



## HTT50N06

60V N-Channel MOSFET

### ● Features:

■ 50A, 60V,  $R_{DS(on)}(Typ) = 13m\Omega @ V_{GS}=10V$

■ Low Gate Charge

■ Low  $C_{rss}$

■ 100% Avalanche Tested

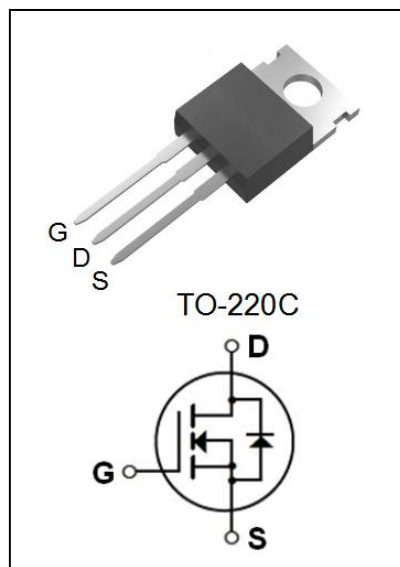
■ Fast Switching

■ Improved dv/dt Capability

### ● Application:

■ High Frequency Switching Mode Power Supply

■ Active Power Factor Correction



### Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ unless otherwise noted)

| Symbol    | Parameter                                                                                            | Value       | Unit                |
|-----------|------------------------------------------------------------------------------------------------------|-------------|---------------------|
| $V_{DSS}$ | Drain-Source Voltage                                                                                 | 60          | V                   |
| $I_D$     | Drain Current<br>- Continuous ( $T_c=25^\circ\text{C}$ )<br>- Continuous ( $T_c=100^\circ\text{C}$ ) | 50*         | A                   |
|           |                                                                                                      | 31.6*       | A                   |
| $I_{DM}$  | Drain Current - Pulsed                                                                               | 200*        | A                   |
| $V_{GSS}$ | Gate-Source Voltage                                                                                  | $\pm 20$    | V                   |
| $E_{AS}$  | Single Pulsed Avalanche Energy<br>(Limit Reference Value) (Note5)                                    | 79          | mJ                  |
| $P_D$     | Power Dissipation ( $T_c = 25^\circ\text{C}$ )<br>- Derate above $25^\circ\text{C}$                  | 62          | W                   |
|           |                                                                                                      | 0.50        | W/ $^\circ\text{C}$ |
| $T_j$     | Operating Junction Temperature                                                                       | 150         | $^\circ\text{C}$    |
| $T_{stg}$ | Storage Temperature Range                                                                            | -55 to +150 | $^\circ\text{C}$    |

### Thermal Characteristics

| Symbol          | Parameter                                    | Max  | Unit                        |
|-----------------|----------------------------------------------|------|-----------------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case (Note2) | 2.02 | $^\circ\text{C} / \text{W}$ |

|                                                                                  |                             |
|----------------------------------------------------------------------------------|-----------------------------|
|  | <b>HTT50N06</b>             |
|                                                                                  | <b>60V N-Channel MOSFET</b> |

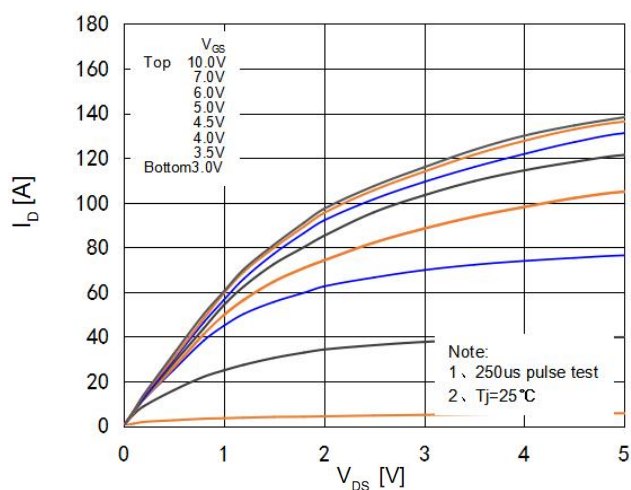
### Electrical Characteristics(Tc=25°C unless otherwise noted)

| Symbol                                                 | Parameter                                                     | Test Conditons                                                                            | Min | Typ  | Max  | Unit |
|--------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----|------|------|------|
| Off Characteristics                                    |                                                               |                                                                                           |     |      |      |      |
| BV <sub>DSS</sub>                                      | Drain-source Breakdown Voltage                                | V <sub>GS</sub> =0V ,I <sub>D</sub> =250μA                                                | 60  | --   | --   | V    |
| I <sub>DSS</sub>                                       | Zero Gate Voltage Drain Current                               | V <sub>DS</sub> =60V,V <sub>GS</sub> =0V                                                  | --  | --   | 1    | μA   |
| I <sub>GSSF</sub>                                      | Gate-Body Leakage Current,Forward                             | V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V                                                | --  | --   | 100  | nA   |
| I <sub>GSSR</sub>                                      | Gate-Body Leakage Current,Reverse                             | V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V                                                | --  | --   | -100 | nA   |
| On Characteristics (Note3)                             |                                                               |                                                                                           |     |      |      |      |
| V <sub>GS(th)</sub>                                    | Gate Threshold Voltage                                        | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                                 | 1.0 | 1.8  | 2.8  | V    |
| R <sub>DS(on)</sub>                                    | Static Drain-Source On-Resistance                             | V <sub>GS</sub> =10 V, I <sub>D</sub> =25A                                                | --  | 13   | 20   | mΩ   |
| R <sub>DS(on)</sub>                                    | Static Drain-Source On-Resistance                             | V <sub>GS</sub> =6 V, I <sub>D</sub> =25A                                                 | --  | 16   | 25   | mΩ   |
| Dynamic Characteristics (Note4)                        |                                                               |                                                                                           |     |      |      |      |
| C <sub>iss</sub>                                       | Input Capacitance                                             | V <sub>DS</sub> =25V,V <sub>GS</sub> =0V,<br>f=1.0MHz                                     | --  | 1750 | --   | pF   |
| C <sub>oss</sub>                                       | Output Capacitance                                            |                                                                                           | --  | 116  | --   | pF   |
| C <sub>rss</sub>                                       | Reverse Transfer Capacitance                                  |                                                                                           | --  | 95   | --   | pF   |
| Switching Characteristics (Note4)                      |                                                               |                                                                                           |     |      |      |      |
| t <sub>d(on)</sub>                                     | Turn-On Delay Time                                            | V <sub>DD</sub> = 30 V, I <sub>D</sub> =15 A,<br>R <sub>G</sub> =3Ω, V <sub>GS</sub> =10V | --  | 7.8  | --   | ns   |
| t <sub>r</sub>                                         | Turn-On Rise Time                                             |                                                                                           | --  | 49   | --   | ns   |
| t <sub>d(off)</sub>                                    | Turn-Off Delay Time                                           |                                                                                           | --  | 18   | --   | ns   |
| t <sub>f</sub>                                         | Turn-Off Fall Time                                            |                                                                                           | --  | 8.7  | --   | ns   |
| Q <sub>g</sub>                                         | Total Gate Charge                                             | V <sub>DS</sub> =48 V, I <sub>D</sub> =15A,<br>V <sub>GS</sub> = 10 V                     | --  | 17   | --   | nC   |
| Q <sub>gs</sub>                                        | Gate-Source Charge                                            |                                                                                           | --  | 5.5  | --   | nC   |
| Q <sub>gd</sub>                                        | Gate-Drain Charge                                             |                                                                                           | --  | 2.7  | --   | nC   |
| Drain-Source Diode Characteristics and Maximum Ratings |                                                               |                                                                                           |     |      |      |      |
| I <sub>S</sub>                                         | Maximum Continuous Drain-Source Diode Forward Current (Note2) |                                                                                           | --  | --   | 50   | A    |
| I <sub>SM</sub>                                        | Maximum Pulsed Drain-Source Diode Forward Current             |                                                                                           | --  | --   | 200  | A    |
| V <sub>SD</sub>                                        | Drain-Source Diode Forward Voltage                            | V <sub>GS</sub> =0V,I <sub>S</sub> =25A (Note3)                                           | --  | --   | 1.4  | V    |
| t <sub>rr</sub>                                        | Reverse Recovery Time                                         | V <sub>GS</sub> =0V, I <sub>S</sub> =15A,<br>d I <sub>F</sub> /dt=100A/μs (Note3)         | --  | 49   | --   | ns   |
| Q <sub>rr</sub>                                        | Reverse Recovery Charge                                       |                                                                                           | --  | 47   | --   | nC   |

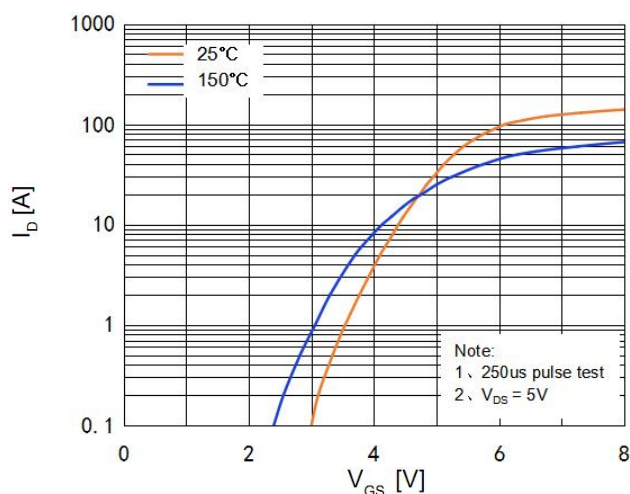
Notes:

- 1、Repetitive Rating:Pulse Width Limited by Maximum Junction Temperature.
- 2、Surface Mounted on FR4 Board, t ≤ 10 sec.
- 3、Pulse Test : Pulse Width ≤300 μ s, Duty Cycle≤2%.
- 4、Guaranteed by design, not subject to production.
- 5、EAS condition: L = 0.5mH, I<sub>AS</sub> =13A, V<sub>DD</sub> = 35V, R<sub>G</sub> = 25 Ω, Starting T<sub>J</sub> = 25°C.

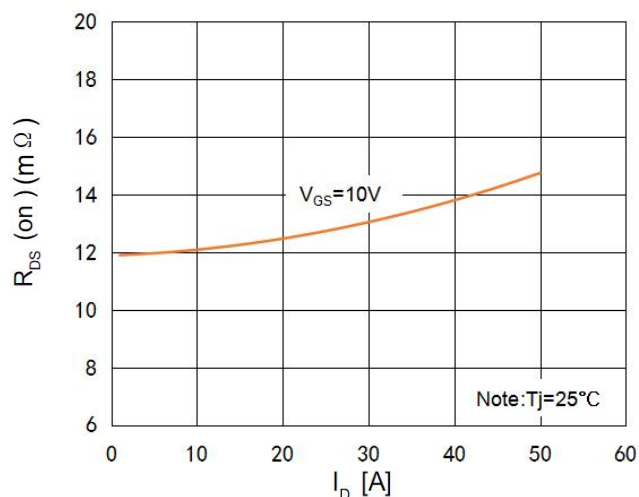
### On-Regin Characteristics



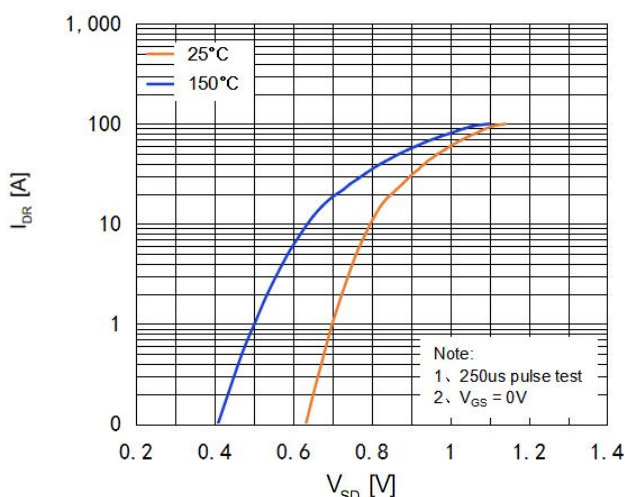
### Transfer Characteristics



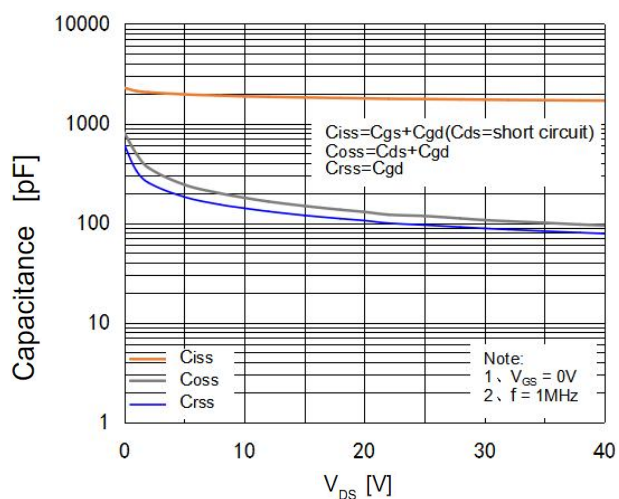
### On-Resistance Variation vs. Drain Current and Gate Voltage



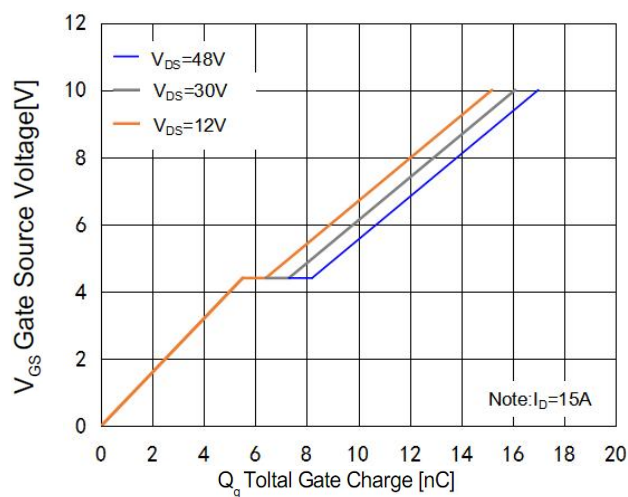
### Body Diode Forward Voltage Variation vs. Source Current and Temperature



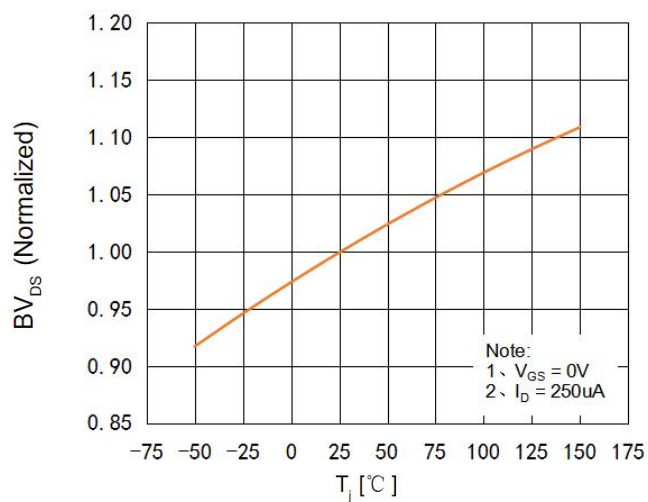
### Capacitance Characteristics



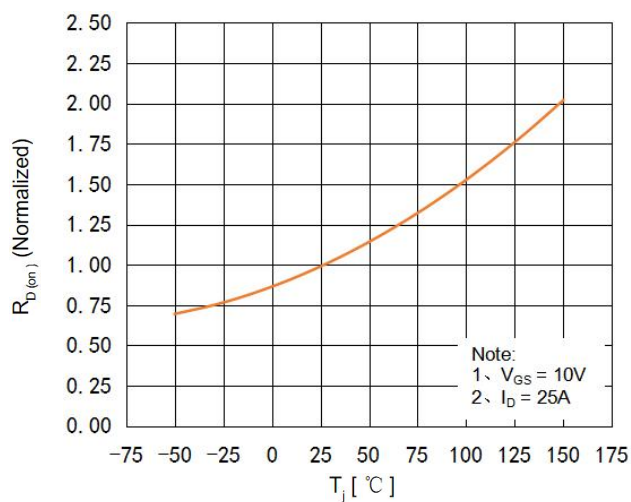
### Gate Charge Characteristics



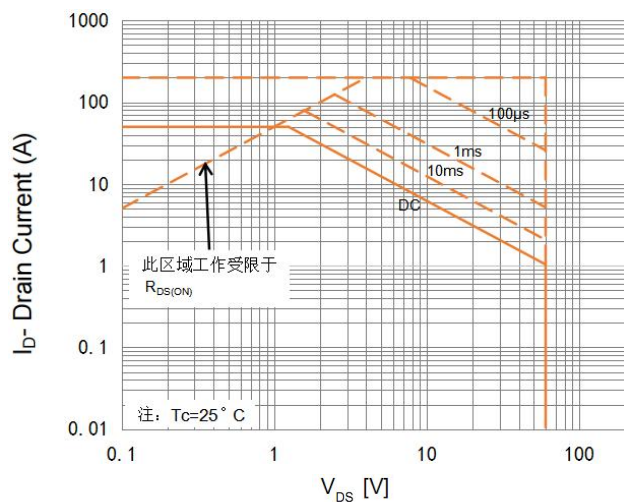
### Breakdown Voltage Variation vs. Temperature



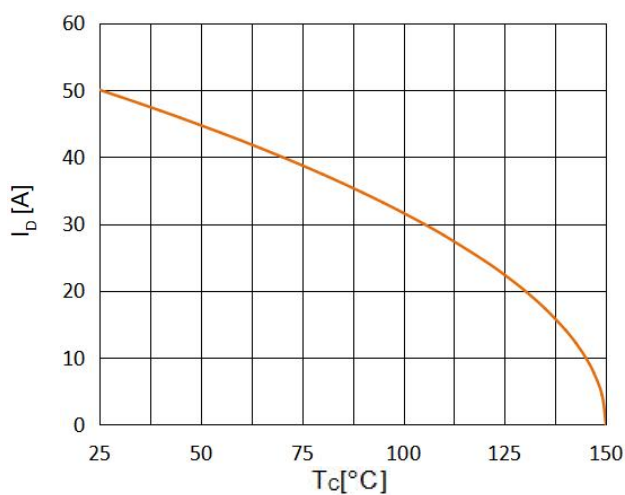
### On-Resistance Variation vs. Temperature



### Maximum Safe Operating Area



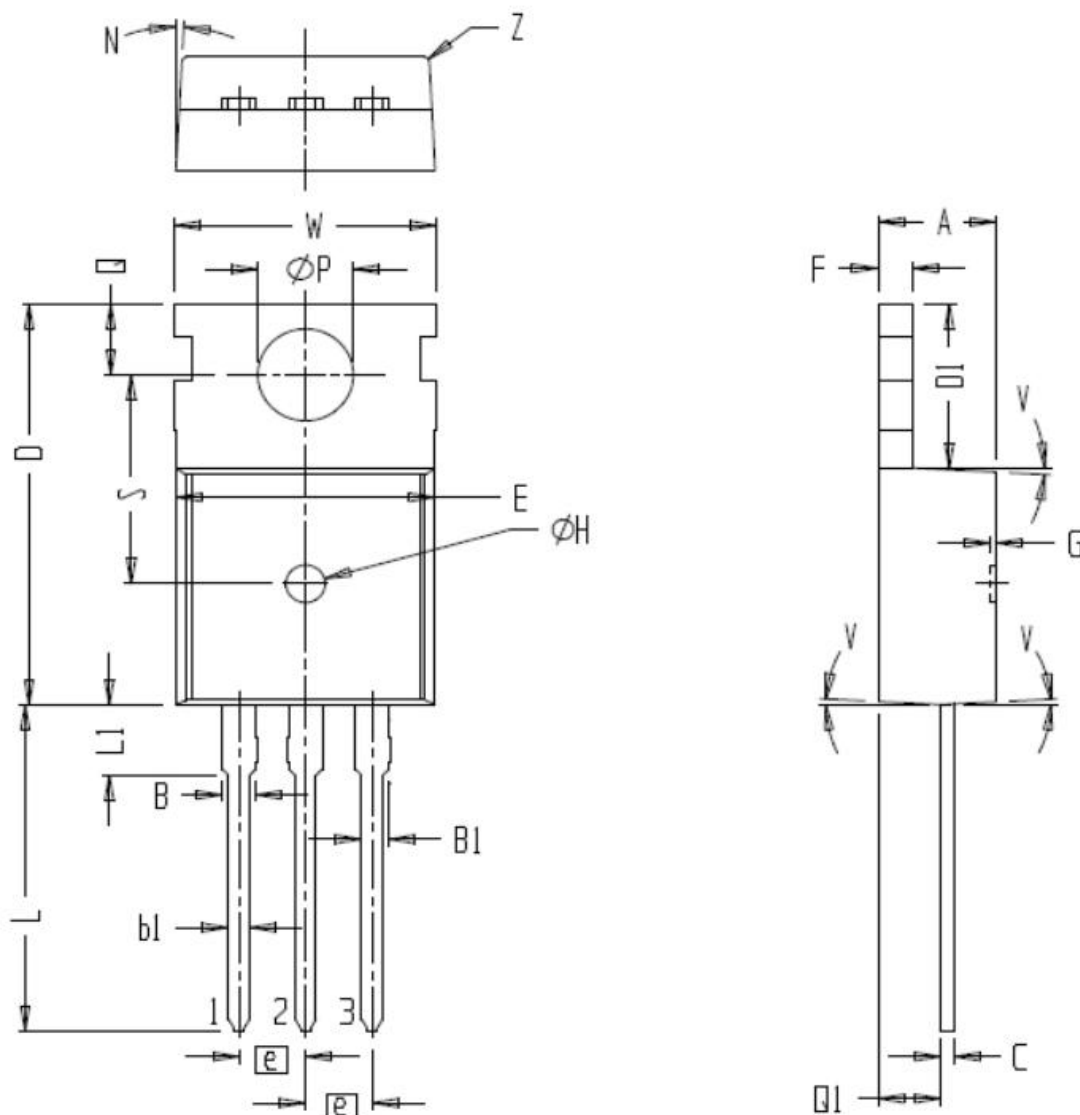
### Maximum Drain Current Vs. Case Temperature



**TO-220C Package Dimensions**

UNIT: mm

| SYMBOL   | min   | nom   | max   | SYMBOL   | min   | nom   | max   |
|----------|-------|-------|-------|----------|-------|-------|-------|
| A        | 4.00  | 4.40  | 4.80  | E        | 9.40  | 9.90  | 10.40 |
| B        | 1.17  | 1.32  | 1.47  | e        |       | 2.54  |       |
| B1       | 0.91  | 1.06  | 1.21  | F        | 1.15  | 1.30  | 1.45  |
| b1       | 0.65  | 0.80  | 0.95  | L        | 12.00 | 13.00 | 14.00 |
| c        | 0.40  | 0.50  | 0.60  | L1       | 2.50  | 3.00  | 3.50  |
| D        | 14.90 | 15.90 | 16.90 | Q        | 2.30  | 2.80  | 3.30  |
| D1       | 6.10  | 6.60  | 7.10  | Q1       | 1.90  | 2.40  | 2.90  |
| W        | 9.50  | 10.00 | 10.50 | $\phi P$ | 3.40  | 3.65  | 3.90  |
| S        |       | 8.30  |       | Z        | 0     |       | 0.20  |
| $\phi H$ |       | 1.50  |       | N        |       | 3 °   |       |
| G        |       | 0.10  |       | V        |       | 3 °   |       |



|                                                                                  |                      |
|----------------------------------------------------------------------------------|----------------------|
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|                                                                                  | 60V N-Channel MOSFET |

注意事项：

- 1、在电路设计时请不要超过器件的最大额定值，否则会影响整机的可靠性。
- 2、MOSFET产品为静电敏感型器件，使用时应注意采取防静电保护措施，如佩戴防静电手环、设备接地等。
- 3、如需安装散热片，请注意控制扭力大小及散热片的平整度。
- 4、该规格书由华科公司制作，并可能不定期更改，恕不另行通知。
- 5、如有疑问，请及时联系我司销售代表。

版本履历表：

| 序号 | 版本号  | 修改时间      | 修改记录 |
|----|------|-----------|------|
| 1  | V1.0 | 2023-3-22 | 首次发行 |
|    |      |           |      |