

/ Descriptions

Silicon PNP transistor in a TO-252 Plastic Package.

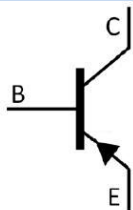
/ Features

Low saturation voltage, excellent  $h_{FE}$  linearity and high  $h_{FE}$ , Halogen-free Product.

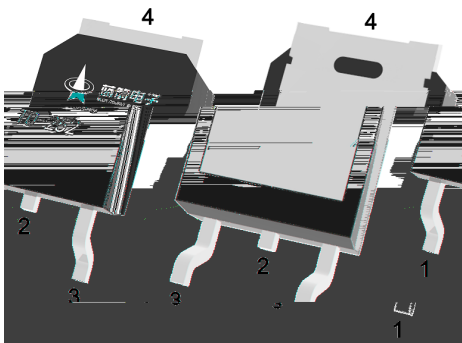
/ Applications

Output stage of 3 watts audio amplifier, voltage regulator, DC-DC converter and relay driver.

/ Equivalent Circuit



/ Pinning



PIN1    Base            PIN 2,4    Collector            PIN 3    Emitter

/  $h_{FE}$  Classifications & Marking

| $h_{FE}$ Classifications<br>Symbol | R         | Q          | P          | E          |
|------------------------------------|-----------|------------|------------|------------|
| $h_{FE}$ Range                     | 60    120 | 100    200 | 160    320 | 200    400 |

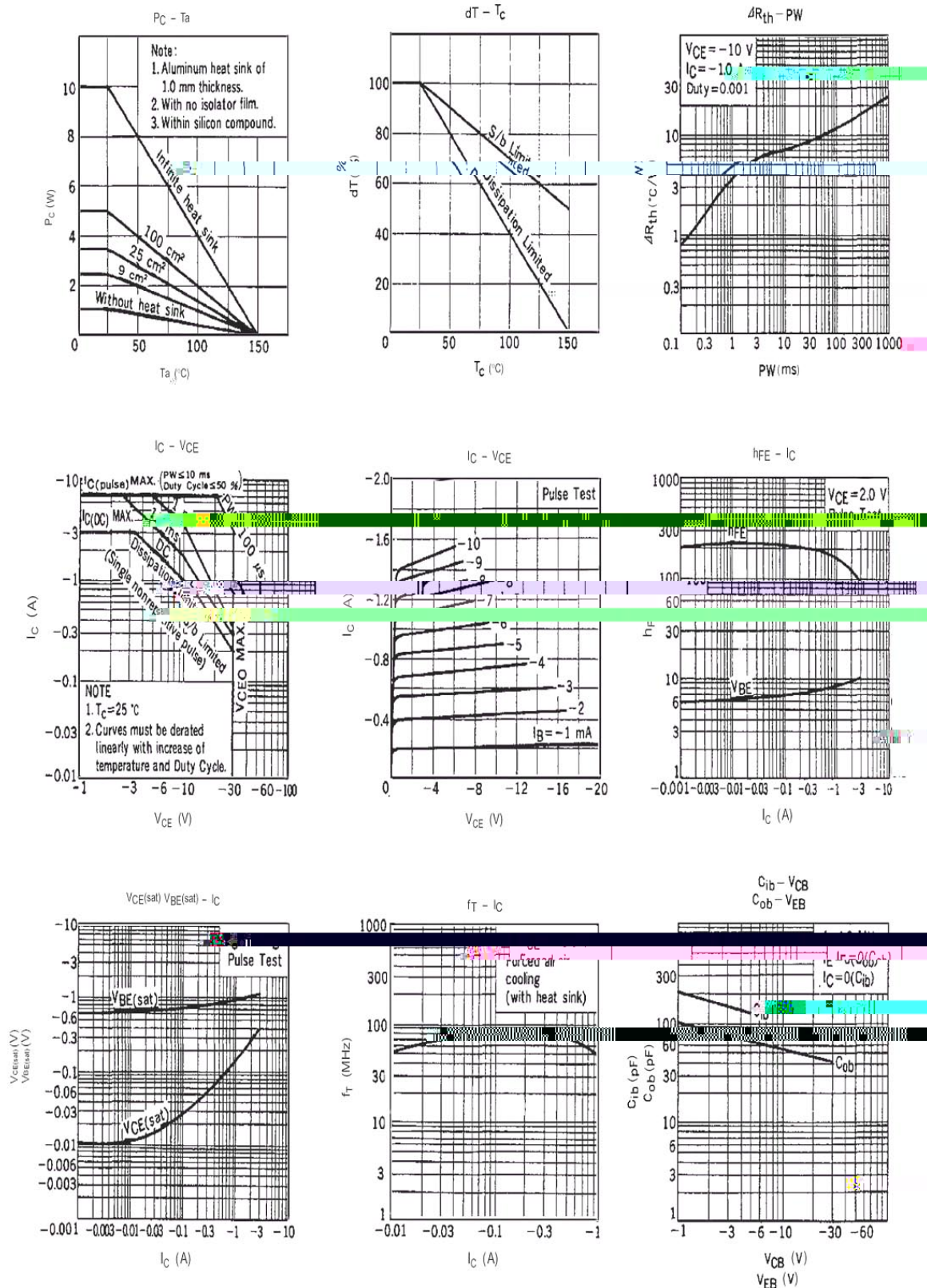
**/ Absolute Maximum Ratings(Ta=25 )**

| Parameter                      | Symbol         | Rating  | Unit |
|--------------------------------|----------------|---------|------|
| Collector to Base Voltage      | $V_{CBO}$      | -40     | V    |
| Collector to Emitter Voltage   | $V_{CEO}$      | -30     | V    |
| Emitter to Base Voltage        | $V_{EBO}$      | -5.0    | V    |
| Collector Current - Continuous | $I_C$          | -3.0    | A    |
| Collector Power Dissipation    | $P_C$          | 1.0     | W    |
|                                | $P_C(T_C=25 )$ | 10      | W    |
| Junction Temperature           | $T_j$          | 150     |      |
| Storage Temperature Range      | $T_{stg}$      | -55 150 |      |

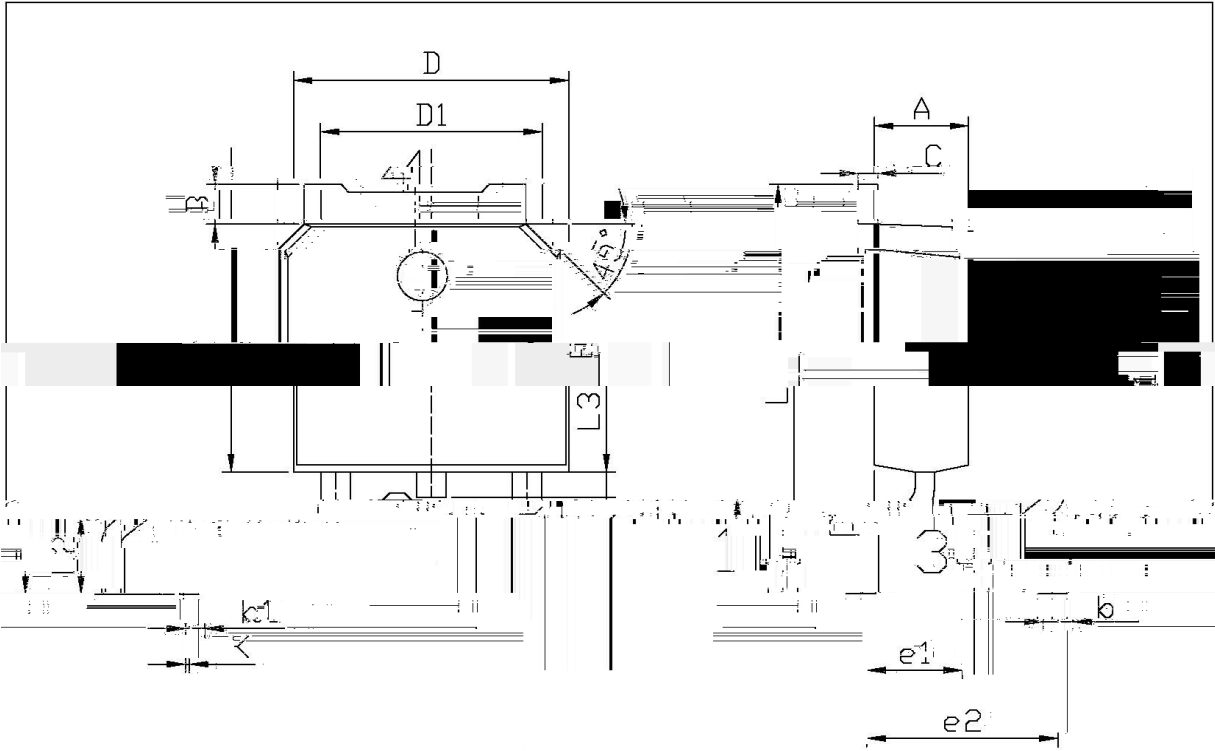
**/ Electrical Characteristics(Ta=25 )**

| Parameter                               | Symbol        | Test Conditions                     | Min  | Typ  | Max  | Unit    |
|-----------------------------------------|---------------|-------------------------------------|------|------|------|---------|
| Collector to Base Breakdown Voltage     | $V_{CBO}$     | $I_C=-100\mu A$ $I_E=0$             | -40  |      |      | V       |
| Collector to Emitter Breakdown Voltage  | $V_{CEO}$     | $I_C=-1mA$ $I_B=0$                  | -30  |      |      | V       |
| Emitter to Base Breakdown Voltage       | $V_{EBO}$     | $I_E=-10\mu A$ $I_C=0$              | -5.0 |      |      | V       |
| Collector Cut-Off Current               | $I_{CBO}$     | $V_{CB}=-30V$ $I_E=0$               |      |      | -1.0 | $\mu A$ |
| Emitter Cut-Off Current                 | $I_{EBO}$     | $V_{EB}=-3.0V$ $I_C=0$              |      |      | -1.0 | $\mu A$ |
| DC Current Gain                         | $h_{FE(1)}$   | $V_{CE}=-2.0V$ $I_C=-1.0A$          | 60   | 160  | 400  |         |
|                                         | $h_{FE(2)}$   | $V_{CE}=-2.0V$ $I_C=-20mA$          | 30   | 220  |      |         |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=-2.0A$ $I_B=-0.2A$             |      | -0.3 | -0.5 | V       |
| Base to Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=-2.0A$ $I_B=-0.2A$             |      | -1.0 | -2.0 | V       |
| Transition Frequency                    | $f_T$         | $I_C=-1.0A$ $V_{CE}=-5.0V$          |      | 80   |      | MHz     |
| Collector output capacitance            | $C_{ob}$      | $V_{CB}=-10V$ $I_E=0$<br>$f=1.0MHz$ |      | 55   |      | pF      |

## / Electrical Characteristic Curve



/ Package Dimensions

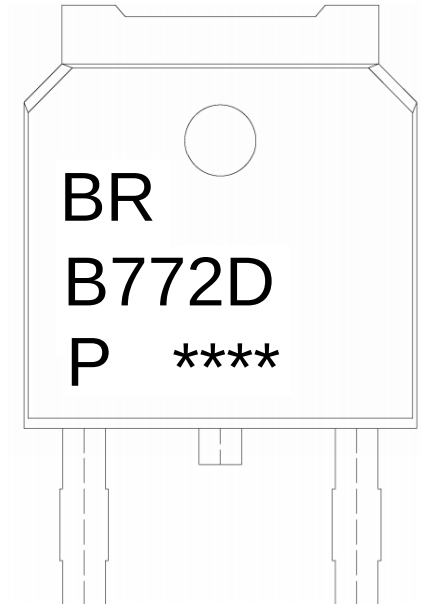


单位: mm

| Dimensions In Millimeters |      |       | Dimensions In Millimeters |      |       |
|---------------------------|------|-------|---------------------------|------|-------|
| Symbol                    | Min  | Max   | Symbol                    | Min  | Max   |
| A                         | 2.20 | 2.20  | b                         | 0.40 | 0.40  |
| B                         | 0.95 | 1.25  | e1                        | 2.50 | 2.50  |
| C                         | 0.70 | 0.70  | e2                        | 2.50 | 2.50  |
| D                         | 6.45 | 6.75  | J2                        | 1.70 | 2.00  |
| D1                        | 5.10 | 5.10  | L1                        | 9.85 | 10.35 |
| L3                        | 9.85 | 10.35 | L2                        | 0.60 | 0.90  |
| L4                        | 0.60 | 0.90  | L3                        | 0.60 | 0.90  |
| L5                        | 0.60 | 0.90  | L4                        | 0.60 | 0.90  |
| L6                        | 0.60 | 0.90  | L5                        | 0.60 | 0.90  |
| L7                        | 0.60 | 0.90  | L6                        | 0.60 | 0.90  |
| L8                        | 0.60 | 0.90  | L7                        | 0.60 | 0.90  |
| L9                        | 0.60 | 0.90  | L8                        | 0.60 | 0.90  |
| L10                       | 0.60 | 0.90  | L9                        | 0.60 | 0.90  |
| L11                       | 0.60 | 0.90  | L10                       | 0.60 | 0.90  |
| L12                       | 0.60 | 0.90  | L11                       | 0.60 | 0.90  |
| L13                       | 0.60 | 0.90  | L12                       | 0.60 | 0.90  |
| L14                       | 0.60 | 0.90  | L13                       | 0.60 | 0.90  |
| L15                       | 0.60 | 0.90  | L14                       | 0.60 | 0.90  |
| L16                       | 0.60 | 0.90  | L15                       | 0.60 | 0.90  |
| L17                       | 0.60 | 0.90  | L16                       | 0.60 | 0.90  |
| L18                       | 0.60 | 0.90  | L17                       | 0.60 | 0.90  |
| L19                       | 0.60 | 0.90  | L18                       | 0.60 | 0.90  |
| L20                       | 0.60 | 0.90  | L19                       | 0.60 | 0.90  |
| L21                       | 0.60 | 0.90  | L20                       | 0.60 | 0.90  |
| L22                       | 0.60 | 0.90  | L21                       | 0.60 | 0.90  |
| L23                       | 0.60 | 0.90  | L22                       | 0.60 | 0.90  |
| L24                       | 0.60 | 0.90  | L23                       | 0.60 | 0.90  |
| L25                       | 0.60 | 0.90  | L24                       | 0.60 | 0.90  |
| L26                       | 0.60 | 0.90  | L25                       | 0.60 | 0.90  |
| L27                       | 0.60 | 0.90  | L26                       | 0.60 | 0.90  |
| L28                       | 0.60 | 0.90  | L27                       | 0.60 | 0.90  |
| L29                       | 0.60 | 0.90  | L28                       | 0.60 | 0.90  |
| L30                       | 0.60 | 0.90  | L29                       | 0.60 | 0.90  |
| L31                       | 0.60 | 0.90  | L30                       | 0.60 | 0.90  |
| L32                       | 0.60 | 0.90  | L31                       | 0.60 | 0.90  |
| L33                       | 0.60 | 0.90  | L32                       | 0.60 | 0.90  |
| L34                       | 0.60 | 0.90  | L33                       | 0.60 | 0.90  |
| L35                       | 0.60 | 0.90  | L34                       | 0.60 | 0.90  |
| L36                       | 0.60 | 0.90  | L35                       | 0.60 | 0.90  |
| L37                       | 0.60 | 0.90  | L36                       | 0.60 | 0.90  |
| L38                       | 0.60 | 0.90  | L37                       | 0.60 | 0.90  |
| L39                       | 0.60 | 0.90  | L38                       | 0.60 | 0.90  |
| L40                       | 0.60 | 0.90  | L39                       | 0.60 | 0.90  |
| L41                       | 0.60 | 0.90  | L40                       | 0.60 | 0.90  |
| L42                       | 0.60 | 0.90  | L41                       | 0.60 | 0.90  |
| L43                       | 0.60 | 0.90  | L42                       | 0.60 | 0.90  |
| L44                       | 0.60 | 0.90  | L43                       | 0.60 | 0.90  |
| L45                       | 0.60 | 0.90  | L44                       | 0.60 | 0.90  |
| L46                       | 0.60 | 0.90  | L45                       | 0.60 | 0.90  |
| L47                       | 0.60 | 0.90  | L46                       | 0.60 | 0.90  |
| L48                       | 0.60 | 0.90  | L47                       | 0.60 | 0.90  |
| L49                       | 0.60 | 0.90  | L48                       | 0.60 | 0.90  |
| L50                       | 0.60 | 0.90  | L49                       | 0.60 | 0.90  |
| L51                       | 0.60 | 0.90  | L50                       | 0.60 | 0.90  |
| L52                       | 0.60 | 0.90  | L51                       | 0.60 | 0.90  |
| L53                       | 0.60 | 0.90  | L52                       | 0.60 | 0.90  |
| L54                       | 0.60 | 0.90  | L53                       | 0.60 | 0.90  |
| L55                       | 0.60 | 0.90  | L54                       | 0.60 | 0.90  |
| L56                       | 0.60 | 0.90  | L55                       | 0.60 | 0.90  |
| L57                       | 0.60 | 0.90  | L56                       | 0.60 | 0.90  |
| L58                       | 0.60 | 0.90  | L57                       | 0.60 | 0.90  |
| L59                       | 0.60 | 0.90  | L58                       | 0.60 | 0.90  |
| L60                       | 0.60 | 0.90  | L59                       | 0.60 | 0.90  |
| L61                       | 0.60 | 0.90  | L60                       | 0.60 | 0.90  |
| L62                       | 0.60 | 0.90  | L61                       | 0.60 | 0.90  |
| L63                       | 0.60 | 0.90  | L62                       | 0.60 | 0.90  |
| L64                       | 0.60 | 0.90  | L63                       | 0.60 | 0.90  |
| L65                       | 0.60 | 0.90  | L64                       | 0.60 | 0.90  |
| L66                       | 0.60 | 0.90  | L65                       | 0.60 | 0.90  |
| L67                       | 0.60 | 0.90  | L66                       | 0.60 | 0.90  |
| L68                       | 0.60 | 0.90  | L67                       | 0.60 | 0.90  |
| L69                       | 0.60 | 0.90  | L68                       | 0.60 | 0.90  |
| L70                       | 0.60 | 0.90  | L69                       | 0.60 | 0.90  |
| L71                       | 0.60 | 0.90  | L70                       | 0.60 | 0.90  |
| L72                       | 0.60 | 0.90  | L71                       | 0.60 | 0.90  |
| L73                       | 0.60 | 0.90  | L72                       | 0.60 | 0.90  |
| L74                       | 0.60 | 0.90  | L73                       | 0.60 | 0.90  |
| L75                       | 0.60 | 0.90  | L74                       | 0.60 | 0.90  |
| L76                       | 0.60 | 0.90  | L75                       | 0.60 | 0.90  |
| L77                       | 0.60 | 0.90  | L76                       | 0.60 | 0.90  |
| L78                       | 0.60 | 0.90  | L77                       | 0.60 | 0.90  |
| L79                       | 0.60 | 0.90  | L78                       | 0.60 | 0.90  |
| L80                       | 0.60 | 0.90  | L79                       | 0.60 | 0.90  |
| L81                       | 0.60 | 0.90  | L80                       | 0.60 | 0.90  |
| L82                       | 0.60 | 0.90  | L81                       | 0.60 | 0.90  |
| L83                       | 0.60 | 0.90  | L82                       | 0.60 | 0.90  |
| L84                       | 0.60 | 0.90  | L83                       | 0.60 | 0.90  |
| L85                       | 0.60 | 0.90  | L84                       | 0.60 | 0.90  |
| L86                       | 0.60 | 0.90  | L85                       | 0.60 | 0.90  |
| L87                       | 0.60 | 0.90  | L86                       | 0.60 | 0.90  |
| L88                       | 0.60 | 0.90  | L87                       | 0.60 | 0.90  |
| L89                       | 0.60 | 0.90  | L88                       | 0.60 | 0.90  |
| L90                       | 0.60 | 0.90  | L89                       | 0.60 | 0.90  |
| L91                       | 0.60 | 0.90  | L90                       | 0.60 | 0.90  |
| L92                       | 0.60 | 0.90  | L91                       | 0.60 | 0.90  |
| L93                       | 0.60 | 0.90  | L92                       | 0.60 | 0.90  |
| L94                       | 0.60 | 0.90  | L93                       | 0.60 | 0.90  |
| L95                       | 0.60 | 0.90  | L94                       | 0.60 | 0.90  |
| L96                       | 0.60 | 0.90  | L95                       | 0.60 | 0.90  |
| L97                       | 0.60 | 0.90  | L96                       | 0.60 | 0.90  |
| L98                       | 0.60 | 0.90  | L97                       | 0.60 | 0.90  |
| L99                       | 0.60 | 0.90  | L98                       | 0.60 | 0.90  |
| L100                      | 0.60 | 0.90  | L99                       | 0.60 | 0.90  |

T0-252

/ Marking Instructions



Note:

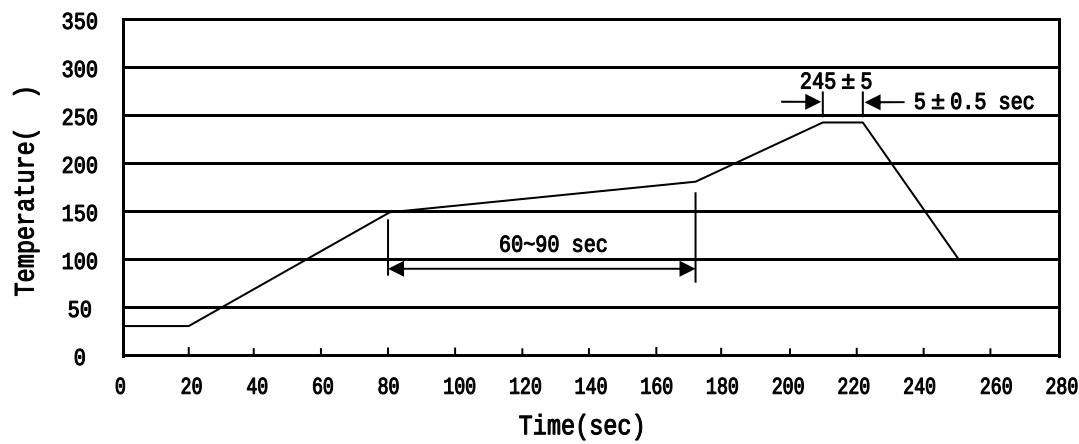
BR: Company Code

B772D: Product Type

P:  $h_{FE}$  Classifications Symbol

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

( ) / Temperature Profile for IR Reflow Soldering(Pb-Free)



Note:

- 1

150 180

60 90sec;

1.Preheating:150~180 , Time:60~90sec.
- 2

245 5

5 0.5sec;

2.Peak Temp.:245 5 , Duration:5 0.5sec.
- 3

2 10 /sec.

3. Cooling Speed: 2~10 /sec.

/ Resistance to Soldering Heat Test Conditions

260 5 10 1 sec. Temp.:260±5 Time:10±1 sec

/ Packaging SPEC.

/ REEL

| Package Type | Units |   |       |   |        | Dimension (unit mm <sup>3</sup> ) |            |             |
|--------------|-------|---|-------|---|--------|-----------------------------------|------------|-------------|
|              |       |   |       |   |        |                                   |            |             |
| TO-252       | 2,500 | 2 | 5,000 | 6 | 30,000 | 13 ×16                            | 360×360×50 | 380×335×366 |

/ TUBE

| Package Type | Units |    |       |   |        | Dimension (unit mm <sup>3</sup> ) |            |             |
|--------------|-------|----|-------|---|--------|-----------------------------------|------------|-------------|
|              |       |    |       |   |        |                                   |            |             |
| TO-251/252   | 75    | 48 | 3,600 | 5 | 18,000 | 526×20.5×5.25                     | 555×164×50 | 575×290×180 |

/ Notices