# The Future of Analog IC Technology®

## DESCRIPTION

The EV6411-S-00A is an evaluation board for MP\MPQ6411, a windowed watchdog timer. It used to reset and monitor the microcontroller. In normal operation, MCU sends trigger signal to MPQ6411 in a defined time window cyclically. A missing or fault trigger signal causes the watchdog to reset the MCU.

MPQ6411 provides a reset signal (low level voltage) to MCU during power-up or under voltage.

By setting the MODE pin to high or low, the watchdog can work as long window mode or short window mode. And the window is programmable.

The EV6411-S-00A is assembled and tested with SOIC8 package.

## ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage | $V_{CC}$ | 5.0 | V |

## FEATURES

- Windowed watchdog
- Power-on reset during power-up and under voltage
- Programmable short window mode or long window mode
- Watchdog disable function
- Low shutdown mode current
- SOIC8 package

## APPLICATIONS

- Automotive Systems
- Industrial Systems

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.
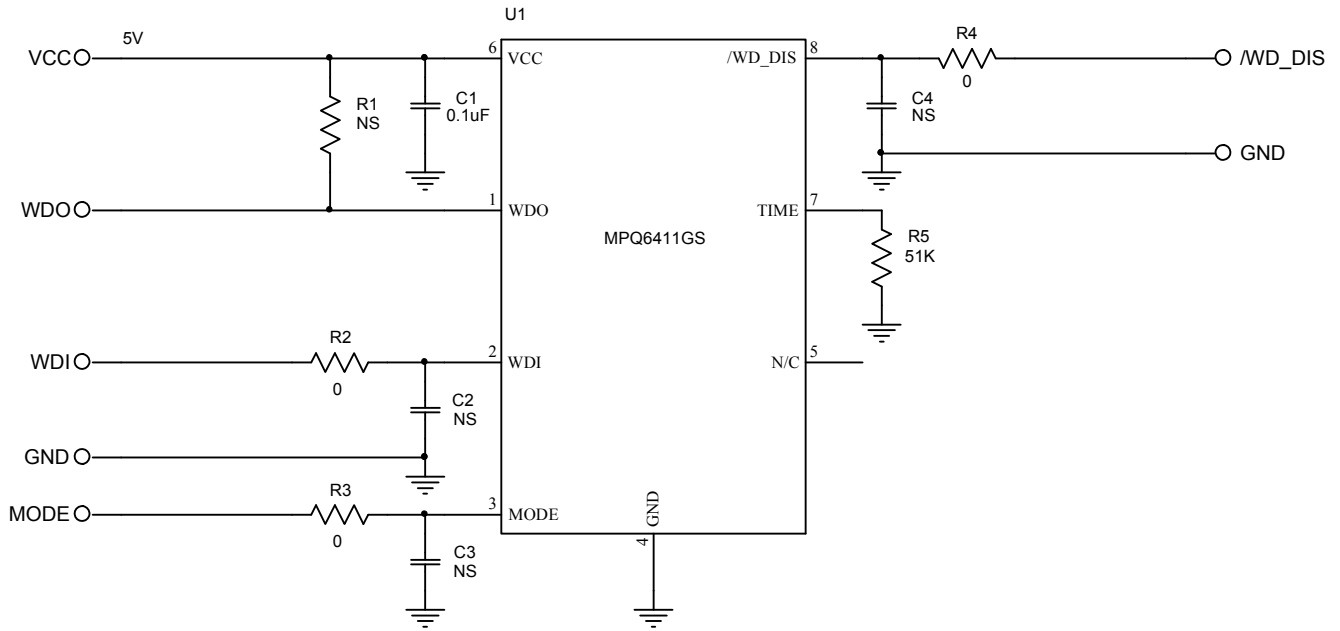
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## EV6411-S-00A EVALUATION BOARD



**(L × W × H) 3.81cm × 3.81cm ×0.5cm**

| Board Number | MPS IC Number |
|---|---|
| EV6411-S-00A | MPQ6411GS |

# EVALUATION BOARD SCHEMATIC



# EV6411-S-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|-----|-----|-------|-------------|---------|--------------|-------------|
| 1 | C1 | 0.1µF | Ceramic Cap., 16V, X7R | 0603 | muRata | GRM188R71C104KA01D |
| 3 | C2, C3, C4 | NS | | | | |
| 1 | R1 | NS | | | | |
| 3 | R2, R3, R4 | 0 | Film Resistor;5% | 0603 | Yageo | RC0603JR-070RL |
| 1 | R5 | 51K | Film Resistor;1% | 0603 | Yageo | RC0603FR-0751KL |
| 1 | U1 | | | SOIC8 | MPS | MPQ6411GS |

# EVB TEST RESULTS

**Performance waveforms are tested on the evaluation board.**
$V_{CC}$ = 5V, $T_A$ = 25°C, unless otherwise noted.
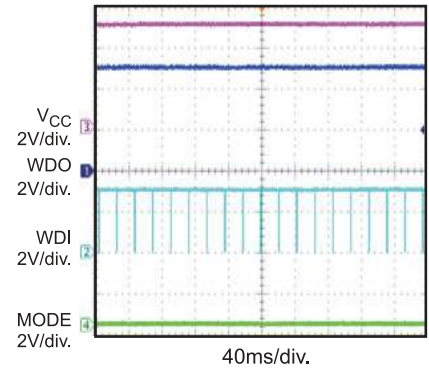
### Power on Reset and No Signal
Mode=0V, WDI=3V



100ms/div.
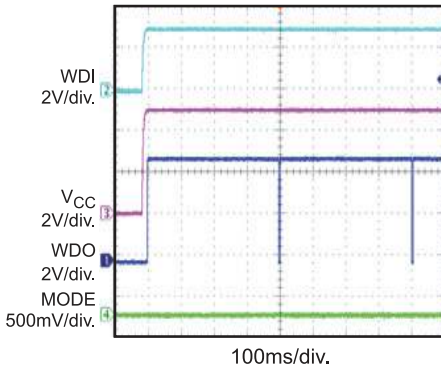
### Sync&No Triggered Signal
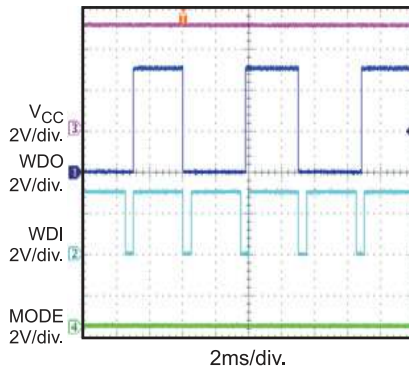Mode=0V, WDI_OK=500µs, WDI Period=1s



200ms/div.
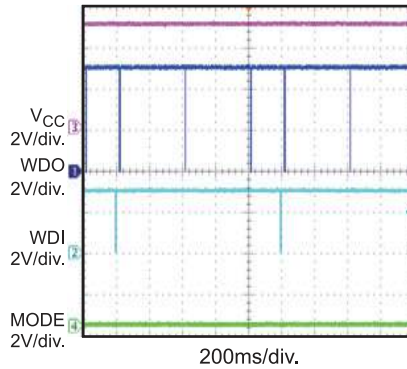
### Sync&Triggered in Open Window
Mode=0V, WDI_OK=500µs, WDI Period=21ms
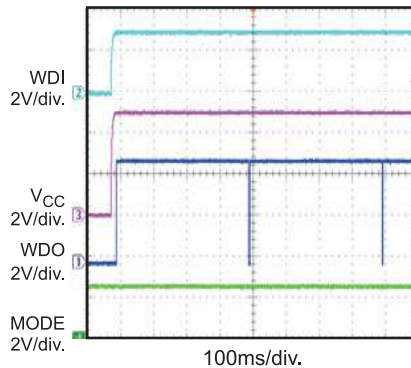


40ms/div.

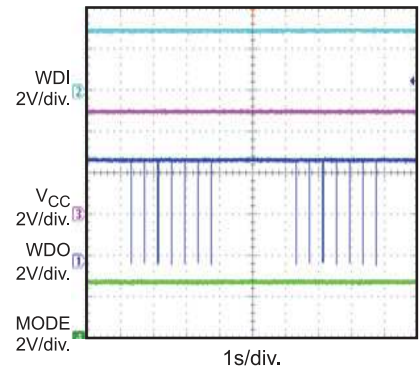### Sync&Triggered in Close Window
Mode=0V, WDI_OK=500µs, WDI Period=3.5ms



2ms/div.

### Power on Reset and No Signal
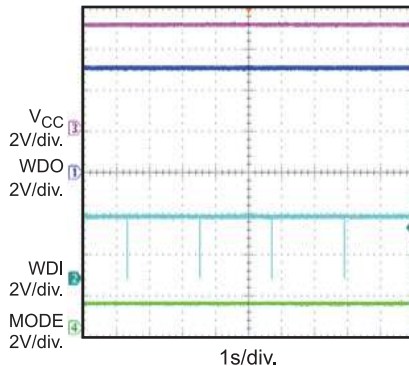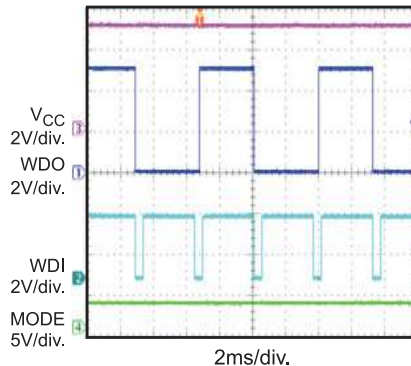Mode=3V, WDI=3V, WDI Period=5s



100ms/div.

### Sync&No Triggered Signal
Mode=3V, WDI_OK=500µs, WDI Period=5s



1s/div.

### Sync&Triggered in Open Window
Mode=3V, WDI_OK=500µs, WDI Period=2.2s



1s/div.

### Sync&Triggered in Close Window
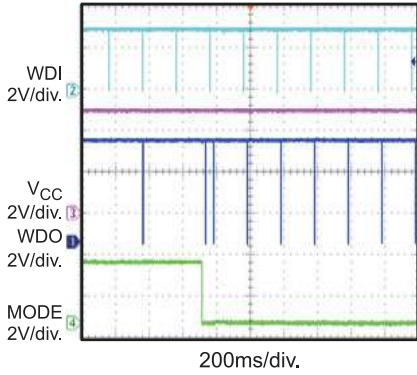Mode=3V, WDI_OK=500µs, WDI Period=3.6ms



2ms/div.

# EVB TEST RESULTS *(continued)*

**Performance waveforms are tested on the evaluation board.**
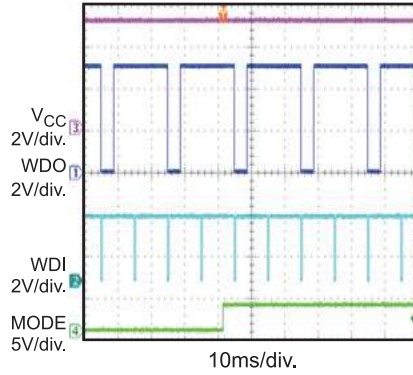$V_{CC}$ = 5V, $T_A$ = 25°C, unless otherwise noted.

**Long Close Mode
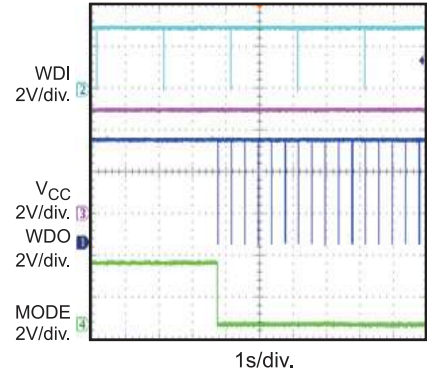to Short Close Mode**
WDI_OK=500µs, WDI Period=200ms

WDI
2V/div.

$V_{CC}$
2V/div.
WDO
2V/div.

MODE
2V/div.

200ms/div.

**Short Close Mode
to Long Close Mode**
WDI_OK=500µs, WDI Period=10ms

$V_{CC}$
2V/div.
WDO
2V/div.

WDI
2V/div.

MODE
5V/div.

10ms/div.

**Long Open Mode
to Short Close Mode**
WDI_OK=500µs, WDI Period=2s

WDI
2V/div.

$V_{CC}$
2V/div.
WDO
2V/div.

MODE
2V/div.

1s/div.

**Long Open Mode
to Short Close Mode**
WDI_OK=500µs, WDI Period=20ms

WDI
2V/div.

$V_{CC}$
2V/div.
WDO
2V/div.

MODE
2V/div.

20ms/div.
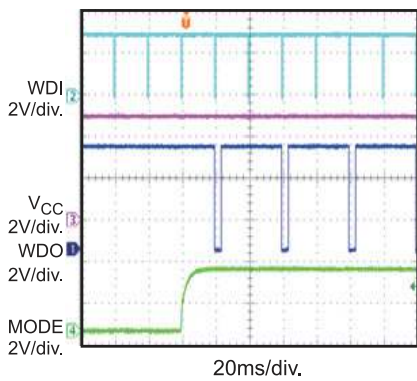
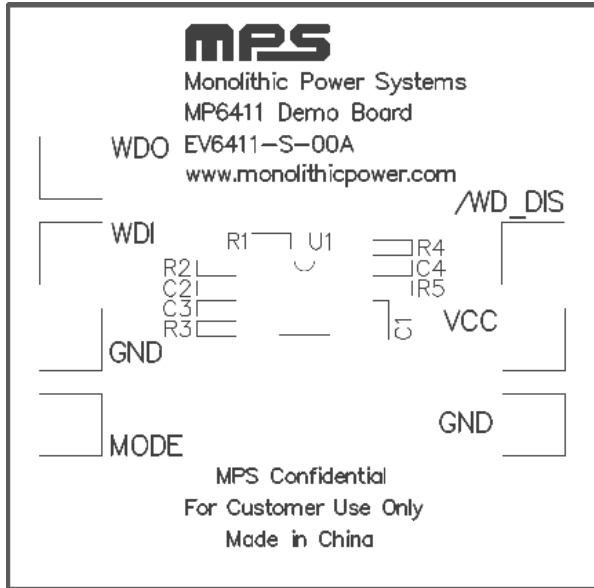# PRINTED CIRCUIT BOARD LAYOUT



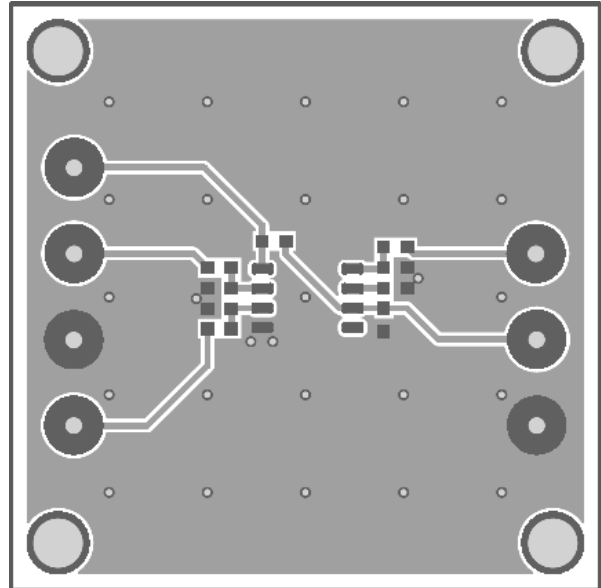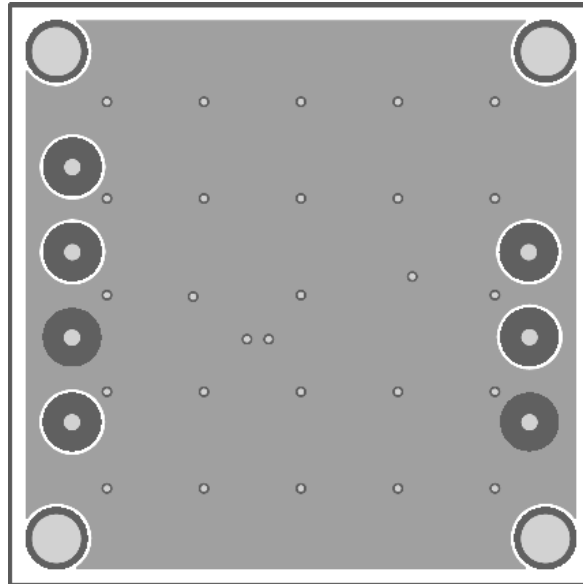**Figure 1: Top Silkscreen Layer**



**Figure 2: Top Layer**



**Figure 3: Bottom Layer**

# QUICK START GUIDE

1. Set the VCC to 5V ($\pm$10%).

2. Drive the /WD-DIS pin higher than 3.2V to enable the watchdog function, set the pin lower than 0.8V to disable the watchdog. Float this pin to turn on the watchdog.

3. Connect the WDI and WDO pin to MCU to receive the trigger signal and output reset signal respectively.

4. Use R5 to set the time-out. For R5=51kΩ, the period of timer T can be determined by:

$$T(\mu s) = 15.75 * R_5(k\Omega) + 73.5$$

5. To choose the window mode, apply a digital input to the MODE pin, Drive MODE higher than 3.2V to go to long window mode, drive MODE less than 0.8V to work as the short window mode. Float this pin to make the watchdog work as the long window mode.