

**描述 / Descriptions**

N 沟道 TO-220 塑封封装场效应管。

N-CHANNEL MOSFET in a TO-220 Plastic Package.

**特征 / Features**

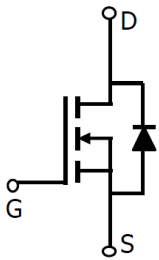
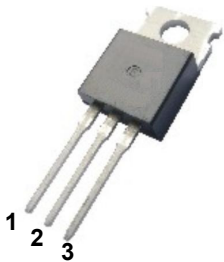
$R_{DS(on)}$ 小, 栅极电荷低, 快速开关特性。

Low  $R_{DS(on)}$ , Low Gate Charge, Fast Switching.

**用途 / Applications**

用于 AC-DC 开关电源, DC-DC 电源转换器, 高压 H 桥 PWM 马达驱动。

Suited for AC-DC Power switch, DC-DC Power converter, High Voltage H-Bridge PWM Motor Drive.

**内部等效电路 / Equivalent Circuit****引脚排列 / Pinning**

PIN1 : G

PIN 2 : D

PIN 3 : S

**放大及印章代码 /  $h_{FE}$  Classifications & Marking**

见印章说明。See Marking Instructions.

**极限参数 / Absolute Maximum Ratings(Ta=25°C)**

| 参数<br>Parameter                          |              | 符号<br>Symbol                      | 数值<br>Rating | 单位<br>Unit |
|------------------------------------------|--------------|-----------------------------------|--------------|------------|
| Drain-Source Voltage                     |              | V <sub>DSS</sub>                  | 70           | V          |
| Drain Current <sup>G</sup>               |              | I <sub>D</sub> (Tc=25℃)           | 80           | A          |
|                                          |              | I <sub>D</sub> (Tc=100℃)          | 62           | A          |
| Drain Current - Pulsed <sup>C</sup>      |              | I <sub>DM</sub>                   | 308          | A          |
| Gate-Source Voltage                      |              | V <sub>GS</sub>                   | ±20          | V          |
| Single Pulsed Avalanche Energy(L=0.5mH)  |              | E <sub>AS</sub>                   | 350          | mJ         |
| Avalanche Current                        |              | I <sub>AS</sub>                   | 30           | A          |
| Power Dissipation <sup>B</sup>           |              | P <sub>D</sub> (Tc=25℃)           | 175          | W          |
|                                          |              | P <sub>D</sub> (Tc=100℃)          | 67           | W          |
| Operating and Storage Temperature Range  |              | T <sub>J</sub> , T <sub>STG</sub> | -55 to 150   | ℃          |
| Maximum Junction-to-Ambient <sup>A</sup> | Steady-State | R <sub>θJA</sub>                  | 62           | ℃/W        |
| Maximum Junction-to-Case <sup>B</sup>    | Steady-State | R <sub>θJC</sub>                  | 0.7          | ℃/W        |

**电性能参数 / Electrical Characteristics(Ta=25°C)**

| 参数<br>Parameter                    | 符号<br>Symbol | 测试条件<br>Test Conditions        | 最小值<br>Min | 典型值<br>Typ | 最大值<br>Max | 单位<br>Unit |
|------------------------------------|--------------|--------------------------------|------------|------------|------------|------------|
| Drain-Source Breakdown Voltage     | $BV_{DSS}$   | $V_{GS}=0V$ $I_D=250\mu A$     | 70         |            |            | V          |
| Zero Gate Voltage Drain Current    | $I_{DSS}$    | $V_{DS}=68V$ $V_{GS}=0V$       |            |            | 1          | $\mu A$    |
|                                    |              | $V_{DS}=68V$ $T_J=55^{\circ}C$ |            |            | 5          |            |
| Gate-Body Leakage Current Forward  | $I_{GSS}$    | $V_{GS}=\pm 20V$ $V_{DS}=0V$   |            |            | 100        | nA         |
| Gate Threshold Voltage             | $V_{GS(th)}$ | $V_{DS}=V_{GS}$ $I_D=250\mu A$ | 2.0        | 2.8        | 4.0        | V          |
| Total gate charge                  | $R_{DS(on)}$ | $V_{GS}=10V$ $I_D=35A$         |            | 5.8        | 7          | mΩ         |
| Drain-Source Diode Forward Voltage | $V_{SD}$     | $V_{GS}=0V$ $I_S=1A$           |            |            | 1.4        | V          |

## 电性能参数 / Electrical Characteristics(Ta=25°C)

| 参数<br>Parameter                    | 符号<br>Symbol | 测试条件<br>Test Conditions                                           | 最小值<br>Min | 典型值<br>Typ | 最大值<br>Max | 单位<br>Unit |
|------------------------------------|--------------|-------------------------------------------------------------------|------------|------------|------------|------------|
| Gate resistance                    | $R_g$        | $V_{GS}=0V$ $V_{DS}=0V$<br>$f=1MHz$                               |            | 1.25       |            | $\Omega$   |
| Input Capacitance                  | $C_{iss}$    | $V_{DS}=30V$ $V_{GS}=0V$<br>$f=1.0MHz$                            |            | 2180       |            | pF         |
| Output Capacitance                 | $C_{oss}$    |                                                                   |            | 614        |            | pF         |
| Reverse Transfer Capacitance       | $C_{rss}$    |                                                                   |            | 110        |            | pF         |
| Total Gate Charge(10V)             | $Q_g$        | $V_{GS}=10V$ $V_{DS}=30V$<br>$I_D=20A$                            |            | 53         | 75         | nC         |
| Total Gate Charge(4.5V)            | $Q_g$        |                                                                   |            | 22         | 31         | nC         |
| Gate Source Charge                 | $Q_{gs}$     |                                                                   |            | 17         | 31         | nC         |
| Gate Drain Charge                  | $Q_{gd}$     |                                                                   |            | 5          |            | nC         |
| Turn-On Delay Time                 | $t_{d(on)}$  | $V_{GS}=10V$ $V_{DS}=30V$<br>$R_L=1.5\Omega$<br>$R_{GEN}=3\Omega$ |            | 18         |            | ns         |
| Turn-On Rise Time                  | $t_r$        |                                                                   |            | 20         |            | ns         |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                                                   |            | 33         |            | ns         |
| Turn-Off Fall Time                 | $t_f$        |                                                                   |            | 4          |            | ns         |
| Body Diode Reverse Recovery Time   | $t_{rr}$     | $I_F=20A$ $dI/dt=500A/\mu s$                                      |            | 26         |            | ns         |
| Body Diode Reverse Recovery Charge | $Q_{rr}$     | $I_F=20A$ $dI/dt=500A/\mu s$                                      |            | 125        |            | nC         |

A: The value of  $R_{\theta JA}$  is measured with the device in a still air environment with  $T_A=25^\circ C$ .

B. The power dissipation PD is based on  $T_J(MAX)=150^\circ C$ , using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C: Repetitive rating, pulse width limited by junction temperature  $T_J(MAX)=150^\circ C$ .

D. The  $R_{\theta JA}$  is the sum of the thermal impedance from junction to case  $R_{\theta JC}$  and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using  $<300 \mu s$  pulses, duty cycle 0.5%max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of  $T_J(MAX)=150^\circ C$ .

G. The maximum current rating is limited by bond-wires.

## 电参数曲线图 / Electrical Characteristic Curve

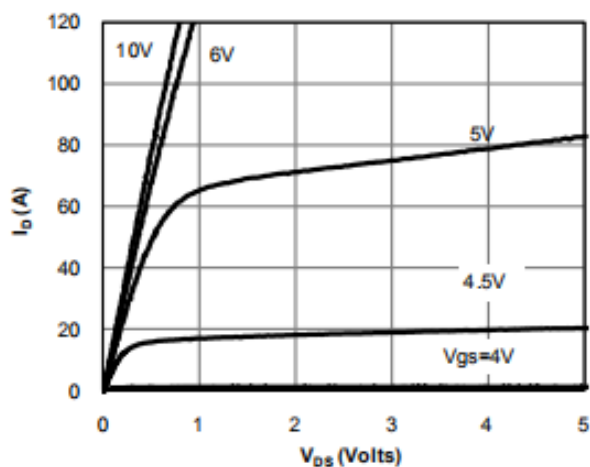


Fig 1: On-Region Characteristics

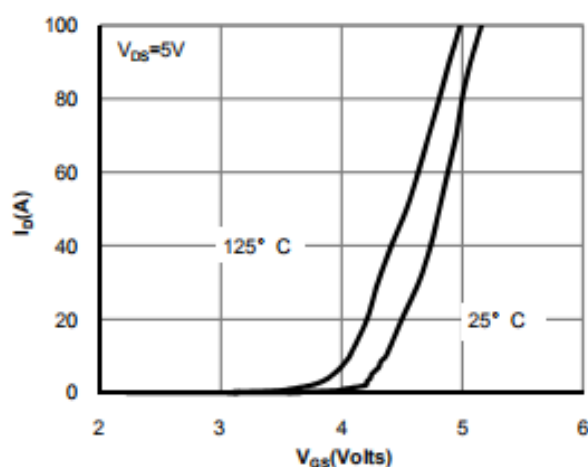


Figure 2: Transfer Characteristics

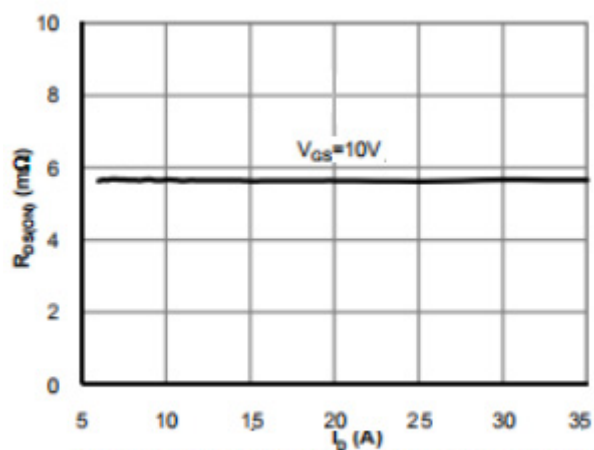


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

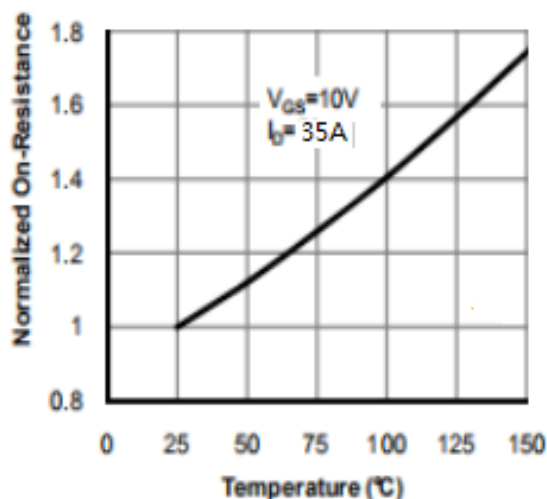


Figure 4: On-Resistance vs. Junction Temperature

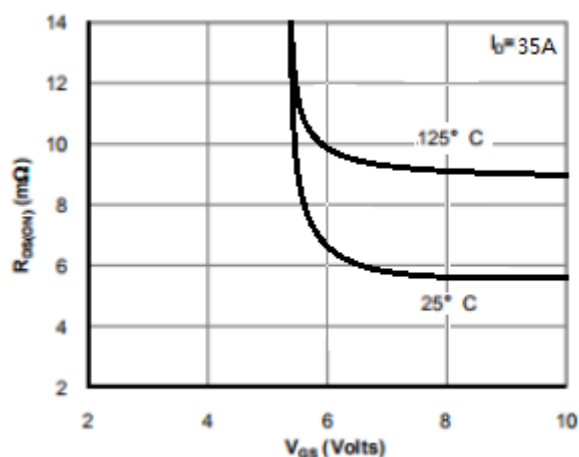
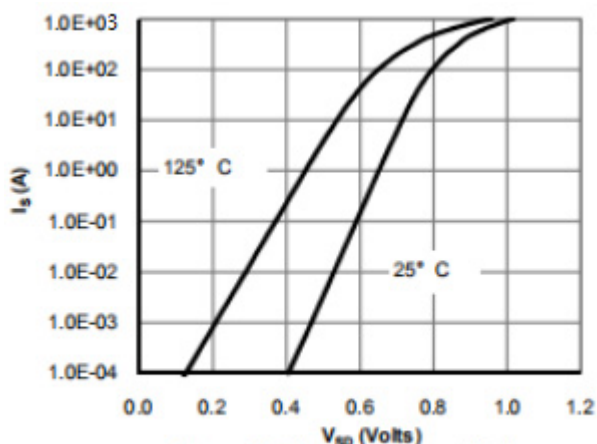
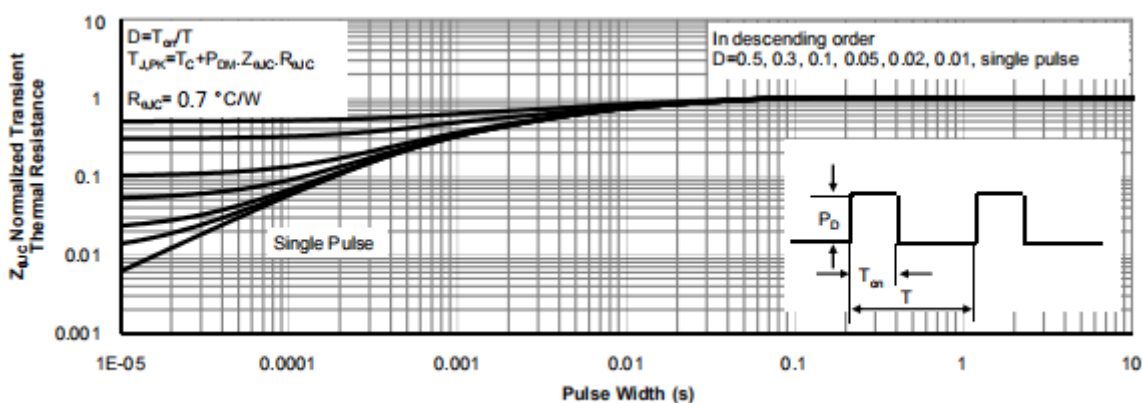
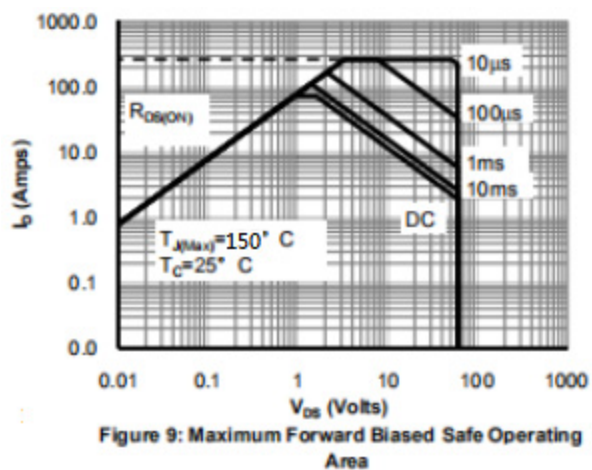
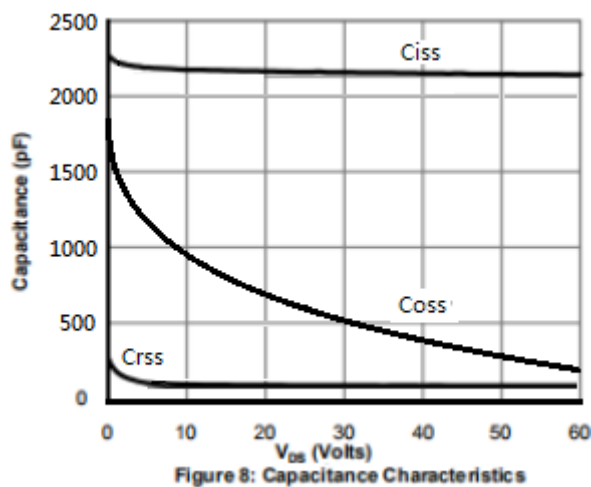
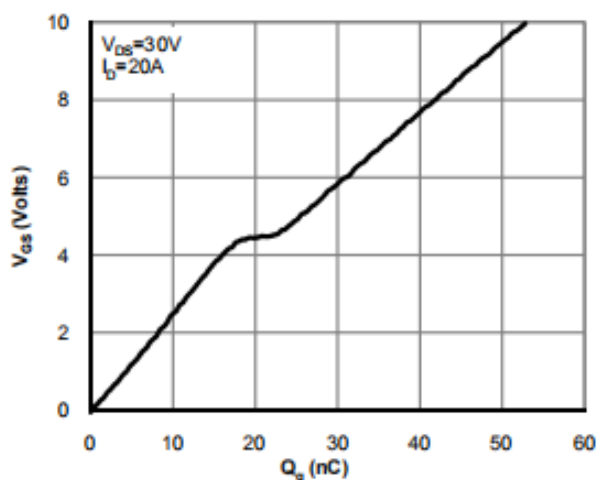


Figure 5: On-Resistance vs. Gate-Source Voltage

Figure 6: Body-Diode Characteristics  
Figure 5: On-Resistance vs. Gate-Source Voltage

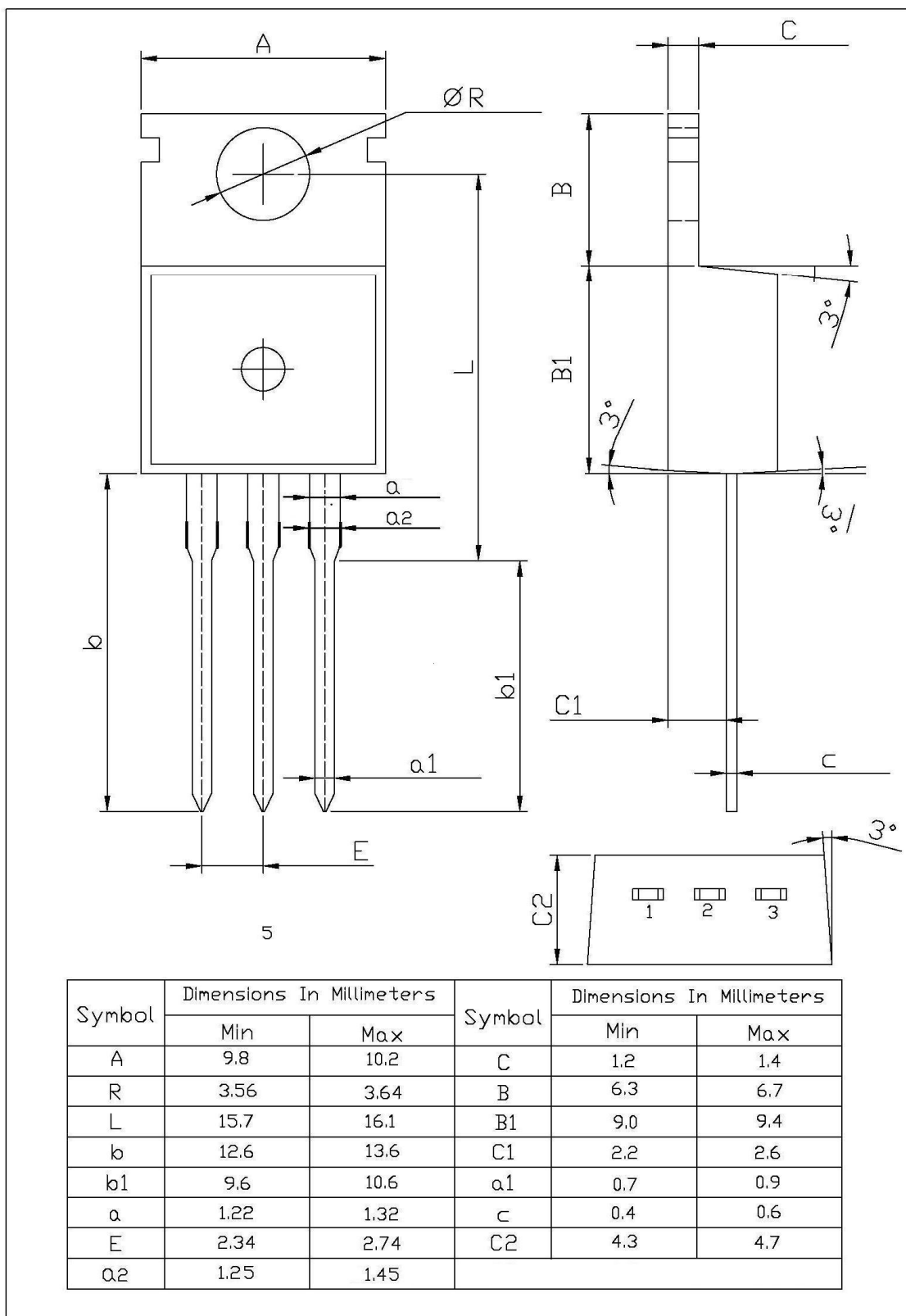
## 电参数曲线图 / Electrical Characteristic Curve



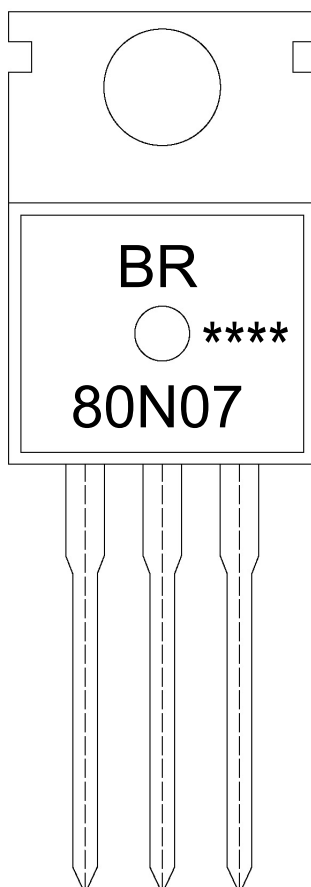
## 外形尺寸图 / Package Dimensions

TO-220

单位: mm



## 印章说明 / Marking Instructions



说明：

BR： 为公司代码

80N07： 为型号代码

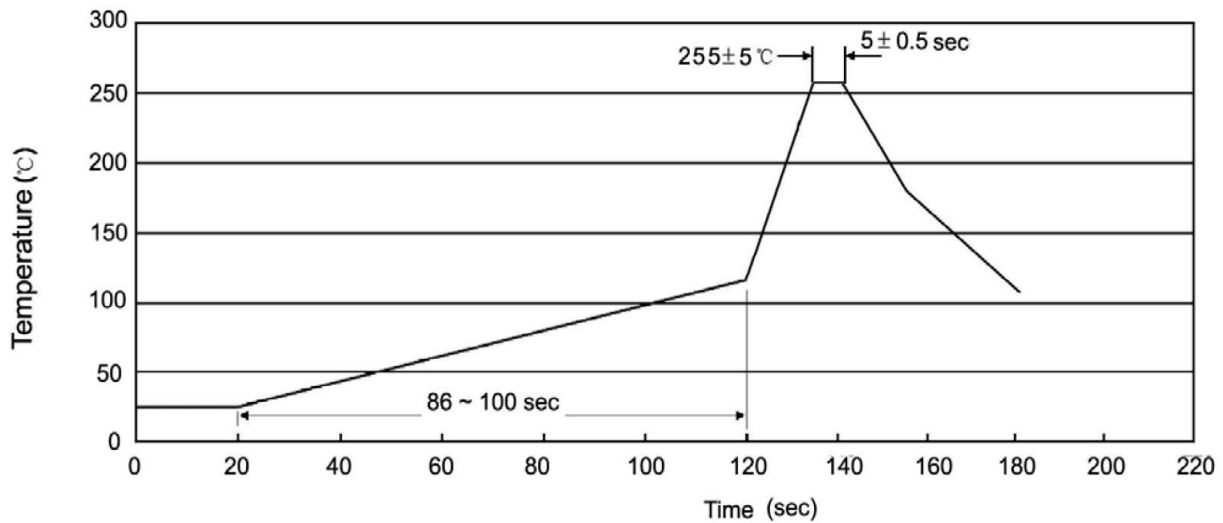
\*\*\*\*： 为生产批号代码，随生产批号变化。

Note:

BR: Company Code

80N07: Product Type.

\*\*\*\*: Lot No. Code, code change with Lot No.

**波峰焊温度曲线图(无铅) / Temperature Profile for Dip Soldering(Pb-Free)**


说明：

- 1、预热温度 25 ~ 150°C，时间 60 ~ 90sec;
- 2、峰值温度 255±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2 ~ 10°C/sec.

Note:

- 1.Preheating:25~150°C, Time:60~90sec.
- 2.Peak Temp.:255±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

**耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions**

温度：270±5°C

时间：10±1 sec.

Temp.:270±5°C

Time:10±1 sec

**包装规格 / Packaging SPEC.**

散件包装 / BULK

| Package Type<br>封装形式 | Units 包装数量       |                       |                        |                              |                        | Dimension 包装尺寸 (unit: mm <sup>3</sup> ) |             |             |
|----------------------|------------------|-----------------------|------------------------|------------------------------|------------------------|-----------------------------------------|-------------|-------------|
|                      | Units/Bag<br>只/袋 | Bags/Inner Box<br>袋/盒 | Units/Inner Box<br>只/盒 | Inner Boxes/Outer Box<br>盒/箱 | Units/Outer Box<br>只/箱 | Bag 袋                                   | Inner Box 盒 | Outer Box 箱 |
| TO-220/F             | 200              | 10                    | 2,000                  | 5                            | 10,000                 | 135×190                                 | 237×172×102 | 560×245×195 |

套管包装 / TUBE

| Package Type<br>封装形式 | Units 包装数量         |                         |                        |                              |                        | Dimension 包装尺寸 (unit: mm <sup>3</sup> ) |             |             |
|----------------------|--------------------|-------------------------|------------------------|------------------------------|------------------------|-----------------------------------------|-------------|-------------|
|                      | Units/Tube<br>只/套管 | Tubes/Inner Box<br>套管/盒 | Units/Inner Box<br>只/盒 | Inner Boxes/Outer Box<br>盒/箱 | Units/Outer Box<br>只/箱 | Tube 套管                                 | Inner Box 盒 | Outer Box 箱 |
| TO-220/F             | 50                 | 20                      | 1,000                  | 5                            | 5,000                  | 532×31.4×5.5                            | 555×164×50  | 575×290×180 |

**使用说明 / Notices**