



JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO., LTD

## TO-92 Plastic-Encapsulate Transistors

### S9011 TRANSISTOR ( NPN )

#### FEATURE

Power dissipation

$P_{CM}$  : 0.31 W (  $T_{amb}=25$  )

Collector current

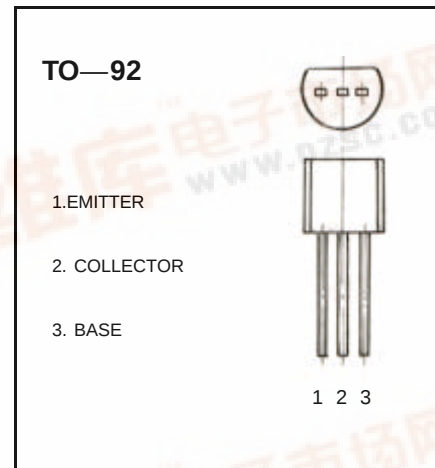
$I_{CM}$ : 0.03 A

Collector-base voltage

$V_{(BR)CBO}$  : 30 V

Operating and storage junction temperature range

$T_j, T_{stg}$ : -55 to +150



#### ELECTRICAL CHARACTERISTICS ( $T_{amb}=25$ unless otherwise specified )

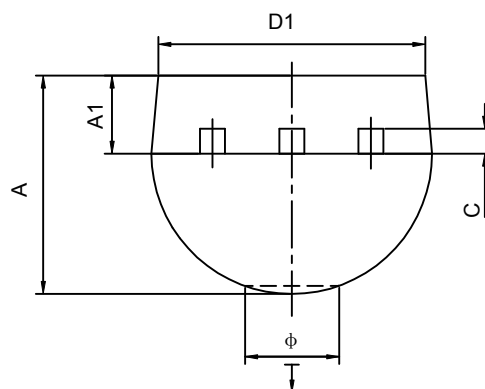
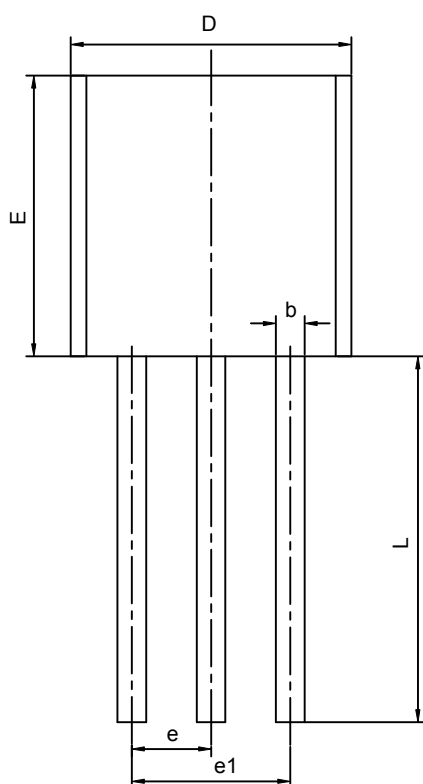
| Parameter                            | Symbol        | Test conditions                     | MIN | TYP | MAX | UNIT    |
|--------------------------------------|---------------|-------------------------------------|-----|-----|-----|---------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C = 100 \mu A, I_E = 0$          | 30  |     |     | V       |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C = 0.1 mA, I_B = 0$             | 20  |     |     | V       |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E = 100 \mu A, I_C = 0$          | 4   |     |     | V       |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 16V, I_E = 0$             |     |     | 0.1 | $\mu A$ |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 16V, I_E = 0$             |     |     | 0.1 | $\mu A$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 3.5V, I_C = 0$            |     |     | 0.1 | $\mu A$ |
| DC current gain                      | $h_{FE(1)}$   | $V_{CE} = 5V, I_C = 1mA$            | 28  |     | 270 |         |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 10 mA, I_B = 1mA$            |     |     | 0.3 | V       |
| Base-emitter voltage                 | $V_{BE(sat)}$ | $I_C = 10 mA, I_B = 1mA$            |     |     | 1   | V       |
| Transition frequency                 | $f_T$         | $V_{CE} = 5V, I_C = 1mA, f = 30MHz$ | 150 |     |     | MHz     |

#### CLASSIFICATION OF $h_{FE(1)}$

| Rank  | D     | E     | F     | G      | H      | I       | J       |
|-------|-------|-------|-------|--------|--------|---------|---------|
| Range | 28-45 | 39-60 | 54-80 | 72-108 | 97-146 | 132-198 | 180-270 |



## TO-92 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 3.300                     | 3.700  | 0.130                | 0.146 |
| A1     | 1.100                     | 1.400  | 0.043                | 0.055 |
| b      | 0.380                     | 0.550  | 0.015                | 0.022 |
| c      | 0.360                     | 0.510  | 0.014                | 0.020 |
| D      | 4.400                     | 4.700  | 0.173                | 0.185 |
| D1     | 3.430                     |        | 0.135                |       |
| E      | 4.300                     | 4.700  | 0.169                | 0.185 |
| e      | 1.270TYP                  |        | 0.050TYP             |       |
| e1     | 2.440                     | 2.640  | 0.096                | 0.104 |
| L      | 14.100                    | 14.500 | 0.555                | 0.571 |
| Ö      |                           | 1.600  |                      | 0.063 |
| ↓      | 0.000                     | 0.380  | 0.000                | 0.015 |