

# BRCS25N60PH

Rev.A Mar.-2020

## 描述 / Descriptions

N 沟道 TO-3PH 塑封封装场效应管。

N-Channel MOSFET in a TO-3PH Plastic Package.

## 特征 / Features

低栅极电荷，低Crss (典型值85pF)，开关速度快，产品全部经过雪崩测试，高抗dv/dt 能力。

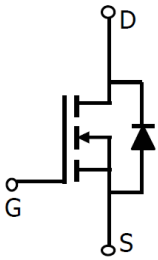
Low gate charge, Low Crss (typical 85pF ), Fast switching, 100% avalanche tested, Improved dv/dt capability.

## 用途 / Applications

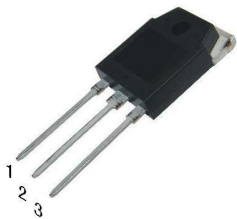
高频开关电源，电子镇流器，UPS 电源。

High efficiency switch mode power supplies, Electronic lamp ballasts based on half bridge, UPS.

## 内部等效电路 / Equivalent Circuit



## 引脚排列 / Pinning



PIN1 : Gate

PIN 2 : Drain

PIN 3 : Source

## 印章代码 / 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                            | $V_{DSS}$  | 600          | V          |
| Drain Current -continuous                       | $I_D(T_C=25^\circ\text{C})$  | 25.0*        | A          |
|   | $I_D(T_C=100^\circ\text{C})$   | 15.5*        | A          |
| Drain Current -pulse (note 1)                   | $I_{DM}$   | 25*          | A          |
| Gate-Source Voltage                             | $V_{GSS}$  | $\pm 30$     | V          |
| Single Pulsed Avalanche Energy (note 2)         | $E_{AS}$   | 550          | mJ         |
| Avalanche Current (note 1)                      | $I_{AR}$   | 25.0         | A          |
| Repetitive Avalanche Current (note 1)           | $E_{AR}$   | 25.7         | mJ         |
| Peak Diode Recovery dv/dt (note 3)              | dv/dt  | 50           | V/ns       |
| Power Dissipation                               | $P_D$<br>$T_C=25^\circ\text{C}$<br>-Derate<br>above $25^\circ\text{C}$ | 286          | W          |
|   |  | 2.29         | W/°C       |
| Operating and Storage Temperature Range         | $T_J, T_{STG}$   | -55~+150     | °C         |
| Maximum Lead Temperature for Soldering Purposes | $T_L$  | 300          | °C         |

\*Drain current limited by maximum junction temperature

**热数据 / Thermal Data**

| 参数<br>Parameter                            | 符号<br>Symbol | 最大值<br>Value | 单位<br>Unit |
|--|--------------|--------------|------------|
| Thermal Resistance,<br>Junction to Case    | Rth(j-c)     | 0.44         | °C/W       |
| Thermal Resistance,<br>Junction to Ambient | Rth(j-A)     | 40.0         | °C/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 |
|--|------------------------------|--|------------|------------|------------|------------|
| Off –Characteristics                                   |                              |  |            |            |            |            |
| Drain-Source Voltage                                   | $BV_{DSS}$                   | $I_D=250\mu A, V_{GS}=0V$                                  | 600        |            |            | V          |
| Breakdown Voltage Coefficient                          | $\Delta BV_{DSS}/\Delta T_J$ | $I_D=250\mu A$ , referenced to 25°C                        |            | 0.5        |            | V/°C       |
| Zero Gate Voltage Drain Current                        | $I_{DSS}$                    | $V_{DS}=600V, V_{GS}=0V, T_C=25^\circ C$                   |            |            | 1          | $\mu A$    |
|  |                              | $V_{DS}=480V, T_C=125^\circ C$                             |            |            | 10         | $\mu A$    |
| Gate-body leakage current, forward                     | $I_{GSSF}$                   | $V_{DS}=0V, V_{GS}=30V$                                    |            |            | 100        | nA         |
| Gate-body leakage current, reverse                     | $I_{GSSR}$                   | $V_{DS}=0V, V_{GS}=-30V$                                   |            |            | -100       | nA         |
| On-Characteristics                                     |                              |  |            |            |            |            |
| Gate Threshold Voltage                                 | $V_{GS(th)}$                 | $V_{DS} = V_{GS}, I_D=250\mu A$                            | 2.0        |            | 4.0        | V          |
| Static Drain-Source On-Resistance                      | $R_{DS(on)}$                 | $V_{GS}=10V, I_D=12.5A$                                    |            | 0.24       | 0.28       | $\Omega$   |
| Forward Transconductance                               | $g_{fs}$                     | $V_{DS}=40V, I_D=12.5A$ ( note 4 )                         |            | 18         |            | S          |
| Dynamic Characteristics                                |                              |  |            |            |            |            |
| Input capacitance                                      | $C_{iss}$                    | $V_{DS}=25V,$<br>$V_{GS}=0V,$<br>$f=1.0MHz$                |            | 2310       | 2920       | pF         |
| Output capacitance                                     | $C_{oss}$                    |  |            | 1270       | 1660       | pF         |
| Reverse transfer capacitance                           | $C_{rss}$                    |  |            | 85         | 120        | pF         |
| Switching –Characteristics                             |                              |  |            |            |            |            |
| Turn-On delay time                                     | $t_d(on)$                    | $V_{DD}=250V, I_D=25A, R_G=25\Omega$<br>( note 4 , 5 )     |            | 60         | 128        | ns         |
| Turn-On rise time                                      | $t_r$                        |  |            | 130        | 270        | ns         |
| Turn-Off delay time                                    | $t_d(off)$                   |  |            | 220        | 445        | ns         |
| Turn-Off Fall time                                     | $t_f$                        |  |            | 70         | 145        | ns         |
| Total Gate Charge                                      | $Q_g$                        | $V_{DS}=480V,$<br>$I_D=25A$<br>$V_{GS}=10V$ ( note 4 , 5 ) |            | 50         | 80         | nC         |
| Gate-Source charge                                     | $Q_{gs}$                     |  |            | 15.0       |            | nC         |
| Gate-Drain charge                                      | $Q_{gd}$                     |  |            | 23         |            | nC         |
| Drain-Source Diode Characteristics and Maximum Ratings |                              |  |            |            |            |            |
| Maximum Continuous Drain-Source Diode Forward Current  |                              | $I_S$  |            |            | 25         | A          |
| Maximum Pulsed Drain-Source Diode Forward Current      |                              | $I_{SM}$   |            |            | 100        | A          |
| Maximum Continuous Drain-Source Diode Forward Current  | $V_{SD}$                     | $V_{GS}=0V, I_S=25A$                                       |            |            | 1.2        | V          |
| Reverse recovery time                                  | $t_{rr}$                     | $V_{GS}=0V, I_S=25A$<br>$di_F/dt=100A/\mu s$ (note 4)      |            | 460        |            | ns         |
| Reverse recovery charge                                | $Q_{rr}$                     |  |            |            | 5.1        |            |

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说明：

1：脉冲宽度由最高结温限制

2：L=5.0mH,  $I_{AS}=25A$ ,  $V_{DD}=50V$ ,  $R_G=25\ \Omega$ , 起始结温  $T_J=25^\circ C$

3： $I_{SD} \leq 25A$ ,  $di/dt \leq 200A/\mu s$ ,  $V_{DD} \leq BV_{DSS}$ , 起始结温  $T_J=25^\circ C$

4：脉冲测试：脉冲宽度 $\leq 300\mu s$ , 占空比 $\leq 2\%$

5：基本与工作温度无

Note:

1: Pulse width limited by maximum junction temperature

2: L=5.0mH,  $I_{AS}=25A$ ,  $V_{DD}=50V$ ,  $R_G=25\ \Omega$ , Starting  $T_J=25^\circ C$

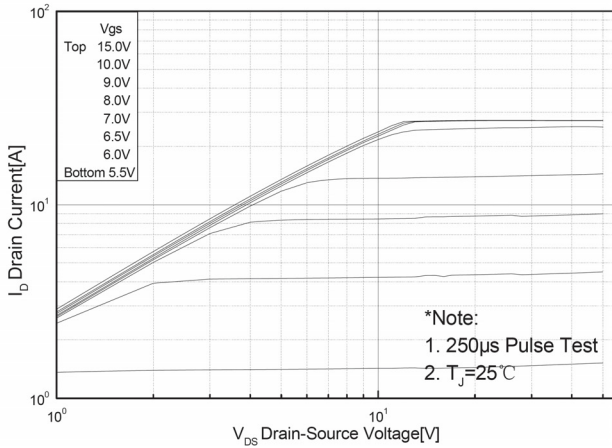
3:  $I_{SD} \leq 25A$ ,  $di/dt \leq 200A/\mu s$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ C$

4: Pulse Test: Pulse Width  $\leq 300\ \mu s$ , Duty Cycle $\leq 2\%$

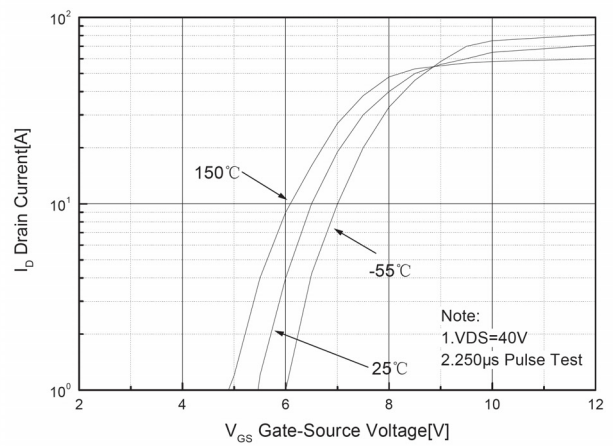
5: Essentially independent of operating temperature

## 电参数曲线图 / Electrical Characteristic Curve

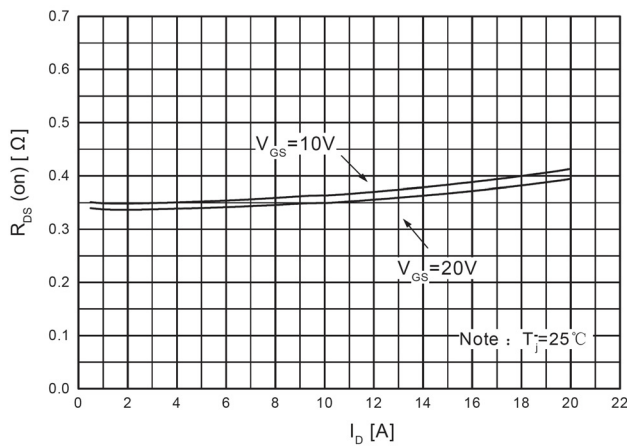
### On-Region Characteristics



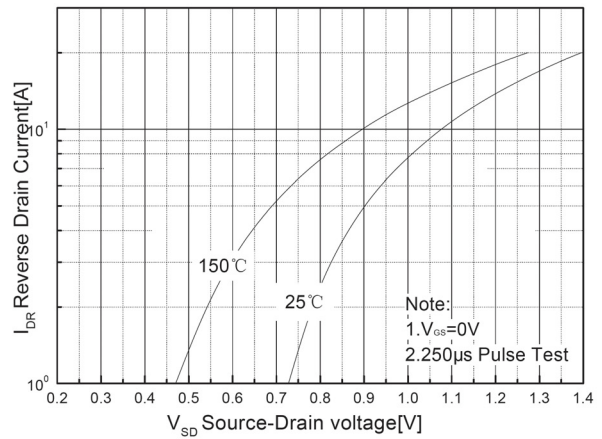
### Transfer Characteristics



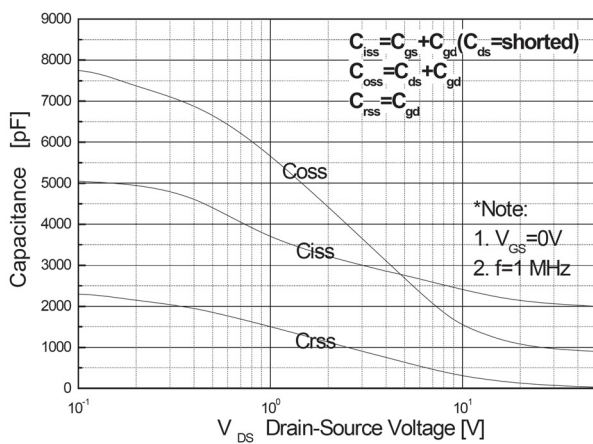
### On-Resistance Variation vs Drain Current and Gate Voltage



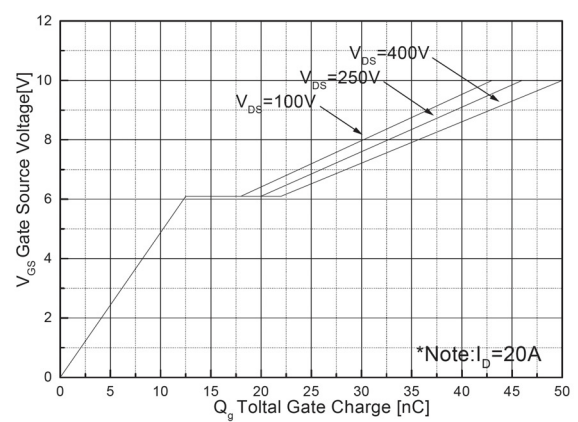
### Body Diode Forward Voltage Variation vs. Source Current and Temperature



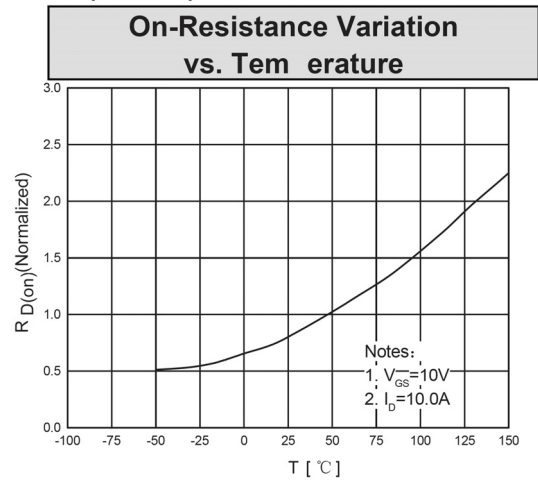
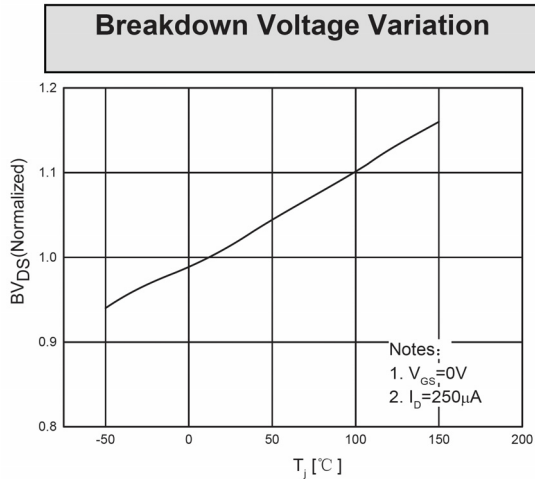
### Capacitance Characteristics



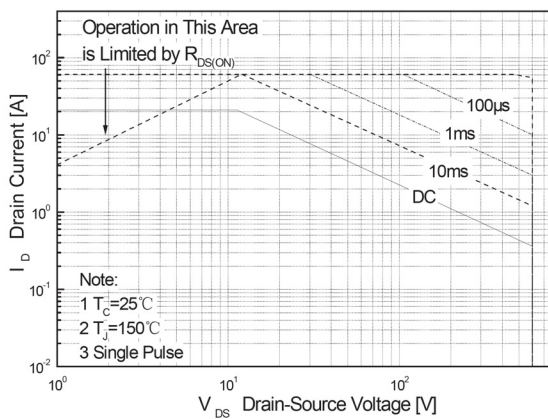
### Capacitance Characteristics



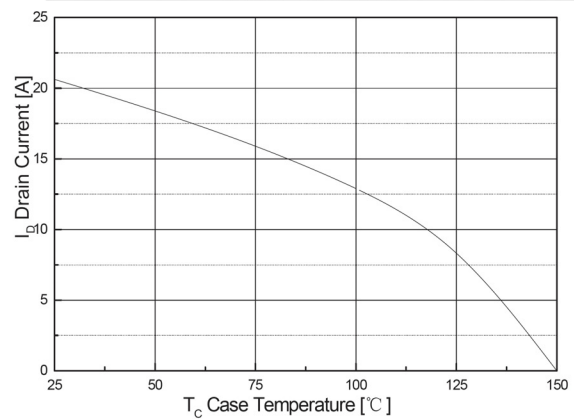
**电性能参数 / Electrical Characteristics(Ta=25°C)**



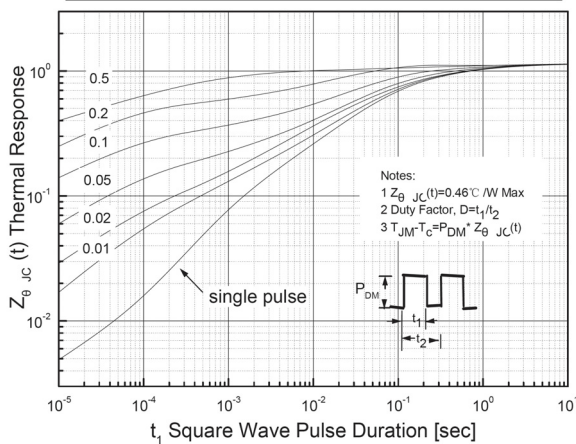
### Maximum Safe Operating Area



### Maximum Drain Current vs. Case Temperature



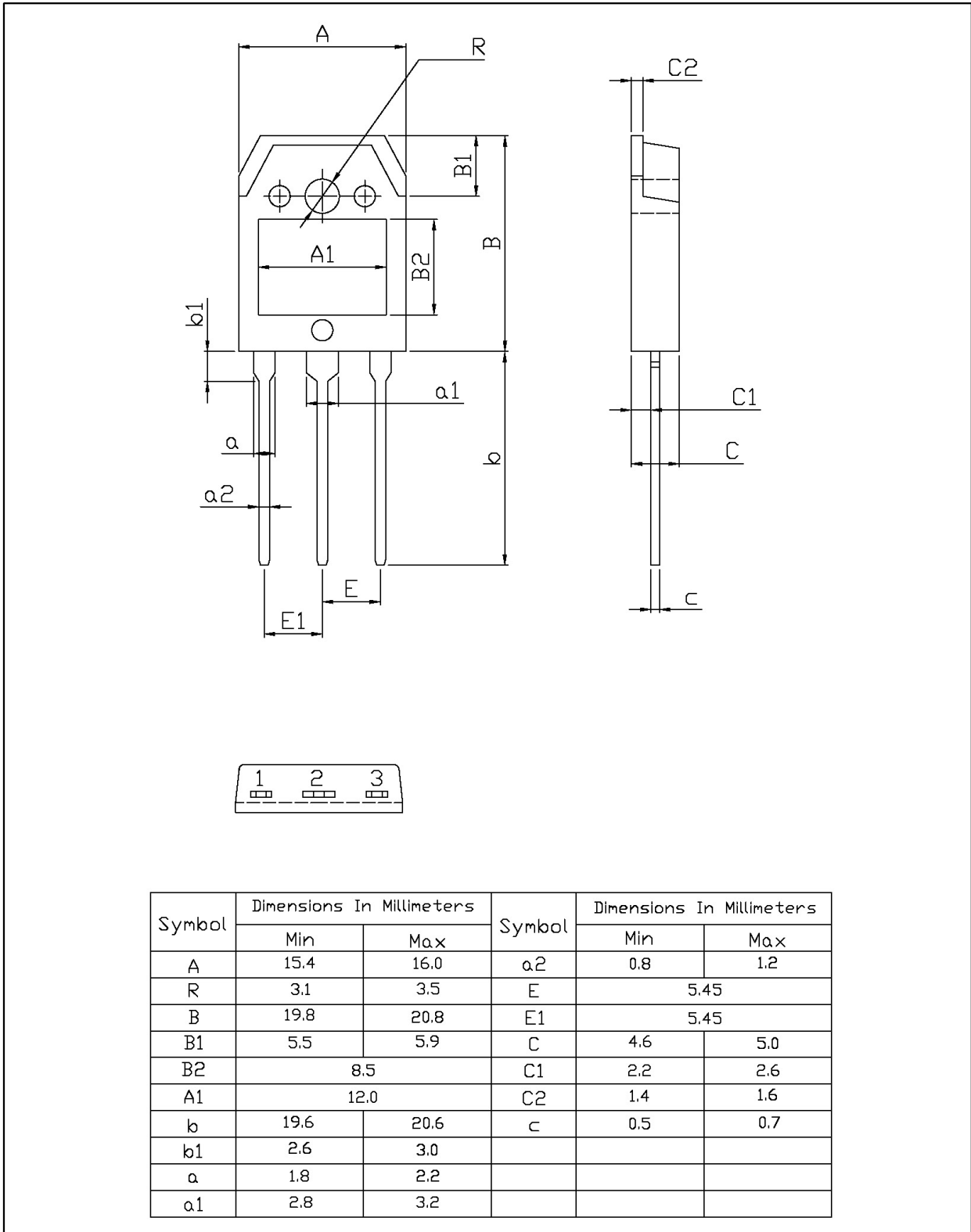
### Transient Thermal Response Curve



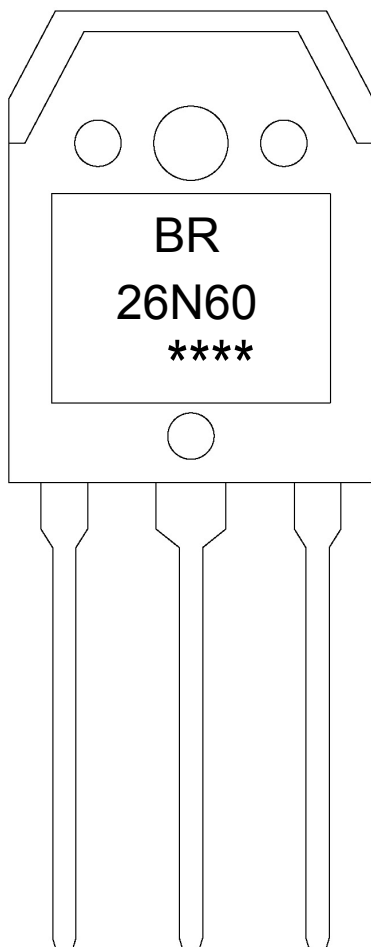
外形尺寸图 / Package Dimensions

TO-3PH

Unit:mm



## 印章说明 / Marking Instructions



说明：

BR: 为公司代码

26N60： 为型号代码

\*\*\*\*： 为生产批号代码，随生产批号变化。

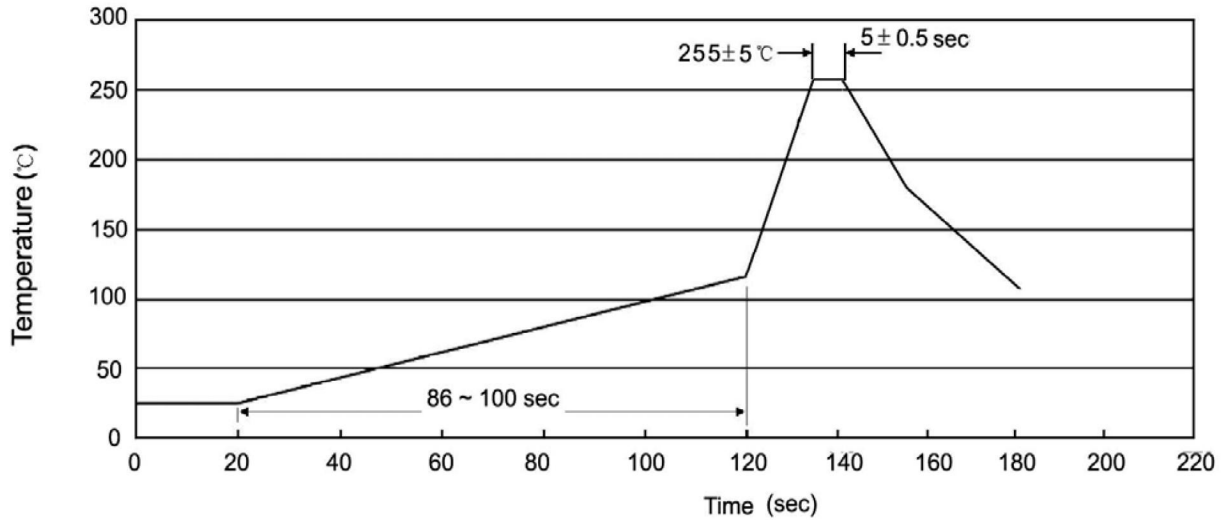
Note:

BR: Company Code.

26N60: 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.**

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-3PH               | 30                 | 15                      | 450                    | 5                            | 2250                   | 497.5×46×8                              | 555×164×50  | 575×290×180 |

**使用说明 / Notices**