

**描述 / Descriptions**

TO-92 塑封封装 NPN 半导体三极管。Silicon NPN transistor in a TO-92 Plastic Package.

**特征 / Features**

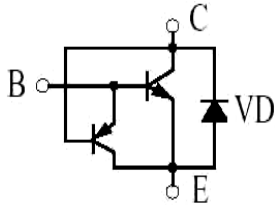
耐压高，快速转换。

High Voltage Capability High Speed Switching.

**用途 / Applications**

主要用于节能灯、日光灯电子镇流器及其它开关、振荡电路。

High frequency electronic lighting ballast applications, converters, inverters, switching regulators, etc.

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

PIN1 : Base      PIN 2 : Collector      PIN 3 : Emitter

**放大及印章代码 / hFE Classifications & Marking**

见印章说明。See Marking Instructions.

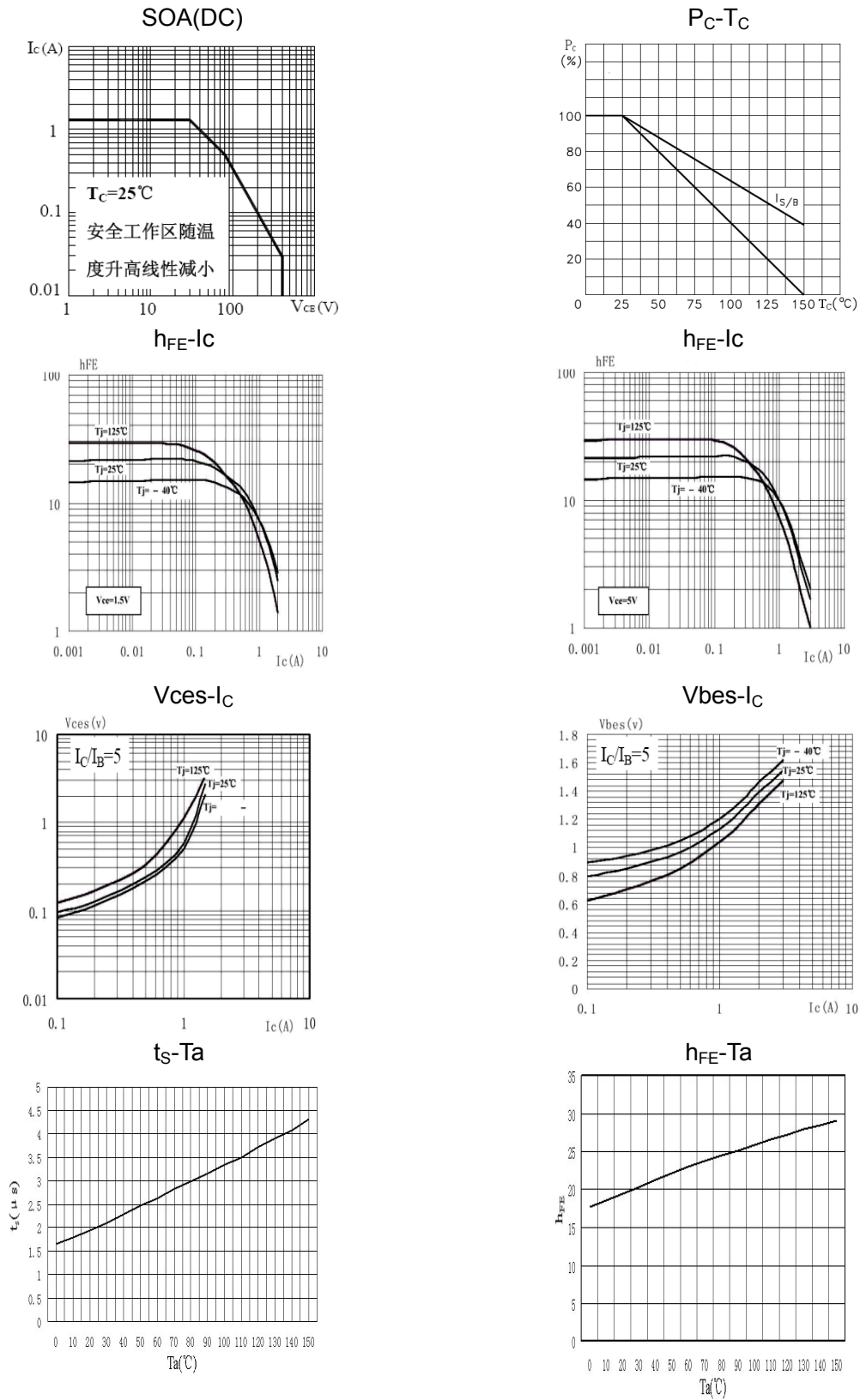
**极限参数 / Absolute Maximum Ratings(Ta=25°C)**

| 参数<br>Parameter                | 符号<br>Symbol | 数值<br>Rating | 单位<br>Unit |
|--------------------------------|--------------|--------------|------------|
| Collector to Base Voltage      | $V_{CBO}$    | 600          | V          |
| Collector to Emitter Voltage   | $V_{CEO}$    | 400          | V          |
| Emitter to Base Voltage        | $V_{EBO}$    | 9.0          | V          |
| Collector Current - Continuous | $I_C$        | 1.3          | A          |
| Collector Power Dissipation    | $P_C$        | 1.0          | W          |
| Junction Temperature           | $T_J$        | 150          | °C         |
| Storage Temperature Range      | $T_{sag}$    | -55 ~ 150    | °C         |

**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 |
|-----------------------------------------|------------------|----------------------------------|------------|------------|------------|------------|
| Collector to Base Breakdown Voltage     | $V_{CBO}$        | $I_C=1mA$ $I_E=0$                | 600        |            |            | V          |
| Collector to Emitter Breakdown Voltage  | $V_{CEO}$        | $I_C=10mA$ $I_B=0$               | 400        |            |            | V          |
| Emitter to Base Breakdown Voltage       | $V_{EBO}$        | $I_E=1mA$ $I_C=0$                | 9.0        |            |            | V          |
| Collector Cut-Off Current               | $I_{CBO}$        | $V_{CB}=600V$ $I_E=0$            |            |            | 0.1        | mA         |
| Collector cut-off current               | $I_{CEO}$        | $V_{CE}=400V$ $I_B=0$            |            |            | 0.1        | mA         |
| Emitter Base Cut-Off Current            | $I_{EBO}$        | $V_{EB}=9.0V$ $I_C=0$            |            |            | 0.1        | mA         |
| DC Current Gain                         | $h_{FE(1)}$      | $V_{CE}=5V$ $I_C=200mA$          | 10         |            | 40         |            |
|                                         | $h_{FE(2)}$      | $V_{CE}=5V$ $I_C=1mA$            | 7          |            |            |            |
|                                         | $h_{FE(3)}$      | $V_{CE}=5V$ $I_C=1.2A$           | 5          |            |            |            |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)(1)}$ | $I_C=500mA$ $I_B=100mA$          |            |            | 0.5        | V          |
|                                         | $V_{CE(sat)(2)}$ | $I_C=1.0A$ $I_B=500mA$           |            |            | 0.6        | V          |
| Base to Emitter Saturation Voltage      | $V_{BE(sat)}$    | $I_C=500mA$ $I_B=100mA$          |            |            | 1.2        | V          |
| Fall time                               | $t_f$            | $V_{CE}=5V$ $I_C=0.25A$ (UI9600) |            |            | 0.8        | μS         |
| Storage time                            | $t_s$            |                                  |            |            | 3.5        | μS         |
| Transition Frequency                    | $f_T$            | $V_{CE}=10V$ $I_C=0.1A$ $f=1MHz$ | 5          |            |            | MHz        |

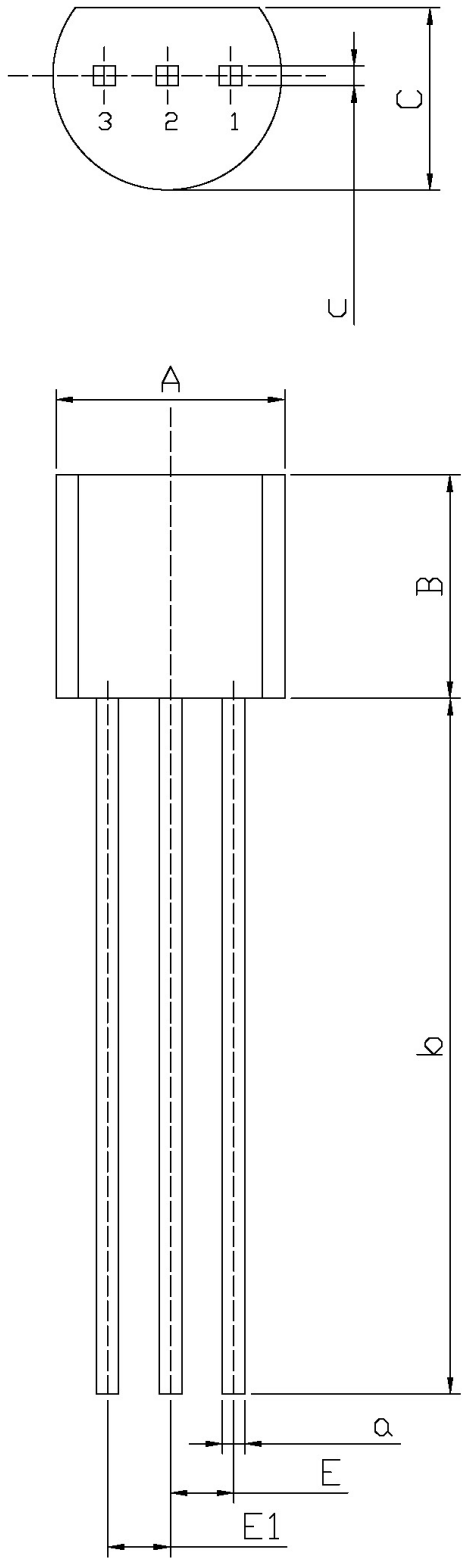
## 电参数曲线图 / Electrical Characteristic Curve



外形尺寸图 / Package Dimensions

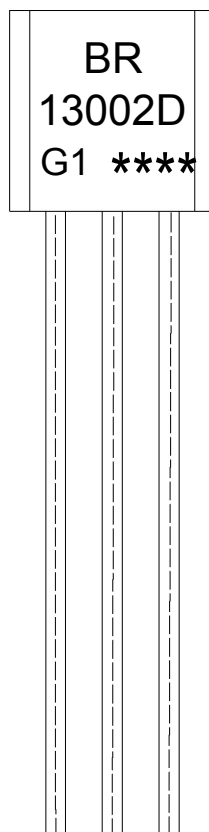
TO-92

Unit: mm



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | Min                       | Max  |
| A      | 4.4                       | 4.8  |
| B      | 4.3                       | 4.7  |
| b      | 13                        | 15   |
| c      | 0.40                      | 0.60 |
| E      | 1.22                      | 1.32 |
| E1     | 1.22                      | 1.32 |
| C      | 3.4                       | 3.8  |
| c      | 0.30                      | 0.50 |

## 印章说明 / Marking Instructions



说明：

BR: 为公司代码

13002D : 为型号代码

G1: 规格代码

\*\*\*\* : 为生产批号代码，随生产批号变化。

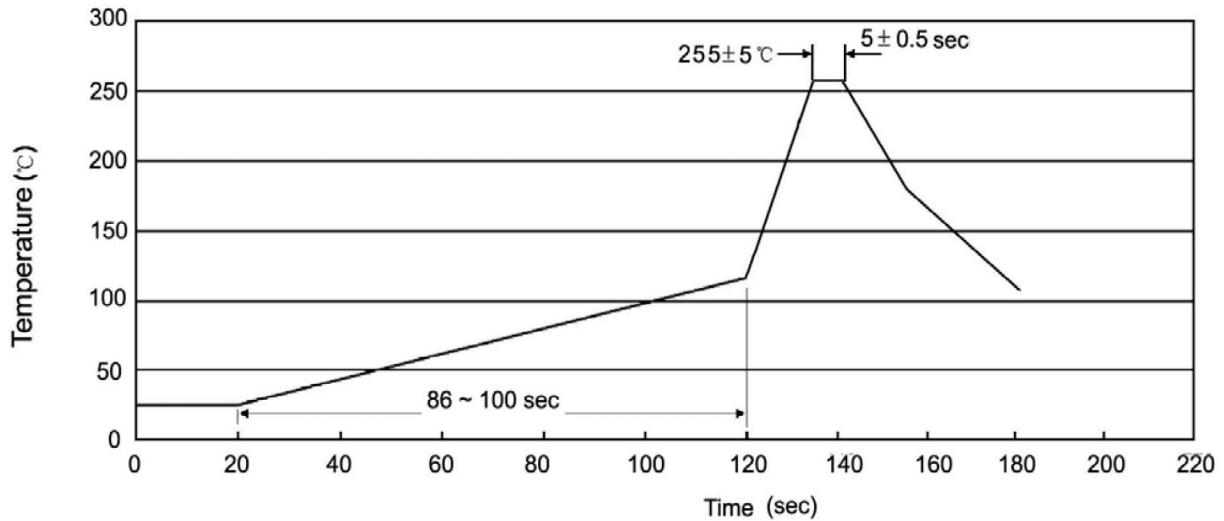
Note:

BR: Company Code.

13002D: Product Type.

G1: Specification Code.

\*\*\*\*: 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: mm3) |             |             |
|----------------------|------------------|-----------------------|------------------------|------------------------------|------------------------|----------------------------|-------------|-------------|
|                      | 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-92                | 1,000            | 10                    | 10,000                 | 5                            | 50,000                 | 135×190                    | 237×172×102 | 560×245×195 |
|                      | 1,000            | 10                    | 10,000                 | 10                           | 100,000                | 135×190                    | 237×172×102 | 560×245×375 |

编带包装 / AMMO

| Package Type<br>封装形式 | Units 包装数量         |                        |                         |                              |                        | Dimension 包装尺寸 (unit: mm3) |                                   |
|----------------------|--------------------|------------------------|-------------------------|------------------------------|------------------------|----------------------------|-----------------------------------|
|                      | Units/tape<br>只/纸带 | Tape/Inner Box<br>纸带/盒 | Rows/Inner Box<br>纸带层/盒 | Inner Boxes/Outer Box<br>盒/箱 | Units/Outer Box<br>只/箱 | Inner Box 盒                | Outer Box 箱                       |
| TO-92                | 3,000              | 1                      | 120                     | 10                           | 30,000                 | 328×230×42                 | 小箱 480×346×235,<br>大箱 547×407×268 |

**使用说明 / Notices**