | C1    | 10uF    | Ceramic Cap., 50V, 10%, X5R   | 1210            | Taiyo Yuden  | UMK325BJ106KM-T  |
| 1   | C2    | 100nF   | Ceramic Cap., 50V, 10%, X7R   | 0805            | muRata       | GRM21BR71H104K   |
| 2   | C3,C4 | 2.2uF   | Ceramic Cap., 100V, 10%, X7R  | 1210            | muRata       | GRM32ER72A225K   |
| 1   | C5    | 33nF    | Ceramic Cap., 50V, 10%, X7R   | 0805            | muRata       | GRM219R71H333K   |
| 0   | C6,C8 | NS      |                               | 0805            |              |                  |
| 1   | C7    | 3.3nF   | Ceramic Cap., 50V, 5%, C0G    | 0805            | muRata       | GRM2165C1H332J   |
| 1   | C9    | 1uF     | Ceramic Cap., 50V, 10%, X5R   | 0805            | muRata       | GRM21BR71H105K   |
| 1   | CN1   |         | 2 Pin Header, 2.54mm          | 2.54mm          | Sullins      | PCC02SAAN        |
| 1   | CN1   | SHUNT   | Short Jumper, 2.54mm          | 2.54mm          | Sullins      | STC02SYAN        |
| 1   | D1    |         | Diode, 50V, 3A                | SMC             | Diodes Inc., | B350-13-F        |
| 0   | J1    | NS      |                               |                 |              |                  |
| 1   | L1    | 33uH/5A | Inductor, Idc4.2A, Rdc 36.8mΩ | 12x12mm         | Wurth        | 7447709330       |
| 1   | R1    | 100k    | Film Res., 5%                 | 0805            | Yageo        | RC0805JR-07100KL |
| 1   | R2    | 383k    | Film Res., 1%                 | 0805            | Yageo        | RC0805FR-07383KL |
| 1   | R3    | 10.0k   | Film Res., 1%                 | 0805            | Yageo        | RC0805FR-0710KL  |
| 1   | R4    | 51k     | Film Res., 5%                 | 0805            | Yageo        | RC0805JR-0751KL  |
| 1   | R5    | 150k    | Film Res., 5%                 | 0805            | Yageo        | RC0805JR-07150KL |
| 1   | R6    | 20k     | Film Res., 5%                 | 0805            | Yageo        | RC0805JR-0720KL  |
| 1   | R7    | 0Ω      | Film Res., 5%                 | 0805            | Yageo        | RC0805JR-070RL   |
| 1   | U1    |         | Boost Converter               | QFN14,<br>3x4mm | MPS          | MP3425DL-R1      |



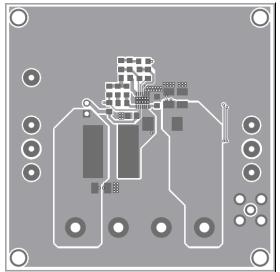
# PRINTED CIRCUIT BOARD LAYOUT





**Top Silk Layer** 

**Bottom Layer** 



**Top Layer** 



# **QUICK START GUIDE**

The output voltage of this board is set to 48V. The frequency is set to 300kHz. The board layout accommodates most commonly used inductors and output capacitors.

- 1. Preset the power supply to  $4V \le VIN \le 22V$ .
- 2. Turn the power supply off.
- 3. Connect the power supply terminals to:
  - a. Positive (+): VIN
  - b. Negative (-): GND
- 4. Connect the load to:
  - a. Positive (+): VOUT
  - b. Negative (-): GND
- 5. Make sure the CN1 jumper is installed
- 6. Turn the power supply on after making the connections.
- 7. The MP3425 is enabled on the evaluation board once VIN is applied.
- The output voltage VOUT can be changed by varying R2. Calculate the new value using the formula:

9. 
$$R2 = (\frac{V_{OUT}}{V_{FB}} - 1) \times R3$$

- a. Where VFB = 1.25V and R2=10k $\Omega$
- 10. The frequency can be changed by adjusting R5. The formula is:
- 11.  $F_{SET} = 23 \times (R5^{-0.86})$ 
  - a. Where FSET is in MHz and R5 is in  $k\Omega$

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