

## General Purpose PNP Epitaxial Planar Transistor

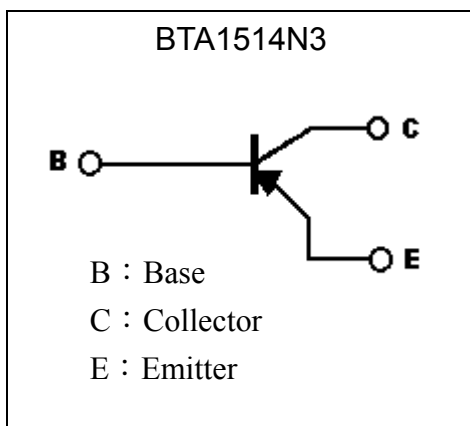
# BTA1514N3

|                  |       |
|------------------|-------|
| $BV_{CEO}$       | -160V |
| $I_C$            | -0.6A |
| $V_{CESAT(MAX)}$ | -0.3V |

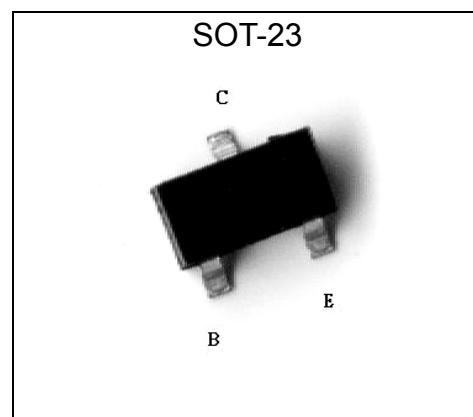
### Description

- The BTA1514N3 is designed for general purpose application requiring high breakdown voltage.
- Large  $I_C$  ,  $I_{C(Max)} = -0.6A$
- High  $BV_{CEO}$ ,  $BV_{CEO} = -160V$
- Complementary to BTC3906N3.
- Pb-free lead plating and halogen-free package

### Symbol

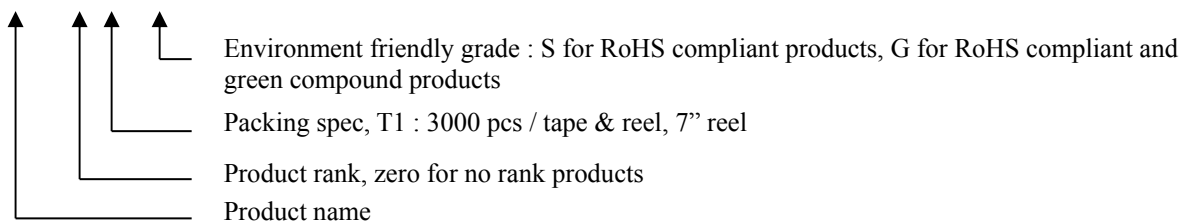


### Outline



### Ordering Information

| Device           | Package                                                   | Shipping               |
|------------------|-----------------------------------------------------------|------------------------|
| BTA1514N3-X-T1-G | SOT-23<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / tape & reel |





## Absolute Maximum Ratings (Ta=25°C)

| Parameter                                        | Symbol                            | Limits       | Unit |
|--------------------------------------------------|-----------------------------------|--------------|------|
| Collector-Base Voltage                           | V <sub>CB0</sub>                  | -180         | V    |
| Collector-Emitter Voltage                        | V <sub>CEO</sub>                  | -160         | V    |
| Emitter-Base Voltage                             | V <sub>EBO</sub>                  | -5           | V    |
| Collector Current                                | I <sub>C</sub>                    | -0.6         | A    |
| Power Dissipation                                | P <sub>D</sub>                    | 225          | mW   |
| Thermal Resistance, Junction to Ambient          | R <sub>θJA</sub>                  | 556          | °C/W |
| ESD susceptibility                               |                                   | 8000 (Note ) | V    |
| Operating Junction and Storage Temperature Range | T <sub>j</sub> ; T <sub>stg</sub> | -55~+150     | °C   |

Note : Human body model, 1.5kΩ in series with 100pF

## Characteristics (Ta=25°C)

| Symbol                  | Min. | Typ. | Max.  | Unit | Test Conditions                                        |
|-------------------------|------|------|-------|------|--------------------------------------------------------|
| BV <sub>CB0</sub>       | -180 | -    | -     | V    | I <sub>C</sub> =-50μA                                  |
| BV <sub>CEO</sub>       | -160 | -    | -     | V    | I <sub>C</sub> =-1mA                                   |
| BV <sub>EBO</sub>       | -5   | -    | -     | V    | I <sub>E</sub> =-50μA                                  |
| I <sub>CB0</sub>        | -    | -    | -50   | nA   | V <sub>CB</sub> =-120V                                 |
| I <sub>EBO</sub>        | -    | -    | -50   | nA   | V <sub>EB</sub> =-4V                                   |
| *V <sub>CE(sat)</sub> 1 | -    | 0.11 | -0.16 | V    | I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA            |
| *V <sub>CE(sat)</sub> 2 | -    | 0.25 | -0.3  | V    | I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA            |
| *V <sub>BE(sat)</sub> 1 | -    | -    | -1    | V    | I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA            |
| *V <sub>BE(sat)</sub> 2 | -    | -    | -1    | V    | I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA            |
| h <sub>FE</sub> 1       | 100  | -    | -     | -    | V <sub>CE</sub> =-5V, I <sub>C</sub> =-1mA             |
| h <sub>FE</sub> 2       | 100  | -    | -     | -    | V <sub>CE</sub> =-5V, I <sub>C</sub> =-10mA            |
| h <sub>FE</sub> 3       | 50   | -    | -     | -    | V <sub>CE</sub> =-5V, I <sub>C</sub> =-50mA            |
| h <sub>FE</sub> 4       | 120  | -    | 390   | -    | V <sub>CE</sub> =-6V, I <sub>C</sub> =-2mA             |
| f <sub>T</sub>          | 100  | -    | -     | MHz  | V <sub>CE</sub> =-30V, I <sub>C</sub> =-10mA, f=100MHz |
| C <sub>ob</sub>         | -    | -    | 6     | pF   | V <sub>CB</sub> =-10V, f=1MHz                          |

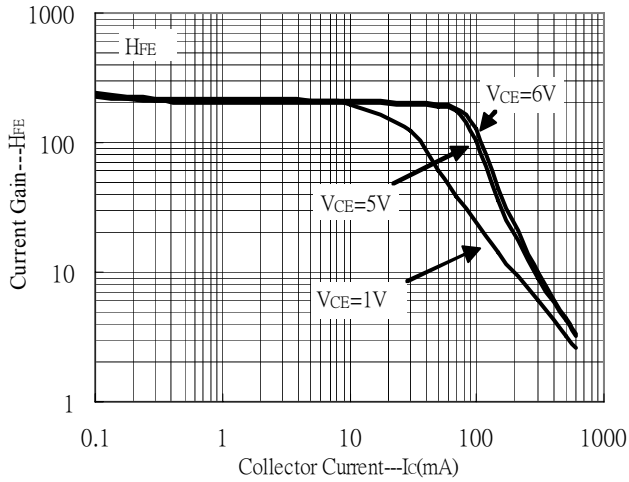
\*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

## Classification Of h<sub>FE</sub> 4

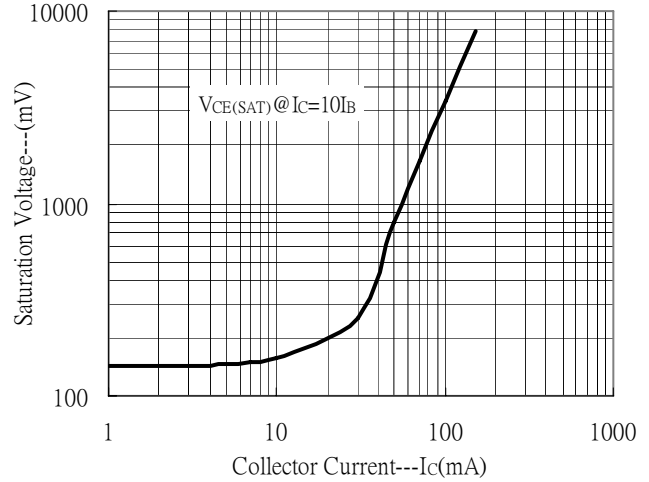
| Rank  | Q       | R       |
|-------|---------|---------|
| Range | 120~270 | 180~390 |

## Typical Characteristics

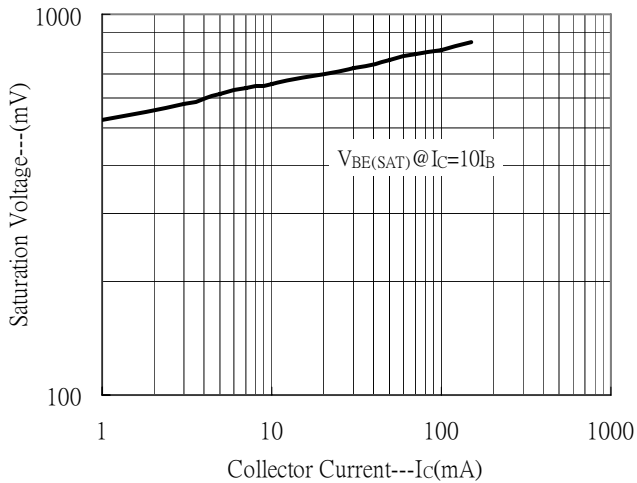
Current Gain vs Collector Current



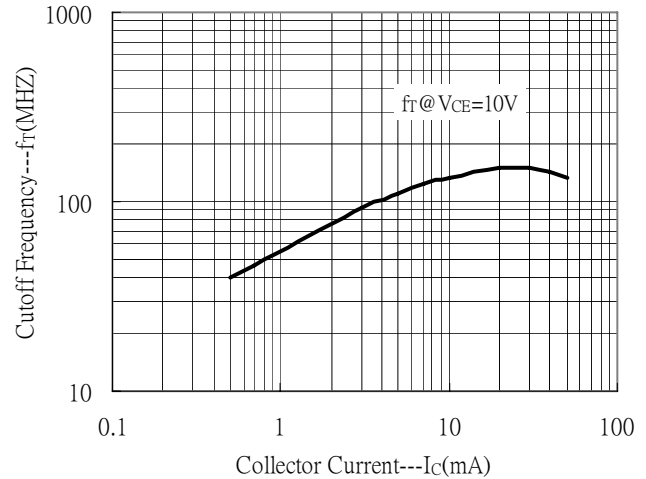
Saturation Voltage vs Collector Current



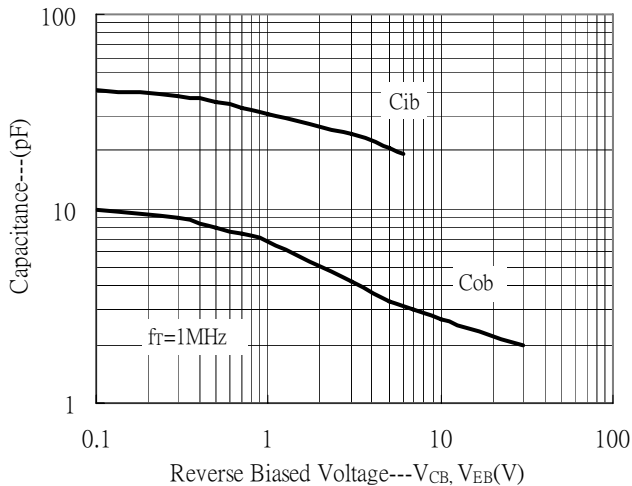
Saturation Voltage vs Collector Current



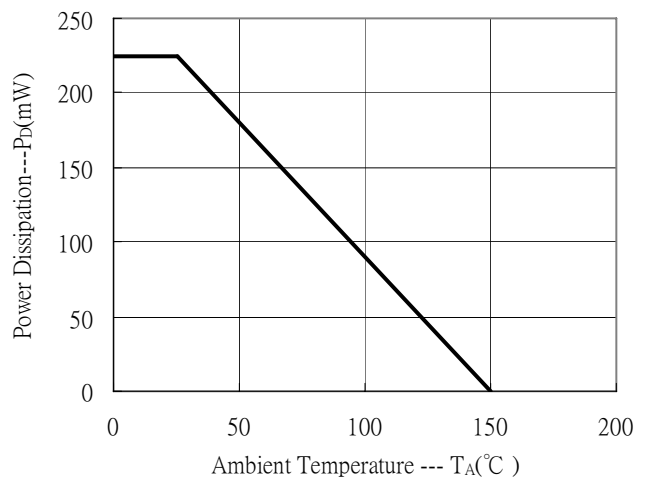
Cutoff Frequency vs Collector Current



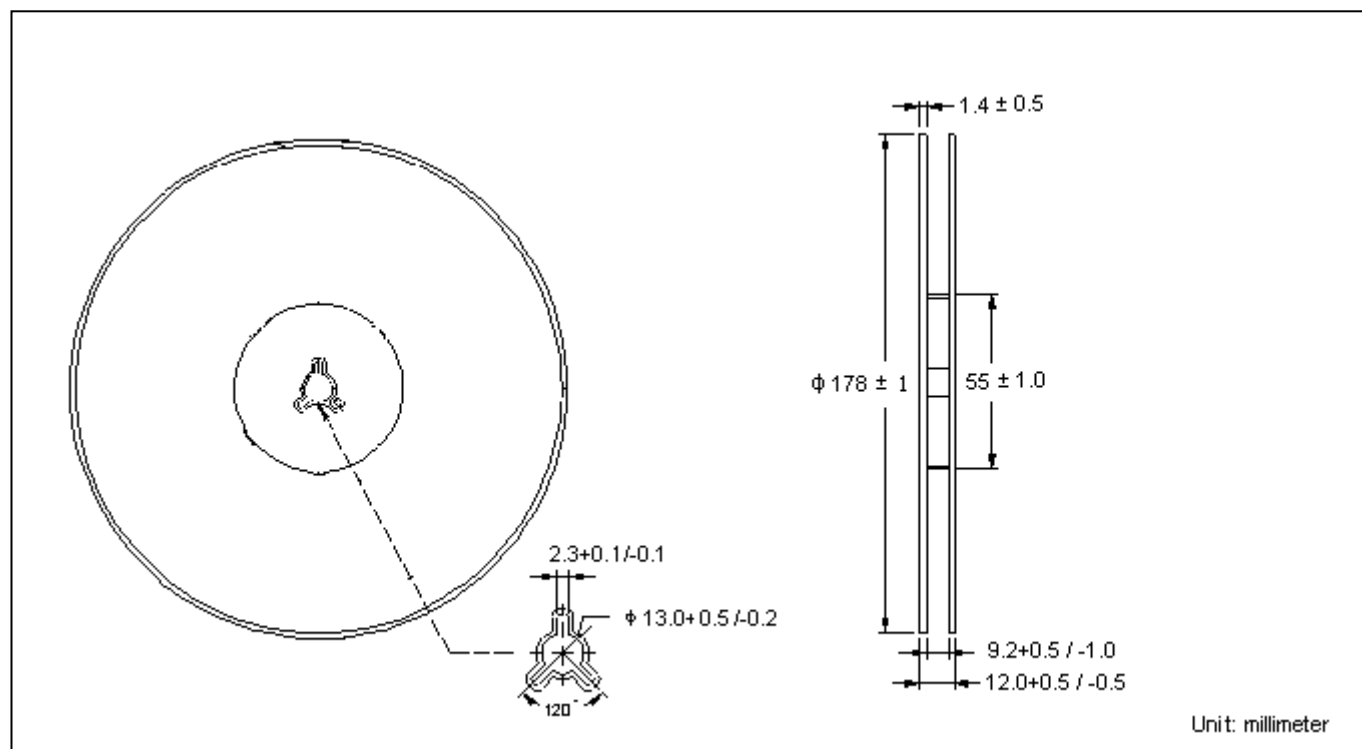
Capacitance Characteristics



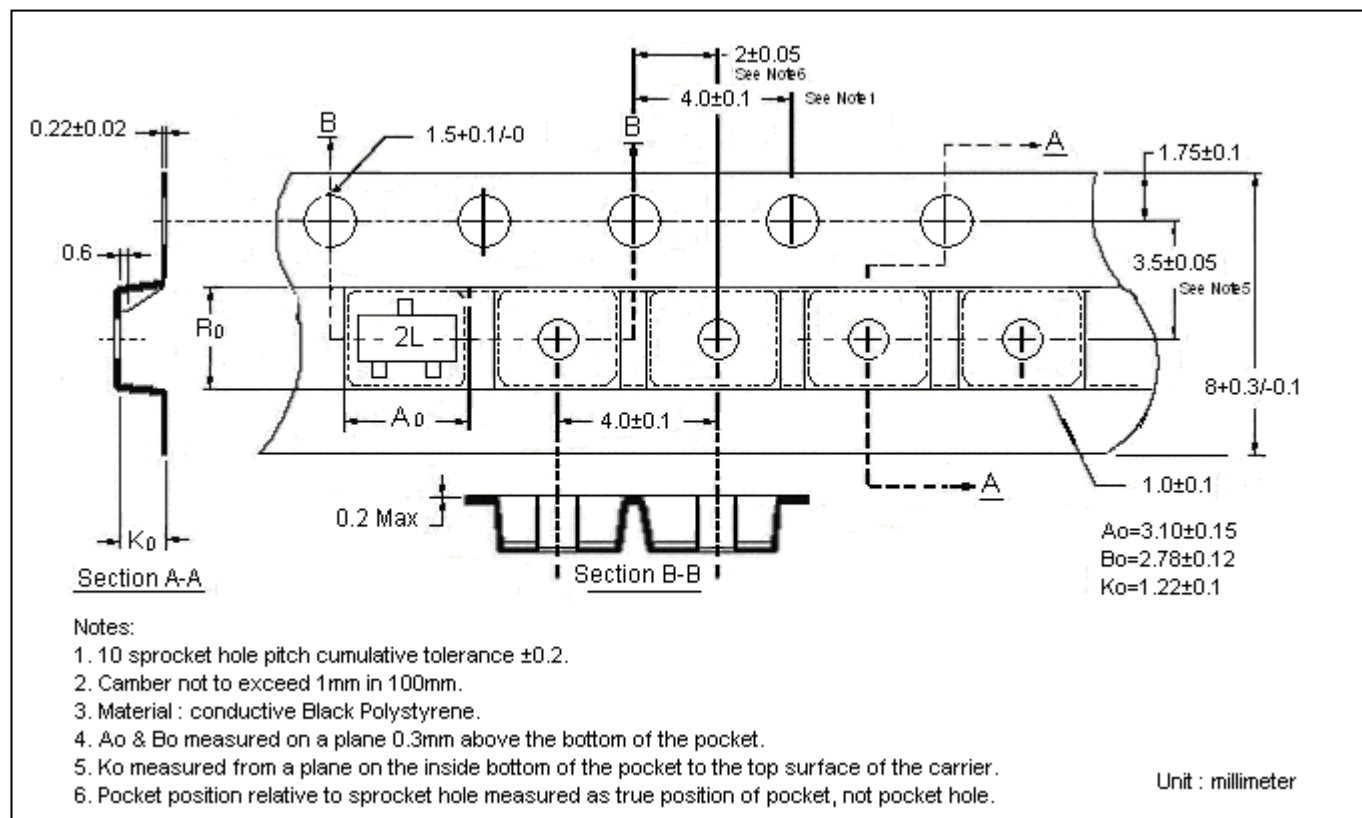
Power Derating Curve



## Reel Dimension



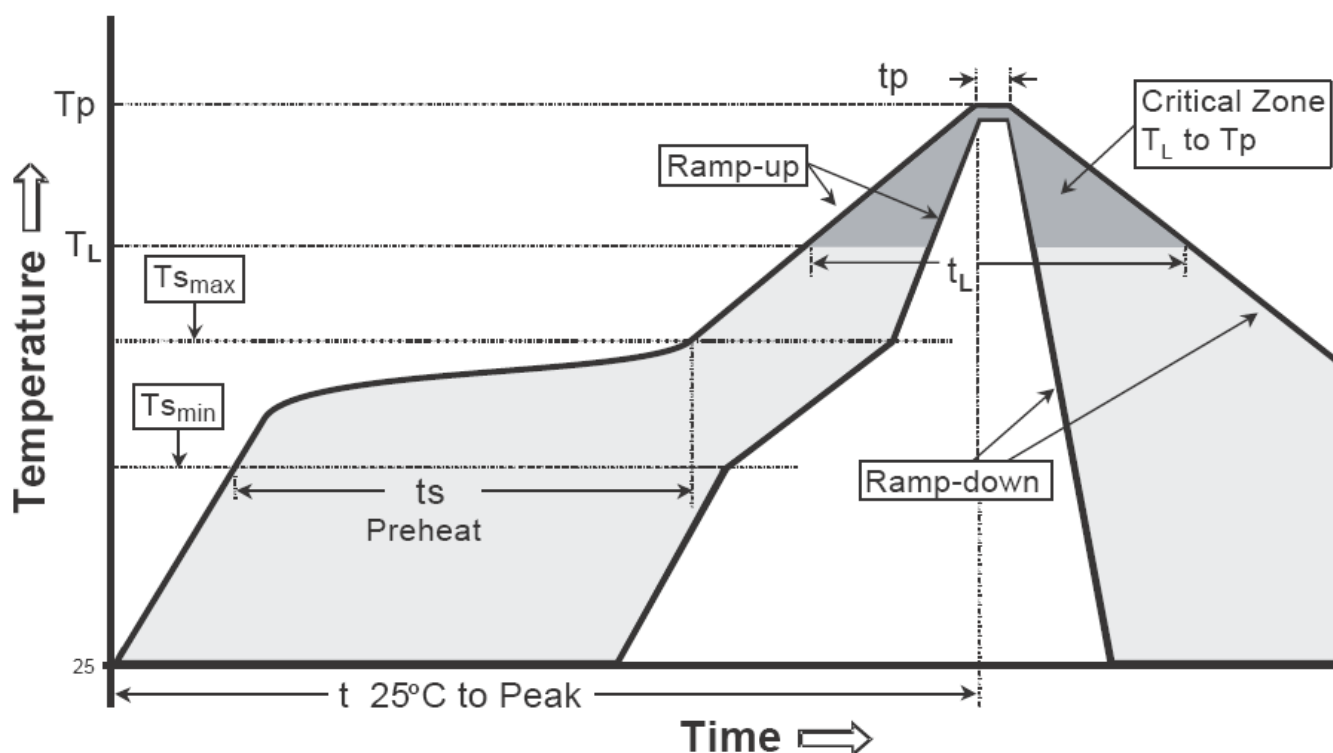
## Carrier Tape Dimension



## Recommended wave soldering condition

| Product         | Peak Temperature | Soldering Time  |
|-----------------|------------------|-----------------|
| Pb-free devices | 260 +0/-5 °C     | 5 +1/-1 seconds |

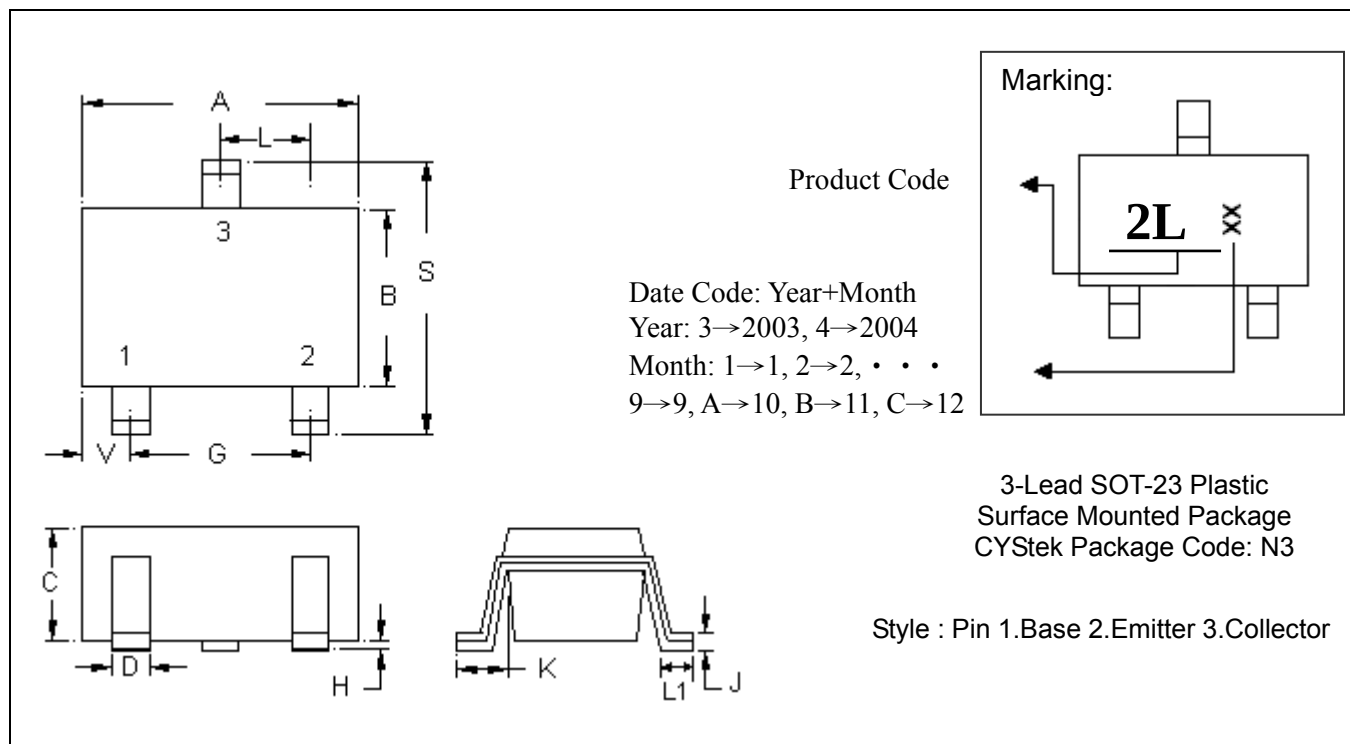
## Recommended temperature profile for IR reflow



| Profile feature                                | Sn-Pb eutectic Assembly | Pb-free Assembly |
|------------------------------------------------|-------------------------|------------------|
| Average ramp-up rate (Tsmax to Tp)             | 3°C/second max.         | 3°C/second max.  |
| Preheat                                        |                         |                  |
| –Temperature Min(Ts min)                       | 100°C                   | 150°C            |
| –Temperature Max(Ts max)                       | 150°C                   | 200°C            |
| –Time(ts min to ts max)                        | 60-120 seconds          | 60-180 seconds   |
| Time maintained above:                         |                         |                  |
| –Temperature (TL)                              | 183°C                   | 217°C            |
| – Time (tL)                                    | 60-150 seconds          | 60-150 seconds   |
| Peak Temperature(TP)                           | 240 +0/-5 °C            | 260 +0/-5 °C     |
| Time within 5°C of actual peak temperature(tp) | 10-30 seconds           | 20-40 seconds    |
| Ramp down rate                                 | 6°C/second max.         | 6°C/second max.  |
| Time 25 °C to peak temperature                 | 6 minutes max.          | 8 minutes max.   |

Note : All temperatures refer to topside of the package, measured on the package body surface.

## SOT-23 Dimension



| DIM | Inches |        | Millimeters |      | DIM | Inches |        | Millimeters |      |
|-----|--------|--------|-------------|------|-----|--------|--------|-------------|------|
|     | Min.   | Max.   | Min.        | Max. |     | Min.   | Max.   | Min.        | Max. |
| A   | 0.1102 | 0.1204 | 2.80        | 3.04 | J   | 0.0032 | 0.0079 | 0.08        | 0.20 |
| B   | 0.0472 | 0.0669 | 1.20        | 1.70 | K   | 0.0118 | 0.0266 | 0.30        | 0.67 |
| C   | 0.0335 | 0.0512 | 0.89        | 1.30 | L   | 0.0335 | 0.0453 | 0.85        | 1.15 |
| D   | 0.0118 | 0.0197 | 0.30        | 0.50 | S   | 0.0830 | 0.1161 | 2.10        | 2.95 |
| G   | 0.0669 | 0.0910 | 1.70        | 2.30 | V   | 0.0098 | 0.0256 | 0.25        | 0.65 |
| H   | 0.0000 | 0.0040 | 0.00        | 0.10 | L1  | 0.0118 | 0.0197 | 0.30        | 0.50 |

Notes: 1.Controlling dimension: millimeters.

2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.

3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

### Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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