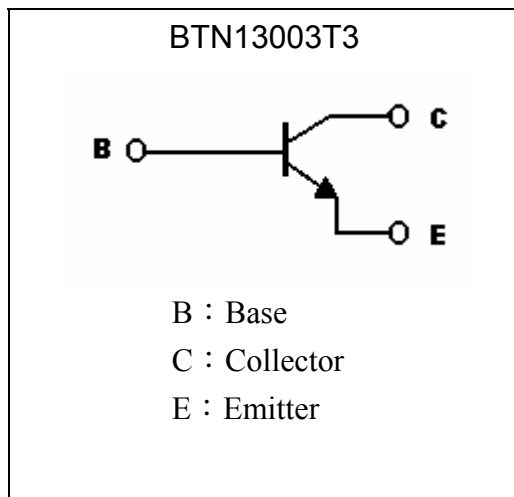
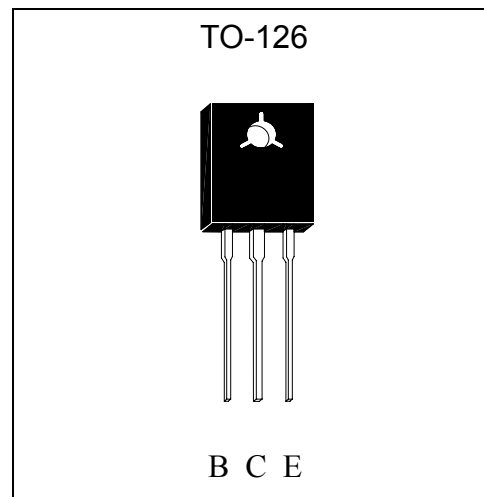


General Purpose NPN Epitaxial Planar Transistor

BTN13003T3

Features

- High breakdown voltage, $V_{CEO}=450V$ (min.)
- High collector current, $I_{C(max)}=1.5A$ (DC)
- Pb-free package

Symbol

Outline

Absolute Maximum Ratings ($T_a=25^{\circ}C$)

| Parameter | Symbol | Limits | Unit |
|--|-----------|----------|-------------|
| Collector-Base Voltage | V_{CBO} | 700 | V |
| Collector-Emitter Voltage | V_{CEO} | 450 | V |
| Emitter-Base Voltage | V_{EBO} | 9 | V |
| Collector Current(DC) | I_C | 1.5 | A |
| Collector Current(Pulsed) | I_{CP} | 3 (Note) | A |
| Base Current | I_B | 0.2 | A |
| Power Dissipation($T_A=25^{\circ}C$) | P_d | 1.5 | W |
| Power Dissipation($T_C=25^{\circ}C$) | | 20 | W |
| Junction Temperature | T_j | 150 | $^{\circ}C$ |
| Storage Temperature | T_{stg} | -55~+150 | $^{\circ}C$ |

 Note : Single pulse, $P_w \leq 300\mu s$, Duty Cycle $\leq 2\%$.

**Characteristics (Ta=25°C)**

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|-----------------------|------|------|------|------|--|
| BV _{CBO} | 700 | - | - | V | I _C =100μA |
| BV _{CEO} | 450 | - | - | V | I _C =10mA |
| BV _{EBO} | 9 | - | - | V | I _E =100μA |
| I _{CBO} | - | - | 1 | μA | V _{CB} =700V, I _E =0 |
| I _{CEO} | - | - | 50 | μA | V _{CE} =400V, I _E =0 |
| I _{EBO} | - | - | 100 | nA | V _{EB} =9V, I _C =0 |
| *V _{CE(SAT)} | - | 136 | 300 | mV | I _C =500mA, I _B =100mA |
| *V _{CE(SAT)} | - | 256 | 600 | mV | I _C =1A, I _B =250mA |
| *V _{CE(SAT)} | - | 400 | 800 | V | I _C =1.5A, I _B =500mA |
| *V _{BE(SAT)} | - | 0.84 | 1 | V | I _C =500mA, I _B =100mA |
| *V _{BE(SAT)} | - | 0.92 | 1.2 | V | I _C =1A, I _B =250mA |
| *h _{FE 1} | 18 | - | 36 | - | V _{CE} =2V, I _C =500mA |
| *h _{FE 2} | 5 | - | 21 | - | V _{CE} =2V, I _C =1A |
| f _T | 5 | - | - | MHz | V _{CE} =10V, I _C =100mA, f=100MHz |
| t _{stg} | - | - | 0.5 | μs | V _{CC} =100V, I _C =1A, I _{B1} =-I _{B2} =0.2A, I _C =0.25A |
| t _r | 1.8 | - | 6.6 | | |

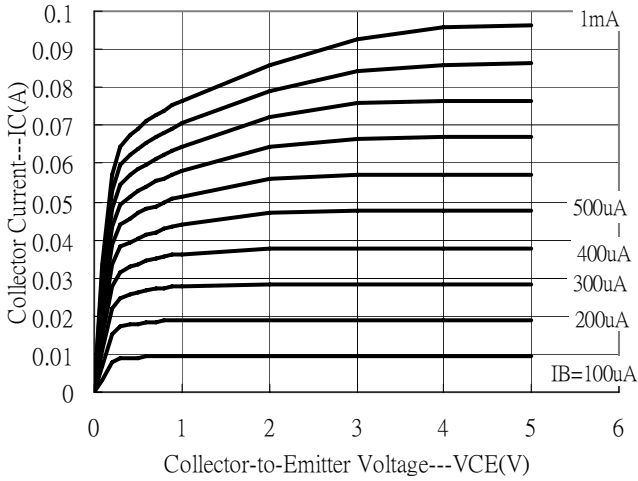
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

Ordering Information

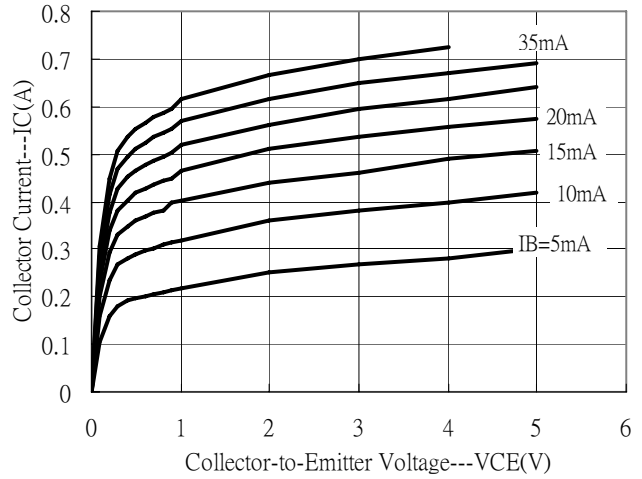
| Device | Package | Shipping | Marking |
|------------|---------------------|---|---------|
| MJE13003T3 | TO-126 (Pb-free) | 200 pcs / Bag, 15 Bags/Box, 10 Boxes/Carton | 13003 |

Typical Characteristics

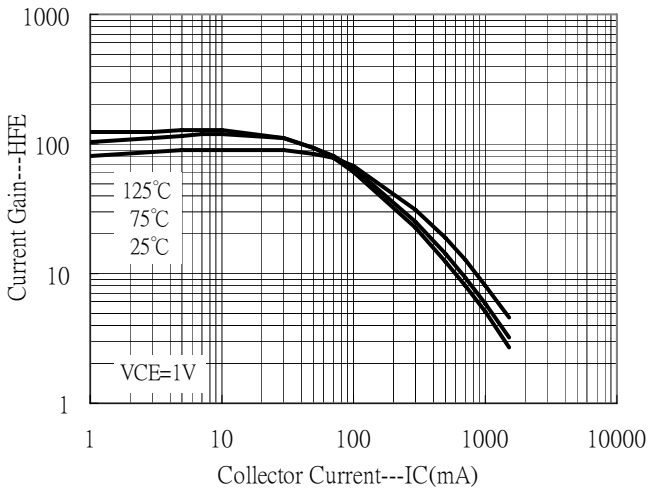
Emitter Grounded Output Characteristics



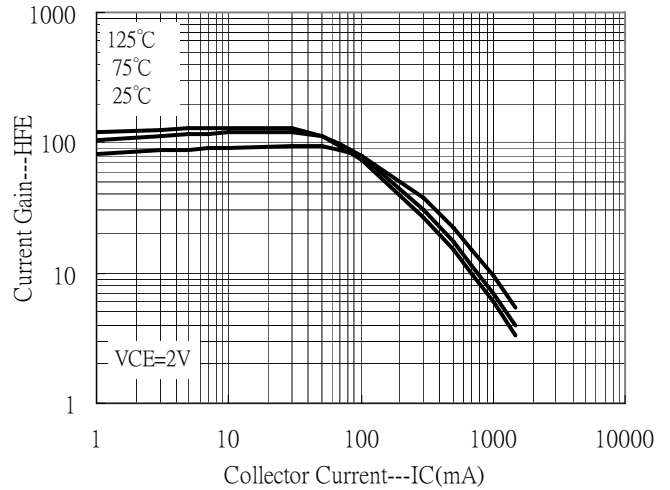
Emitter Grounded Output Characteristics



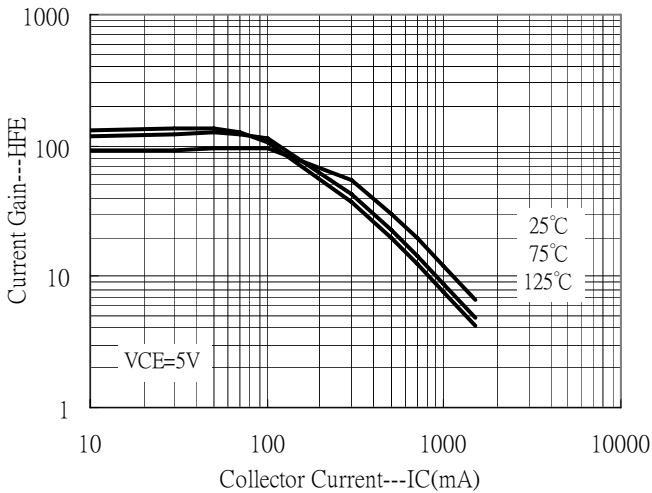
Current Gain vs Collector Current



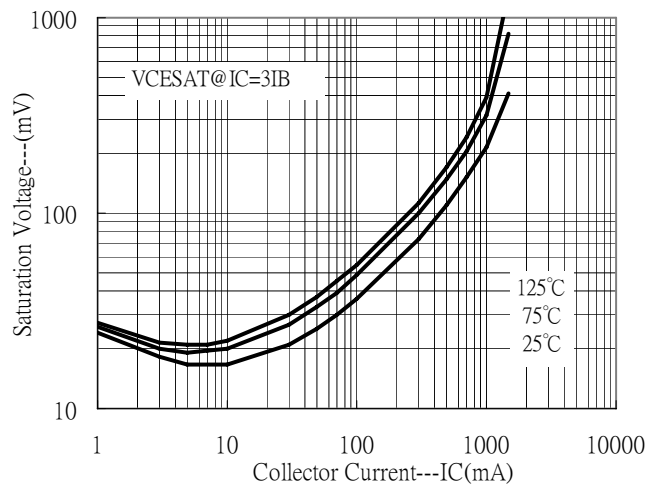
Current Gain vs Collector Current



Current Gain vs Collector Current

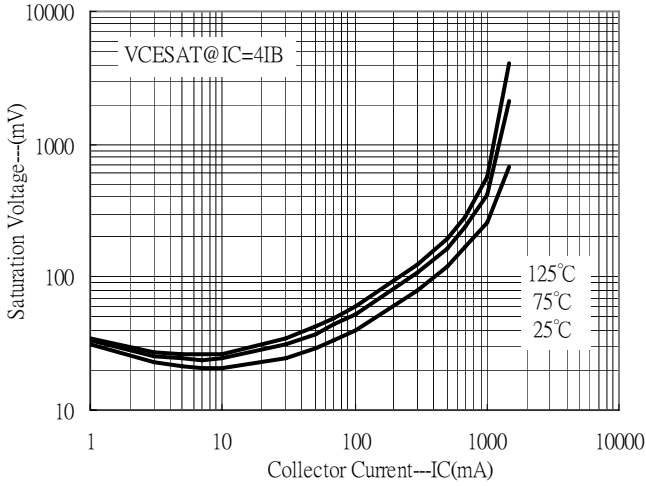


Saturation Voltage vs Collector Current

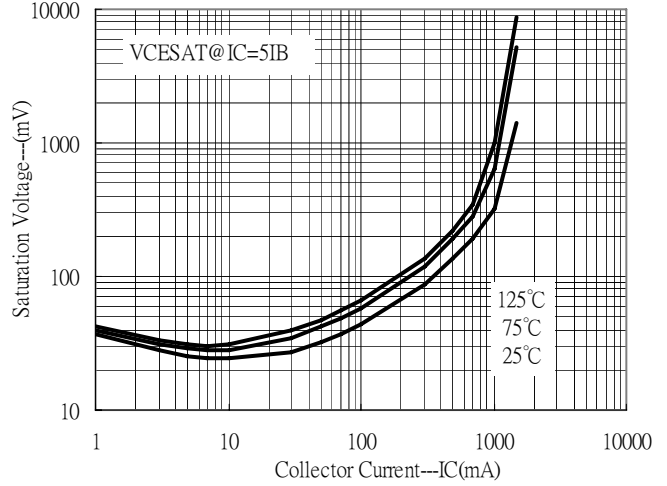


Typical Characteristics(Cont.)

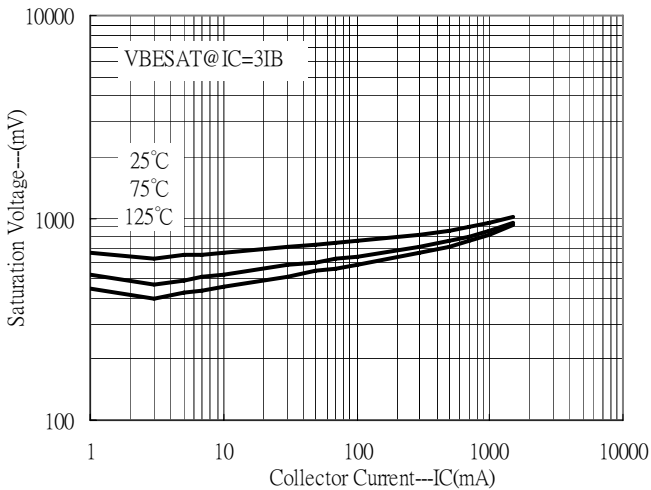
Saturation Voltage vs Collector Current



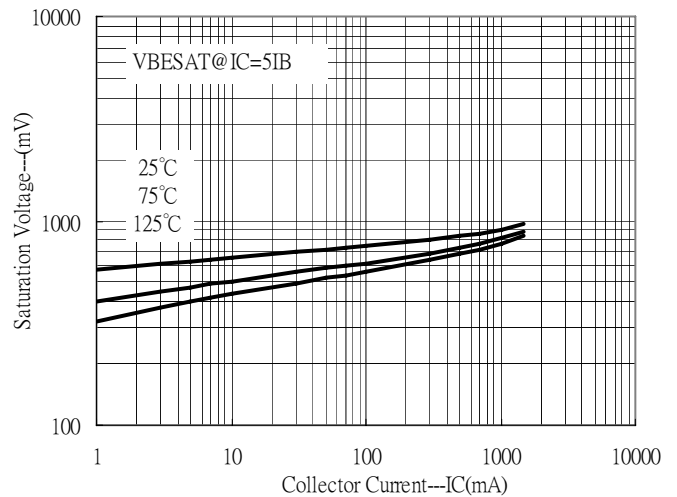
Saturation Voltage vs Collector Current



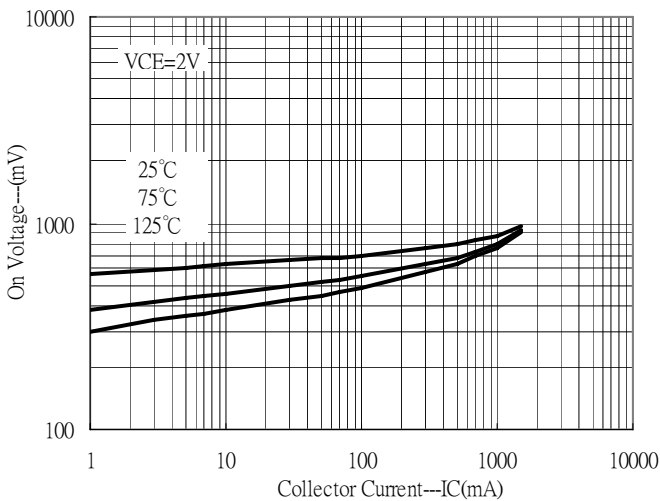
Saturation Voltage vs Collector Current



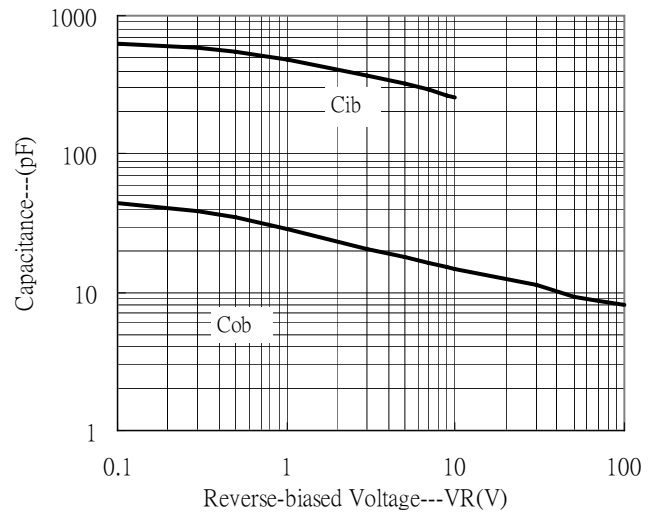
Saturation Voltage vs Collector Current



On Voltage vs Collector Current



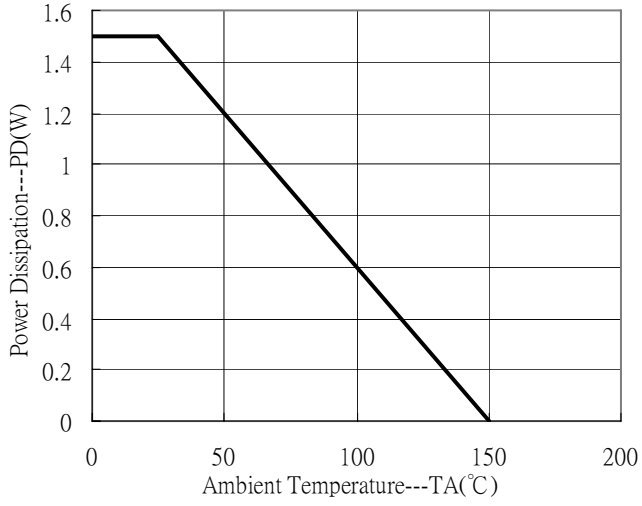
Capacitance vs Reverse-biased Voltage



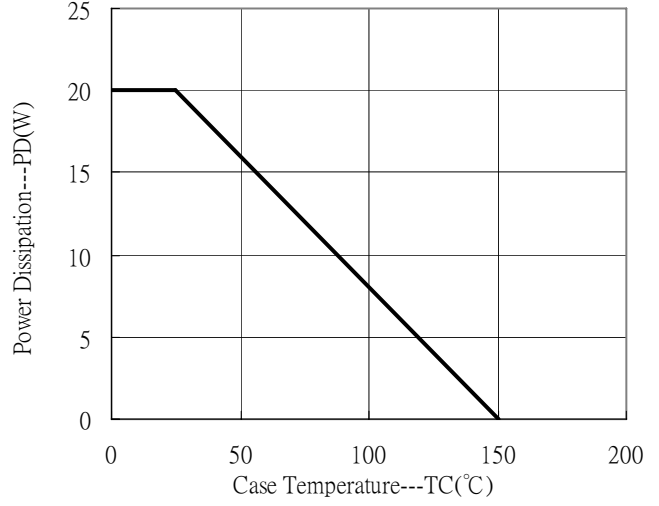


Typical Characteristics(Cont.)

Power Derating Curve



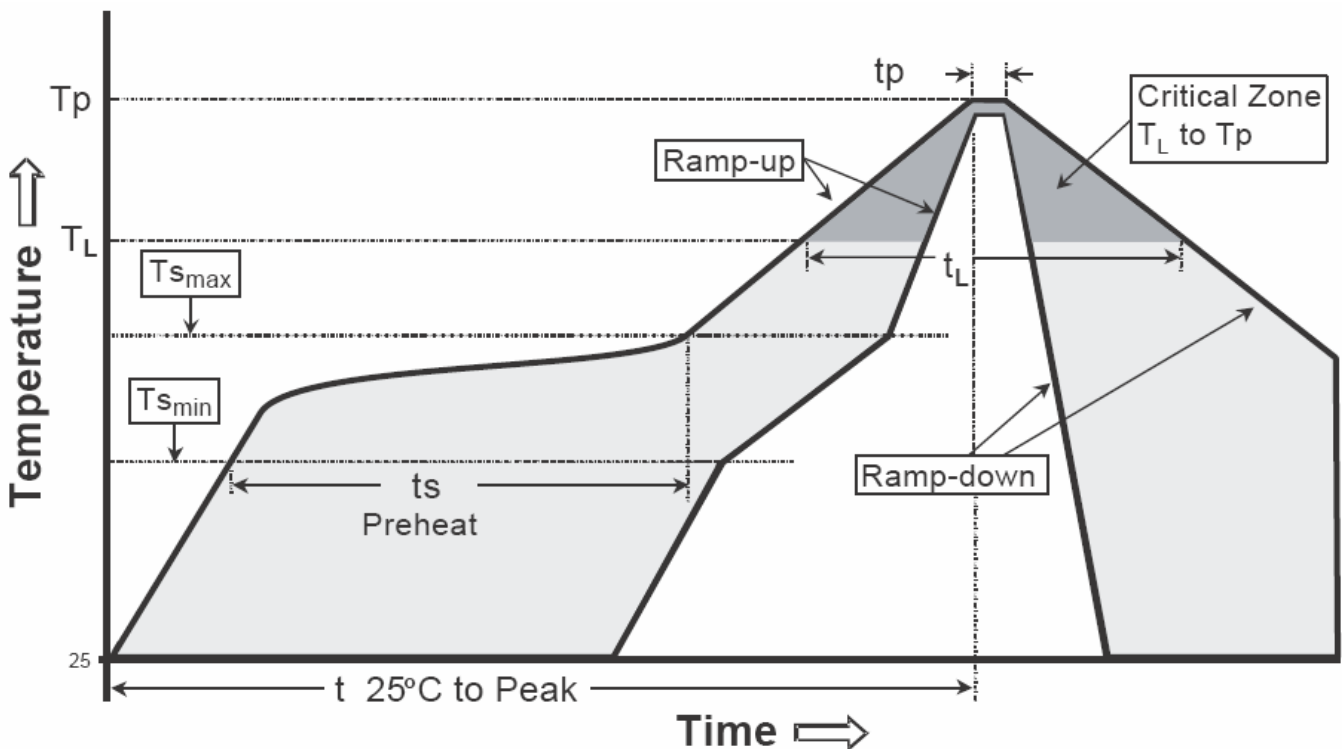
Power Derating Curve



Recommended wave soldering condition

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

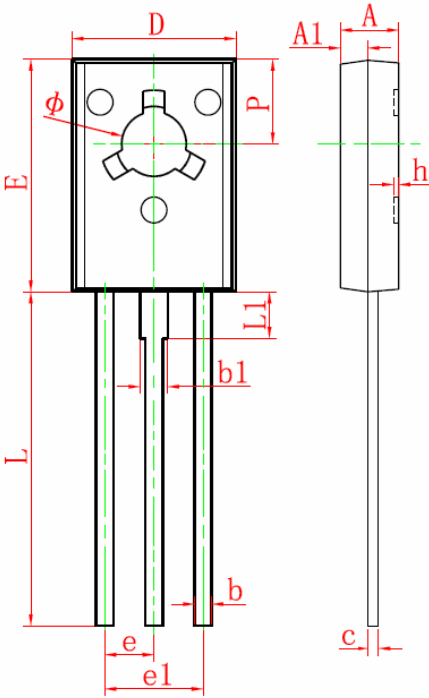
Recommended temperature profile for IR reflow



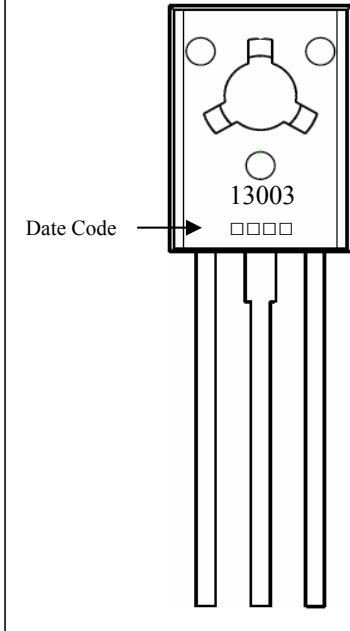
| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|--|-------------------------|------------------|
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3°C/second max. |
| Preheat | | |
| -Temperature Min(Ts min) | 100°C | 150°C |
| -Temperature Max(Ts max) | 150°C | 200°C |
| -Time(ts 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.

TO-126 Dimension



Marking:



Date Code → □□□□

Style: Pin 1.Base 2.Collector 3.Emitter

3-Lead TO-126 Plastic Package
CYStek Package Code: T3

*: Typical

| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|-----|-------------|--------|--------|-------|-----|-------------|--------|--------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 2.500 | 2.900 | 0.098 | 0.114 | e | *2.290 | | *0.090 | |
| A1 | 1.100 | 1.500 | 0.043 | 0.059 | e1 | 4.480 | 4.680 | 0.176 | 0.184 |
| b | 0.660 | 0.860 | 0.026 | 0.034 | h | 0.000 | 0.300 | 0.000 | 0.012 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 | L | 15.300 | 15.700 | 0.602 | 0.618 |
| c | 0.450 | 0.600 | 0.018 | 0.024 | L1 | 2.100 | 2.300 | 0.083 | 0.091 |
| D | 7.400 | 7.800 | 0.291 | 0.307 | P | 3.900 | 4.100 | 0.154 | 0.161 |
| E | 10.600 | 11.000 | 0.417 | 0.433 | Φ | 3.000 | 3.200 | 0.118 | 0.126 |

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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