

## DESCRIPTION

EV8003A-Q-00A Evaluation Board is designed to demonstrate the capability of MP8003A's function. MP8003A is an IEEE 802.3af/at power-over-Ethernet (PoE) compliant powered device (PD) interface controller. It has all the functions of IEEE 802.3af/at.

MP8003A sets 120mA inrush current limit and 840mA operation current limit, a PG signal sets to high to indicate output fully charged, and it pulls low when Vout drops in overload condition. MP8003A also provides a T2P signal when it is connected to a type 2 power sourcing equipment (PSE).

An AUX pin of MP8003A provides smoothly power switch from PSE to auxiliary wall adaptor. MP8003A also features built in thermal protection and wide input VULO hysteresis.

The MP8003A is available in a 10-pin QFN (3mm×3mm) package.

## ELECTRICAL SPECIFICATIONS

| Parameter       | Symbol        | Value | Units |
|-----------------|---------------|-------|-------|
| Input Voltage   | $V_{IN}$      | 37-57 | V     |
| Adapter Voltage | $V_{ADAPTER}$ | 12    | V     |
| Output current  | $I_{OUT}$     | 600   | mA    |

## FEATURES

- Compatible with 802.3af/at Specifications
- 100V 0.48Ω Integrated Pass Switch
- 120mA Inrush Current Limit
- 840mA Operation Current Limit
- 2-Event Classification
- Auxiliary Adaptor ORing Power Supply
- Self-driving Power Good Inductor
- Open Drain Type 2 PSE Indicator
- Over Temperature Protection
- Available in QFN-10 (3mmx3mm) Package

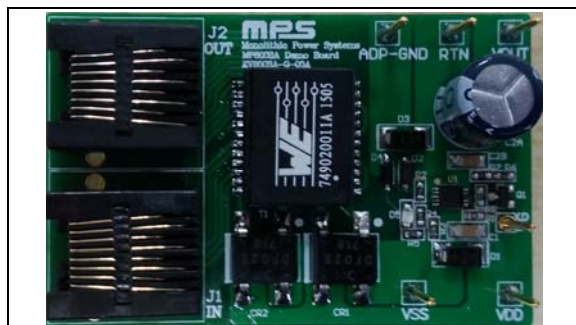
## APPLICATIONS

- IEEE 802.3af/at-Compliant Devices
- Security Cameras
- VoIP Phones
- WLAN Access Points
- IoT Devices

All MPS parts are lead-free, halogen free, and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance.

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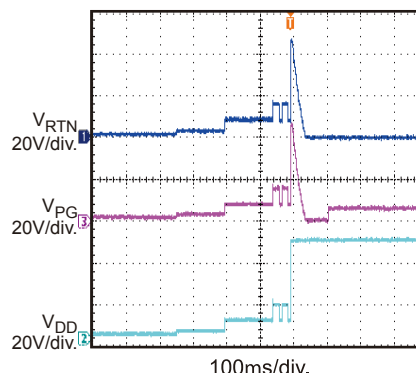
## EV8003A-Q-00A EVALUATION BOARD



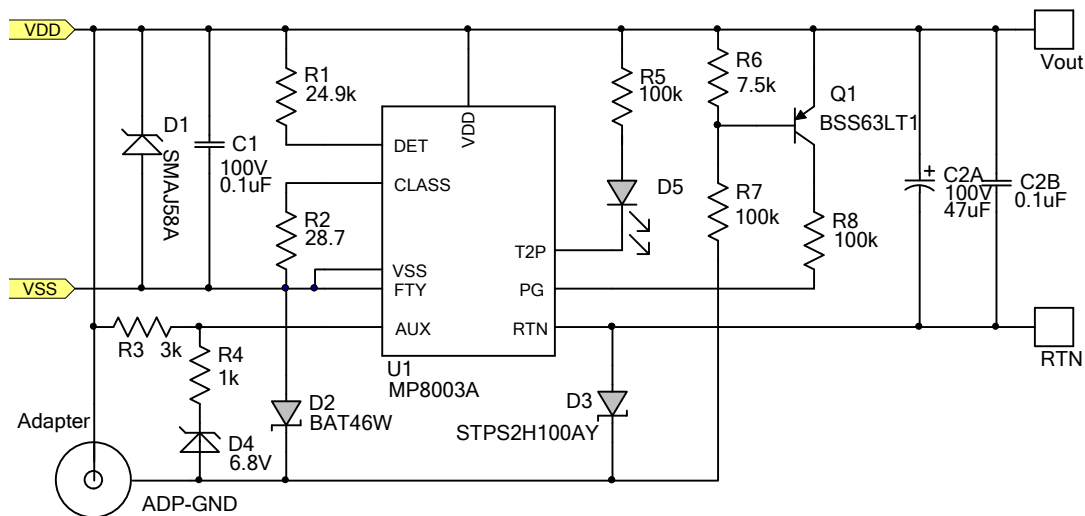
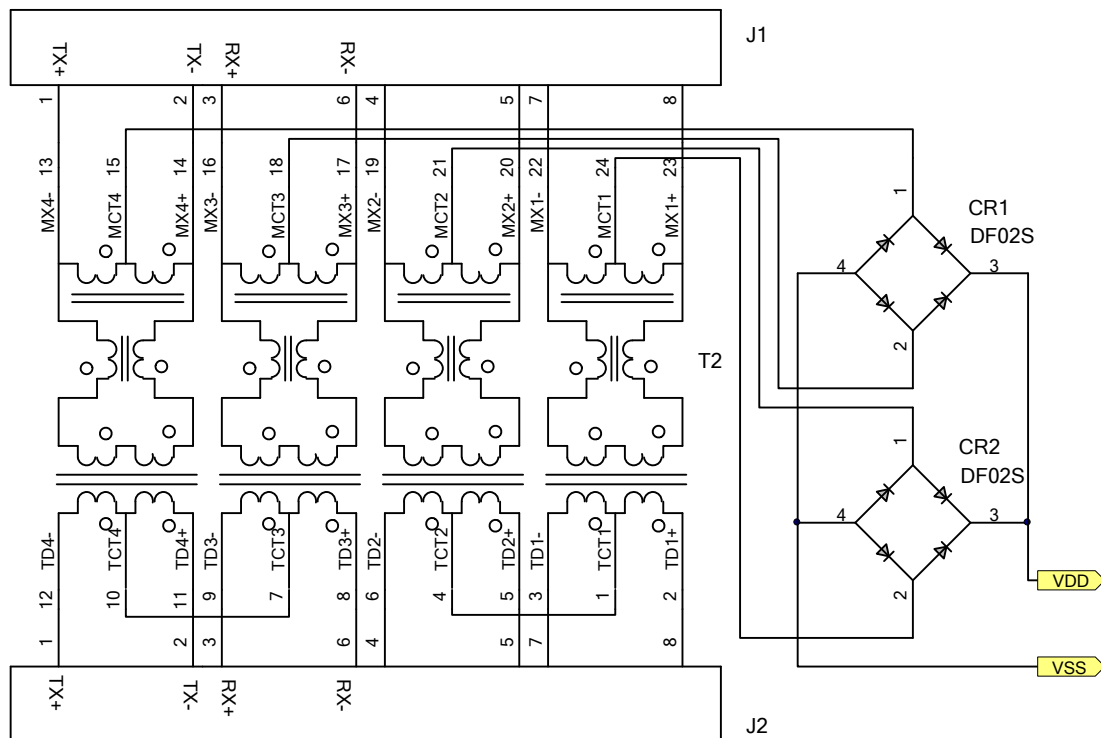
(L x W x H) (6.2cm x 4cm x 1.5cm)

| Board Number  | MPS IC Number |
|---------------|---------------|
| EV8003A-Q-00A | MP8003AGQ     |

### Start-Up by PSE



# EVALUATION BOARD SCHEMATIC



## EV8003A-Q-00A BILL OF MATERIALS

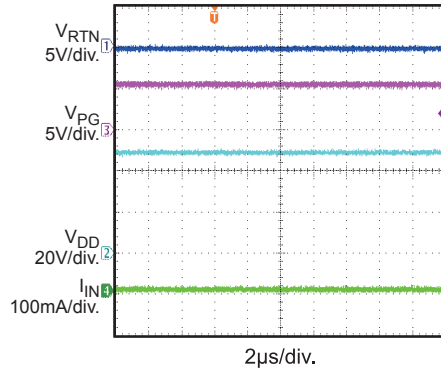
| Qty | Ref       | Value       | Description                                                                     | Package    | Manufacturer       | Part Number        |
|-----|-----------|-------------|---------------------------------------------------------------------------------|------------|--------------------|--------------------|
| 2   | C1, C2B   | 0.1uF       | Ceramic Cap. 100V, X7R                                                          | 1206       | Murata             | GRM319R72A104KA01D |
| 1   | C2A       | 47uF        | 47uF 100V CD284 E-Cap. 10X12.5mm                                                | DIP        | JiangHai           | 47uF/100V          |
| 1   | R1        | 24.9k       | Film Res,1%                                                                     | 0603       | ROYAL              | RC0603FR-0724K9L   |
| 1   | R2        | 28.7        | Film Res,1%                                                                     | 0603       | ROYAL              | RC0603FR-0728R7L   |
| 1   | R3        | 3k          | Film Res,1%                                                                     | 0603       | ROYAL              | RC0603FR-073KL     |
| 1   | R4        | 1k          | Film Res,1%                                                                     | 0603       | ROYAL              | RC0603FR-071KL     |
| 3   | R5,R7, R8 | 100k        | Film Res,1%                                                                     | 0603       | ROYAL              | RC0603FR-07100KL   |
| 1   | R6        | 7.5k        | Film Res,1%                                                                     | 0603       | ROYAL              | RC0603FR-077K5L    |
| 1   | D1        | SMAJ58A     | TVS                                                                             | SMA        | Littelfuse         | SMAJ58A            |
| 1   | D2        | BAT46W      | 100V, DIODE                                                                     | SOD-123    | Diodes             | BAT46W-7-F         |
| 1   | D3        | STPS2H100AY | 2A,100V, SCHOTTKY                                                               | SMA        | STMicroelectronics | STPS2H100AY        |
| 1   | D4        | 6.8V        | Diode Zener 6.8V                                                                | SOD-123    | Diodes Inc         | BZT52C6V8          |
| 1   | T1        | 749020010A  | LAN-Transformer WE-LAN                                                          | SMD        | Würth              | 749020010A         |
| 1   | Q1        | BSS63LT1    | PNP, 100V, 100mA                                                                | SOT-23     | Semiconductor      | BSS63LT1G          |
| 2   | CR1,C R2  | DF02S       | 1.0A Surface Mount Glass Passivity Bridge Rectifier                             |            | Diodes Inc         | DF02S              |
| 2   | J1,J2     | RJ45-8N4-B  | RJ Jack / Signal Line EMI/RFI Filters 6 TRMN BRD/CBLE GRND 8 PIN BLOCK INDUCTOR | RJ45-TAB   | Tyco Electronics   | RJ45-8N4-B         |
| 1   | U1        | MP8003A     | PD interface                                                                    | QFN(3X3mm) | MPS                | MP8003AGQ          |

## EVB TEST RESULTS

VDD=48V, R<sub>DET</sub> = 24.9kΩ, R<sub>CLASS</sub> =28.7Ω, I<sub>OUT</sub>=0.6A, T<sub>A</sub>=25°C, unless otherwise noted.

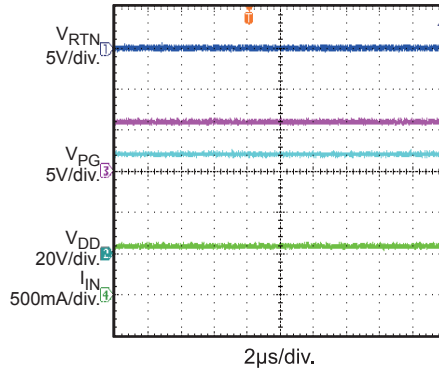
### Steady State

I<sub>OUT</sub> = 0A



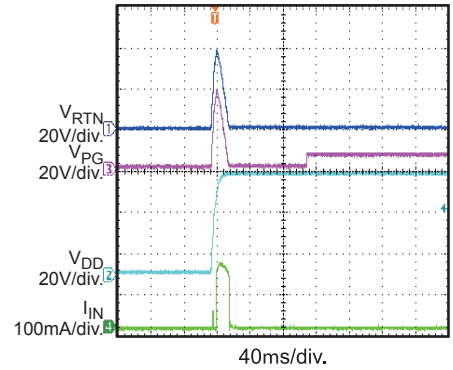
### Steady State

I<sub>OUT</sub> = 0.6A



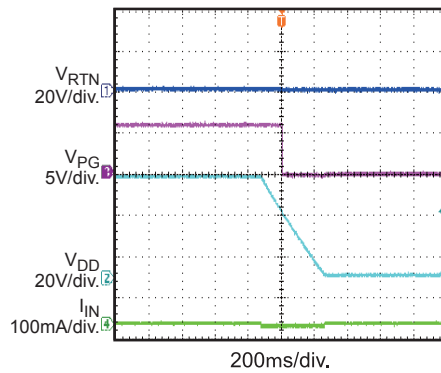
### V<sub>DD</sub> Start-Up

I<sub>OUT</sub> = 0A



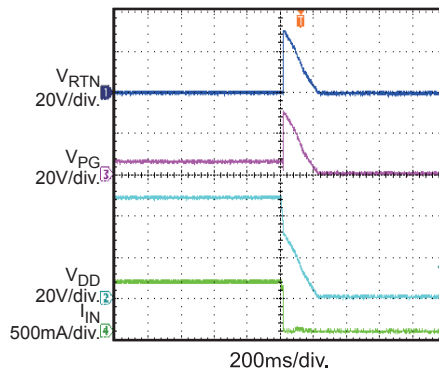
### V<sub>DD</sub> Shutdown

I<sub>OUT</sub> = 0A

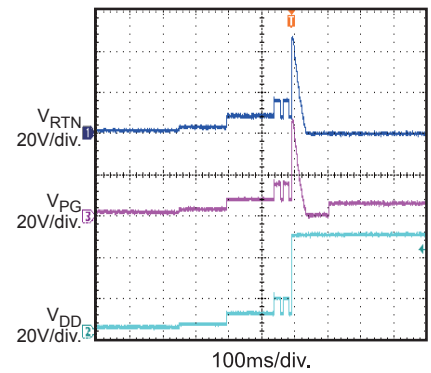


### V<sub>DD</sub> Shutdown

I<sub>OUT</sub> = 0.6A

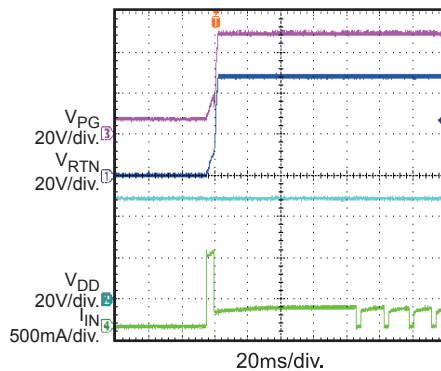


### Start-Up by PSE



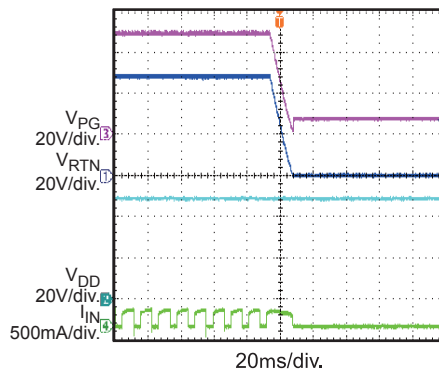
### OCP Entry

I<sub>OUT</sub> = 0A to 1A



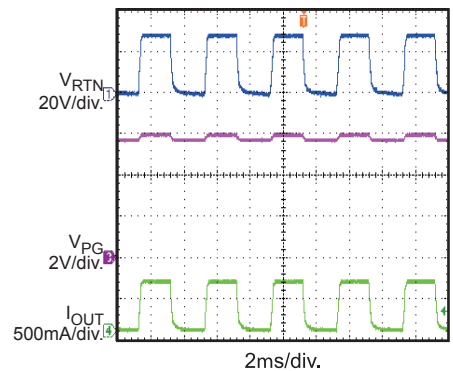
### OCP Recovery

I<sub>OUT</sub> = 1A to 0A



### Load Transient

I<sub>OUT</sub> = 0A to 0.6A



## PRINTED CIRCUIT BOARD LAYOUT

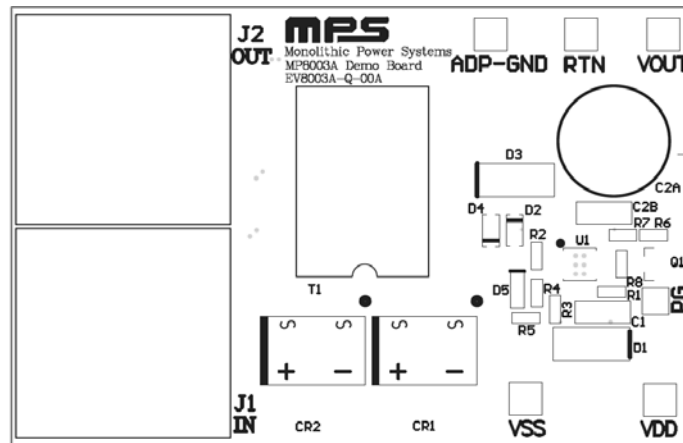


Figure 1: Top Silk Layer

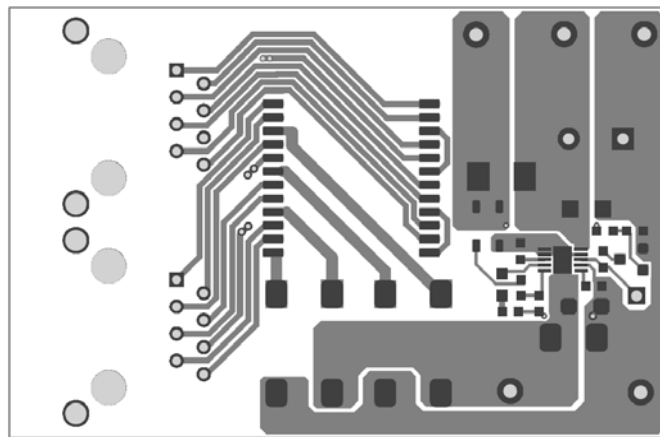


Figure 2: Top Layer

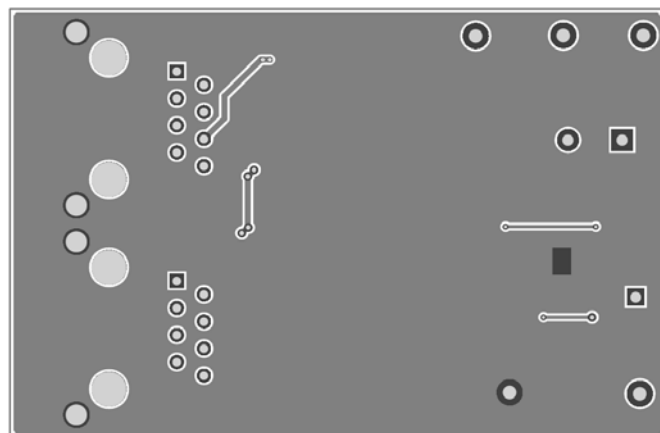


Figure 3: Bottom Layer

## QUICK START GUIDE

The board layout accommodates most commonly used components. There are two methods to start EV8003A-Q-00A.

Method 1:

1. Connect Load to:
  - a. Positive (+): VOUT
  - b. Negative (–): RTN
2. Plug the cable coming from the PSE into the Ethernet Jack J1. The board will automatically startup.

Method 2:

1. Preset Power Supply to  $40V \leq V_{IN} \leq 57V$ . (It can work in  $33V \leq V_{IN} \leq 57V$  after power up.)
2. Turn Power Supply off.
3. Connect Power Supply terminals to:
  - a. Positive (+): VDD
  - b. Negative (–): VSS
4. Connect Load to:
  - a. Positive (+): VOUT
  - b. Negative (–): RTN
5. Turn Power Supply on after making connections.
7. To use adapter supply function, connect one 12V adapter's positive terminal to VDD and negative terminal to ADP-GND, then turn on the adapter, the board will prior use adapter to supply the load. If the adaptor voltage is too high, some additional circuit is needed to clamp the AUX pin voltage.

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