## Silicon NPN Epitaxial Planar Transistor

# BTD1857AJ3

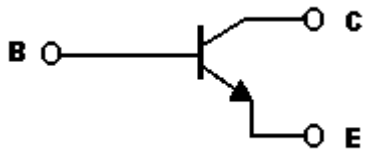
| | |
|---|---|
| $BV_{CEO}$ | 160V |
| $I_C$ | 1.5A |

## Description

- High $BV_{CEO}$
- High current capability
- Complementary to BTB1236AJ3
- Pb-free lead plating and halogen-free package

## Symbol

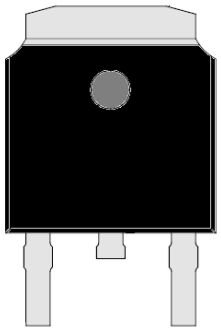
BTD1857AJ3




B：Base
C：Collector
E：Emitter

## Outline

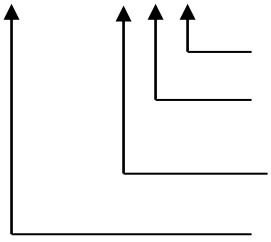
TO-252(DPAK)



B C E

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| BTD1857AJ3-X-T3-G | TO-252<br>(Pb-free lead plating and halogen-free package) | 2500 pcs / Tape & Reel |



Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T3:2500 pcs/tape & reel, 13” reel

Product rank, zero for no rank products

Product name

## Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 180 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 160 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | V |
| Collector Current (DC) | $I_C$ | 1.5 | A |
| Collector Current (Pulse) | $I_{CP}$ | 3 | A |
| Power Dissipation @$T_A$=25℃ | $P_D$ | 1 | W |
| Power Dissipation @$T_C$=25℃ | | 10 | W |
| Junction Temperature | Tj | 150 | °C |
| Storage Temperature | Tstg | -55~+150 | °C |

## Thermal Data

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-case, max | $R_{th,j-c}$ | 12.5 | °C/W |
| Thermal Resistance, Junction-to-ambient, max | $R_{th,j-a}$ | 125 | °C/W |

## Characteristics (Ta=25°C)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $BV_{CBO}$ | 180 | - | - | V | $I_C$=50μA, $I_E$=0 |
| $BV_{CEO}$ | 160 | - | - | V | $I_C$=1mA, $I_B$=0 |
| $BV_{EBO}$ | 5 | - | - | V | $I_E$=50μA, $I_C$=0 |
| $I_{CBO}$ | - | - | 1 | μA | $V_{CB}$=160V, $I_E$=0 |
| $I_{EBO}$ | - | - | 1 | μA | $V_{EB}$=4V, $I_C$=0 |
| *$V_{CE(sat)}$ | - | - | 0.6 | V | $I_C$=1A, $I_B$=100mA |
| *$V_{BE(on)}$ | - | - | 1.5 | V | $V_{CE}$=5V, $I_C$=150mA |
| $h_{FE}1$ | 180 | - | 390 | - | $V_{CE}$=5V, $I_C$=150mA |
| $h_{FE}2$ | 30 | - | - | - | $V_{CE}$=5V, $I_C$=500mA |
| $f_T$ | - | 140 | - | MHz | $V_{CE}$=5V, $I_C$=150mA |
| Cob | - | 27 | - | pF | $V_{CB}$=10V, $I_E$=0, f=1MHz |

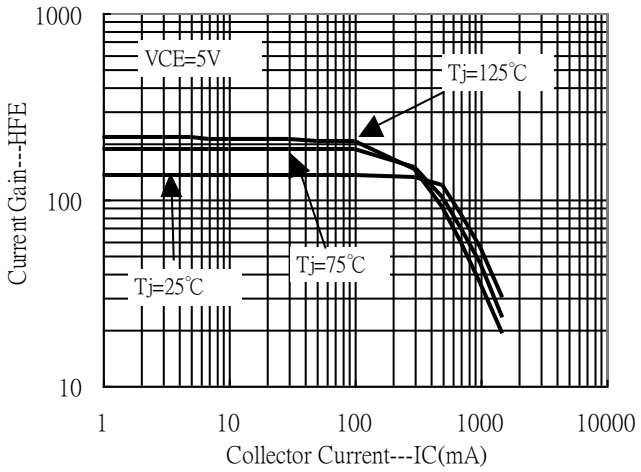
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

## Classification Of $h_{FE}$ 1

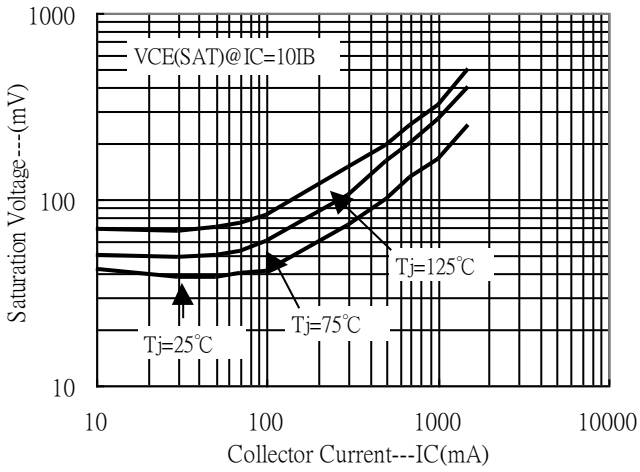
| Rank | R |
|---|---|
| Range | 180~390 |

## Typical Characteristics

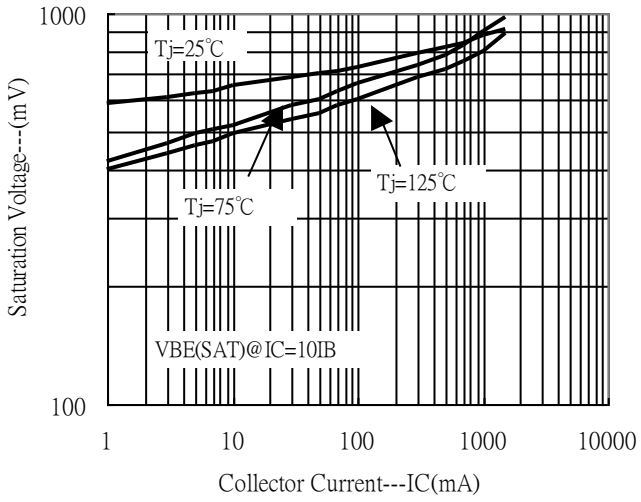
Current Gain vs Collector Current



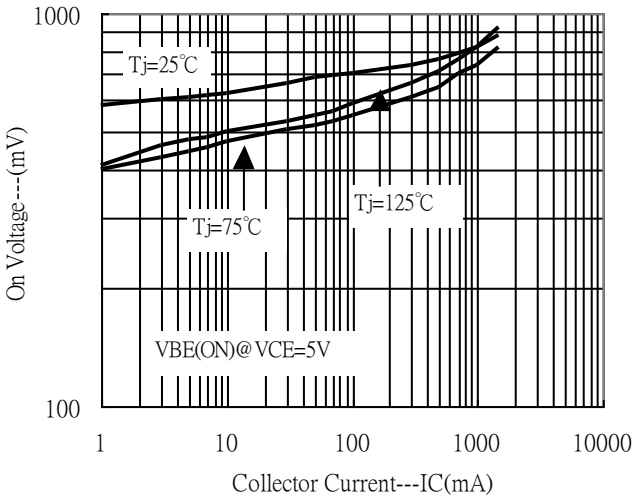

Saturation Voltage vs Collector Current



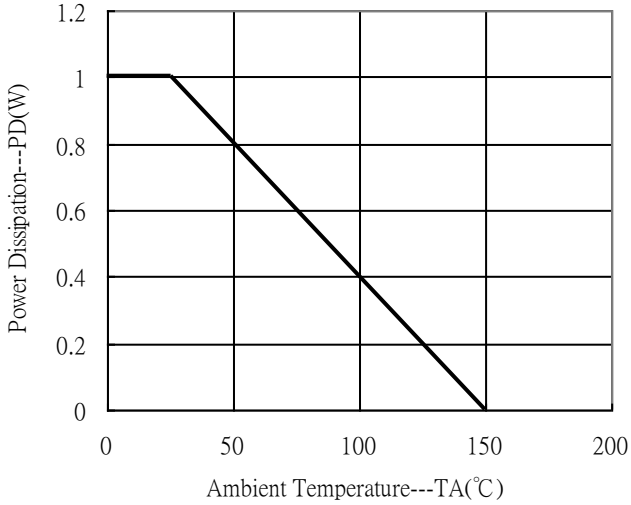

Saturation Voltage vs Collector Current



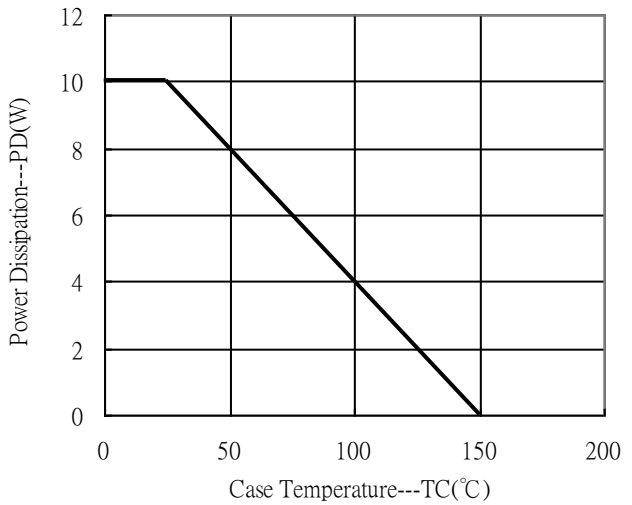

On Voltage vs Collector Current



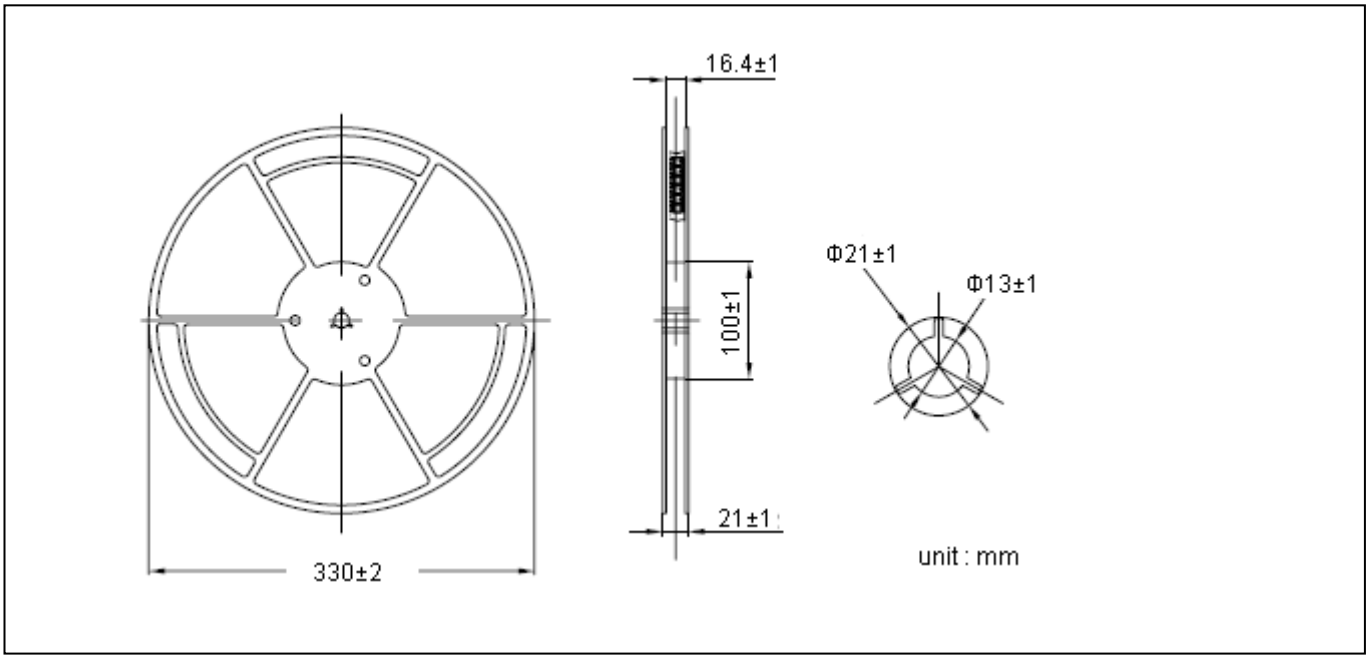

Power Derating Curve



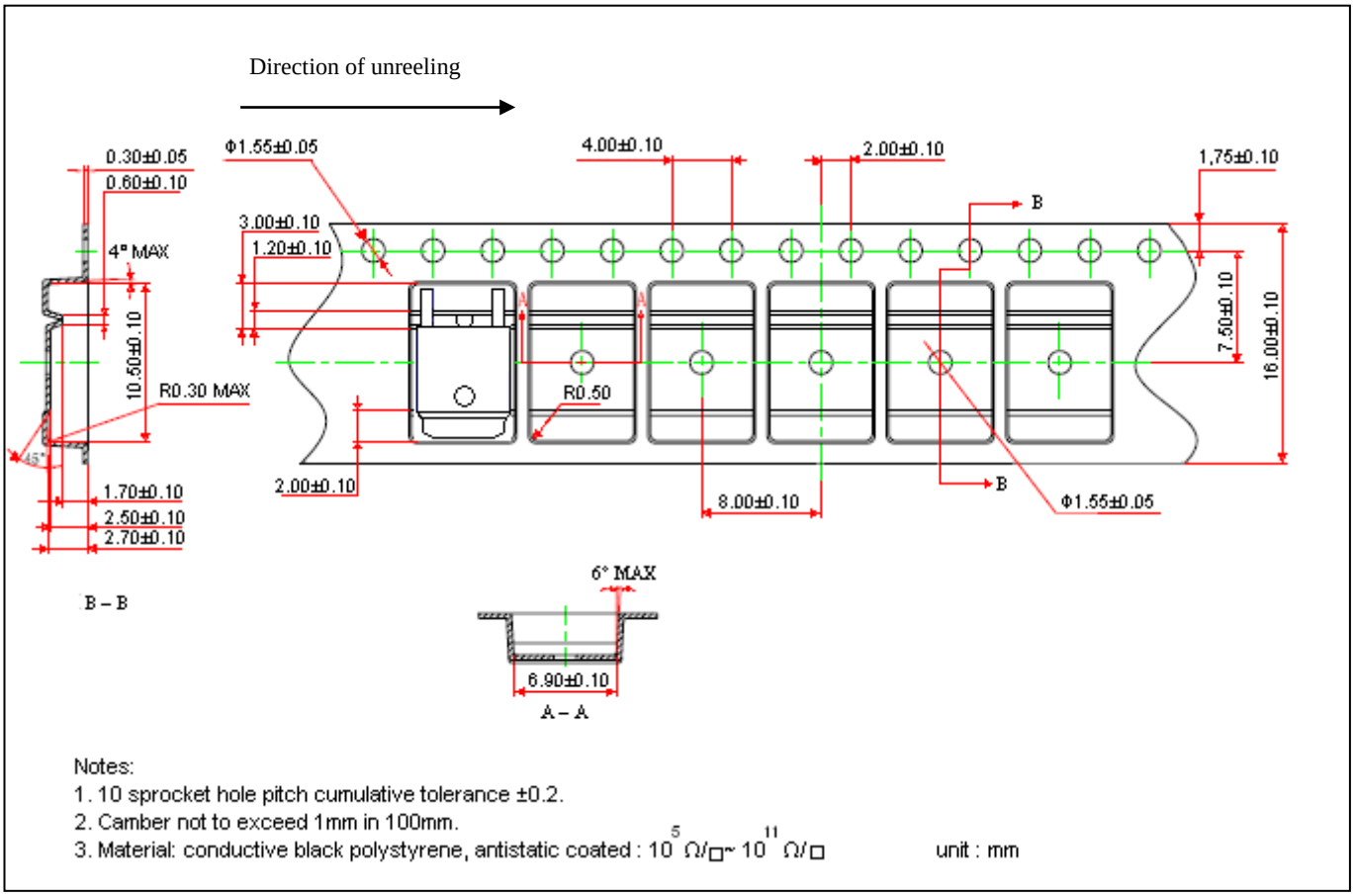

Power Derating Curve



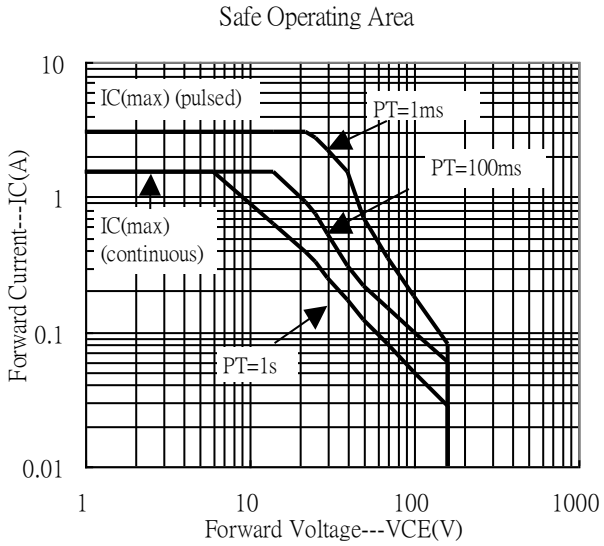
## Reel Dimension




## Carrier Tape Dimension



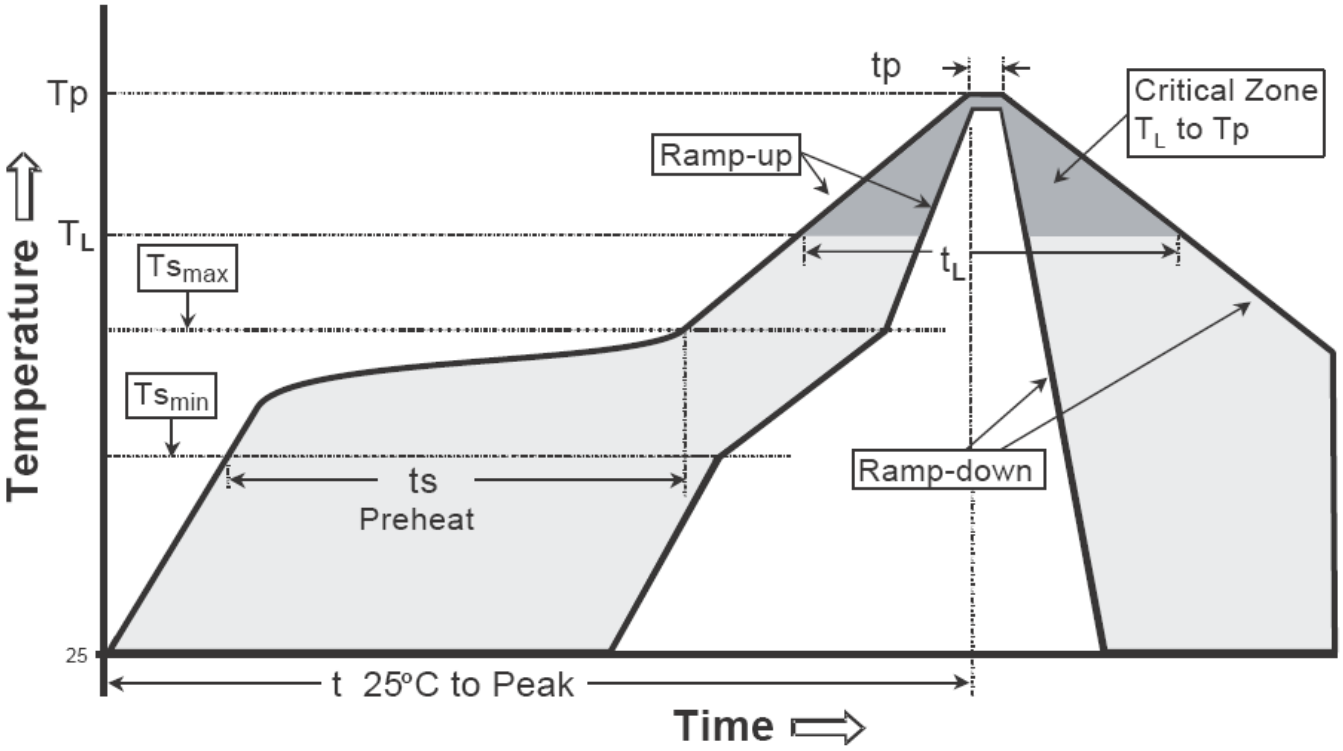
## Typical Characteristics(Cont.)



## Recommended wave soldering condition

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

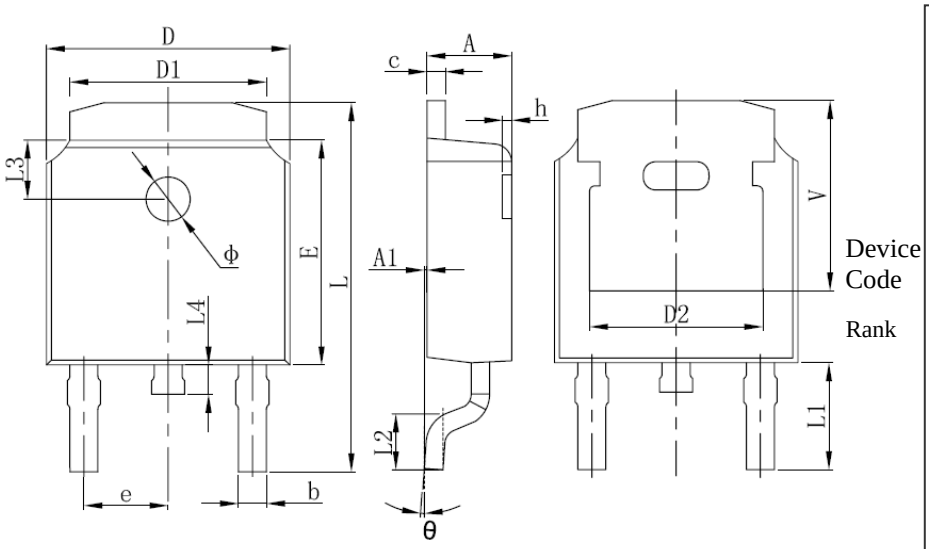
## Recommended temperature profile for IR reflow

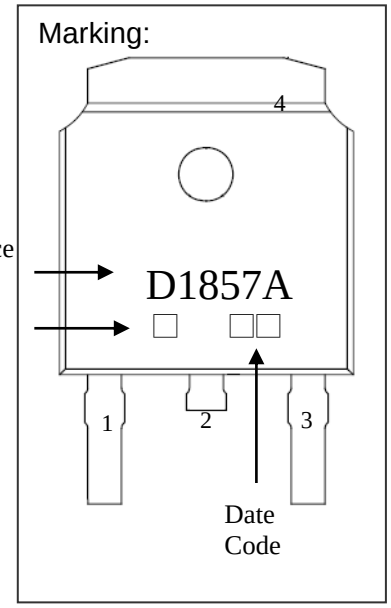



| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|---|---|
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3°C/second max. |
| Preheat<br>−Temperature Min(Ts min)<br>−Temperature Max(Ts max)<br>−Time(ts min to ts max) | <br>100°C<br>150°C<br>60-120 seconds | <br>150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>−Temperature (TL)<br>− Time (tL) | <br>183°C<br>60-150 seconds | <br>217°C<br>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-252 Dimension




3-Lead TO-252 Plastic Surface Mount Package
CYStek Package Code: J3

Date Code :
First code : Year code, Last digit of Christian Year
Second Code : Month code, 1~9, A, B, C

Style: Pin 1.Base 2.Collector 3.Emitter 4.Collector

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.087 | 0.094 | 2.200 | 2.400 | L | 0.382 | 0.406 | 9.712 | 10.312 |
| A1 | 0.000 | 0.005 | 0.000 | 0.127 | L1 | 0.114 REF | | 2.900 REF | |
| b | 0.025 | 0.030 | 0.635 | 0.770 | L2 | 0.055 | 0.067 | 1.400 | 1.700 |
| c | 0.018 | 0.023 | 0.460 | 0.580 | L3 | 0.063 REF | | 1.600 REF | |
| D | 0.256 | 0.264 | 6.500 | 6.700 | L4 | 0.024 | 0.039 | 0.600 | 1.000 |
| D1 | 0.201 | 0.215 | 5.100 | 5.460 | Φ | 0.043 | 0.051 | 1.100 | 1.300 |
| D2 | 0.190 REF | | 4.830 REF | | θ | 0° | 8° | 0° | 8° |
| E | 0.236 | 0.244 | 6.000 | 6.200 | h | 0.000 | 0.012 | 0.000 | 0.300 |
| e | 0.086 | 0.094 | 2.186 | 2.386 | v | 0.207 REF | | 5.250 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.