

## Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump

### FEATURES

- Supply Voltage Range from 1 V to 5V
- Bigger than 100mA 6V output to drive Blue LED
- 24V<sub>PP</sub> Output from a 3V Supply
- Input Signal 1Hz to 50kHz
- No Voltage Cross Output at Shutdown Mode
- Low Current Consumption
- Automatic Standby and Wake-up Control
- Available QFN3\*3\_16 package
- OTP feature

### APPLICATIONS

- Health Care Systems
- Home Appliances
- Wrist Watches
- Handheld GPS devices

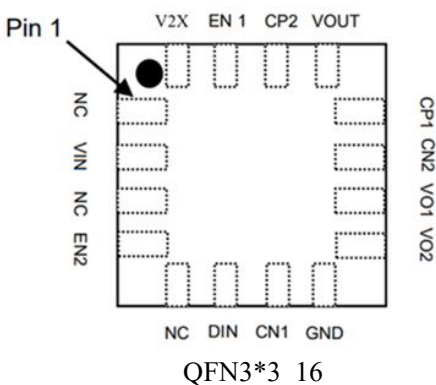
### PACKAGE

- PADs
- Security Devices
- Alarm Clocks

### DESCRIPTION

The SD118A is a switching driver with multi-mode charge pump for piezo-sounder. It can drive outputs up to 24V<sub>pp</sub> from 3V supply. For adjusting the piezoelectric sounder sound volume, the charge pump can operate in either of a 1x, 2x or 4x mode. Because SD118A has the shutdown function, it is suitable for the battery application. And more SD118A have a bigger than 100mA 6V output to drive blue LED.

SD118A includes built-in automatic shutdown and wake up that guarantees longer battery life. SD118A features thermal shutdown and output short protection circuits.

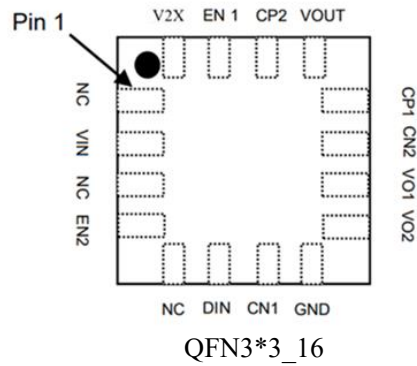


### ORDING INFORMATION

| Part Number | Package Type | Package Qty | Op Temp(°C) | Mark       |
|-------------|--------------|-------------|-------------|------------|
| SD118A      | QFN3*3_16    | 5000        | -40~85      | SD118A XXX |

# Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump

## PINOUT



## PIN FUNCTIONS

| QFN3*3_16 | PIN  |   | Function                      |
|-----------|------|---|-------------------------------|
| 1         | NC   | — | No Connection                 |
| 2         | VIN  | P | Power supply                  |
| 3         | NC   | — | No Connection                 |
| 4         | EN2  | I | Charge pump mode select 2     |
| 5         | NC   | — | No Connection                 |
| 6         | DIN  | I | Signal Input                  |
| 7         | CN1  | I | Capacitor 1 Negative Terminal |
| 8         | GND  | G | GND                           |
| 9         | VO2  | O | Positive Output               |
| 10        | VO1  | O | Negative Output               |
| 11        | CN2  | I | Capacitor 2 Negative Terminal |
| 12        | CP1  | I | Capacitor 1 Positive Terminal |
| 13        | VOUT | O | Boost Output                  |
| 14        | CP2  | I | Capacitor 2 Positive Terminal |
| 15        | EN1  | I | Charge pump mode select 1     |
| 16        | V2X  | O | Boost Vin                     |

(1)G = Ground, I = Input, O = Output, P = Power

## Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump

### ABSOLUTE MAXIMUM RATINGS<sup>(Note 1)</sup>

(@ T<sub>A</sub> = +25°C, unless otherwise specified.)

| Symbol           | Characteristics                      | Value                        | Unit |
|------------------|--------------------------------------|------------------------------|------|
| V <sub>IN</sub>  | Supply Voltage                       | -0.3 to 5.0                  | V    |
| V <sub>OUT</sub> | Output Voltage                       | -0.3 to 20                   | V    |
| V <sub>EN1</sub> | EN1 Voltage                          | -0.3 to V <sub>IN</sub> +0.3 | V    |
| T <sub>A</sub>   | Operating Free-Air Temperature Range | -40 to +85                   | °C   |
| T <sub>J</sub>   | Operating Junction Temperature Range | -40 to +150                  | °C   |
| T <sub>STG</sub> | Storage Temperature Range            | -65 to +150                  | °C   |

Note: 1. Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

### RECOMMENDED OPERATING CONDITIONS

(@ T<sub>A</sub> = +25°C, unless otherwise specified.)

| Symbol          | Characteristics | Conditions                | Min | Max | Unit |
|-----------------|-----------------|---------------------------|-----|-----|------|
| V <sub>IN</sub> | Supply Voltage  | 1x Mode, 2x Mode, 4x Mode | 1.3 | 5.0 | V    |

### ESD Susceptibility

|     |                      |     |    |
|-----|----------------------|-----|----|
| HBM | Human Body Model     | 4   | kV |
| MM  | Machine Model        | 600 | V  |
| CDM | Charged Device Model | 3   | kV |

### THERMAL INFORMATION

| Parameter                                | Symbol          | Package   | Maximum | Unit |
|------------------------------------------|-----------------|-----------|---------|------|
| Thermal Resistance (Junction to Ambient) | θ <sub>JA</sub> | QFN3*3_16 | 35      | °C/W |
| Thermal Resistance (Junction to Case)    | θ <sub>JC</sub> | QFN3*3_16 | 14      | °C/W |

## Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump

### ELECTRICAL CHARACTERISTICS

(@T<sub>A</sub> = +25°C, V<sub>IN</sub> = 3.0V, C<sub>PIEZO</sub> = 30nF, f<sub>DIN</sub> = 3 kHz, unless otherwise specified.)

| Parameter                    | Symbol           | Conditions                                                         | Min                 | Typ | Max                 | Unit |
|------------------------------|------------------|--------------------------------------------------------------------|---------------------|-----|---------------------|------|
| Output Voltage               | VOUT1            | 1x Mode                                                            | 1.2                 | —   | 5                   | V    |
|                              | VOUT2            | 2x Mode                                                            | 5.2                 | —   | 10.4                | V    |
|                              | VOUT3            | 4x Mode (Note 2)                                                   | 7.8                 | —   | 20                  | V    |
| Operating Current 1          | IDD11            | 1x Mode, C <sub>PIEZO</sub> = No Load                              | —                   | 150 | —                   | μA   |
|                              | IDD12            | 2x Mode, C <sub>PIEZO</sub> = No Load                              | —                   | 330 | —                   | μA   |
|                              | IDD13            | 4x Mode, C <sub>PIEZO</sub> = No Load                              | —                   | 600 | —                   | μA   |
| Operating Current 2          | IDD21            | 1x Mode, Single-ended application                                  | —                   | 0.5 | —                   | mA   |
|                              | IDD22            | 2x Mode, Single-ended application                                  | —                   | 2.0 | —                   | mA   |
|                              | IDD23            | 4x Mode, Single-ended application                                  | —                   | 7.6 | —                   | mA   |
| Operating Current 3          | IDD41            | 1x Mode, Differential application                                  | —                   | 0.3 | —                   | mA   |
|                              | IDD42            | 2x Mode, Differential application                                  | —                   | 1.1 | —                   | mA   |
|                              | IDD43            | 4x Mode, Differential application                                  | —                   | 3.8 | —                   | mA   |
| V2X                          | V2X              | V <sub>in</sub> =3V, Driving capability                            | 100                 |     |                     | mA   |
| Shutdown Current             | ISD              | DIN = 0V                                                           | —                   | 8   | 20                  | nA   |
| Input Frequency              | F <sub>in</sub>  | Rectangular pulse                                                  | —                   | 3   | —                   | kHz  |
| Oscillating Frequency        | F <sub>OSC</sub> | Charge Pump Frequency                                              | —                   | 220 | —                   | kHz  |
| VOUT Start Delay Time        | t <sub>ON1</sub> | 1x Mode, From DIN signal High to 90% V <sub>OUT</sub> steady state | —                   | 1   | —                   | mS   |
|                              | t <sub>ON2</sub> | 2x Mode, From DIN signal High to 90% V <sub>OUT</sub> steady state | —                   | 1   | —                   | mS   |
|                              | t <sub>ON3</sub> | 4 x Mode From DIN signal High to 90% V <sub>OUT</sub> steady state | —                   | 1   | —                   | mS   |
| Shutdown Delay Time          | t <sub>OFF</sub> | DIN = H- > L                                                       | —                   | 40  | —                   | ms   |
| Output Short-Circuit Current | ISC              | —                                                                  | —                   | 125 | —                   | mA   |
| Control Terminal Voltage H   | VIH              | EN1, EN2, DIN pins                                                 | 0.5*V <sub>IN</sub> | —   | V <sub>IN</sub>     | V    |
| Control Terminal Voltage L   | VIL              | EN1, EN2, DIN pins                                                 | 0                   | —   | 0.2*V <sub>IN</sub> | V    |
| Control Terminal Current 1   | IIH1             | DIN = 3V                                                           | —                   | 1.3 | —                   | μA   |
| Control Terminal Current 2   | IIH2             | V <sub>EN1</sub> = 3V, DIN = 3V                                    | —                   | 1.3 | —                   | μA   |
| Control Terminal Current 3   | IIH3             | V <sub>EN1</sub> = 3V, DIN = 0V                                    | —                   | —   | 1                   | μA   |

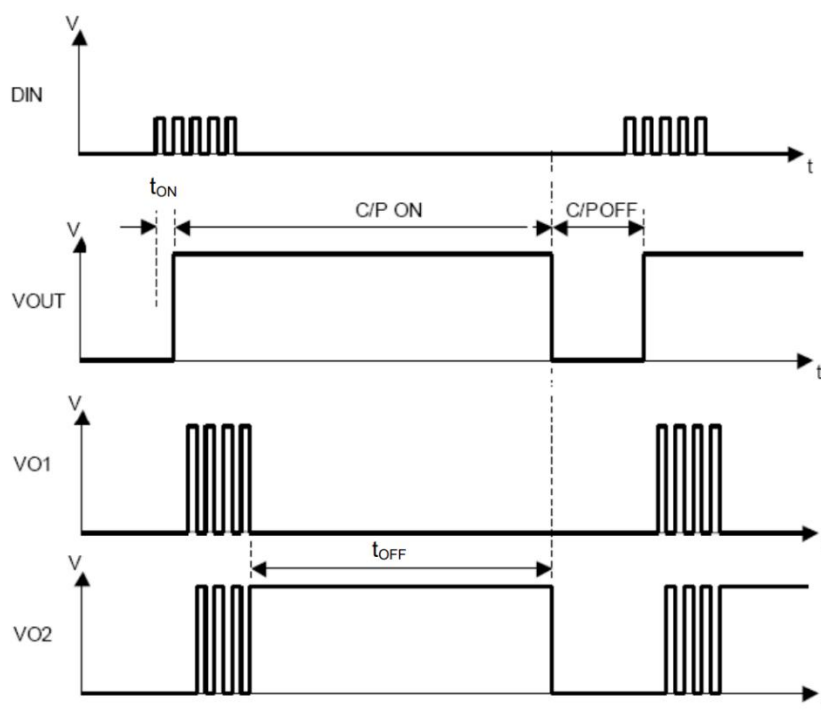
## Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump

### CHARGE PUMP MODE SETTING

| DIN | EN1 | EN2 | MODE          |
|-----|-----|-----|---------------|
| 0   | --  | --  | Shutdown Mode |
| 1   | 0   | 1   | 1x Mode       |
| 1   | 1   | 0   | 2x Mode       |
| 1   | 1   | 1   | 4x Mode       |

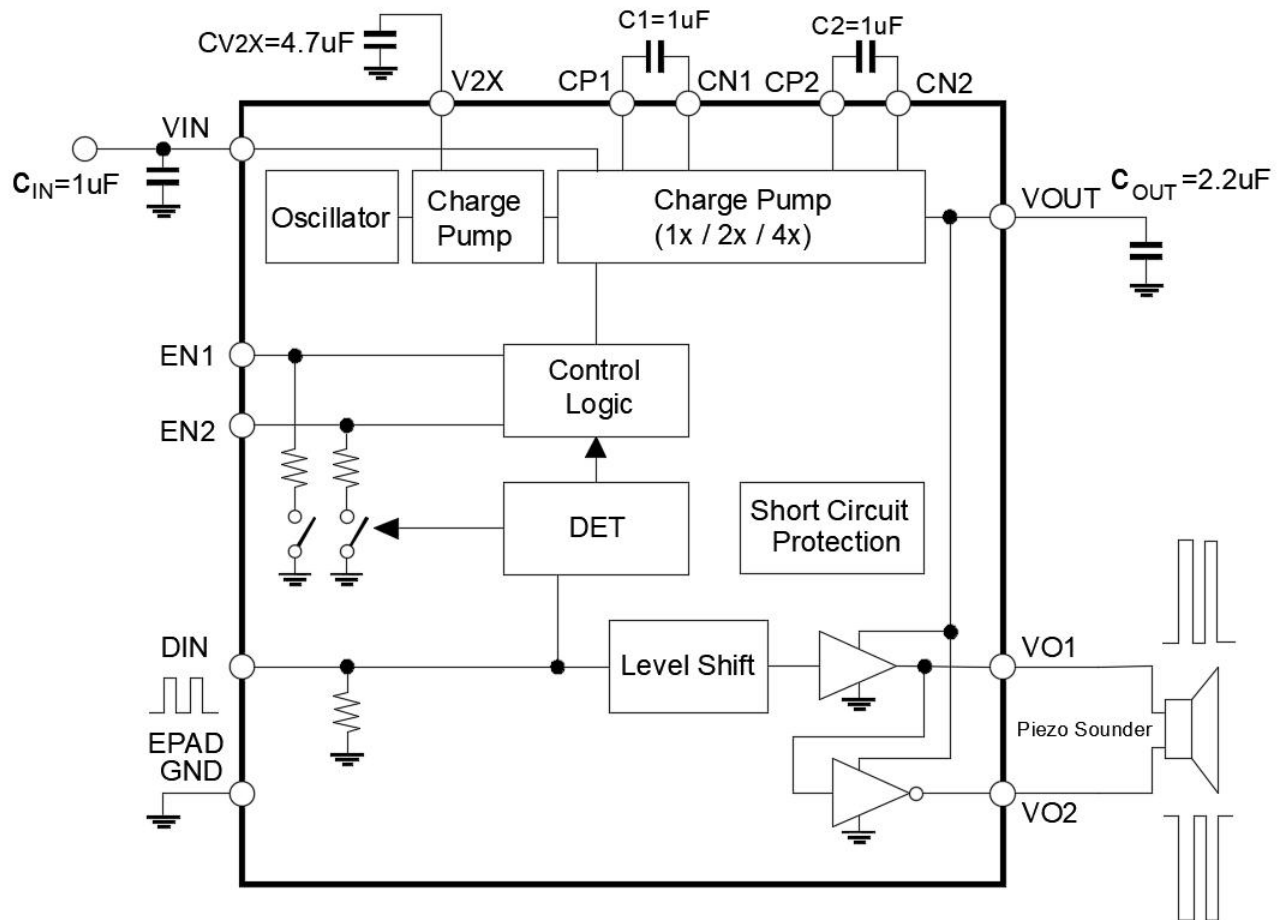
**Notes:** When DIN is triggered, EN1 and EN2 are prohibited from square-wave input or open-circuit state.

### TIMING CHART1



**Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump**

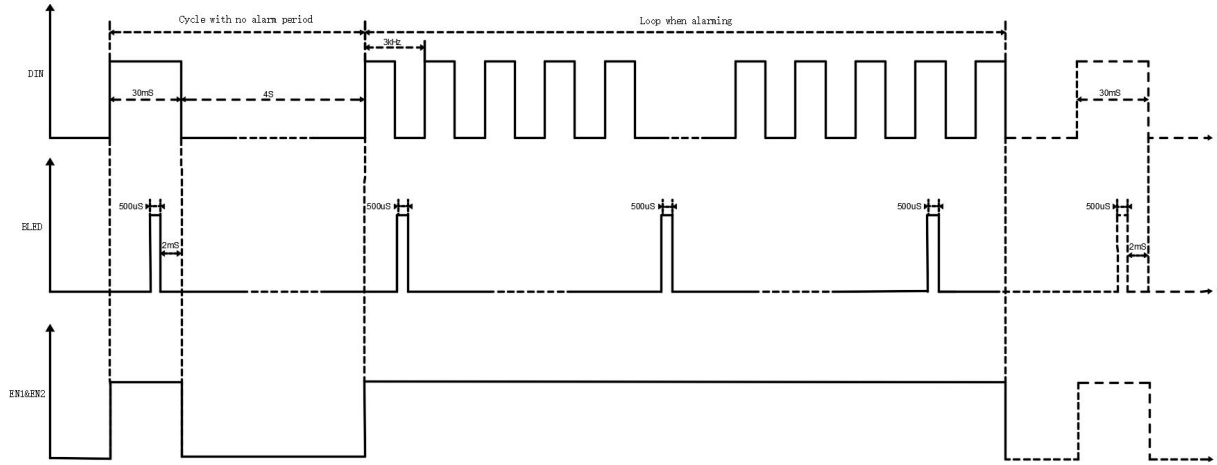
**APPLICATION CIRCUIT1**



**Application 1**

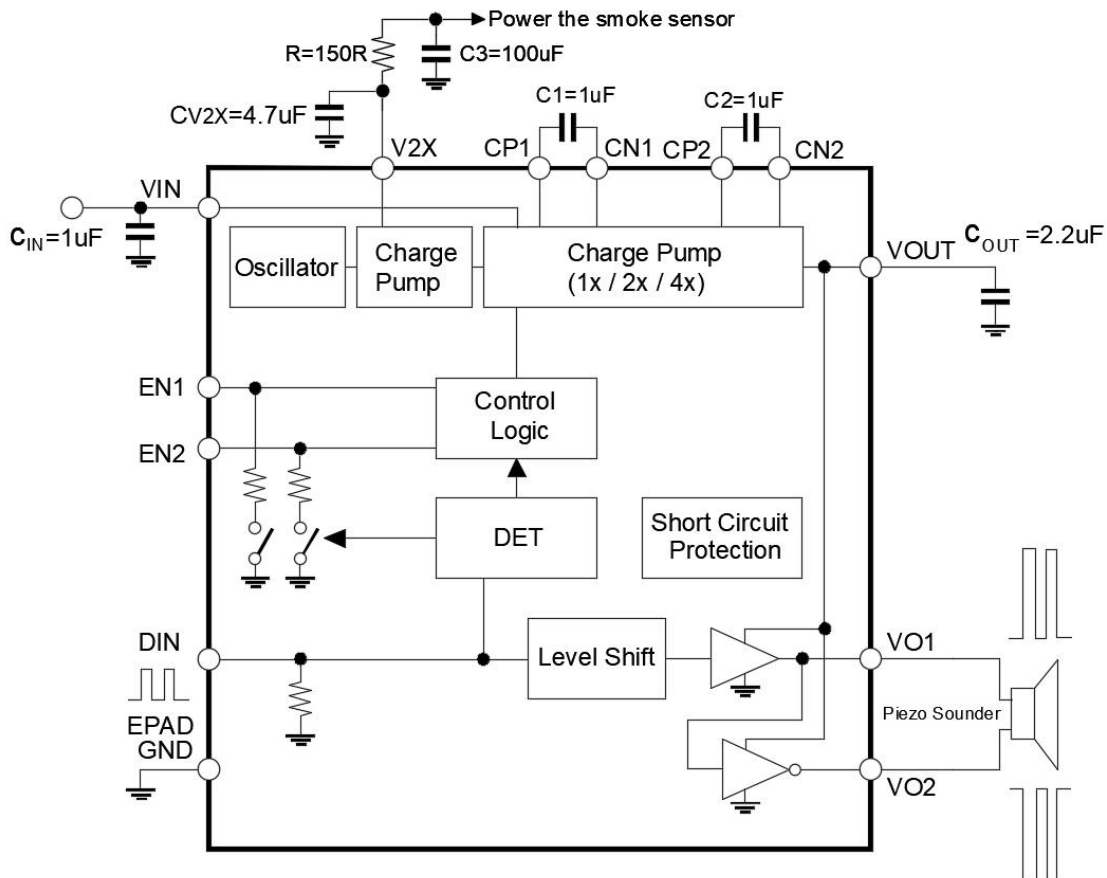
**Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump**

**TIMING CHART2**



**Smoke sensor Application Timing Diagram**

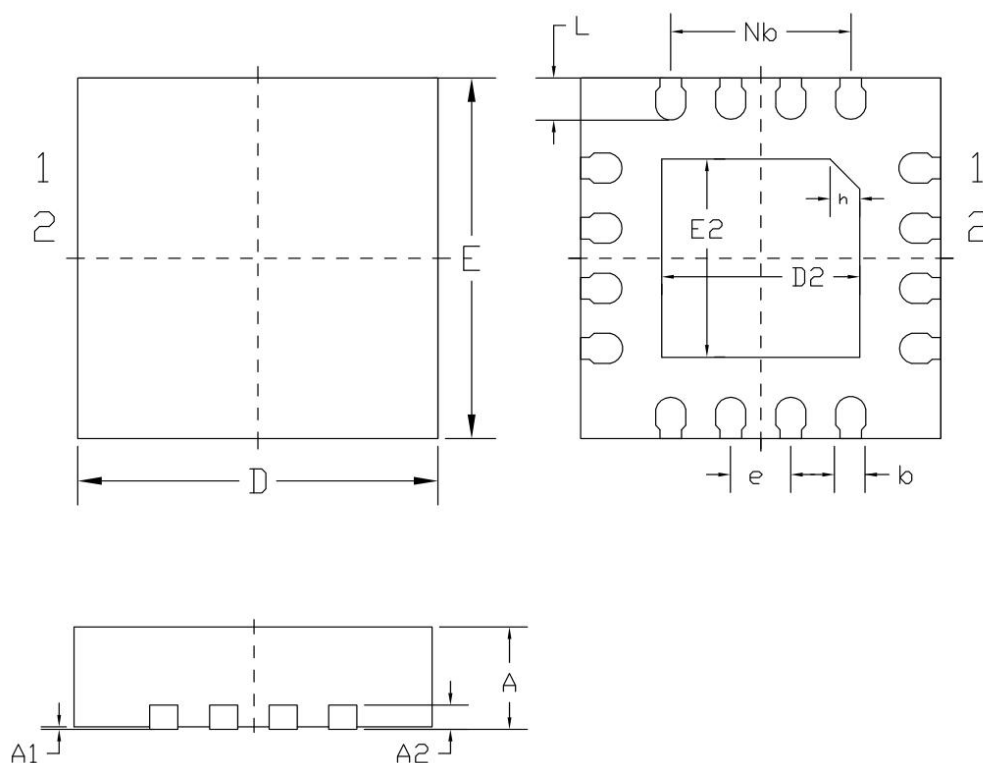
**APPLICATION CIRCUIT2**



**Smoke sensor Application**

**Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump**

**PACKAGE INFORMATION(QFN3\*3\_16)**



| MILLIMETER |          |      |      |
|------------|----------|------|------|
| SYMBOL     | MIN      | NOM  | MAX  |
| E          | 2.90     | 3.00 | 3.10 |
| D          | 2.90     | 3.00 | 3.10 |
| A          | 0.70     | 0.75 | 0.80 |
| A1         | 0.00     | 0.02 | 0.05 |
| A2         | 0.203REF |      |      |
| Nb         | 1.50BSC  |      |      |
| e          | 0.50BSC  |      |      |
| L          | 0.30     | 0.35 | 0.40 |
| b          | 0.20     | 0.25 | 0.30 |
| h          | 0.15     | 0.25 | 0.35 |
| D2         | 1.60     | 1.65 | 1.70 |
| E2         | 1.60     | 1.65 | 1.70 |

**Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump****Responsibility and Copyright Declaration**

Shenzhen Semihigh Technology Co., Ltd. has the right to make corrections, modifications, enhancements, improvements or other changes to the products and services provided. Customers should obtain the latest relevant information and verify whether this information is complete and up-to-date before placing an order. All products are sold in accordance with the sales terms and conditions provided during order confirmation.

Shenzhen Semihigh Technology Co., Ltd. assumes no obligation for application assistance or customer product design. Customers are solely responsible for their use of Shenzhen Semihigh's products and applications. To minimize risks associated with customer products and applications, customers should provide sufficient design and operational safety verification.

The customer acknowledges and agrees that although any application related information or support may still be provided by Semihigh, they will be solely responsible for meeting all legal, regulatory, and safety requirements related to their products and the use of Semihigh products in their applications. The customer declares and agrees that they possess all necessary professional skills and knowledge to develop and implement safety measures, foresee the dangerous consequences of faults, monitor faults and their consequences, reduce the probability of faults that may cause personal injury, and take appropriate remedial measures. The customer will fully compensate for any losses caused to Shenzhen Semihigh and its agents due to the use of any Shenzhen Semihigh products in such critical applications.

For the product manuals or data sheets of Shenzhen Semihigh, copying is only allowed without any tampering with the content and with relevant authorization, conditions, restrictions, and statements. Shenzhen Semihigh assumes no responsibility or obligation for such tampered documents. Copying third-party information may require additional restrictions.

Shenzhen Semihigh will update the content of this document from time to time. The actual parameters of the product may vary due to different models or other matters. This document does not serve as any express or implied warranty or authorization

When reselling Shenzhen Semihigh products, if there is a discrepancy or false content between the description of the product parameters and the parameters indicated by Shenzhen Semihigh, all express or implied authorizations related to Shenzhen Semihigh products will be lost, and this is an improper and fraudulent business behavior. Shenzhen Semihigh assumes no responsibility or obligation for any such false statements.

**Blue LED Driver and Piezo-sounder Driver with Multi-mode charge pump****REVISION HISTORY****Document revision history**

| Data        | Version | Changes          |
|-------------|---------|------------------|
| 18-May-2026 | Ver1.0  | First issue Spec |