

### GENERAL DESCRIPTION

The EV1541DJ-TFT-00A is the evaluation board for TFT applications using the MP1541. The MP1541 is a 5-pin thin SOT23 current mode step up converter intended for small, low power applications. The MP1541 switches at 1.3MHz and allows the use of tiny, low cost capacitors and inductors 2mm or less in height. Internal soft start results in small inrush current and extends battery life. The MP1541 operates from an input voltage as low as 2.5V and can generate 12V at up to 200mA from a 5V supply.

The EV1541DJ-TFT-00A provides  $V_{OUT}$  from the boost output and also derives  $V_P$  (positive) and  $V_N$  (negative) from the charge pumps off of the boost switching node.

### ELECTRICAL SPECIFICATIONS

| Parameter        | Symbol    | Value   | Units |
|------------------|-----------|---------|-------|
| Input Voltage    | $V_{IN}$  | 3 – 3.6 | V     |
| Output Voltage 1 | $V_{OUT}$ | 5       | V     |
| Output Current 1 | $I_{OUT}$ | 200     | mA    |
| Output Voltage 2 | $V_N$     | -10     | V     |
| Output Current 2 | $I_N$     | 10      | mA    |
| Output Voltage 3 | $V_P$     | 15      | V     |
| Output Current 3 | $I_P$     | 20      | mA    |

### FEATURES

- 3V to 3.6V Operating Input Range
- Uses Tiny Capacitors and Inductors
- 1.3MHz Fixed Switching Frequency
- Internally Compensated
- Internal Soft Start
- 3 Outputs in a Single Package: Boost Converter for 5V, Charge Pump for 15V, and Negative Charge Pump for -10V
- UVLO, Thermal Shutdown
- Internal Current Limit
- Available in a TSOT23-5 Package

### APPLICATIONS

- Handheld Computers and PDAs
- Digital Still and Video Cameras
- Small LCD Displays

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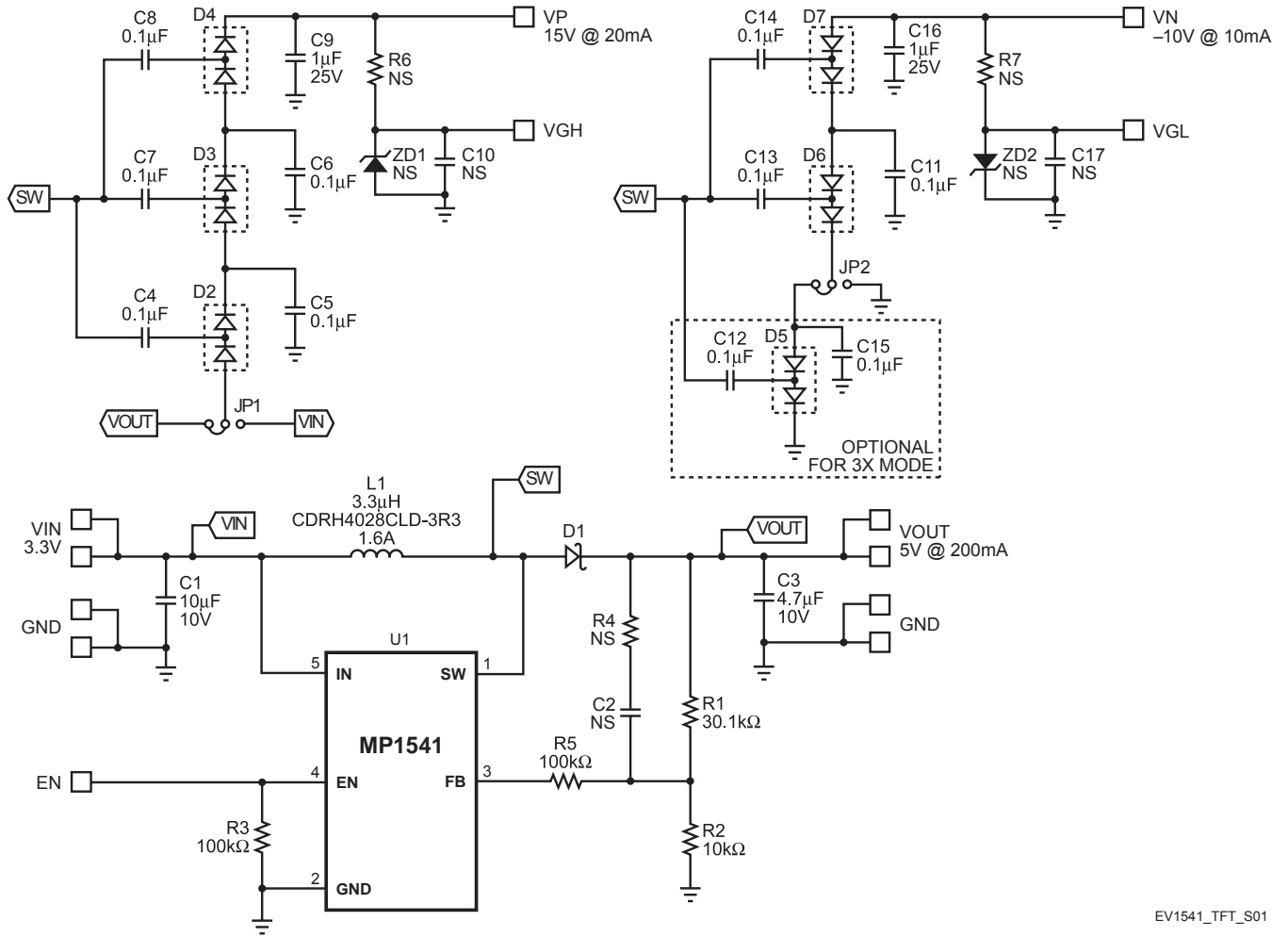
## EV1541DJ-TFT-00A EVALUATION BOARD



Dimensions (2.0"X x 2.0"Y x 0.4"Z)

| Board Number     | MPS IC Number |
|------------------|---------------|
| EV1541DJ-TFT-00A | MP1541DJ      |

### EVALUATION BOARD SCHEMATIC



EV1541\_TFT\_S01

**EV1541DJ-TFT-00A BILL OF MATERIALS**

| Qty | Ref   | Value          | Description                          | Package  | Manufacturer | Manufacturer P/N |
|-----|---|----------------|--------------------------------------|----------|--------------|------------------|
| 1   | C1  | 10 $\mu$ F     | Ceramic Cap, 10V, X5R                | 1210     | TDK          | C3225X5R1A106K   |
| 3   | C2, C10,<br>C17   | NS             | Not Stuffed                          |          |              |                  |
| 1   | C3  | 4.7 $\mu$ F    | Ceramic Cap, 10V, X5R                | 1210     | Taiyo Yuden  | LMK325BJ475KD    |
| 10  | C4, C5,<br>C6, C7,<br>C8, C11,<br>C12, C13,<br>C14, C15 | 0.1 $\mu$ F    | Ceramic Cap, 50V, X7R                | 0805     | TDK          | C2012X7R1H1 04K  |
| 2   | C9, C16   | 1 $\mu$ F      | Ceramic Cap, 25V, X5R                | 0805     | TDK          | C2012X5R1E105K   |
| 1   | D1  |                | Schottky Diodes, 40V, 1A             | SOD-123  | Diodes Inc   | 1N5819HW-7       |
| 6   | D2, D3,<br>D4, D5,<br>D6, D7                            |                | Diode Rectifier, Dual, 30V,<br>200mA | SOT-123  | Fairchild    | BAT54S           |
| 2   | JP1, JP2  |                | 3-Pin Connector Header, 0.100        |          | Sullins      | PTC03SAAN        |
| 1   | L1  | 3.3 $\mu$ H    | 1.6A                                 |          | Sumida       | CDRH4D28CLD-3R3  |
| 1   | R1  | 30.1k $\Omega$ | Metal Film Res, 1%                   | 0805     | Panasonic    | ERJ-6ENF3012V    |
| 1   | R2  | 10k $\Omega$   | Metal Film Res, 1%                   | 0805     | Panasonic    | ERJ-6ENF1002V    |
| 2   | R3, R5  | 100k $\Omega$  | Metal Film Res, 5%                   | 0805     | Panasonic    | ERJ-6GEYJ104V    |
| 3   | R4, R6,<br>R7   | NS             | Not Stuffed                          |          |              |                  |
| 1   | U1  |                | DC-DC Converter                      | TSOT23-5 | MPS          | MP1541DJ         |
| 2   | ZD1, ZD2  | NS             | Not Stuffed                          |          |              |                  |

### PRINTED CIRCUIT BOARD LAYOUT

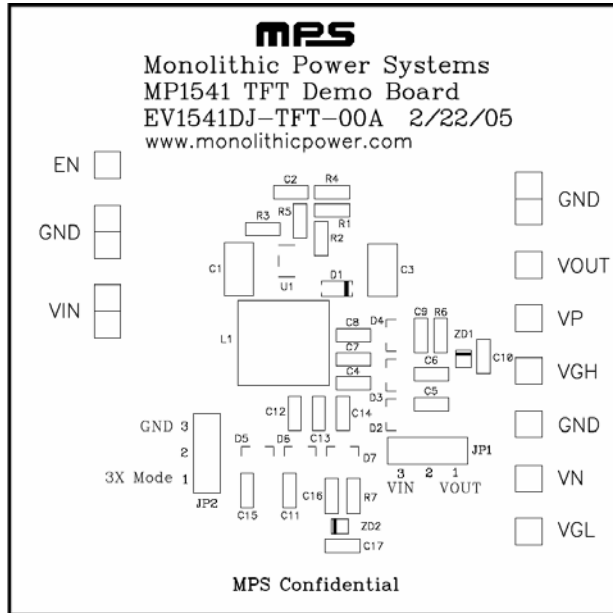


Figure 1—Top Silk Layer

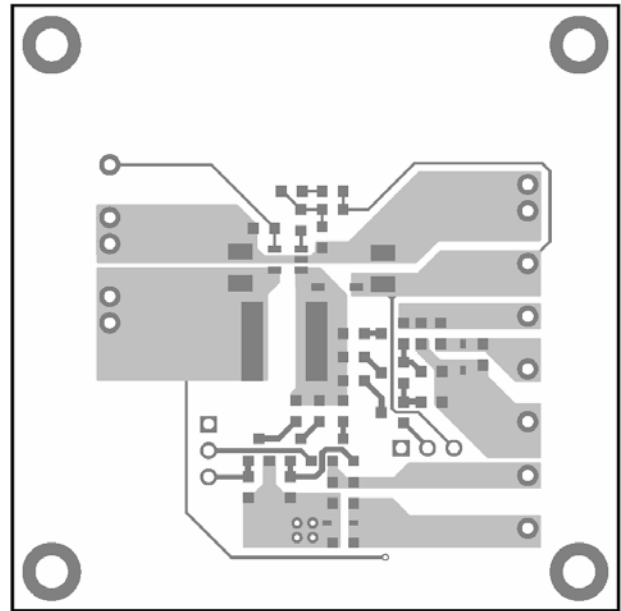


Figure 2—Top Layer

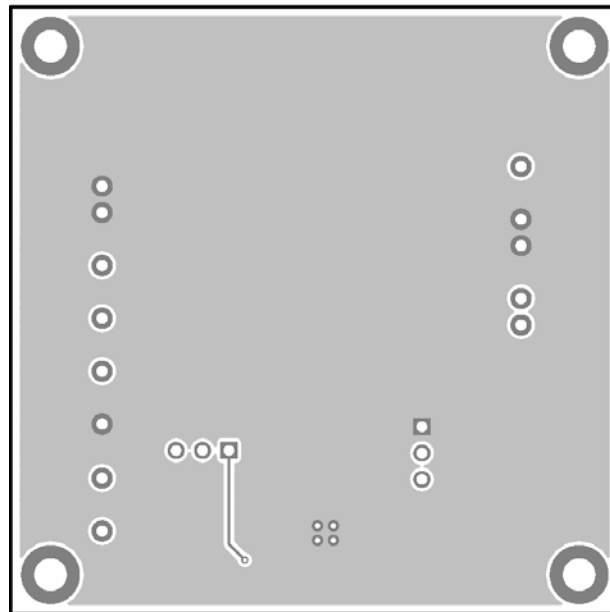


Figure 3—Bottom Layer

## QUICK START GUIDE

The output voltage of this board is set to 5V, -10V and 15V on V<sub>OUT</sub>, V<sub>N</sub> and V<sub>P</sub>, respectively. The board layout accommodates most commonly used inductors and output capacitors.

1. Preset the power supply to  $3V \leq V_{IN} \leq 3.6V$ .
2. Turn off the power supply.
3. Connect the power supply terminals to:
  - a. Positive (+): V<sub>IN</sub>, EN
  - b. Negative (-): GND
4. Connect the load to:
  - a. Positive (+): V<sub>OUT</sub>, V<sub>P</sub>, GND (for the negative output)
  - b. Negative (-): GND, V<sub>N</sub> (for the negative output)
5. Turn on the power supply after making the connections.
6. The MP1541 is disabled on the evaluation board if only V<sub>IN</sub> is applied. To enable the MP1541, EN needs to be pulled HIGH.
7. The output voltage V<sub>OUT</sub> can be changed by varying R1. Calculate the new value using the formula:

$$R1 = \left( \frac{V_{OUT}}{V_{FB}} - 1 \right) R2$$

Where  $V_{FB} = 1.25V$  and  $R2 = 10k\Omega$

For example, for  $V_{OUT} = 7.5V$

$$R1 = \left( \frac{7.5V}{1.25V} - 1 \right) \times 10k\Omega = 50k\Omega$$

Therefore use a 49.9k $\Omega$  standard 1% value resistor.

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