

### MAIN CHARACTERISTICS

|                                       |               |
|---------------------------------------|---------------|
| $I_D$                                 | 20A           |
| $V_{DSS}$                             | 500V          |
| $R_{DS(on)-typ}$<br>(@ $V_{GS}=10V$ ) | 0.24 $\Omega$ |

### FEATURES

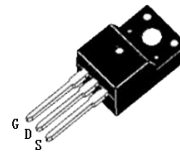
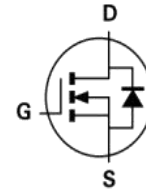
- Fast Switching
- Low ON Resistance
- Low Gate Charge
- 100% Single Pulse avalanche energy Test

### APPLICATIONS

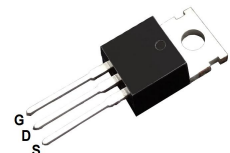
- Power switch circuit of adaptor and charger.

### MECHANICAL DATA

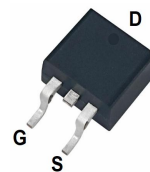
- Case: Molded plastic
- Mounting Position: Any
- Molded Plastic: UL Flammability Classification Rating 94V-0
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Solder bath temperature 275°C maximum, 10s per JESD 22-B106



TO-220F



TO-220C



TO-263C

### Product specification classification

| Part Number | Package         | Mode Name | Pack |
|-------------|-----------------|-----------|------|
| CS20N50A8   | TO-220F (1.3mm) | CS20N50A  | Tube |
| CS20N50AP   | TO-220C         | CS20N50A  | Tube |
| CS20N50AT   | TO-263C         | CS20N50A  | Tube |

### Maximum Ratings at Tc=25°C unless otherwise specified

| Characteristics                         | Symbol          | Value       |           | Unit |
|-----------------------------------------|-----------------|-------------|-----------|------|
|                                         |                 | 220F        | 220C/263C |      |
| Drain-Source Voltage                    | $V_{DS}$        | 500         |           | V    |
| Gate-Source Voltage                     | $V_{GS}$        | $\pm 30$    |           | V    |
| Continue Drain Current                  | $I_D$           | 20          |           | A    |
| Pulsed Drain Current (Note1)            | $I_{DM}$        | 80          |           | A    |
| Power Dissipation                       | $P_D$           | 34          | 220       | W    |
| Single Pulse Avalanche Energy (Note1)   | $E_{AS}$        | 660         |           | mJ   |
| Operating Temperature Range             | $T_J$           | 150         |           | °C   |
| Storage Temperature Range               | $T_{STG}$       | -55 to +150 |           | °C   |
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 3.68        | 0.54      | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 44          | 40        | °C/W |

Note1:Pulse test: 300  $\mu$ s pulse width, 2 % duty cycle

### Electrical Characteristics at Tc=25°C unless otherwise specified

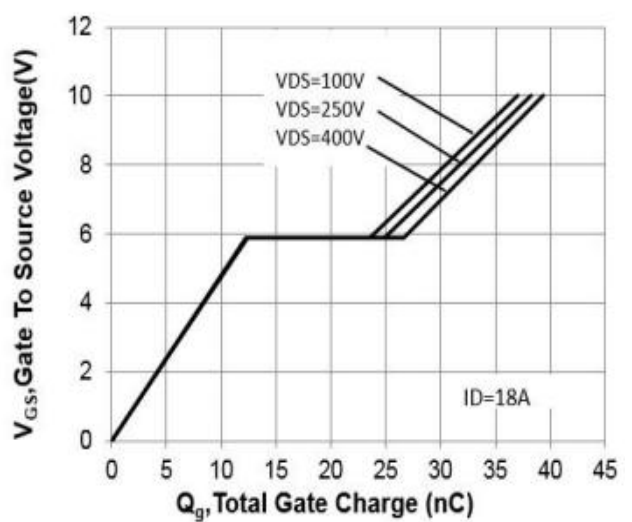
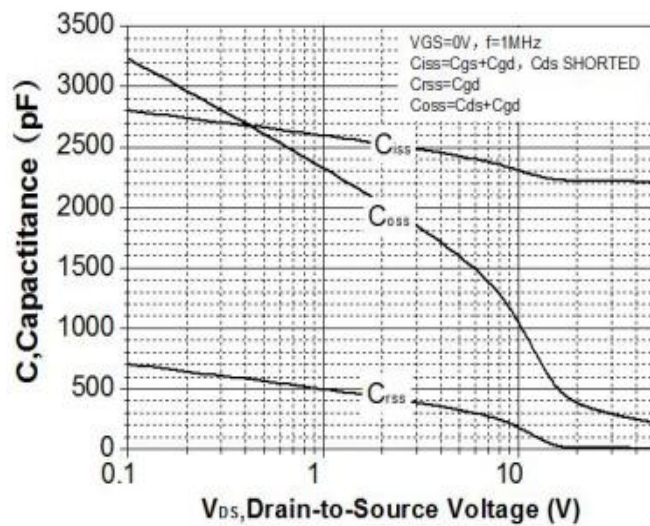
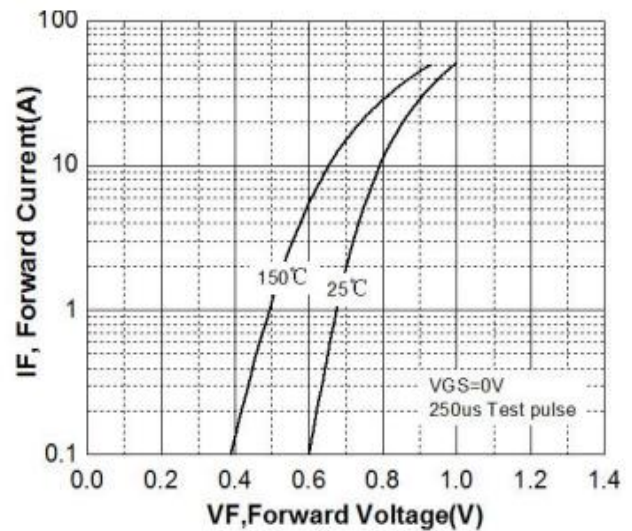
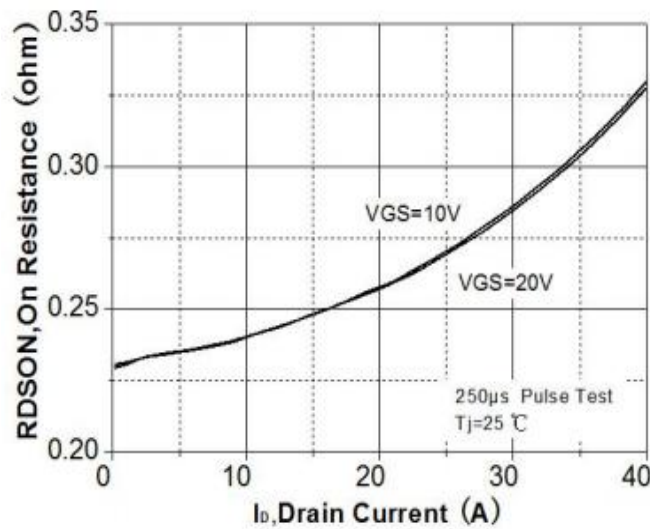
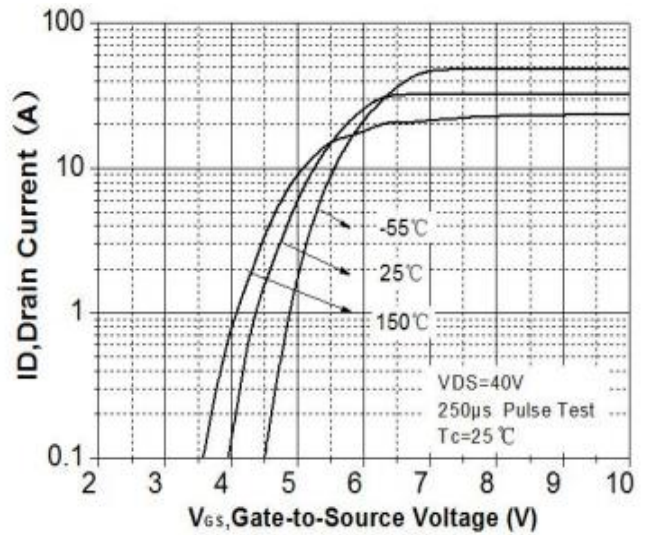
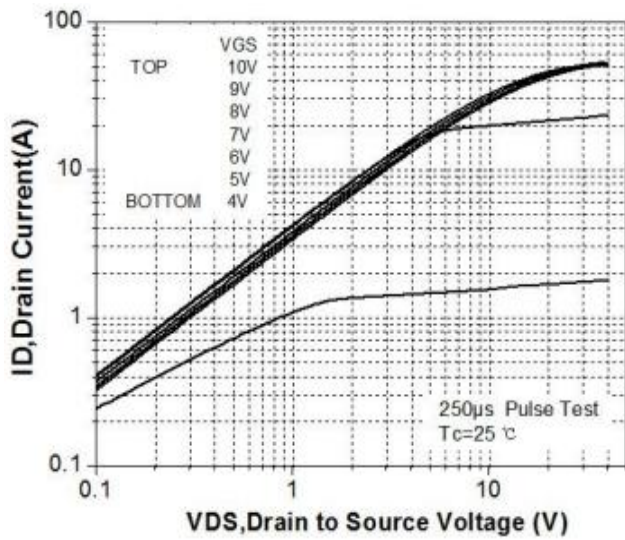
| Characteristics                  | Test Condition                                                      | Symbol       | Min | Typ  | Max       | Unit          |
|----------------------------------|---------------------------------------------------------------------|--------------|-----|------|-----------|---------------|
| Drain-Source Breakdown Voltage   | $V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$                       | $BV_{DSS}$   | 500 | -    | -         | V             |
| Drain-Source Leakage Current     | $V_{DS} = 500 \text{ V}, V_{GS} = 0 \text{ V}$                      | $I_{DSS}$    | -   | -    | 1         | $\mu\text{A}$ |
| Gate Leakage Current             | $V_{GS} = \pm 30 \text{ V}, V_{DS} = 0 \text{ V}$                   | $I_{GSS}$    | -   | -    | $\pm 100$ | nA            |
| Gate-Source Threshold Voltage    | $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$                            | $V_{GS(th)}$ | 2   | -    | 4         | V             |
| Drain-Source On-State Resistance | $V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$                         | $R_{DS(on)}$ | -   | 0.24 | 0.28      | $\Omega$      |
| Forward Transconductance         | $V_{DS} = 40 \text{ V}, I_D = 10 \text{ A}$                         | $g_{fs}$     | -   | 19   | -         | S             |
| Input Capacitance                | $V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$    | $C_{iss}$    | -   | 3415 | -         | pF            |
| Output Capacitance               |                                                                     | $C_{oss}$    | -   | 323  | -         | pF            |
| Reverse Transfer Capacitance     |                                                                     | $C_{rss}$    | -   | 6.5  | -         | pF            |
| Turn-on Delay Time(Note2)        | $I_D = 20 \text{ A}, V_{DD} = 250 \text{ V}, R_G = 25 \Omega$       | $t_d(ON)$    | -   | 34   | -         | ns            |
| Rise Time(Note2)                 |                                                                     | $t_r$        | -   | 45   | -         | ns            |
| Turn-Off Delay Time(Note2)       |                                                                     | $t_d(OFF)$   | -   | 90   | -         | ns            |
| Fall Time(Note2)                 |                                                                     | $t_f$        | -   | 41.3 | -         | ns            |
| Total Gate Charge(Note2)         | $I_D = 20 \text{ A}, V_{DD} = 250 \text{ V}, V_{GS} = 10 \text{ V}$ | $Q_G$        | -   | 38   | -         | nC            |
| Gate to Source Charge(Note2)     |                                                                     | $Q_{GS}$     | -   | 12.5 | -         | nC            |
| Gate to Drain Charge(Note2)      |                                                                     | $Q_{GD}$     | -   | 13   | -         | nC            |

### Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

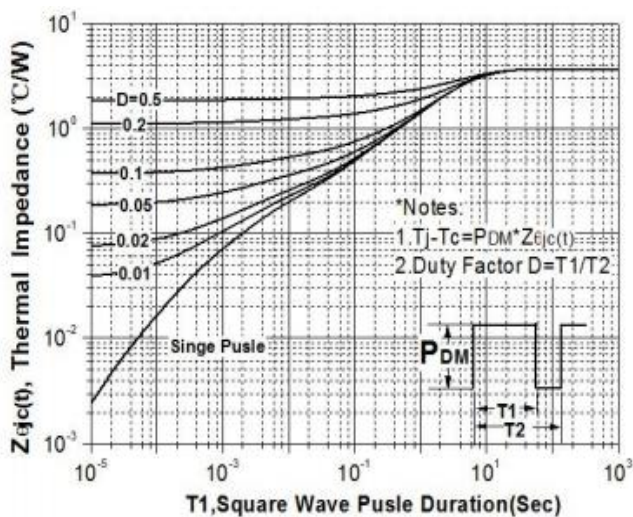
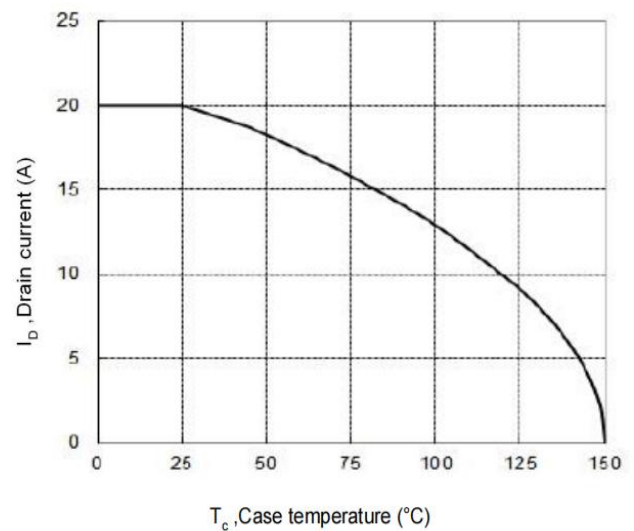
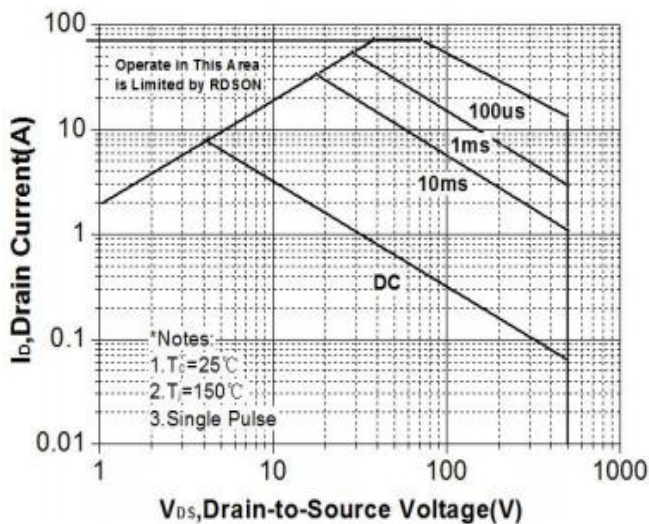
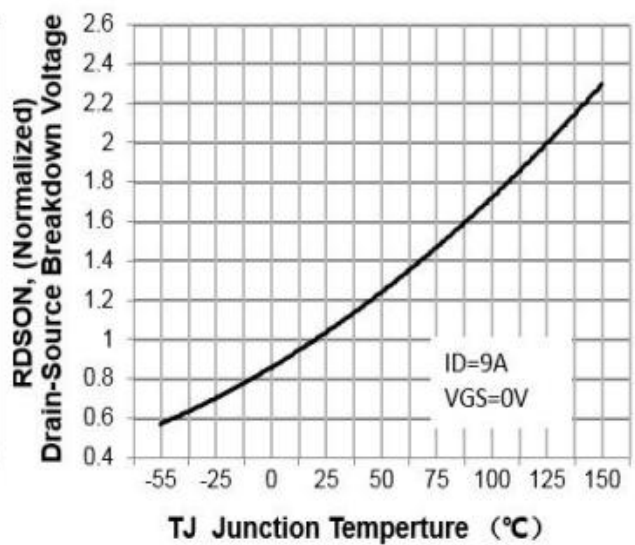
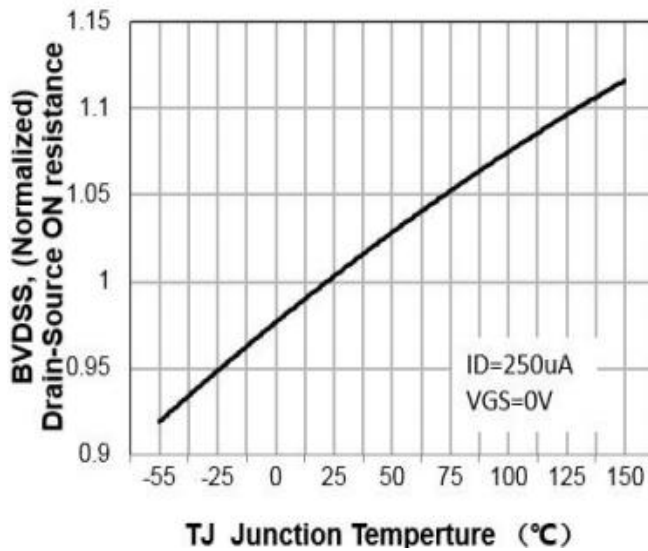
| Characteristics                          | Test Condition                                                                       | Symbol   | Min. | Typ. | Max. | Unit          |
|------------------------------------------|--------------------------------------------------------------------------------------|----------|------|------|------|---------------|
| Maximun Body-Diode Continuous Current    |                                                                                      | $I_S$    | -    | -    | 20   | A             |
| Maximun Body-Diode Pulsed Current(Note2) |                                                                                      | $I_{SM}$ | -    | -    | 80   | A             |
| Drain-Source Diode Forward Voltage       | $I_{SD} = 20 \text{ A}$                                                              | $V_{SD}$ | -    | -    | 1.4  | V             |
| Reverse Recovery Time(Note2)             | $I_{SD} = 20 \text{ A}, V_{GS} = 0 \text{ V}, dI_F / dt = 100 \text{ A}/\mu\text{s}$ | $t_{rr}$ | -    | 335  | -    | ns            |
| Reverse Recovery Charge(Note2)           |                                                                                      | $Q_{rr}$ | -    | 4.3  | -    | $\mu\text{C}$ |

Note2:Pulse test: 300  $\mu$ s pulse width, 2 % duty cycle

### RATINGS AND CHARACTERISTIC CURVES

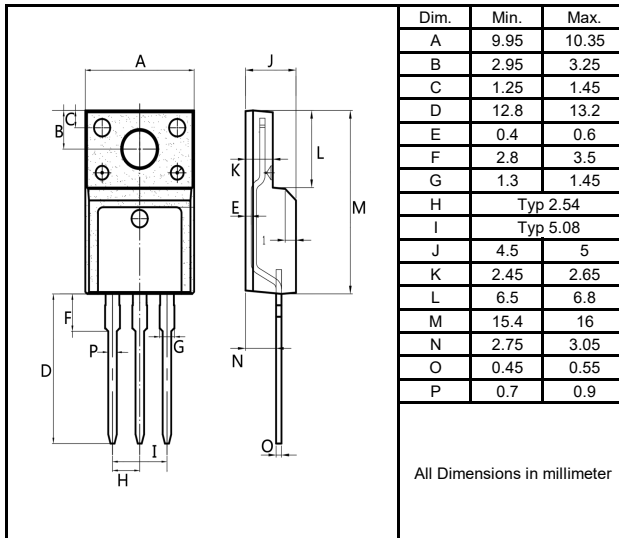


### RATINGS AND CHARACTERISTIC CURVES

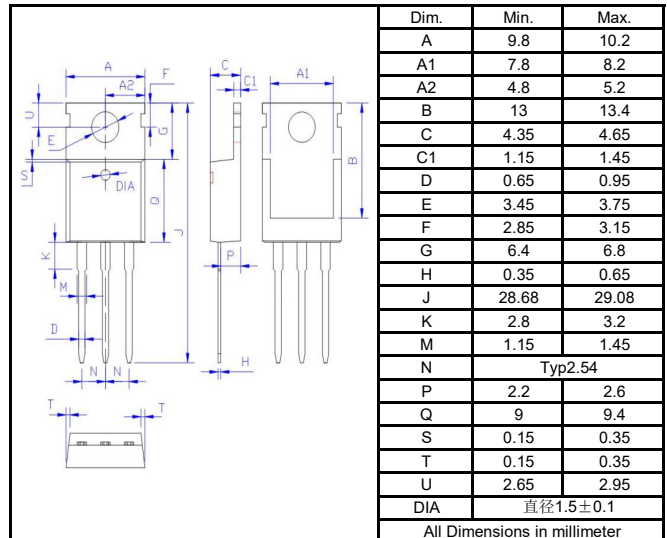


### Package Outline Dimensions millimeters

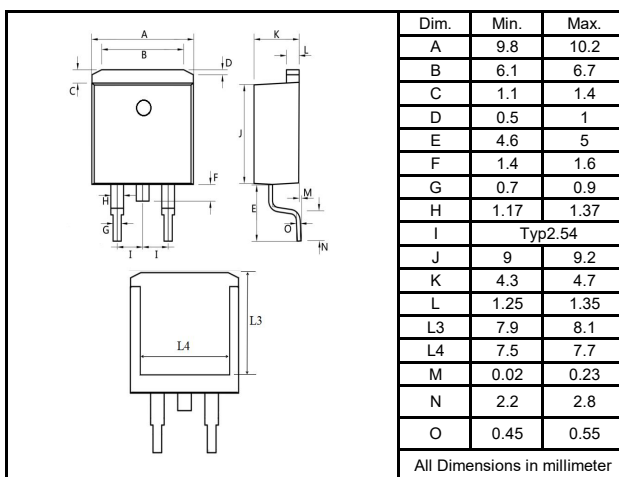
T0-220F



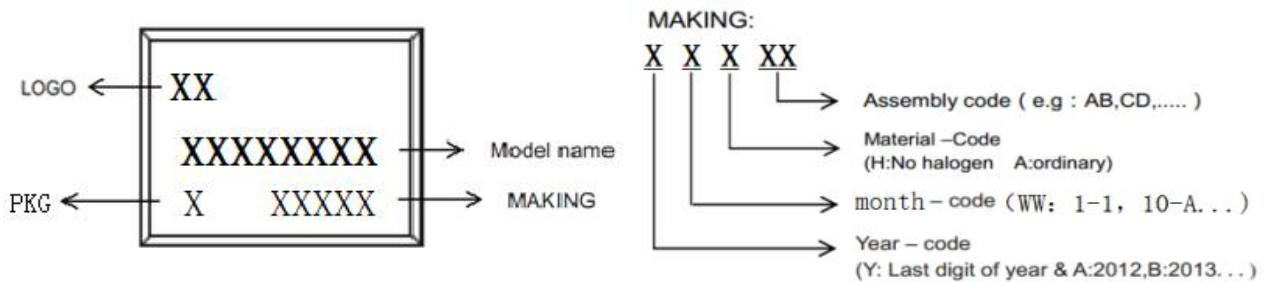
T0-220C



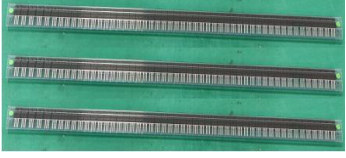
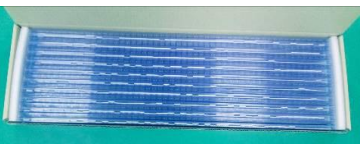
T0-263C



### Marking on the body



### packing instruction

| PKG                           | 最小包装                                                                                | 内盒                                                                                  | 外箱                                                                                    |
|-------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| TO-220F<br>TO-220C<br>TO-263C |    |   |   |
|                               | 50pcs/管                                                                             | 1000pcs/盒                                                                           | 5000pcs/箱                                                                             |
| TO-263C                       |  |  |  |
|                               | 800pcs/盘                                                                            | 1600pcs/盒                                                                           | 8000pcs/箱                                                                             |

### Notice

All product, product specifications and data are subject to change without notice to improve. The right to explain is owned by LINGXUN electronics company.

Confirm that operation temperature is within the specified range described in the product specification. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

LINGXUN electronics shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.