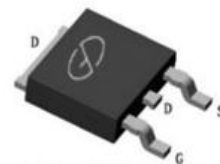


## N-Channel 800V (D-S) SiC MOSFET

### Features

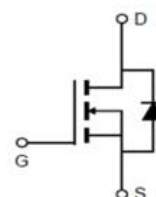
- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant



TO-252

### Applications

- Switch mode power supplies
- Renewable energy
- On Board Charger
- High voltage DC/DC converters



### Absolute Maximum Ratings (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                                           | Symbol                           | Ratings     | Unit |
|-----------------------------------------------------|----------------------------------|-------------|------|
| Drain Source Voltage                                | V <sub>DS</sub>                  | 800         | V    |
| Gate Source Voltage                                 | V <sub>GS</sub>                  | -8/+22      | V    |
| Recommend Gate Source Voltage                       | V <sub>GSop</sub>                | -4/+18      | V    |
| Drain Current Continuous<br>V <sub>GS</sub> =18V    | I <sub>D</sub>                   | 14.7        | A    |
|                                                     |                                  | 8.5         |      |
| Power Dissipation                                   | P <sub>D</sub>                   | 79          | W    |
| Operating Temperature and Storage Temperature Range | T <sub>J</sub> /T <sub>STG</sub> | -55 to +175 | °C   |

### Thermal Characteristics

| Parameter                              | Symbol            | Max. | Unit |
|----------------------------------------|-------------------|------|------|
| Thermal Resistance Junction to Case    | R <sub>thJC</sub> | 1.9  | °C/W |
| Thermal Resistance Junction to Ambient | R <sub>thJA</sub> | 40   | °C/W |

## Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                        | Symbol               | Test Conditions                                                                                        | Min. | Typ.  | Max. | Unit |
|----------------------------------|----------------------|--------------------------------------------------------------------------------------------------------|------|-------|------|------|
| Drain Source Breakdown Voltage   | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =100μA                                                             | 800  | --    | --   | V    |
| Gate Leakage Current             | I <sub>GSS</sub>     | V <sub>GS</sub> =18V, V <sub>DS</sub> =0V                                                              | --   | --    | 100  | nA   |
| Zero Gate Voltage Drain Current  | I <sub>DSS</sub>     | V <sub>DS</sub> =800V, V <sub>GS</sub> =0V                                                             | --   | 1     | 5    | μA   |
| Gate Threshold Voltage           | V <sub>GS(TH)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =1mA                                                | 2    | 3     | 4    | V    |
|                                  |                      | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =1mA, T <sub>J</sub> =175°C                         | --   | 2     | --   |      |
| Drain-Source On-state Resistance | R <sub>DS(on)</sub>  | V <sub>GS</sub> =18V, I <sub>D</sub> =3.6A                                                             | --   | 230   | 300  | mΩ   |
|                                  |                      | V <sub>GS</sub> =18V, I <sub>D</sub> =3.6A, T <sub>J</sub> =175°C                                      | --   | 270   | --   |      |
| Drain-Source On-state Resistance | R <sub>DS(on)</sub>  | V <sub>GS</sub> =15V, I <sub>D</sub> =3.6A                                                             | --   | 295   | 360  | mΩ   |
|                                  |                      | V <sub>GS</sub> =15V, I <sub>D</sub> =3.6A, T <sub>J</sub> =175°C                                      | --   | 350   | --   |      |
| Total Gate Charge                | Q <sub>g</sub>       | V <sub>GS(off)</sub> =-4V, V <sub>GS(on)</sub> =18V<br>V <sub>DD</sub> =600V, I <sub>D</sub> =3.6A     | --   | 14.1  | --   | nC   |
| Gate Source Charge               | Q <sub>gs</sub>      |                                                                                                        | --   | 2.78  | --   |      |
| Gate Drain Charge                | Q <sub>gd</sub>      |                                                                                                        | --   | 8.97  | --   |      |
| Turn-On Switching Energy         | E <sub>ON</sub>      | V <sub>GS</sub> =-4/+18V, V <sub>DD</sub> =600V ·<br>I <sub>D</sub> =3.6A, R <sub>G</sub> =5Ω, L=100uH | --   | 42.5  | --   | μJ   |
| Turn-Off Switching Energy        | E <sub>OFF</sub>     |                                                                                                        | --   | 7.1   | --   |      |
| Turn-on Delay Time               | t <sub>d(on)</sub>   |                                                                                                        | --   | 4.3   | --   | ns   |
| Turn-on Rise Time                | t <sub>r</sub>       |                                                                                                        | --   | 9     | --   |      |
| Turn-off Delay Time              | t <sub>d(off)</sub>  |                                                                                                        | --   | 8.6   | --   |      |
| Turn-off Fall Time               | t <sub>f</sub>       |                                                                                                        | --   | 30.6  | --   |      |
| Input Capacitance                | C <sub>iss</sub>     | V <sub>GS</sub> =0V, V <sub>DS</sub> =600V,<br>V <sub>AC</sub> =25mV, f=1MHz                           | --   | 287.9 | --   | pF   |
| Output Capacitance               | C <sub>oss</sub>     |                                                                                                        | --   | 21.84 | --   |      |
| Reverse Transfer Capacitance     | C <sub>rss</sub>     |                                                                                                        | --   | 2.31  | --   |      |
| Gate resistance                  | R <sub>G</sub>       | V <sub>AC</sub> = 25mV, f=1MHz                                                                         | --   | 3.8   | --   | Ω    |

## Reverse Diode Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                        | Symbol           | Test Conditions                                                                     | Min. | Typ. | Max. | Unit |
|----------------------------------|------------------|-------------------------------------------------------------------------------------|------|------|------|------|
| Diode Forward Voltage            | V <sub>SD</sub>  | I <sub>SD</sub> =1.8A, V <sub>GS</sub> =-4V                                         | --   | 4.2  | --   | V    |
|                                  |                  | I <sub>SD</sub> =1.8A, V <sub>GS</sub> =-4V, T <sub>J</sub> =175°C                  | --   | 3.8  | --   |      |
| Continuous Diode Forward Current | I <sub>SD</sub>  | V <sub>GS</sub> =-4V                                                                | --   | 14.7 | --   | A    |
| Reverse Recovery Time            | t <sub>rr</sub>  | V <sub>R</sub> =600V, I <sub>F</sub> =3.6A,<br>V <sub>GS</sub> =-4V, di/dt=1000A/μs | --   | 10.7 | --   | ns   |
| Reverse Recovery Charge          | Q <sub>rr</sub>  |                                                                                     | --   | 23   | --   | nC   |
| Reverse Recovery Energy          | E <sub>REC</sub> |                                                                                     | --   | 0.45 | --   | μJ   |
| Peak Reverse Recovery Current    | I <sub>rrm</sub> |                                                                                     | --   | 2.46 | --   | A    |
| Charge Time                      | t <sub>A</sub>   |                                                                                     | --   | 7.1  | --   | ns   |
| DisCharge Time                   | t <sub>B</sub>   |                                                                                     | --   | 3.6  | --   | ns   |

## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Figure 1. Output Characteristic ( $T_J = -55^\circ\text{C}$ )

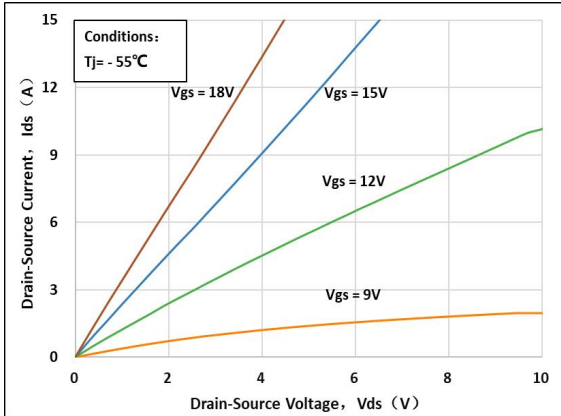


Figure 2. Output Characteristic ( $T_J = 25^\circ\text{C}$ )

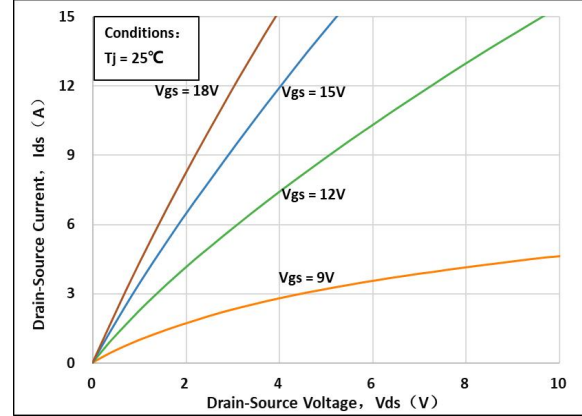


Figure 3. Output Characteristic ( $T_J = 175^\circ\text{C}$ )

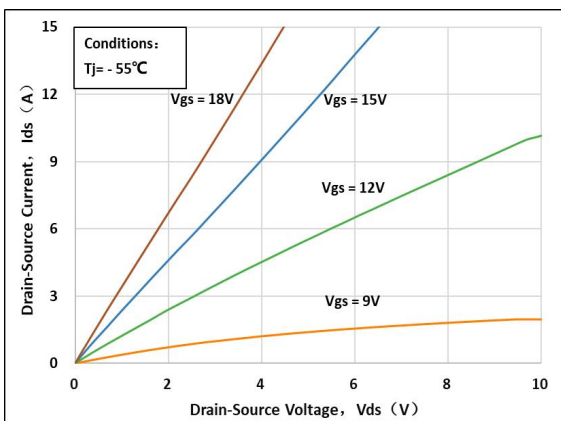


Figure 4.  $R_{DS(on)}$  Vs  $I_{DS}$  Characteristic

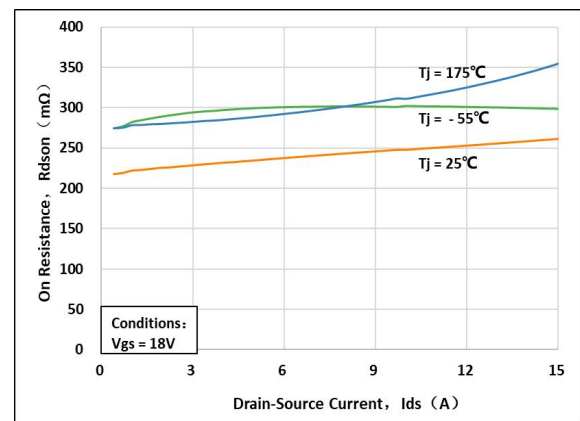


Figure 5.  $R_{DS(on)}$  vs. Temperature

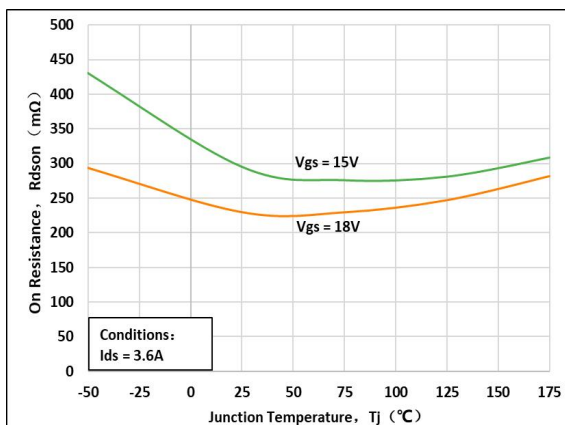
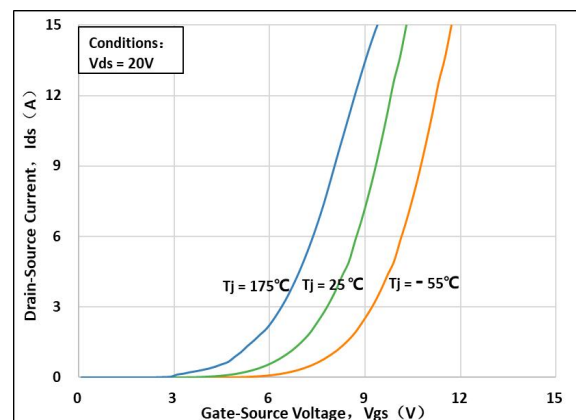


Figure 6. Transfer Characteristic



## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Figure 7: Body-diode Characteristic ( $T_J = -55^\circ\text{C}$ )

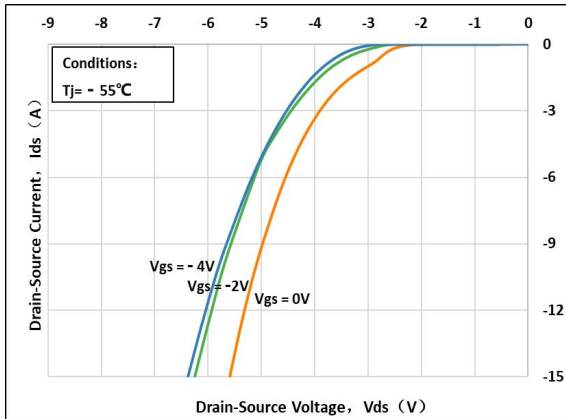


Figure 8: Body-diode Characteristic ( $T_J = 25^\circ\text{C}$ )

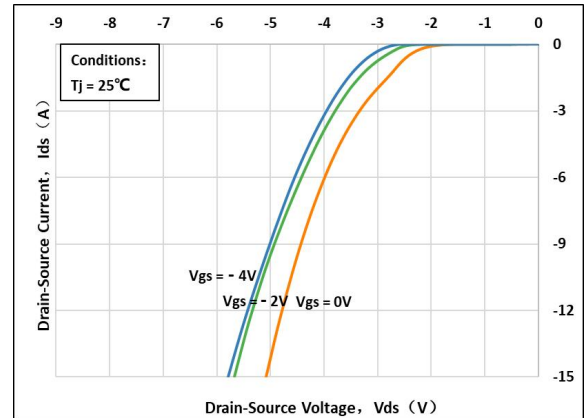


Figure 9: Body-diode Characteristic ( $T_J = 175^\circ\text{C}$ )

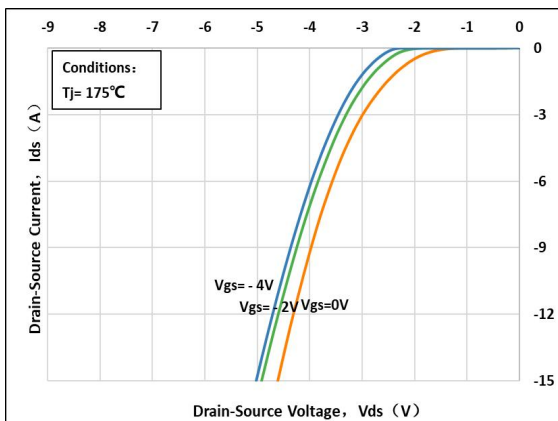


Figure 10:  $V_{TH}$  Vs  $T_J$  Temperature Characteristic

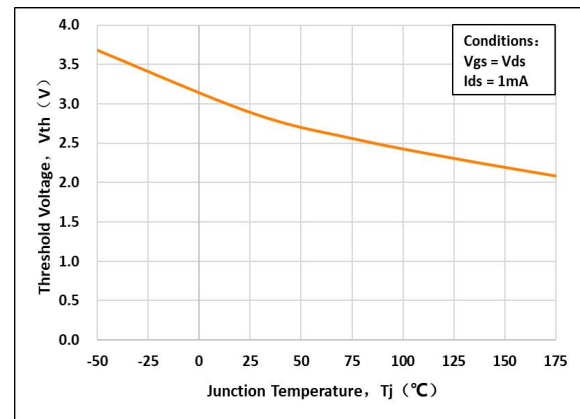


Figure 11: 3rd Quadrant Characteristic ( $T_J = -55^\circ\text{C}$ )

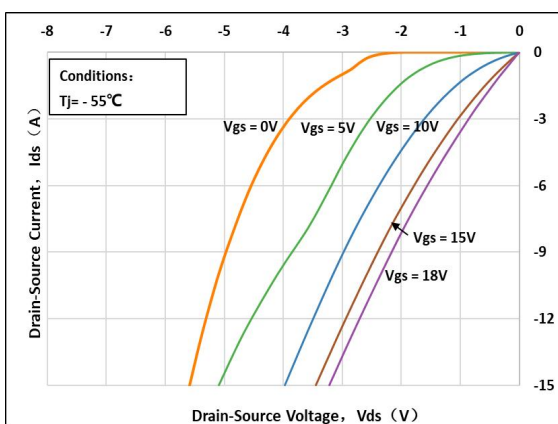
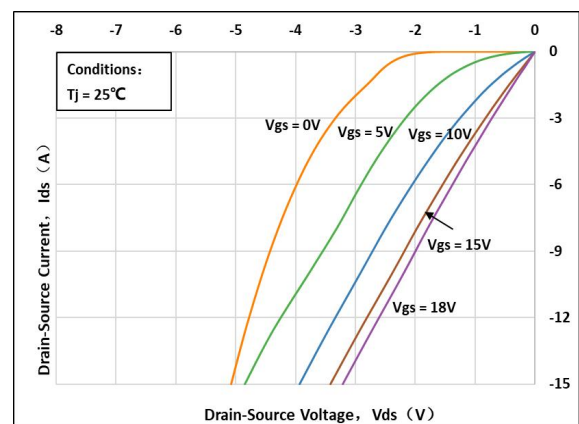


Figure 12: 3rd Quadrant Characteristic ( $T_J = 25^\circ\text{C}$ )



## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Figure 13: 3rd Quadrant Characteristic( $T_J=175^\circ\text{C}$ )

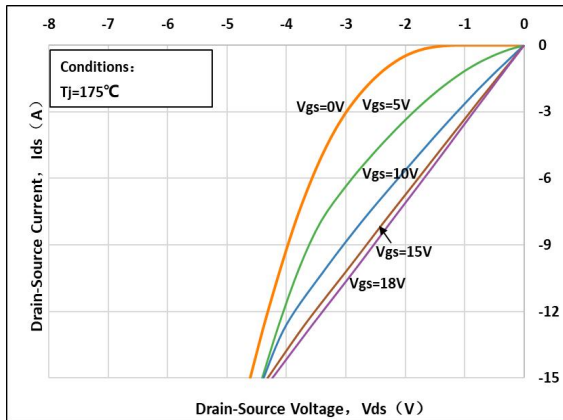


Figure 14: Gate Charge Characteristics

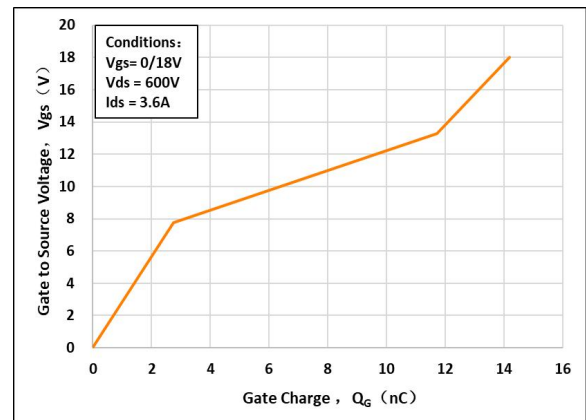


Figure 15: Drain Current vs. Case Temperature

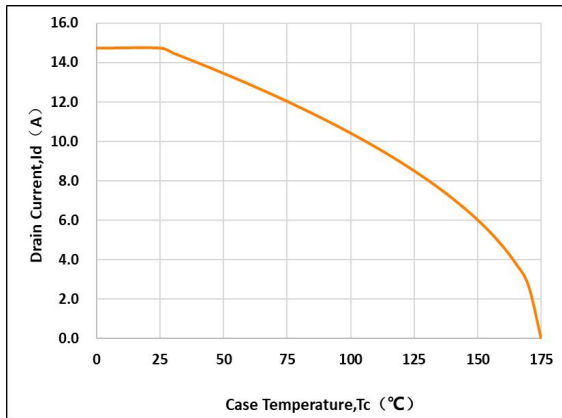


Figure 16: Safe Operating Area

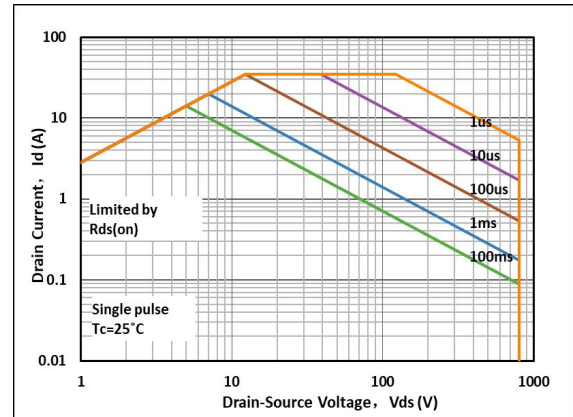


Figure 17: Capacitance Characteristics

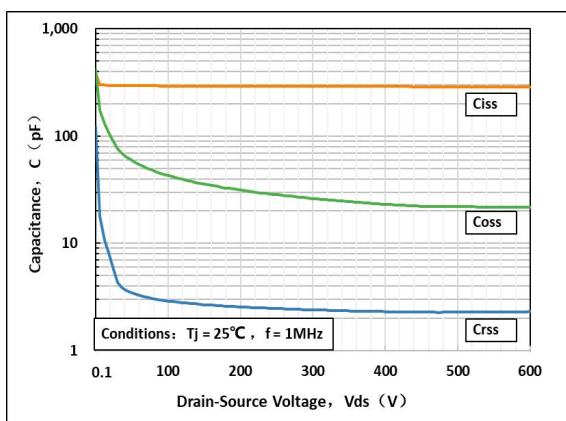
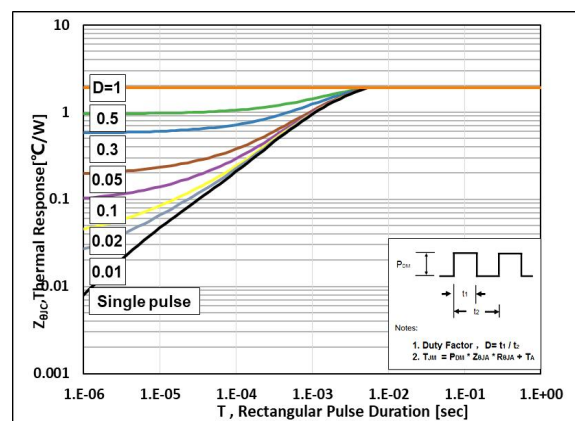
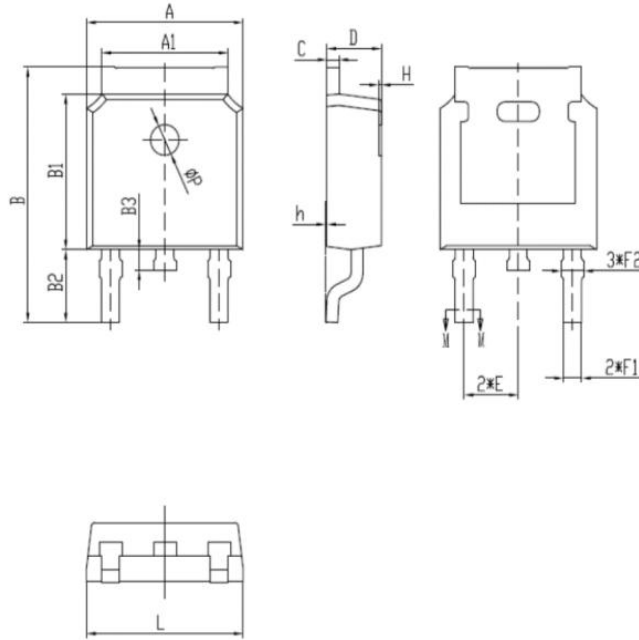


Figure 18: Transient Thermal Impedance



## Package Outline Dimensions (Unit: millimeters)

### TO-252



| 项目       | 规范(mm) |       |
|----------|--------|-------|
|          | MIN    | MAX   |
| A        | 6.50   | 6.70  |
| A1       | 5.16   | 5.46  |
| B        | 9.77   | 10.17 |
| B1       | 6.00   | 6.20  |
| B2       | 2.60   | 3.00  |
| B3       | 0.70   | 0.90  |
| C        | 0.45   | 0.61  |
| D        | 2.20   | 2.40  |
| E        | 2.186  | 2.386 |
| F1       | 0.67   | 0.87  |
| F2       | 0.76   | 0.96  |
| H        | 0.00   | 0.30  |
| h        | 0.00   | 0.127 |
| L        | 6.50   | 6.70  |
| $\phi P$ | 1.10   | 1.30  |

### **Disclaimers**

These materials are intended as a reference to assist our customers in the selection of the Suzhou Good-Ark product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Suzhou Good-Ark Electronics Co., Ltd. or a third party.

Suzhou Good-Ark Electronics Co., Ltd. assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.

All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Suzhou Good-Ark Electronics Co., Ltd. without notice due to product improvements or other reasons. It is therefore recommended that customers contact Suzhou Good-Ark Electronics Co., Ltd. or an authorized Suzhou Good-Ark Electronics Co., Ltd. for the latest product information before purchasing a product listed herein. The information described here may contain technical inaccuracies or typographical errors. Suzhou Good-Ark Electronics Co., Ltd. assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors. Please also pay attention to information published by Suzhou Good-Ark Electronics Co., Ltd. by various means, including our website home page.

(<http://www.goodark.com>)

When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Suzhou Good-Ark Electronics Co., Ltd. assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.

The prior written approval of Suzhou Good-Ark Electronics Co., Ltd. is necessary to reprint or reproduce in whole or in part these materials.

Please contact Suzhou Good-Ark Electronics Co., Ltd. or an authorized distributor for further details on these materials or the products contained herein.