

描述 / Descriptions

SOT-89 塑封封装 PNP 半导体三极管。Silicon PNP transistor in a SOT-89 Plastic Package.

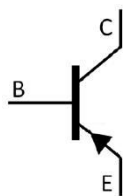
特征 / Features

与 BR2SD669TAQ 互补，符合 AEC-Q101 标准高可靠性要求，无卤产品。  
Complementary pair with BR2SD669TAQ, Qualified to AEC-Q101 Standards for High Reliability, HF Product.

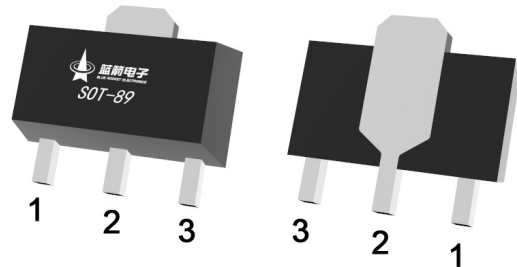
用途 / Applications

用于低频功率放大，满足汽车应用的严格要求。  
Low frequency power amplifier, Meet the stringent requirements of automotive applications.

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 /  $h_{FE}$  Classifications & Marking

| $h_{FE}$ Classifications<br>Symbol | B      | C       | D       |
|------------------------------------|--------|---------|---------|
| $h_{FE}$ Range                     | 60~120 | 100~200 | 160~320 |
| Marking                            | Q649B* | Q649C*  | Q649D*  |

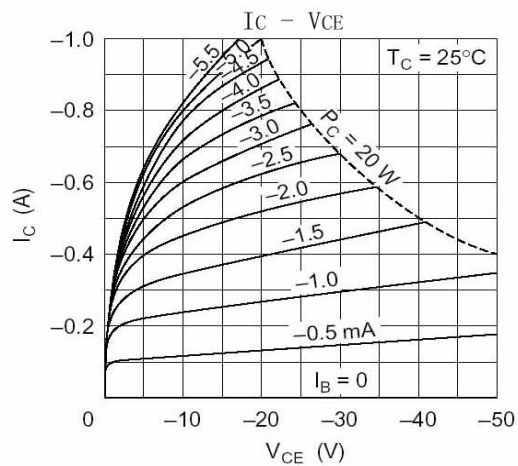
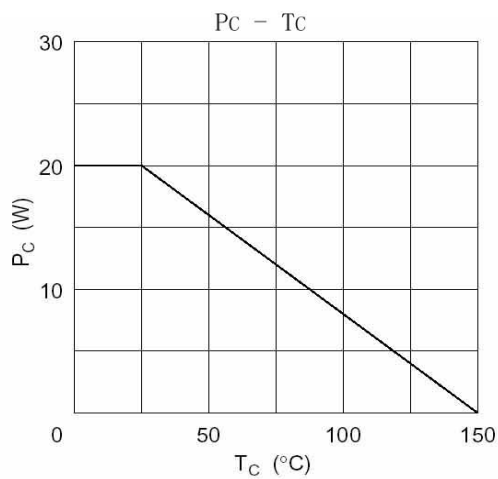
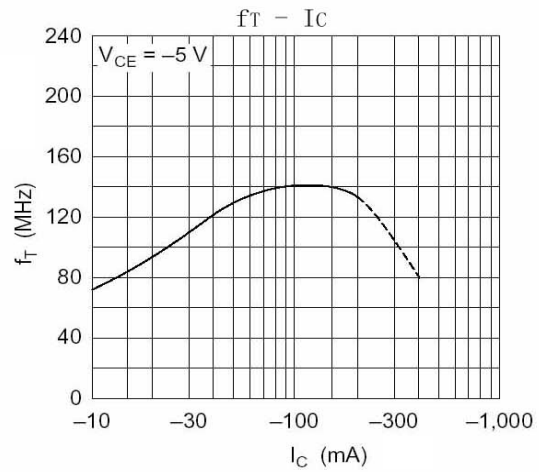
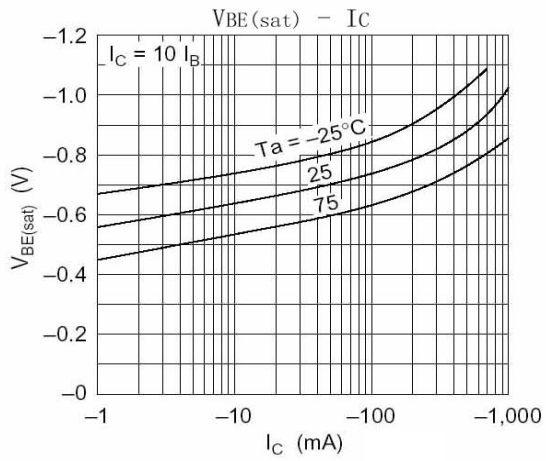
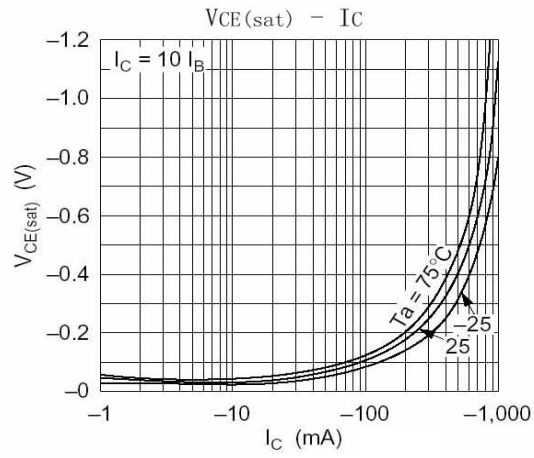
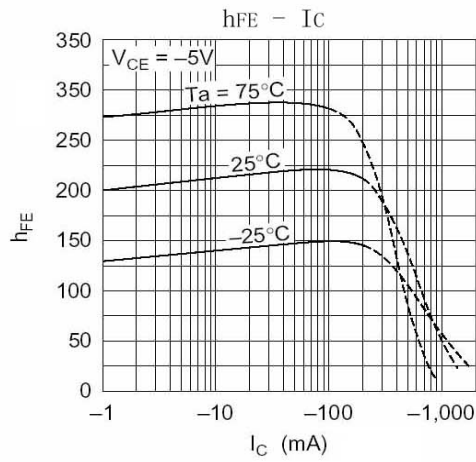
**极限参数 / Absolute Maximum Ratings(Ta=25°C)**

| 参数<br>Parameter                     | 符号<br>Symbol                  | 数值<br>Rating | 单位<br>Unit         |
|-------------------------------------|-------------------------------|--------------|--------------------|
| Collector to Base Voltage           | $V_{CBO}$                     | -180         | V                  |
| Collector to Emitter Voltage        | $V_{CEO}$                     | -160         | V                  |
| Emitter to Base Voltage             | $V_{EBO}$                     | -5.0         | V                  |
| Collector Current-Continuous        | $I_C$                         | -1.5         | A                  |
| Collector Current-Continuous(Pulse) | $I_{CP}$                      | -3.0         | A                  |
| Collector Power Dissipation         | $P_C$                         | 500          | mW                 |
| Collector Power Dissipation         | $P_C(T_C=25^{\circ}\text{C})$ | 20           | W                  |
| Junction Temperature                | $T_j$                         | 150          | $^{\circ}\text{C}$ |
| Storage Temperature Range           | $T_{stg}$                     | -55~150      | $^{\circ}\text{C}$ |

**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     | $V_{CBO}$     | $I_C=-1.0\text{mA}$ $I_E=0$                       | -180       |            |            | V             |
| Collector to Emitter Breakdown Voltage  | $V_{CEO}$     | $I_C=-10\text{mA}$ $R_{BE}=\infty$                | -160       |            |            | V             |
| Emitter to Base Breakdown Voltage       | $V_{EBO}$     | $I_E=-1.0\text{mA}$ $I_C=0$                       | -5.0       |            |            | V             |
| Collector Cut-Off Current               | $I_{CBO}$     | $V_{CB}=-160\text{V}$ $I_E=0$                     |            |            | -10        | $\mu\text{A}$ |
| DC Current Gain                         | $h_{FE(1)}$   | $V_{CE}=-5.0\text{V}$ $I_C=-150\text{mA}$         | 60         |            | 320        |               |
|                                         | $h_{FE(2)}$   | $V_{CE}=-5.0\text{V}$ $I_C=-500\text{mA}$         | 30         |            |            |               |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=-500\text{mA}$ $I_B=-50\text{mA}$            |            |            | -1.0       | V             |
| Base to Emitter Voltage                 | $V_{BE}$      | $V_{CE}=-5.0\text{V}$ $I_C=-150\text{mA}$         |            |            | -1.5       | V             |
| Transition Frequency                    | $f_T$         | $V_{CE}=-5.0\text{V}$ $I_C=-150\text{mA}$         |            | 140        |            | MHz           |
| Collector Output Capacitance            | $C_{ob}$      | $V_{CB}=-10\text{V}$ $I_E=0$<br>$f=1.0\text{MHz}$ |            | 27         |            | pF            |

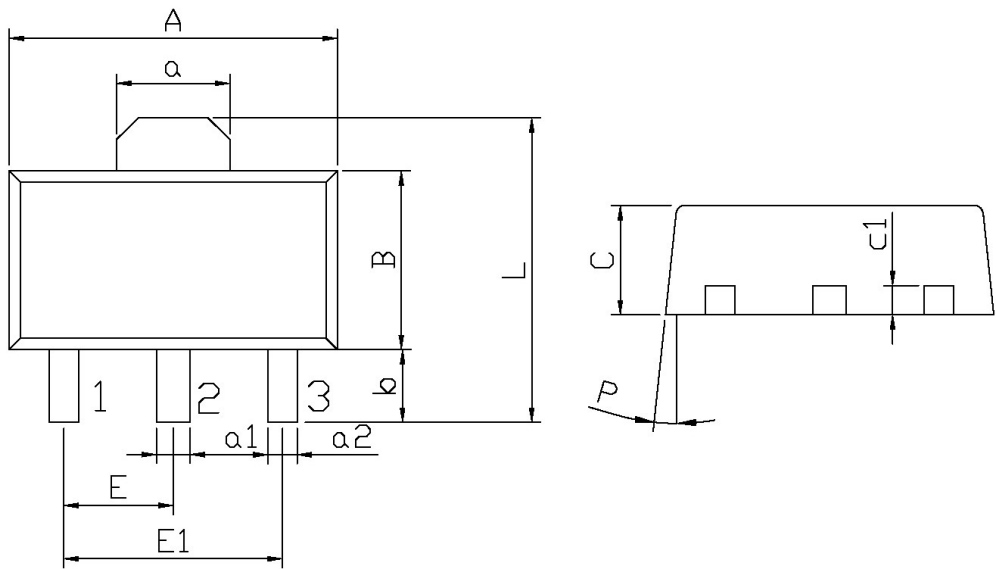
## 电参数曲线图 / Electrical Characteristic Curve



外形尺寸图 / Package Dimensions

SOT-89

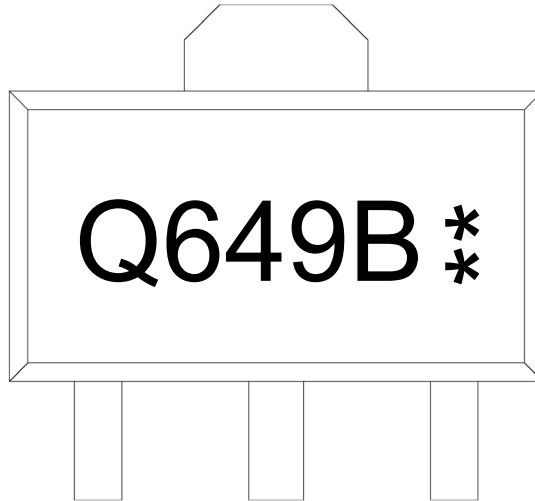
单位: mm



| Symbol | Dimensions In Millimeters |       | Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|-------|--------|---------------------------|------|
|        | Min                       | Max   |        | Min                       | Max  |
| A      | 4.4                       | 4.7   | a1     | 0.36                      | 0.56 |
| B      | 2.35                      | 2.65  | a2     | 0.30                      | 0.50 |
| L      | 3.878                     | 4.478 | C      | 1.40                      | 1.70 |
| a      | 1.45                      | 1.65  | c1     | 0.35                      | 0.50 |
| E      | 1.40                      | 1.60  | P      | 6°                        |      |
| E1     | 2.80                      | 3.20  |        |                           |      |
| b      | 0.80                      | 1.20  |        |                           |      |



印章说明 / Marking Instructions



说明：

Q： 为汽车无卤产品标识

649： 为型号代码

B： 为  $h_{FE}$  分档代码

\*\*： 为生产批号代码，随生产批号变化

Note:

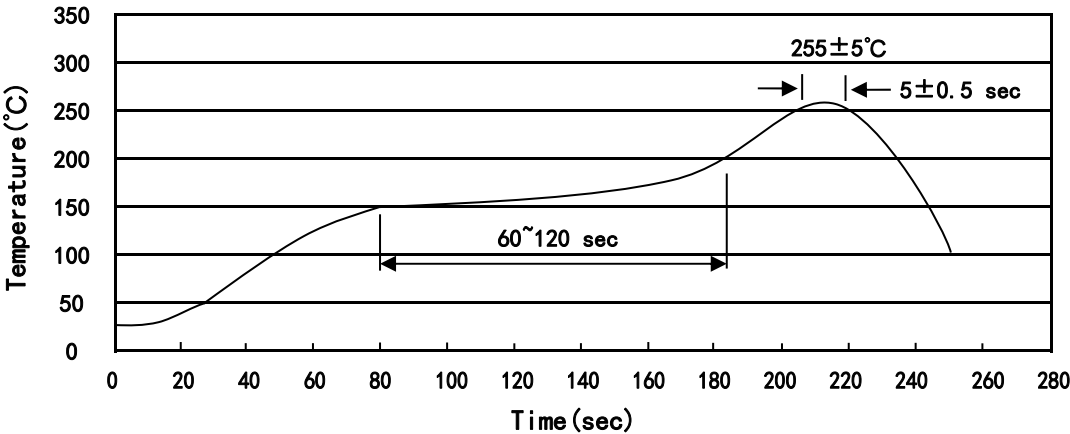
Q: Automobile halogen-free product Code

649: Product Type Code

B:  $h_{FE}$  Classifications Symbol

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

回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)



- 说明：

  - 1、预热温度 150 ~ 200℃，时间 60 ~ 120sec;
  - 2、峰值温度 255±5℃，时间持续为 5±0.5sec;
  - 3、焊接制程冷却速度为 2 ~ 10℃/sec.
- Note:

  - 1.Preheating:150~200℃, Time:60~120sec.
  - 2.Peak Temp.:255±5℃, Duration:5±0.5sec.
  3. Cooling Speed: 2~10℃/sec.

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

温度：260±5℃      时间：10±1 sec.

Temp.:260±5℃      Time:10±1 sec

包装规格 / Packaging SPEC.

卷盘包装 / REEL

| Package Type<br>封装形式 | Units 包装数量         |                         |                        |                              |                        | Dimension 包装尺寸 (unit: mm <sup>3</sup> ) |             |             |
|----------------------|--------------------|-------------------------|------------------------|------------------------------|------------------------|-----------------------------------------|-------------|-------------|
|                      | Units/Reel<br>只/卷盘 | Reels/Inner Box<br>卷盘/盒 | Units/Inner Box<br>只/盒 | Inner Boxes/Outer Box<br>盒/箱 | Units/Outer Box<br>只/箱 | Reel                                    | Inner Box 盒 | Outer Box 箱 |
| SOT-89               | 1,000              | 10                      | 10,000                 | 4                            | 40,000                 | 7" ×12                                  | 210×205×205 | 445×435×230 |

使用说明 / Notices