

# 9014

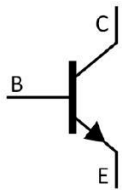
Rev.E Mar.-2016

TO-92          NPN          Silicon NPN transistor in a TO-92 Plastic Package.

$P_C$ ,  $h_{FE}$ , 9015

High  $P_C$  and  $h_{FE}$  excellent  $h_{FE}$  linearity, complementary pair with 9015.

Low frequency, low noise amplifier.



PIN1   Collector          PIN 2   Base          PIN 3   Emitter

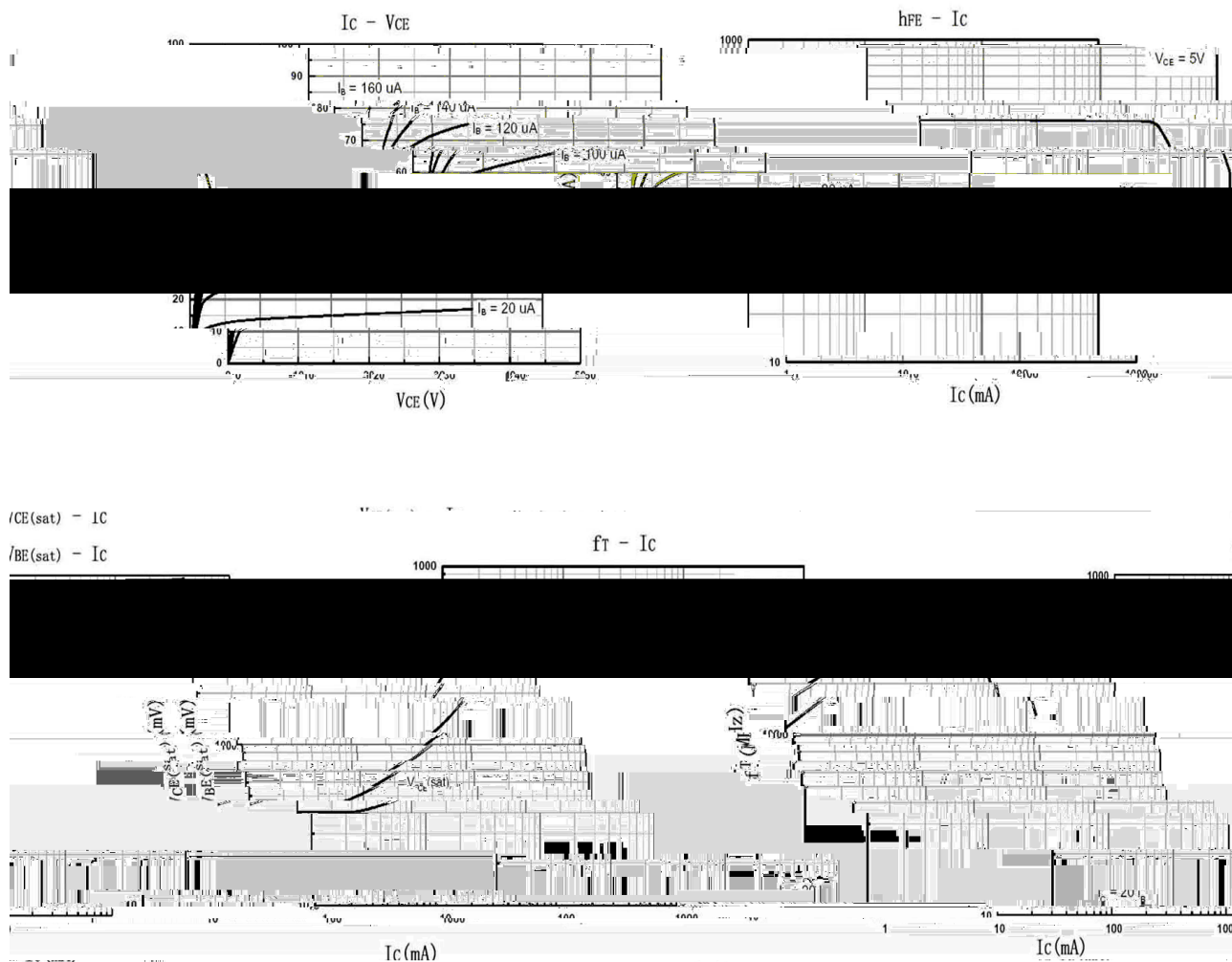
## / Absolute Maximum Ratings(Ta=25 )

| Parameter                      | Symbol    | Rating  | Unit |
|--------------------------------|-----------|---------|------|
| Collector to Base Voltage      | $V_{CBO}$ | 50      | V    |
| Collector to Emitter Voltage   | $V_{CEO}$ | 45      | V    |
| Emitter to Base Voltage        | $V_{EBO}$ | 5.0     | V    |
| Collector Current - Continuous | $I_C$     | 100     | mA   |
| Collector Power Dissipation    | $P_C$     | 450     | mW   |
| Junction Temperature           | $T_j$     | 150     |      |
| Storage Temperature Range      | $T_{stg}$ | -55 150 |      |

## / Electrical Characteristics(Ta=25 )

| Parameter                               | Symbol        | Test Conditions                                               | Min | Typ  | Max  | Unit |
|-----------------------------------------|---------------|---------------------------------------------------------------|-----|------|------|------|
| Collector to Base Breakdown Voltage     | $V_{CBO}$     | $I_C=0.1mA$ $I_E=0$                                           | 50  |      |      | V    |
| Collector to Emitter Breakdown Voltage  | $V_{CEO}$     | $I_C=1.0mA$ $I_B=0$                                           | 45  |      |      | V    |
| Emitter to Base Breakdown Voltage       | $V_{EBO}$     | $I_E=0.1mA$ $I_C=0$                                           | 5.0 |      |      | V    |
| Collector Cut-Off Current               | $I_{CBO}$     | $V_{CB}=50V$ $I_E=0$                                          |     |      | 0.05 | A    |
| Emitter Cut-Off Current                 | $I_{EBO}$     | $V_{EB}=5.0V$ $I_C=0$                                         |     |      | 0.05 | A    |
| DC Current Gain                         | $h_{FE}$      | $V_{CE}=5.0V$ $I_C=1.0mA$                                     | 60  |      | 1000 |      |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=100mA$ $I_B=5.0mA$                                       |     | 0.14 | 0.3  | V    |
| Base to Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=100mA$ $I_B=5.0mA$                                       |     | 0.84 | 1.0  | V    |
| Base to Emitter Voltage                 | $V_{BE}$      | $V_{CE}=5.0V$ $I_C=2.0mA$                                     |     | 0.63 | 0.7  | V    |
| Transition Frequency                    | $f_T$         | $V_{CE}=5.0V$ $I_C=10mA$                                      | 150 | 270  |      | MHz  |
| Collector Output Capacitance            | $C_{ob}$      | $V_{CB}=10V$ $I_E=0$<br>$f=1.0MHz$                            |     | 2.2  | 3.5  | pF   |
| Noise Figure                            | NF            | $V_{CE}=5.0V$ $I_C=0.2mA$<br>$R_g=2.0K$ $f=1.0K$<br>$f=200Hz$ |     | 0.9  | 10   | dB   |

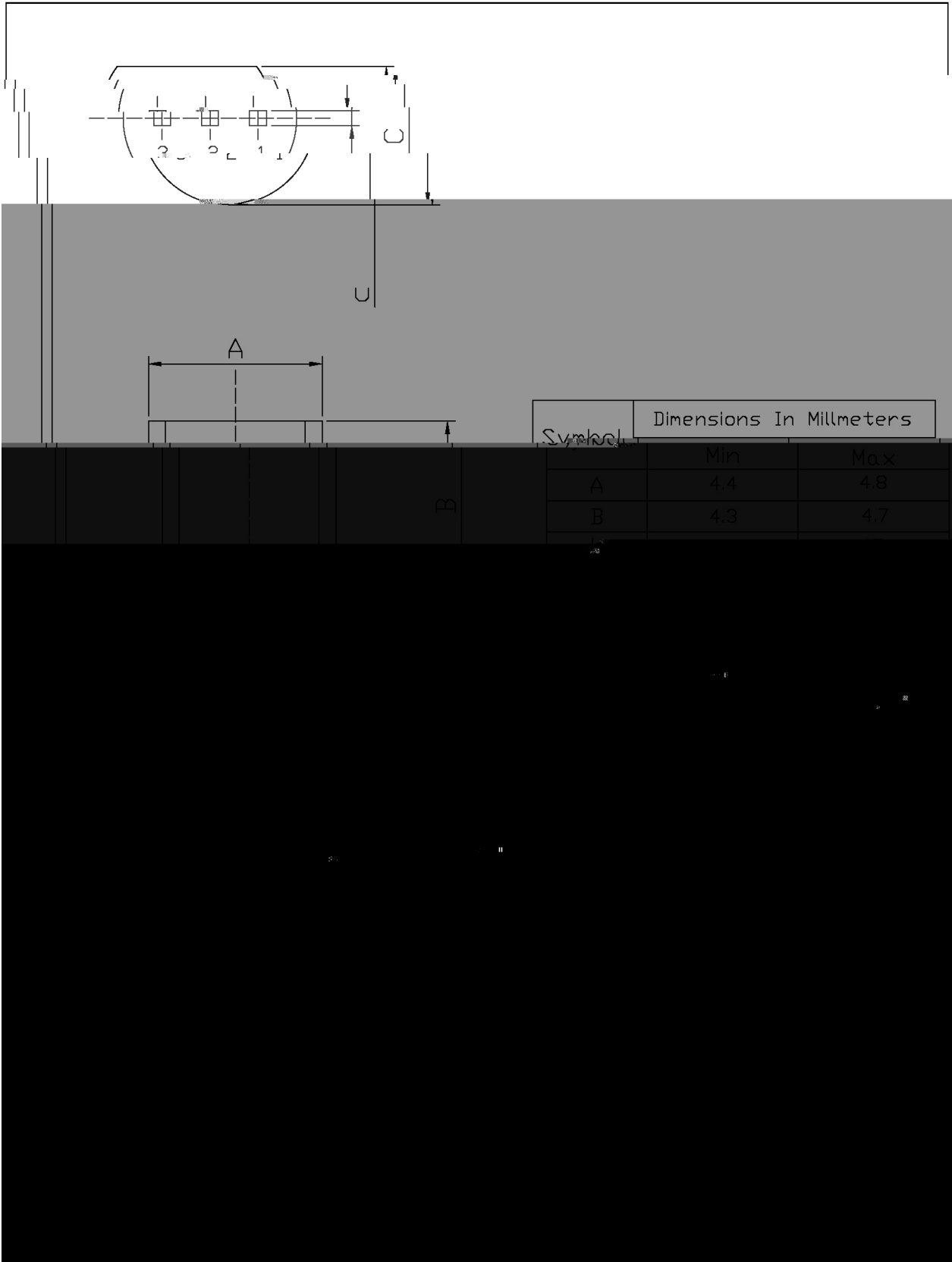
/ Electrical Characteristic Curve



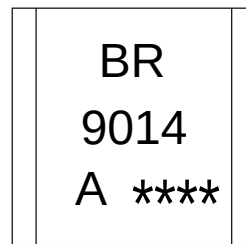
/ Package Dimensions

T0-92

Unit: mm



## / Marking Instructions



BR

9014

A:  $h_{FE}$ 

\*\*\*\*

Note:

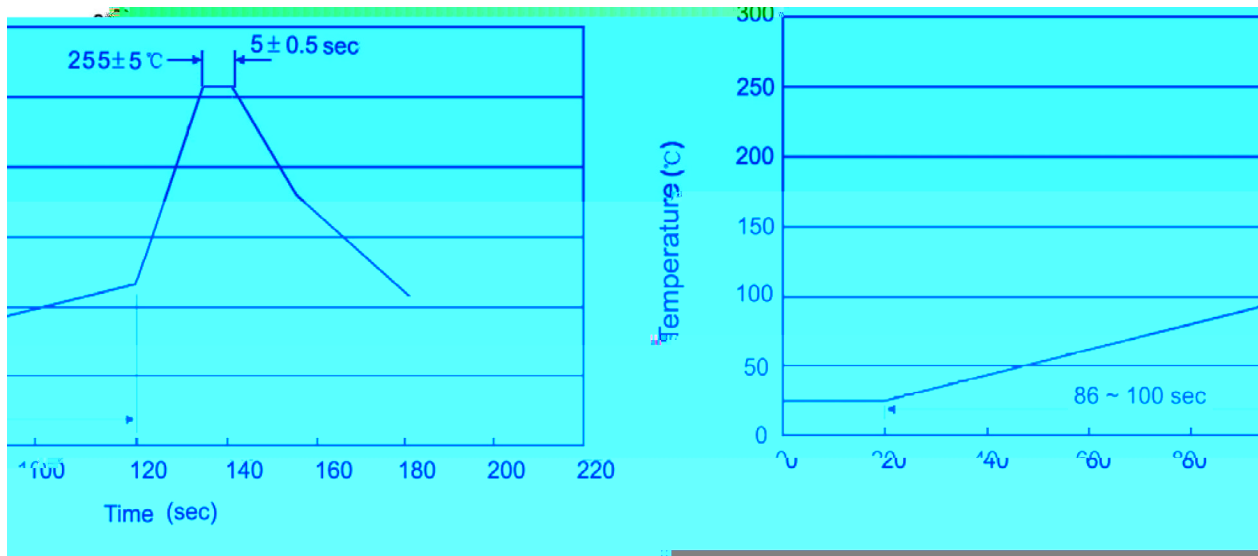
BR: Company Code.

9014: Product Type.

A:  $h_{FE}$  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

$270 \pm 5$        $10 \pm 1 \text{ sec.}$       Temp.:  $270 \pm 5$       Time:  $10 \pm 1 \text{ sec}$

## / Packaging SPEC.

## / BULK

| Package Type | Units          |                     |                      |                            |                      | Dimension (unit mm3) |             |             |
|--------------|----------------|---------------------|----------------------|----------------------------|----------------------|----------------------|-------------|-------------|
|              | Units/Bag<br>/ | Bags/Inner Box<br>/ | Units/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Bag                  | Inner Box   | Outer Box   |
| 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 |

## / AMMO

| Package Type | Units           |                     |                     |                            |                      | Dimension (unit mm3) |                            |
|--------------|-----------------|---------------------|---------------------|----------------------------|----------------------|----------------------|----------------------------|
|              | Units/tape<br>/ | Tape/Inner Box<br>/ | Rows/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Inner Box            | Outer Box                  |
| TO-92        | 3,000           | 1                   | 120                 | 10                         | 30,000               | 328×230×42           | 480×346×235<br>547×407×268 |

## / Notices