

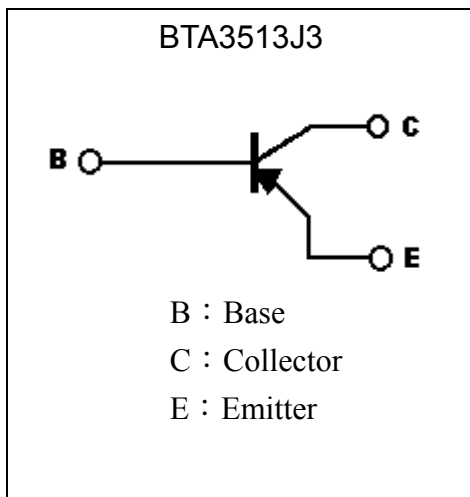
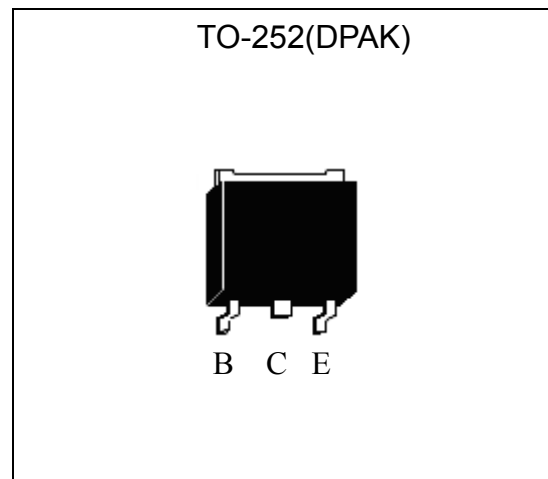
**Low Vcesat PNP Epitaxial Planar Transistor**

# BTA3513J3

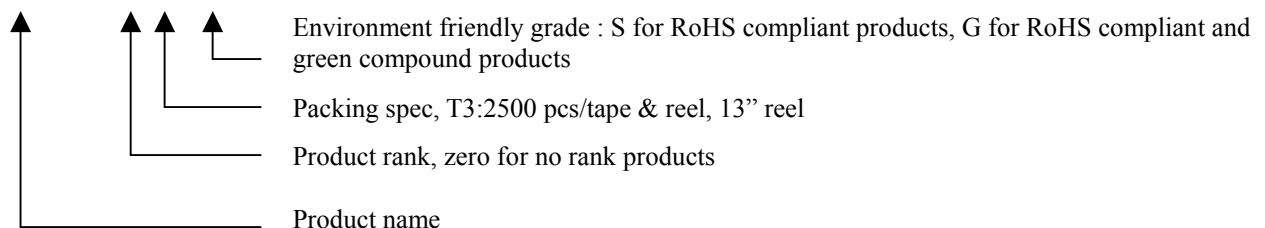
|             |                   |
|-------------|-------------------|
| $BV_{CEO}$  | -80V              |
| $I_C$       | -8A               |
| $R_{CESAT}$ | 75m $\Omega$ typ. |

**Features**

- Low  $V_{CE(sat)}$
- High  $BV_{CEO}$
- Excellent current gain characteristics
- RoHS compliant package
- Pb-free lead-free and halogen-free package

**Symbol**

**Outline**

**Ordering Information**

| Device           | Package                                             | Shipping               |
|------------------|-----------------------------------------------------|------------------------|
| BTA3513J3-0-T3-G | TO-252<br>(RoHS compliant and halogen-free package) | 2500 pcs / Tape & Reel |



**Absolute Maximum Ratings** (Ta=25°C)

| Parameter                                | Symbol           | Limits        | Unit |
|------------------------------------------|------------------|---------------|------|
| Collector-Base Voltage                   | V <sub>CBO</sub> | -80           | V    |
| Collector-Emitter Voltage                | V <sub>CEO</sub> | -80           | V    |
| Emitter-Base Voltage                     | V <sub>EBO</sub> | -5            | V    |
| Collector Current (DC)                   | I <sub>C</sub>   | -8            | A    |
| Collector Current (Pulse)                | I <sub>CP</sub>  | -16 (Note 1)  |      |
| Power Dissipation @ T <sub>A</sub> =25°C | P <sub>D</sub>   | 1.75 (Note 2) | W    |
| Power Dissipation @ T <sub>C</sub> =25°C | P <sub>D</sub>   | 20            |      |
| Thermal Resistance, Junction to Ambient  | R <sub>θJA</sub> | 71.4 (Note 2) | °C/W |
| Thermal Resistance, Junction to Case     | R <sub>θJC</sub> | 6.25          | °C/W |
| Junction Temperature                     | T <sub>j</sub>   | 150           | °C   |
| Storage Temperature                      | T <sub>stg</sub> | -55~+150      | °C   |

Note : 1. Single Pulse , P<sub>w</sub> ≤ 300μs, Duty ≤ 2%.

2. When mounted on a PCB with the minimum pad size.

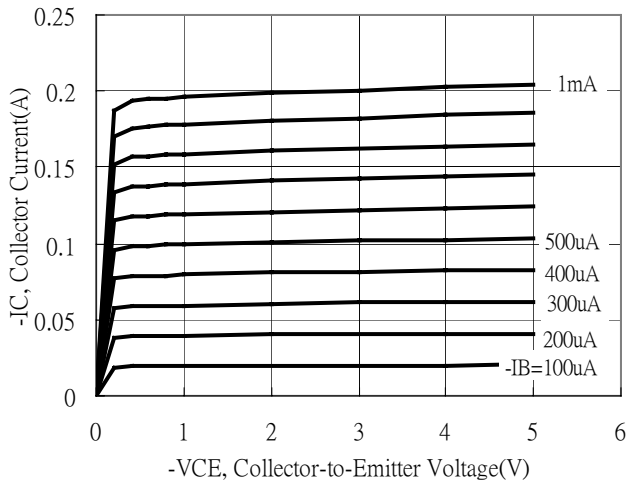
**Characteristics** (Ta=25°C)

| Symbol                  | Min. | Typ.  | Max. | Unit | Test Conditions                                               |
|-------------------------|------|-------|------|------|---------------------------------------------------------------|
| BV <sub>CEO(SUS)</sub>  | -80  | -     | -    | V    | I <sub>C</sub> =-30mA, I <sub>B</sub> =0                      |
| I <sub>CEO</sub>        | -    | -     | -10  | μA   | V <sub>CE</sub> =-80V, I <sub>B</sub> =0                      |
| I <sub>CES</sub>        | -    | -     | -10  | μA   | V <sub>CE</sub> =-80V, V <sub>BE</sub> =0                     |
| I <sub>EBO</sub>        | -    | -     | -50  | μA   | V <sub>EB</sub> =-5V, I <sub>C</sub> =0                       |
| *V <sub>CE(sat)</sub> 1 | -    | -0.2  | -0.3 | V    | I <sub>C</sub> =-3A, I <sub>B</sub> =-150mA                   |
| *V <sub>CE(sat)</sub> 2 | -    | -0.3  | -0.5 | V    | I <sub>C</sub> =-4A, I <sub>B</sub> =-200mA                   |
| *V <sub>CE(sat)</sub> 3 | -    | -0.6  | -1.0 | V    | I <sub>C</sub> =-8A, I <sub>B</sub> =-0.4A                    |
| *R <sub>CE(sat)</sub>   | -    | 75    | 125  | mΩ   | I <sub>C</sub> =-8A, I <sub>B</sub> =-0.4A                    |
| *V <sub>BE(sat)</sub> 1 | -    | -0.85 | -1.0 | V    | I <sub>C</sub> =-3A, I <sub>B</sub> =-150mA                   |
| *V <sub>BE(sat)</sub> 2 | -    | -0.9  | -1.2 | V    | I <sub>C</sub> =-4A, I <sub>B</sub> =-200mA                   |
| *V <sub>BE(sat)</sub> 3 | -    | -1.0  | -1.5 | V    | I <sub>C</sub> =-8A, I <sub>B</sub> =-0.8A                    |
| *h <sub>FE</sub> 1      | 160  | -     | -    | -    | V <sub>CE</sub> =-2V, I <sub>C</sub> =-500mA                  |
| *h <sub>FE</sub> 2      | 180  | -     | 360  | -    | V <sub>CE</sub> =-2V, I <sub>C</sub> =-1A                     |
| *h <sub>FE</sub> 3      | 100  | -     | -    | -    | V <sub>CE</sub> =-2V, I <sub>C</sub> =-3A                     |
| f <sub>T</sub>          | -    | 80    | -    | MHz  | V <sub>CE</sub> =-10V, I <sub>C</sub> =-500mA, f=20MHz        |
| C <sub>ob</sub>         | -    | 98    | -    | pF   | V <sub>CB</sub> =-10V, f=1MHz                                 |
| ton                     | -    | 135   | -    | ns   | I <sub>C</sub> =-5A, I <sub>B1</sub> =-I <sub>B2</sub> =-0.5A |
| tstg                    | -    | 500   | -    | ns   |                                                               |
| tf                      | -    | 100   | -    | ns   |                                                               |

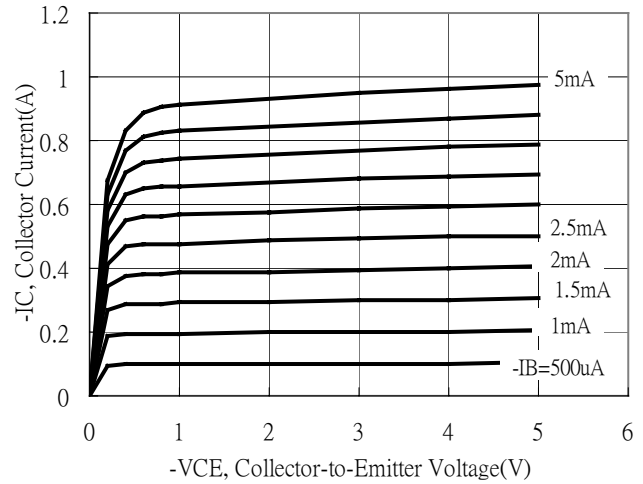
\*Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

## Typical Characteristics

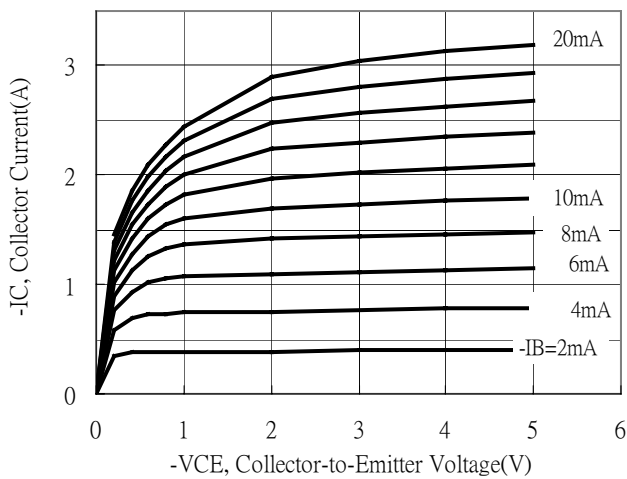
Emitter Grounded Output Characteristics



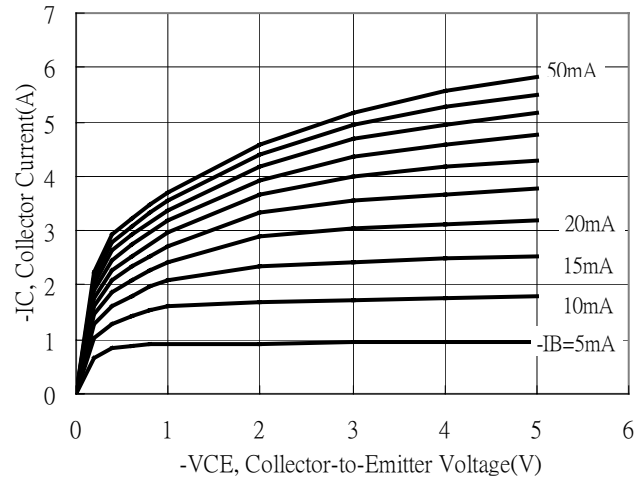
Emitter Grounded Output Characteristics



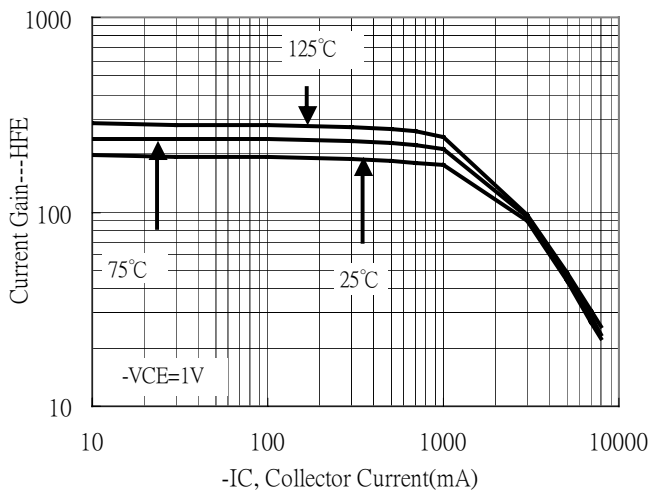
Emitter Grounded Output Characteristics



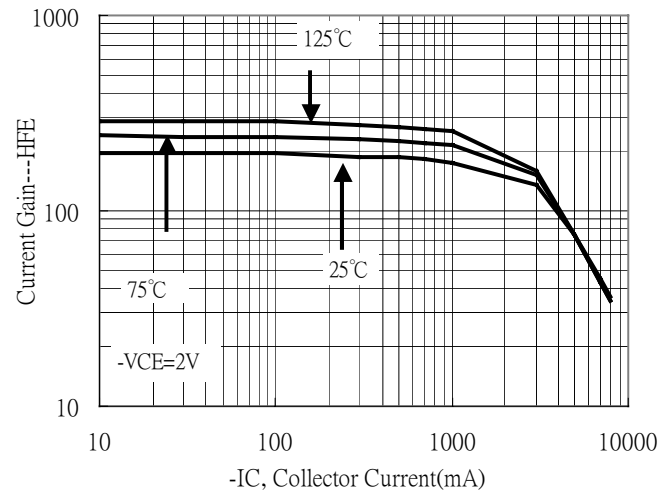
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

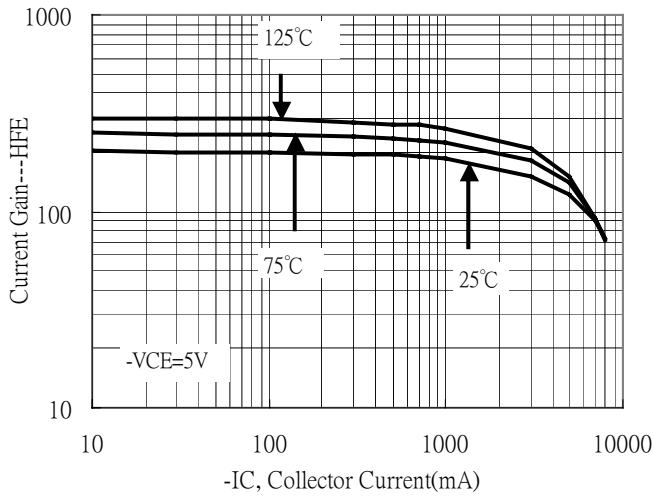


Current Gain vs Collector Current

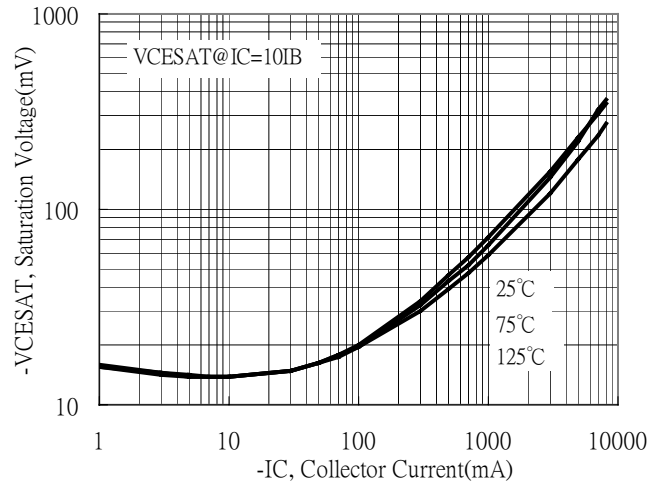


## Typical Characteristics(Cont.)

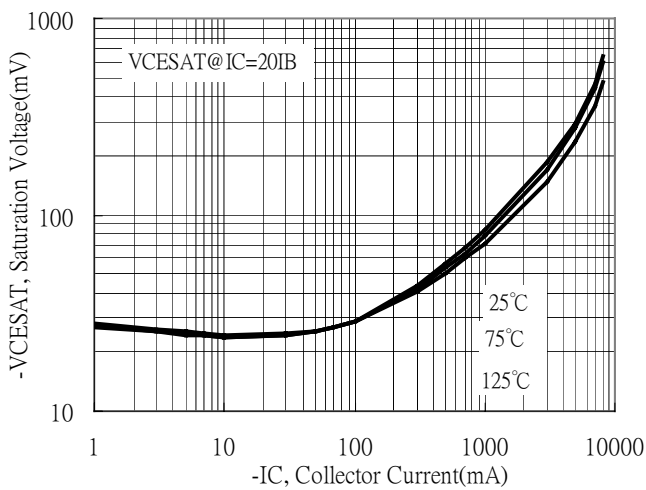
Current Gain vs Collector Current



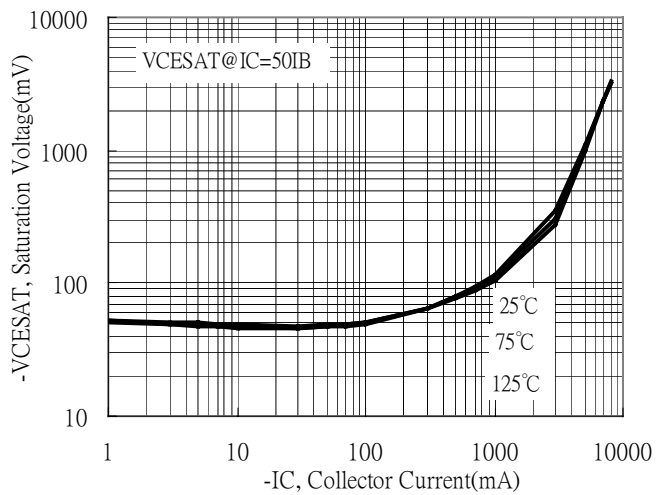
Saturation Voltage vs Collector Current



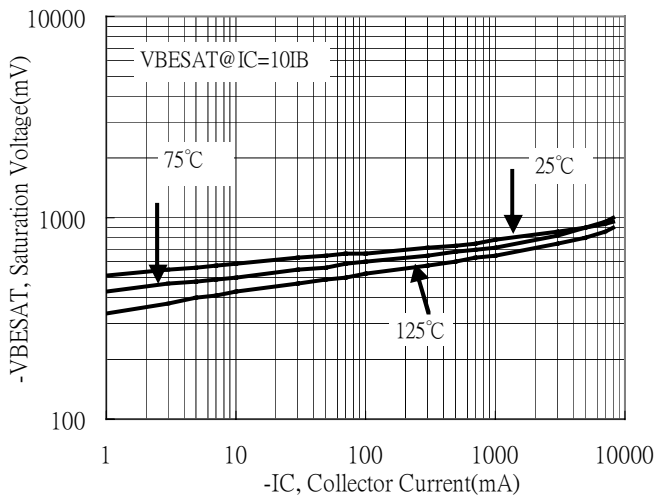
Saturation Voltage vs Collector Current



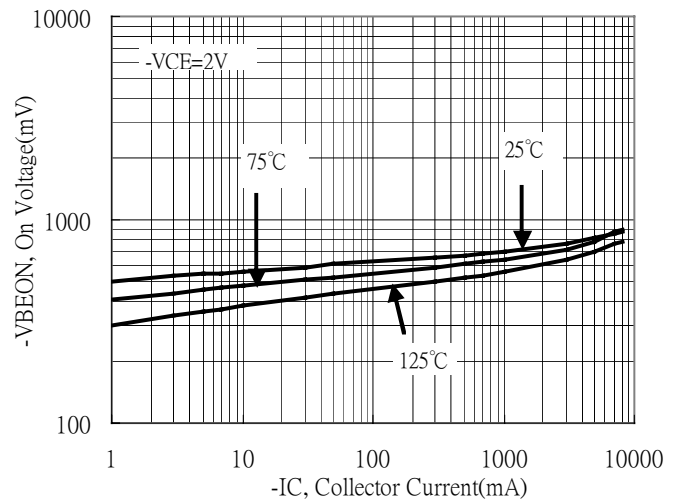
Saturation Voltage vs Collector Current



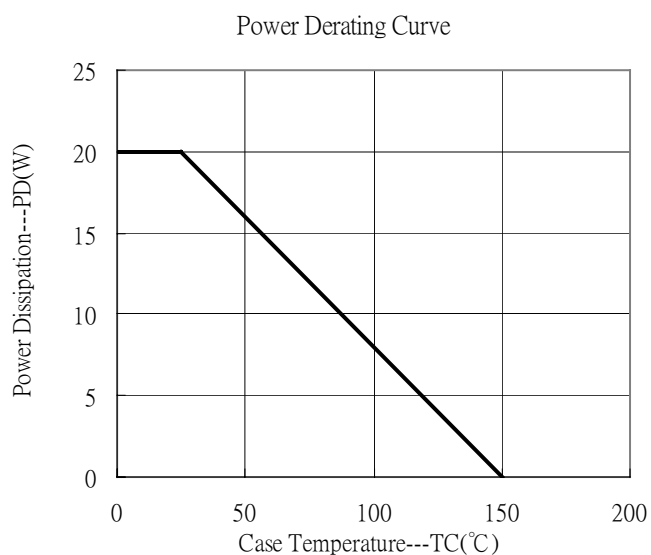
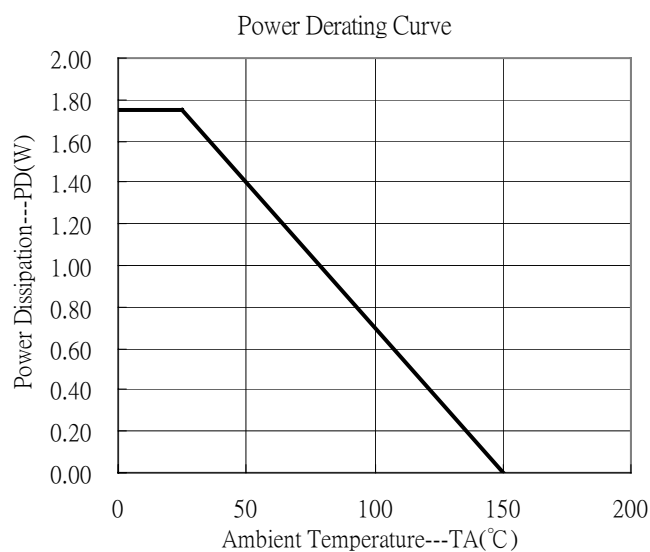
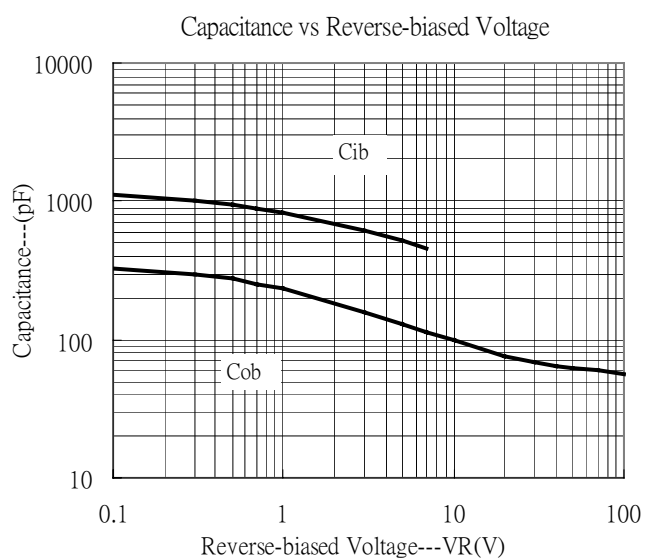
Saturation Voltage vs Collector Current



On Voltage vs Collector Current



## Typical Characteristics(Cont.)

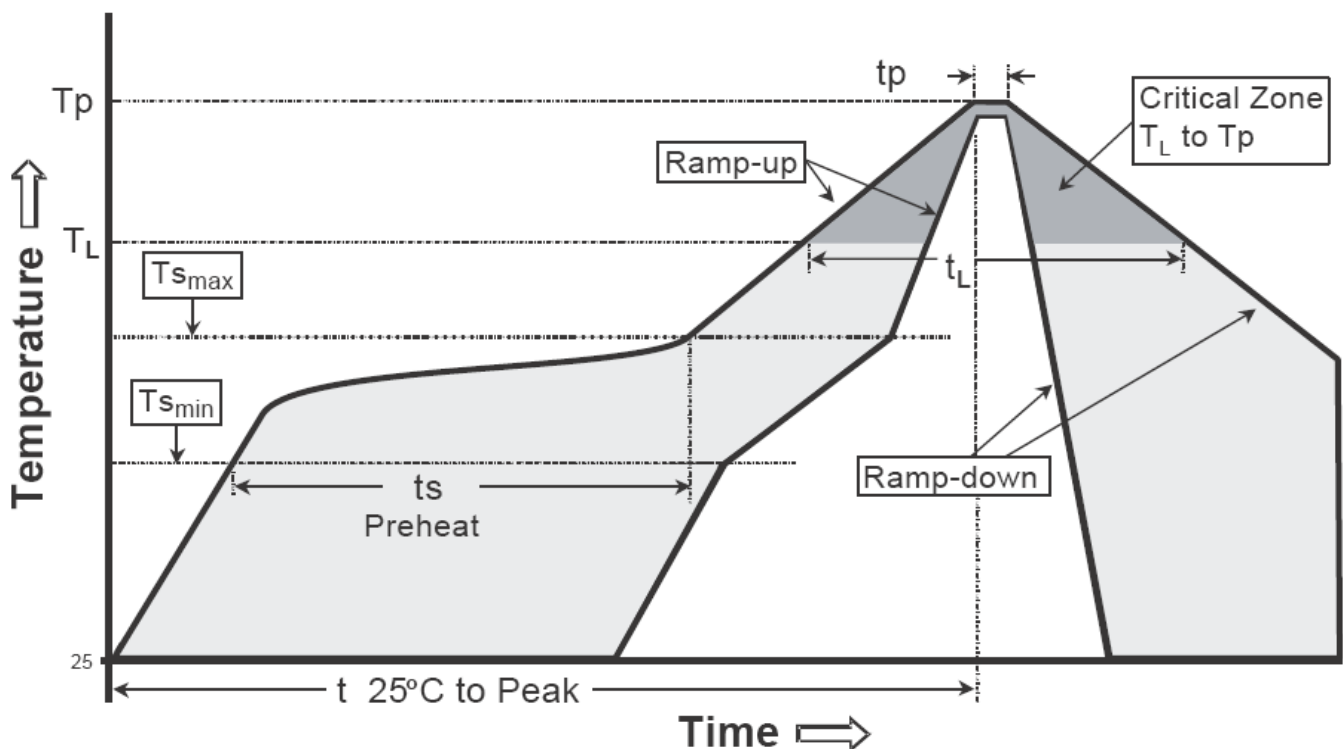




### Recommended wave soldering condition

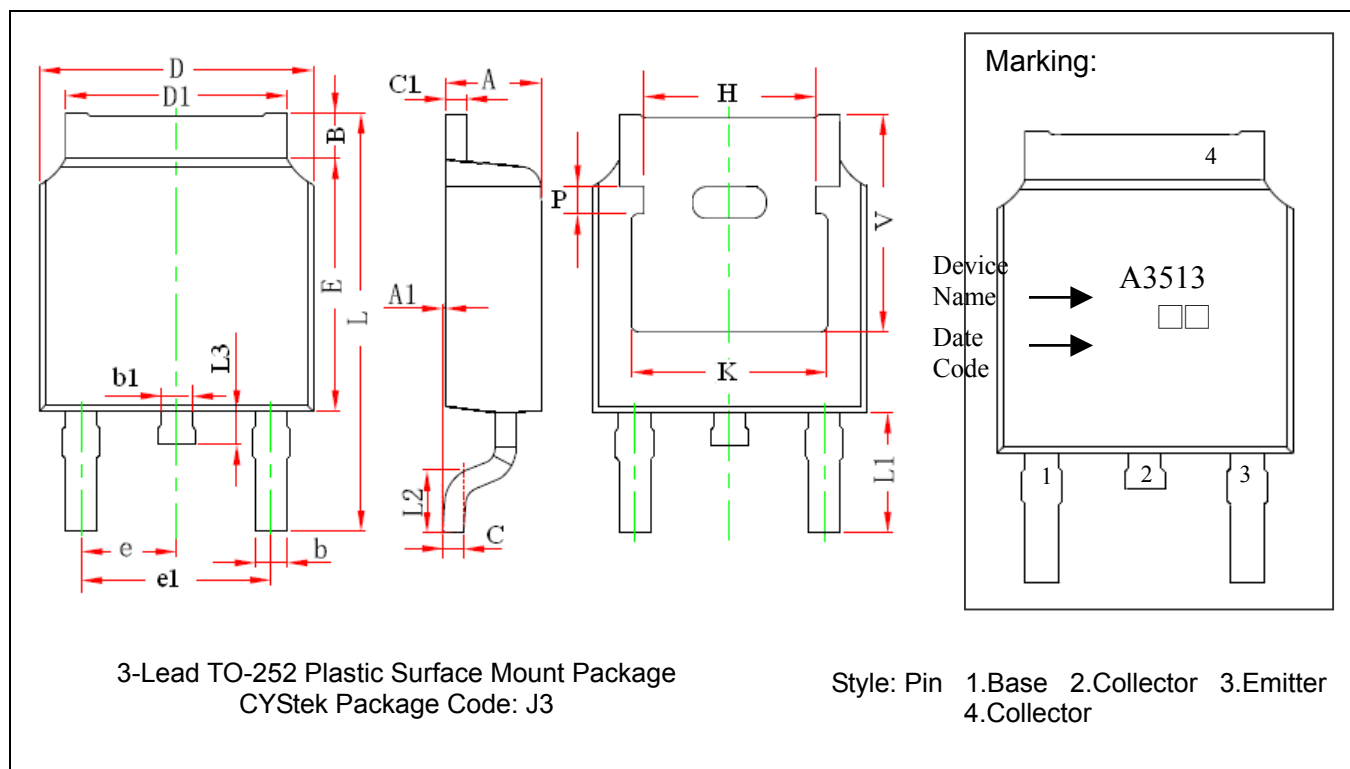
| Product         | Peak Temperature | Soldering Time  |
|-----------------|------------------|-----------------|
| Pb-free devices | 260 +0/-5 °C     | 5 +1/-1 seconds |

### 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.   |

## TO-252 Dimension



| DIM | Inches |       | Millimeters |       | DIM | Inches |       | Millimeters |        |
|-----|--------|-------|-------------|-------|-----|--------|-------|-------------|--------|
|     | Min.   | Max.  | Min.        | Max.  |     | Min.   | Max.  | Min.        | Max.   |
| A   | 0.087  | 0.094 | 2.200       | 2.400 | e   | 0.086  | 0.094 | 2.186       | 2.386  |
| A1  | 0.000  | 0.005 | 0.000       | 0.127 | e1  | 0.172  | 0.188 | 4.372       | 4.772  |
| B   | 0.039  | 0.048 | 0.990       | 1.210 | H   | 0.163  | REF   | 4.140       | REF    |
| b   | 0.026  | 0.034 | 0.660       | 0.860 | K   | 0.190  | REF   | 4.830       | REF    |
| b1  | 0.026  | 0.034 | 0.660       | 0.860 | L   | 0.386  | 0.409 | 9.800       | 10.400 |
| C   | 0.018  | 0.023 | 0.460       | 0.580 | L1  | 0.114  | REF   | 2.900       | REF    |
| C1  | 0.018  | 0.023 | 0.460       | 0.580 | L2  | 0.055  | 0.067 | 1.400       | 1.700  |
| D   | 0.256  | 0.264 | 6.500       | 6.700 | L3  | 0.024  | 0.039 | 0.600       | 1.000  |
| D1  | 0.201  | 0.215 | 5.100       | 5.460 | P   | 0.026  | REF   | 0.650       | REF    |
| E   | 0.236  | 0.244 | 6.000       | 6.200 | V   | 0.211  | REF   | 5.350       | REF    |

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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