

## / Descriptions

Silicon PNP transistor in a TO-126F Plastic Package.

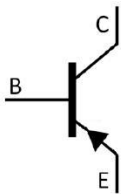
## / Features

Complementary pair with 2SD669(A).

## / Applications

Low frequency power amplifier.

## / Equivalent Circuit



## / Pinning



PIN1 Emitter      PIN 2 Collector      PIN 3 Base

## / $h_{FE}$ Classifications & Marking

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

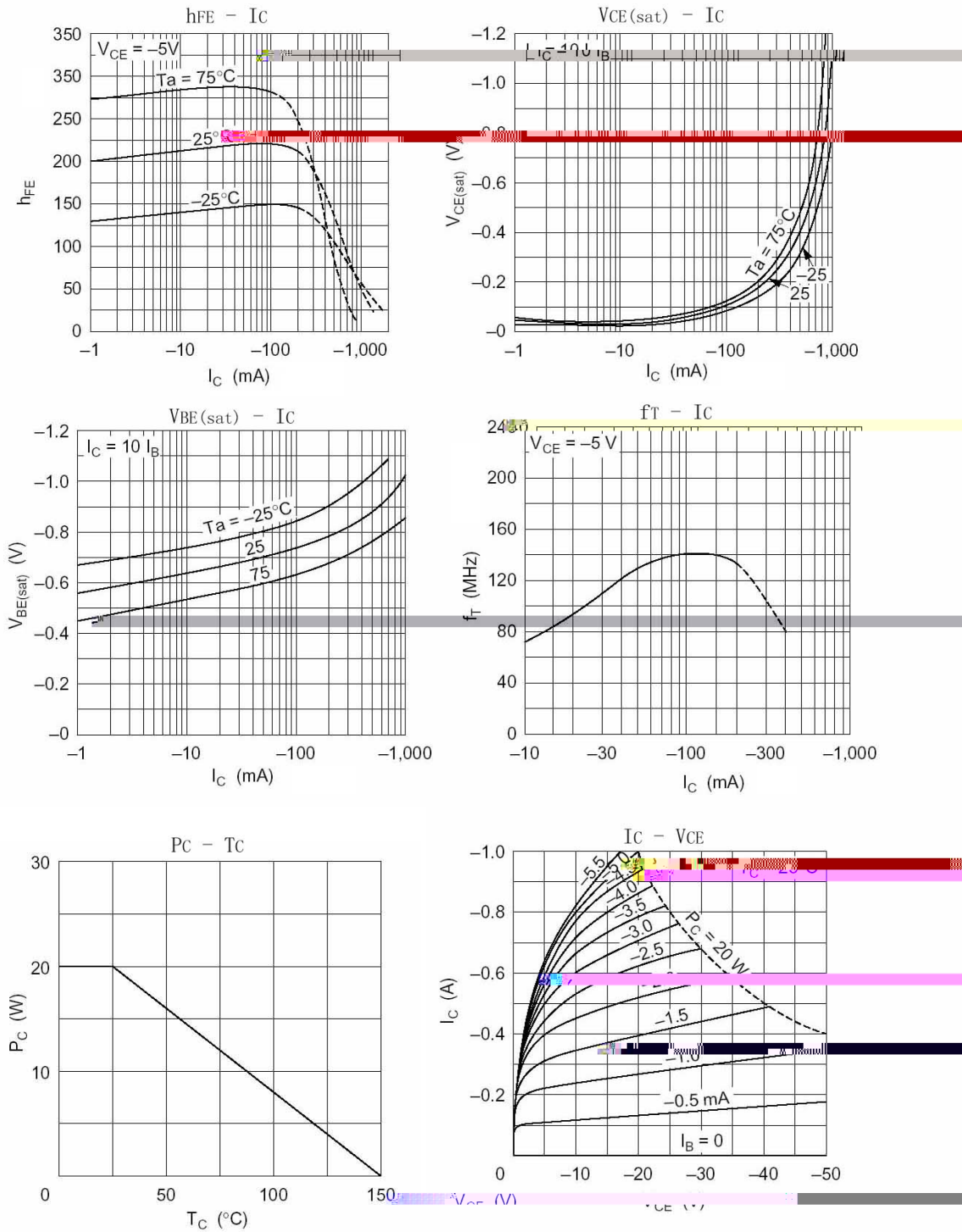
**/ Absolute Maximum Ratings(Ta=25 )**

| Parameter                      | Symbol                 | Rating          | Unit        |
|--------------------------------|------------------------|-----------------|-------------|
| Collector to Base Voltage      | $V_{CBO}$              | -180            | V           |
| Collector to Emitter Voltage   | $V_{CEO}$              | 2SB649<br>-120  | V           |
|                                |                        | 2SB649A<br>-160 |             |
| Emitter to Base Voltage        | $V_{EBO}$              | -5.0            | V           |
| Collector Current - Continuous | $I_C$                  | -1.5            | A           |
| Collector Current(Pulse)       | $I_{CP}$               | -3.0            | A           |
| Collector Power Dissipation    | $P_C$                  | 1.0             | W           |
| Collector Power Dissipation    | $P_C(T_c=25^{\circ}C)$ | 20              | W           |
| Junction Temperature           | $T_j$                  | 150             | $^{\circ}C$ |
| Storage Temperature Range      | $T_{stg}$              | -55~150         | $^{\circ}C$ |

**/ Electrical Characteristics(Ta=25 )**

| Parameter                               | Symbol        | Test Conditions                     | Min  | Typ | Max  | Unit    |
|-----------------------------------------|---------------|-------------------------------------|------|-----|------|---------|
| Collector to Base Breakdown Voltage     | $V_{CBO}$     | $I_C=-1.0mA$ $I_E=0$                | -180 |     |      | V       |
| Collector to Emitter Breakdown Voltage  | $V_{CEO}$     | $I_C=-10mA$ $R_{BE}=\infty$         | -120 |     |      | V       |
|                                         |               |                                     | -160 |     |      |         |
| Emitter to Base Breakdown Voltage       | $V_{EBO}$     | $I_E=-1.0mA$ $I_C=0$                | -5.0 |     |      | V       |
| Collector Cut-Off Current               | $I_{CBO}$     | $V_{CB}=-160V$ $I_E=0$              |      |     | -10  | $\mu A$ |
| DC Current Gain                         | $h_{FE(1)}$   | $V_{CE}=-5.0V$ $I_C=-150mA$         | 60   |     | 320  |         |
|                                         | $h_{FE(2)}$   | $V_{CE}=-5.0V$ $I_C=-500mA$         | 30   |     |      |         |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=-500mA$ $I_B=-50mA$            |      |     | -1.0 | V       |
| Base to Emitter Voltage                 | $V_{BE}$      | $V_{CE}=-5.0V$ $I_C=-150mA$         |      |     | -1.5 | V       |
| Transition Frequency                    | $f_T$         | $V_{CE}=-5.0V$ $I_C=-150mA$         |      | 140 |      | MHz     |
| Collector output capacitance            | $C_{ob}$      | $V_{CB}=-10V$ $I_E=0$<br>$f=1.0MHz$ |      | 27  |      | pF      |

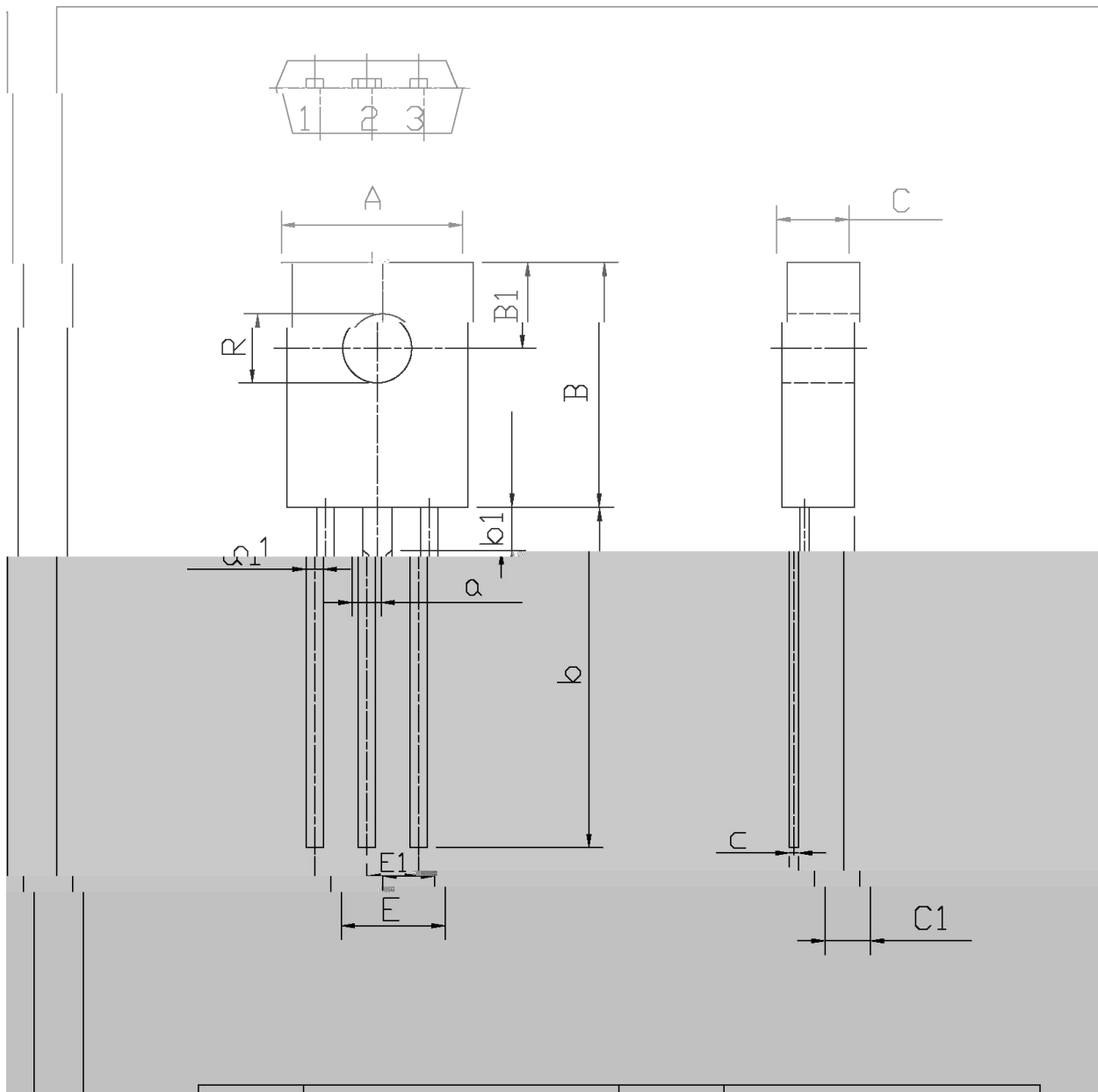
**/ Electrical Characteristic Curve**



/ Package Dimensions

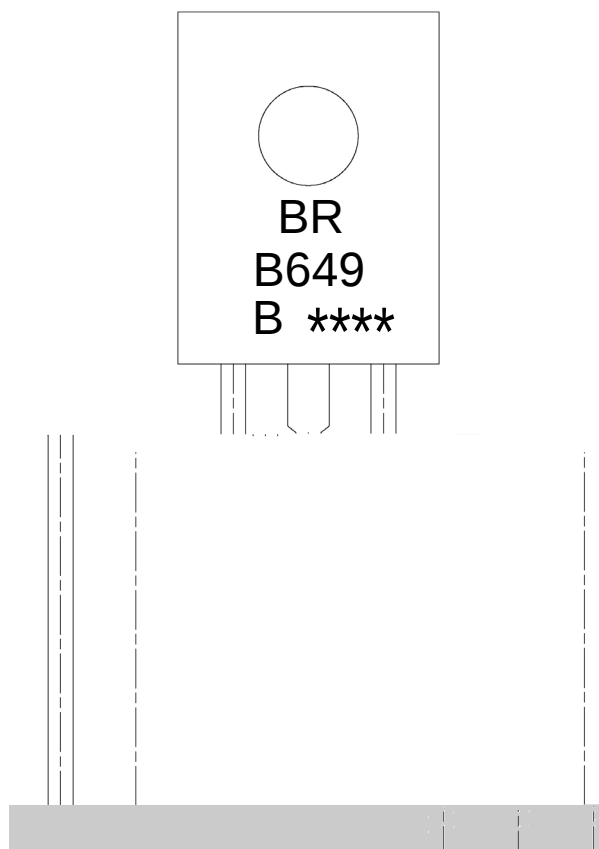
2SB649

单位: mm



|    | Min  | Max  |    | Min  | Max  |
|----|------|------|----|------|------|
| A  | 7.8  | 8.2  | a1 | 0.55 | 0.85 |
| B  | 10.0 | 11.2 | E  | 4.4  | 4.8  |
| B1 | 3.8  | 4.2  | C  | 3.1  | 3.3  |
| R  | 2.05 | 3.15 | C1 | 1.9  | 2.1  |
| b  | 14   | 16   | c  | 0.3  | 0.6  |
| b1 | 1.9  |      | a  | 1.27 |      |
| E1 | 2.1  | 2.5  |    |      |      |

**/ Marking Instructions**



Note:

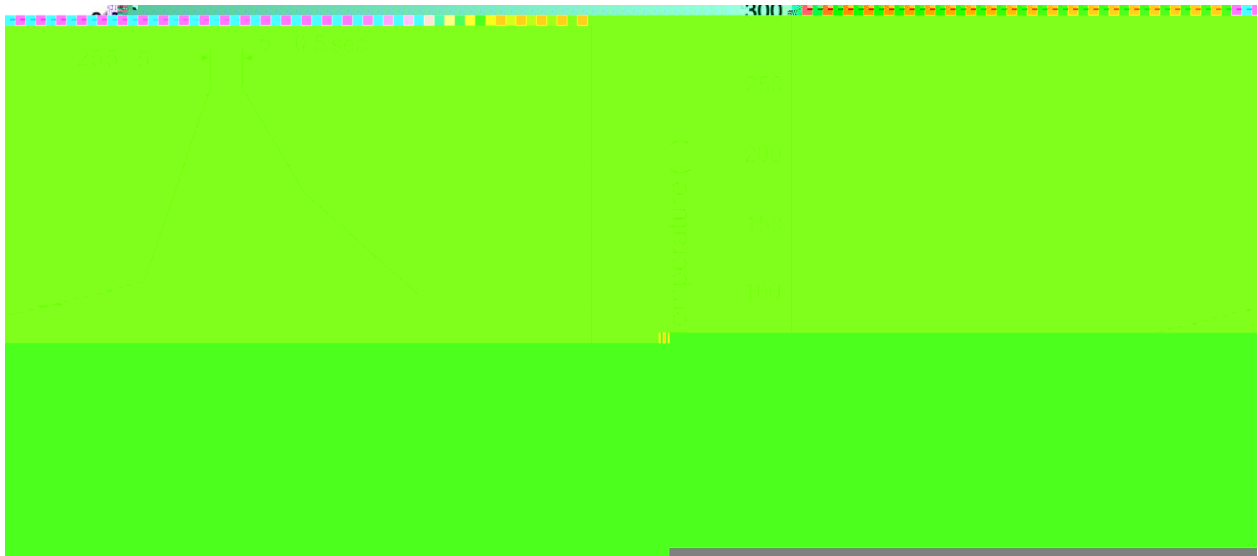
BR: Company Code

B649 : Product Type.

B:  $h_{FE}$  Classifications Symbol

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

( ) / Temperature Profile for Dip Soldering(Pb-Free)



Note:

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

/ Resistance to Soldering Heat Test Conditions

270 5                      10 1 sec.                      Temp.:270±5℃                      Time:10±1 sec

/ Packaging SPEC.

/ BULK

| Package Type | Units           |                      |                      |                            |                      | Dimension (unit mm <sup>3</sup> ) |             |             |
|--------------|-----------------|----------------------|----------------------|----------------------------|----------------------|-----------------------------------|-------------|-------------|
|              | Units/Tube<br>/ | Tubes/Inner Box<br>/ | Units/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Tube                              | Inner Box   | Outer Box   |
| TO-126/F     | 500             | 6                    | 3,000                | 5                          | 15,000               | 135×190                           | 237×172×102 | 560×245×195 |

/ TUBE

| Package Type | Units           |                      |                      |                            |                      | Dimension (unit mm <sup>3</sup> ) |            |             |
|--------------|-----------------|----------------------|----------------------|----------------------------|----------------------|-----------------------------------|------------|-------------|
|              | Units/Tube<br>/ | Tubes/Inner Box<br>/ | Units/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Tube                              | Inner Box  | Outer Box   |
| TO-126/F     | 65              | 26                   | 1,690                | 5                          | 8,450                | 532×31×5.6                        | 555×164×50 | 575×290×180 |

/ Notices