

DESCRIPTION

The EV3398A-S-00A is an evaluation board for the MP3398A, a step-up converter designed for liquid-crystal displays that employ an array of LEDs as the light source. It can drive up to 4 strings LEDs in parallel with 350mA/string maximum current.

The MP3398A uses current mode, fixed switching frequency architecture. The frequency is programmable by an external frequency setting resistor. MP3398A drives an external MOSFET to boost up the output voltage from a 5V to 28V input supply. It regulates the current in each LED string to the programmed value set by an external current setting resistor.

The MP3398A can support both analog and PWM dimming independently to meet the special dimming mode request. In addition, rich protection modes are also integrated including OCP, OTP, UVP, OVP, LED short/open protection, inductor/diode short protection.

The MP3398A is available in SOIC16, TSSOP16 and SOIC20 packages.

ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|---------------|-----------|--------------------------------|-------|
| Input Voltage | V_{IN} | 8 – 28 | V |
| LEDs # | | 4 LED string 12 LEDs/string | |
| LED Current | I_{LED} | 120/string | mA |

FEATURES

- 4-String, Max 350mA/String at 10% DPWM
- 5V to 28V Input Voltage Range
- 2.5% Current Matching Accuracy Between Strings
- Programmable Switching Frequency
- PWM and Analog Dimming Mode
- Cascading Capability with a Single Power Source
- LED Open and Short LED Protection
- Programmable Over-Voltage Protection
- Recoverable thermal Shutdown Protection
- Over Current Protection
- Inductor/Diode short Protection
- Under-Voltage Lockout
- SOIC16, TSSOP16 and SOIC20 Packages

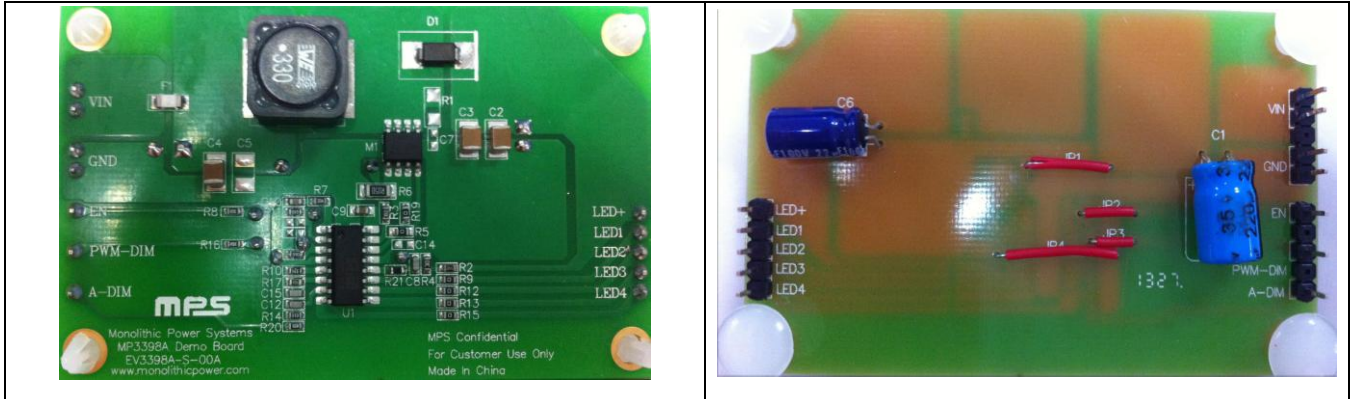
APPLICATIONS

- Desktop LCD Flat Panel Displays
- Flat Panel Video Displays
- 2D/3D LCD TVs and Monitors

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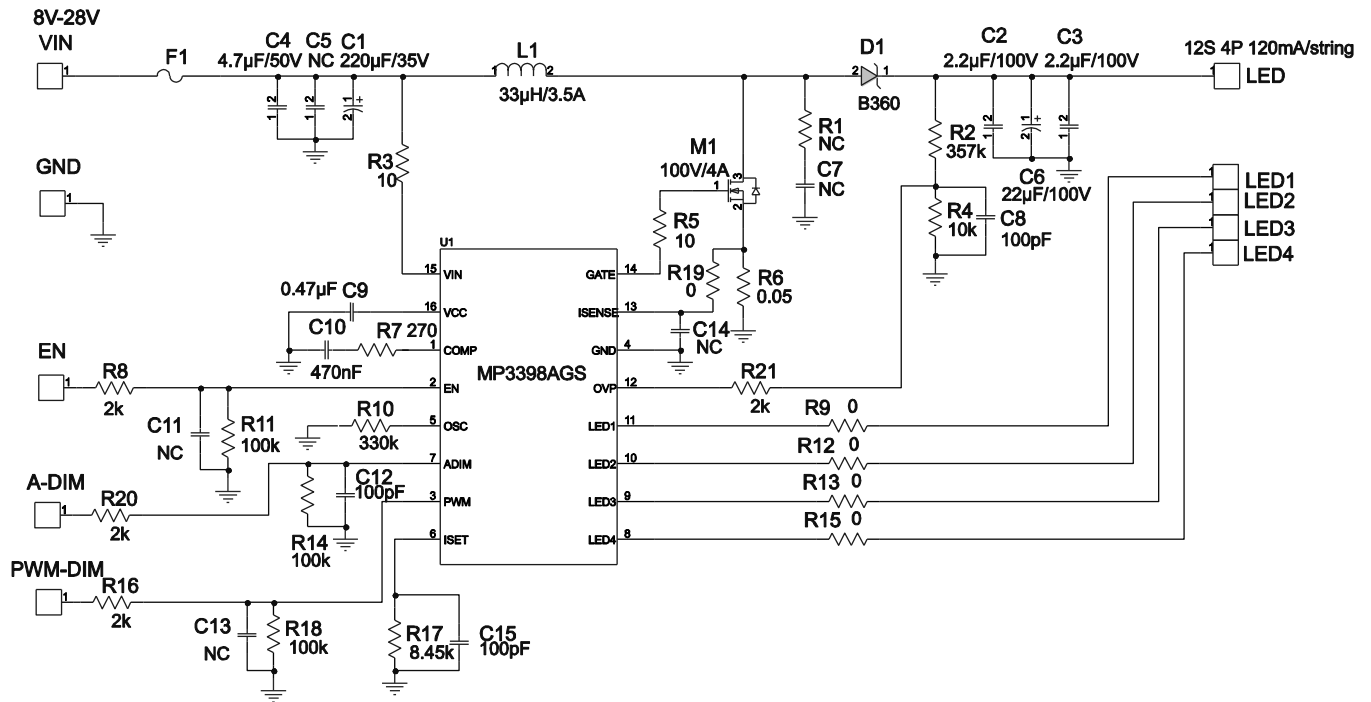
EV3398A-S-00A EVALUATION BOARD



(L x W x H) 7.8cm x 4.9cm x 1.0cm

| Board Number | MPS IC Number |
|---------------|---------------|
| EV3398A-S-00A | MP3398AGS |

EVALUATION BOARD SCHEMATIC



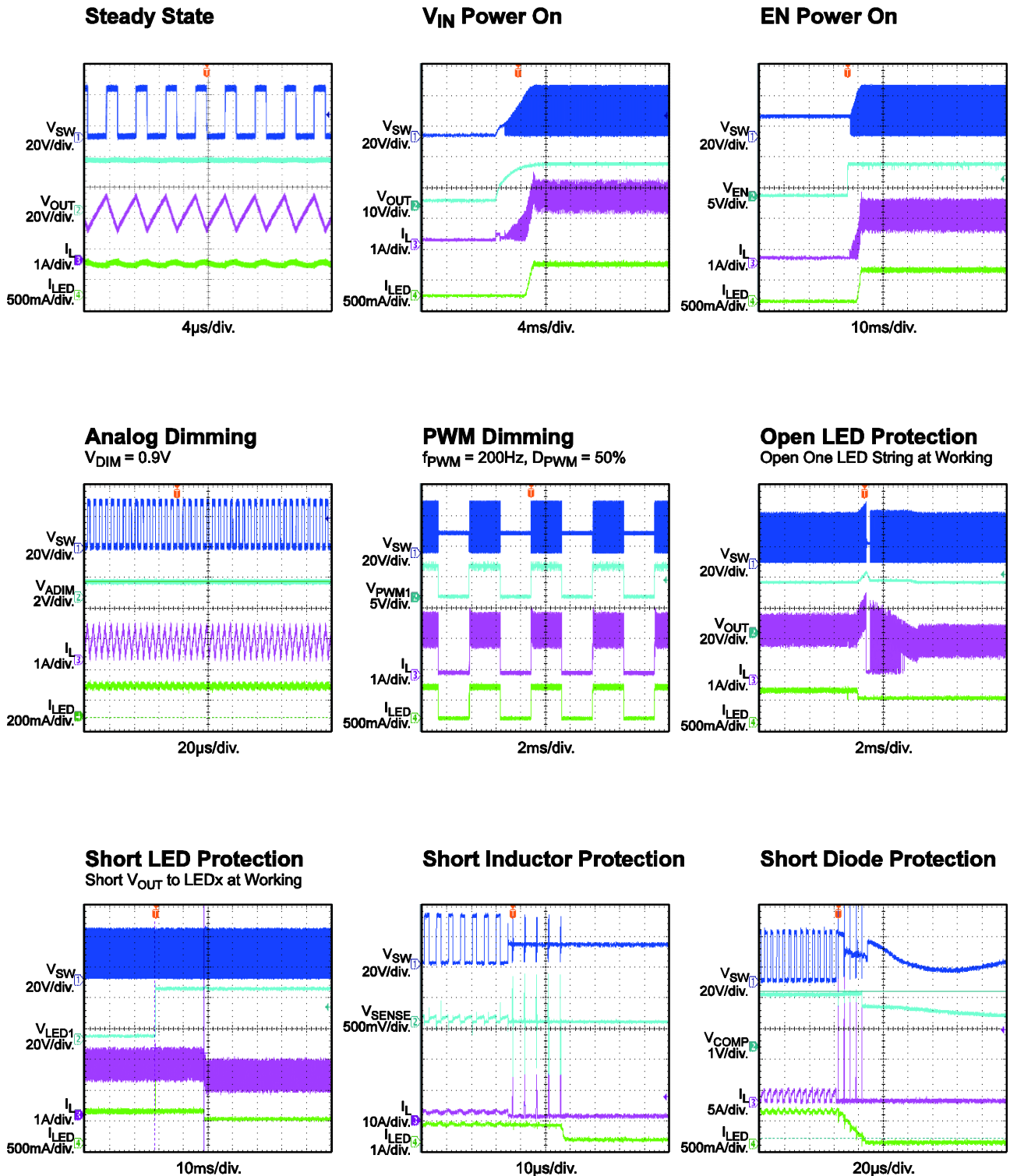
EV3398A-S-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|-----|----------------------------|----------------|---------------------------------|---------|--------------|--------------------|
| 1 | C1 | 220 μ F | Electrolytic Capacitor, 35V | | | |
| 2 | C2,C3 | 2.2 μ F | Ceramic Capacitor, 100V, X7R | 1210 | Murata | GRM32ER72A225KA35L |
| 1 | C4 | 4.7 μ F | Ceramic Capacitor, 50V, X7R | 1210 | Murata | GRM32ER71H475KA88L |
| 1 | C5 | NC | | 1210 | | |
| 1 | C6 | 22 μ F | Electrolytic Capacitor, 100V | | | |
| 4 | C7,C11, C13C14 | NC | | 0603 | | |
| 3 | C8,C15, C12 | 100pF | Ceramic Capacitor,50V, COG | 0603 | Murata | GRM1885C1H101JA01D |
| 2 | C9,C10 | 470nF | Ceramic Capacitor, 16V, X7R | 0603 | Murata | GRM18R7C474KA88D |
| 1 | D1 | | Diode Schottky, 60V, 3A | SMA | Diodes Inc | B360 |
| 1 | F1 | 0 Ω | Fuse, 2A, 63V | 1206 | Cooper | 3216FF2-R |
| 1 | L1 | 33 μ H | Inductor,3.2A | SMD | Würth | 744770133 |
| 1 | M1 | | N- channel MOSFET | SO8 | Analog Power | AM4490N |
| 1 | R1 | NC | | 0603 | | |
| 1 | R2 | 357k Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-07357KL |
| 1 | R3, R5 | 10 Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-0710RL |
| 1 | R4 | 10k Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-0710KL |
| 6 | R9,R12, R13, R15,R19 | 0 Ω | Resistor, 1% | 0603 | Yageo | RC0603JR-070RL |
| 1 | R7 | 200 Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-07200RL |
| 1 | R6 | 0.05 Ω | Current Resistor, 1% | 1206 | Yageo | RC1206FR-070R05L |
| 3 | R8,R16, R20,R21 | 2k Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-072KL |
| 1 | R10 | 330k Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-07330KL |
| 3 | R11,R14, R18 | 100k Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-07100KL |
| 1 | R17 | 8.45k Ω | Resistor, 1% | 0603 | Yageo | RC0603FR-078K45L |
| 1 | U1 | | LED Driver IC | SOIC16 | MPS | MP3398AGS R5 |

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN} = 12V$, $V_{OUT} = 30V$, $L = 33\mu H$, $I_{LED} = 120mA/$ String, 4 strings, $T_A = 25^\circ C$, unless otherwise noted.



PRINTED CIRCUIT BOARD LAYOUT

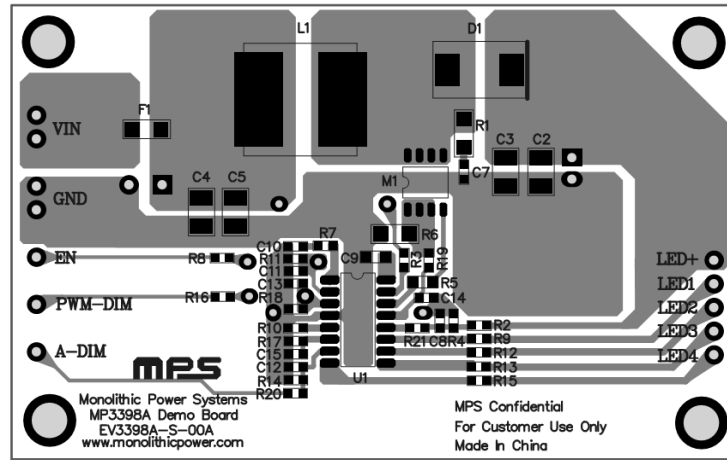


Figure 1—Top Layer

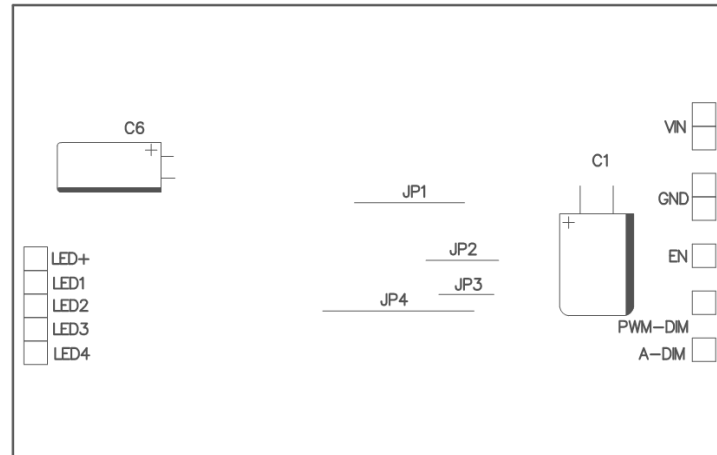


Figure 2—Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load panel (12 white LEDs in series, 4 strings) to the LED+ and LED1~4 pins on the EV board, respectively.
2. Connect the positive and negative terminals of the power supply (8V ~ 28V) to the VIN and GND pins on the EV board, respectively.
3. Drive EN pin high (5V) to enable the MP3398A.
4. For PWM dimming, apply a PWM rectangular waveform with a minimum voltage less than 0.5V and a maximum greater than 1.5V on PWM pin. The frequency of the PWM signal is recommended between 200Hz to 2kHz.
5. For analog dimming, apply a PWM rectangular waveform with a minimum voltage less than 0.4V and a maximum greater than 1.5V on ADIM pin. The frequency of the PWM signal is recommended >20kHz.

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