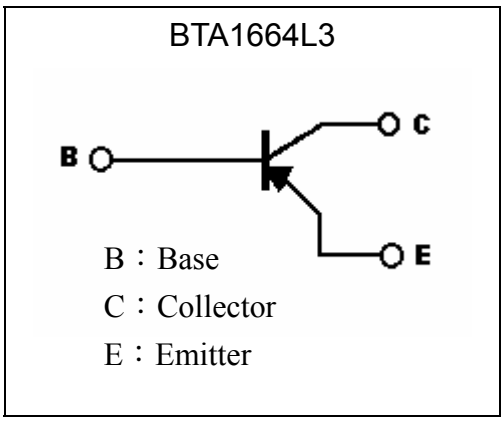
## Low Vcesat PNP Epitaxial Planar Transistor

# BTA1664L3

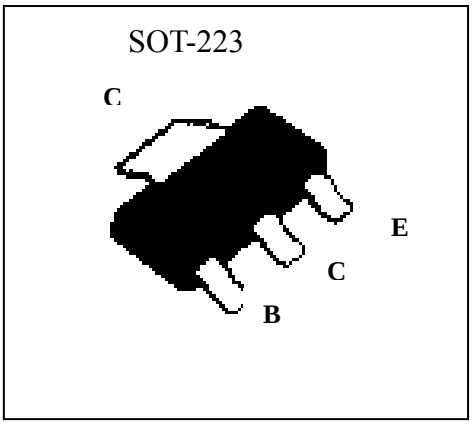
## Features

- Low $V_{CE(sat)}$, $V_{CE(sat)}$=-0.24V (typical), at $I_C$ / $I_B$ =- 500mA /- 20mA
- Pb-free lead plating and halogen-free package

## Symbol




## Outline




## Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -40 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -25 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -5 | V |
| Collector Current(DC) | $I_C$ | -2 | A |
| Peak Collector Current | $I_{CM}$ | -4 | A |
| Peak Base Current | $I_{BM}$ | -200 | mA |
| Power Dissipation @$T_A$=25℃ | Pd | 3 (Note) | W |
| Junction Temperature | Tj | 150 | °C |
| Storage Temperature | Tstg | -55~+150 | °C |

Note : The power which can be dissipated assuming the device is mounted in a typical manner on a P.C.B. with copper equal to 4 square inch minimum.

## Characteristics (Ta=25°C)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| $BV_{CBO}$ | -40 | - | - | V | $I_C$=-50μA, $I_E$=0 |
| $BV_{CEO}$ | -25 | - | - | V | $I_C$=-1mA, $I_B$=0 |
| $BV_{EBO}$ | -5 | - | - | V | $I_E$=-50μA, $I_C$=0 |
| $I_{CBO}$ | - | - | -100 | nA | $V_{CB}$=-40V, $I_E$=0 |
| $I_{EBO}$ | - | - | -100 | nA | $V_{EB}$=-5V, $I_C$=0 |
| *$V_{CE(sat)}$ | - | -0.24 | -0.4 | V | $I_C$=-500mA, $I_B$=-20mA |
| *$V_{BE(on)}$ | -0.5 | - | -0.8 | V | $V_{CE}$=-1V, $I_C$=-10mA |
| *$h_{FE}$ 1 | 120 | - | 390 | - | $V_{CE}$=-1V, $I_C$=-100mA |
| *$h_{FE}$ 2 | 40 | - | - | - | $V_{CE}$=-1V, $I_C$=-700mA |
| $f_T$ | - | 120 | - | MHz | $V_{CE}$=-5V, $I_C$=-10mA, f=100MHz |
| Cob | - | 19 | - | pF | $V_{CB}$=-10V, f=1MHz |

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

## Classification of $h_{FE}$ 1

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

## Ordering Information

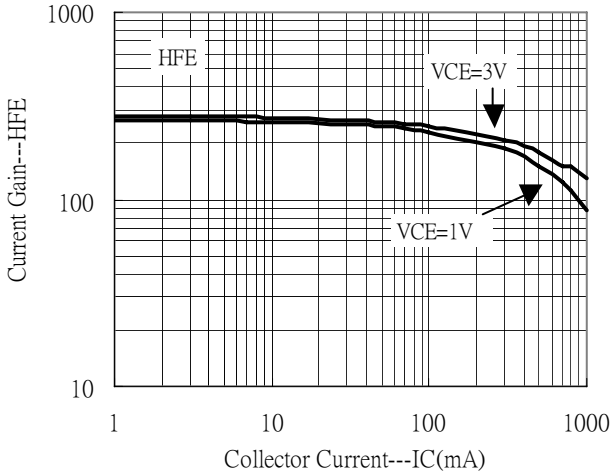
| Device | Package | Shipping | Marking |
|---|---|---|---|
| BTA1664L3 | SOT-223<br>(Pb-free lead plating and halogen-free package) | 2500 pcs / Tape & Reel | A1664 |

## Moisture Sensitivity Level : Conform to JEDEC Level 3

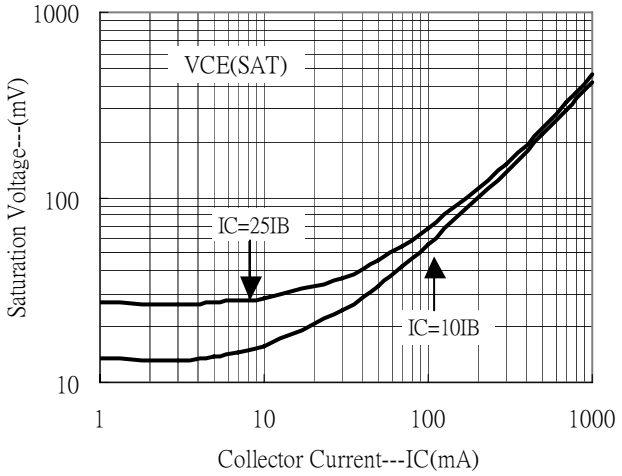
Recommended Storage Condition:
Temperature : ≤ 30 °C
Humidity : ≤ 60% RH

## Characteristic Curves

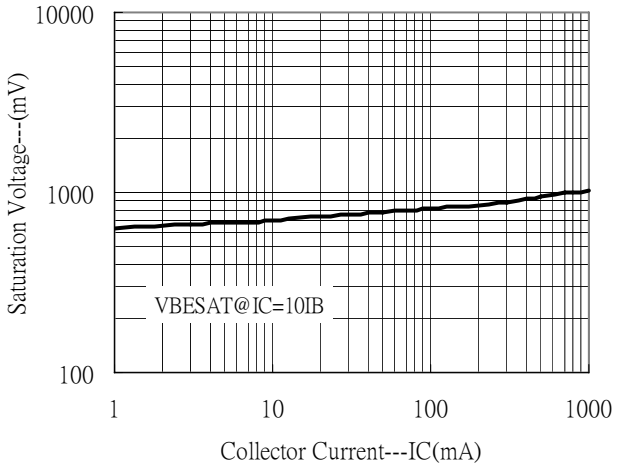
Current Gain vs Collector Current



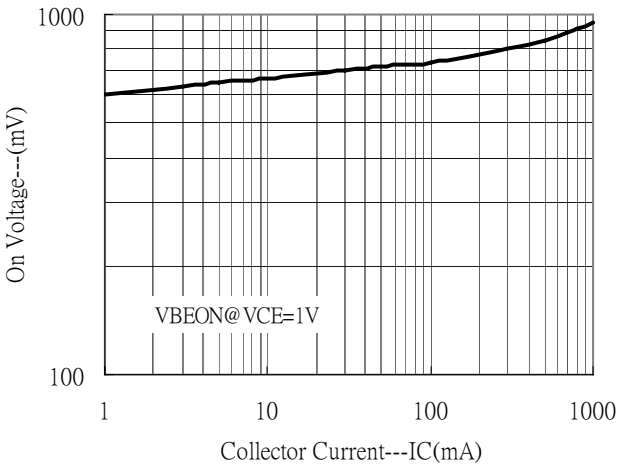

Saturation Voltage vs Collector Current



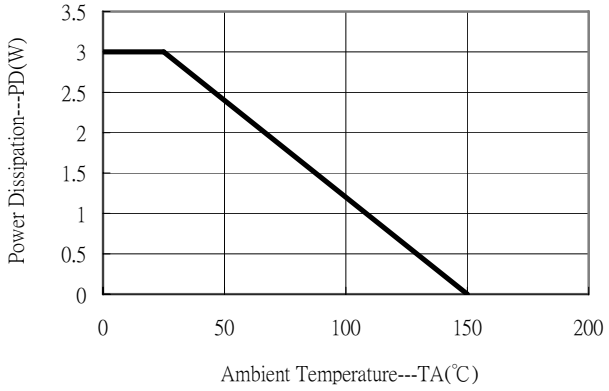

Saturation Voltage vs Collector Current



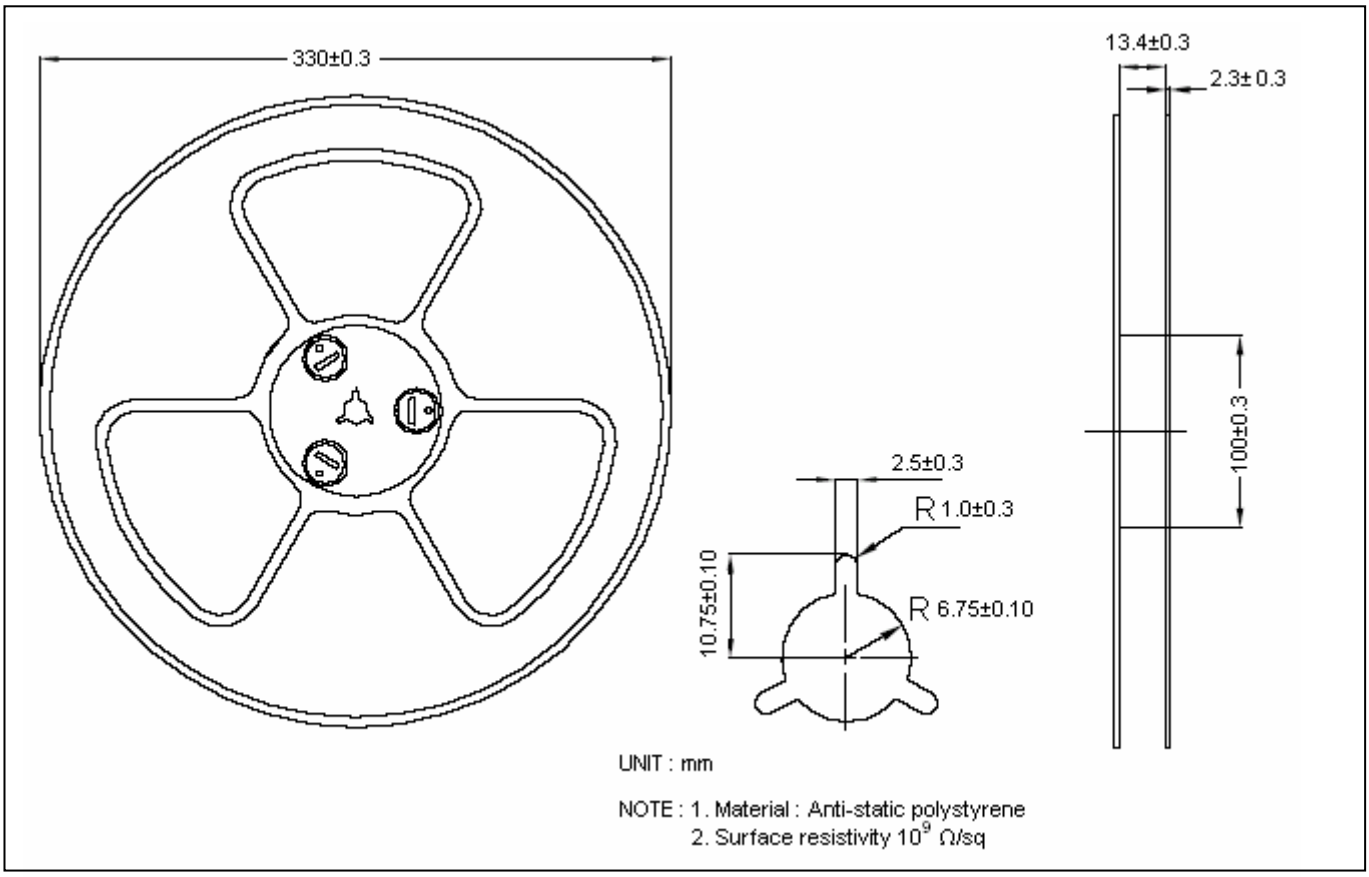

On Voltage vs Collector Current



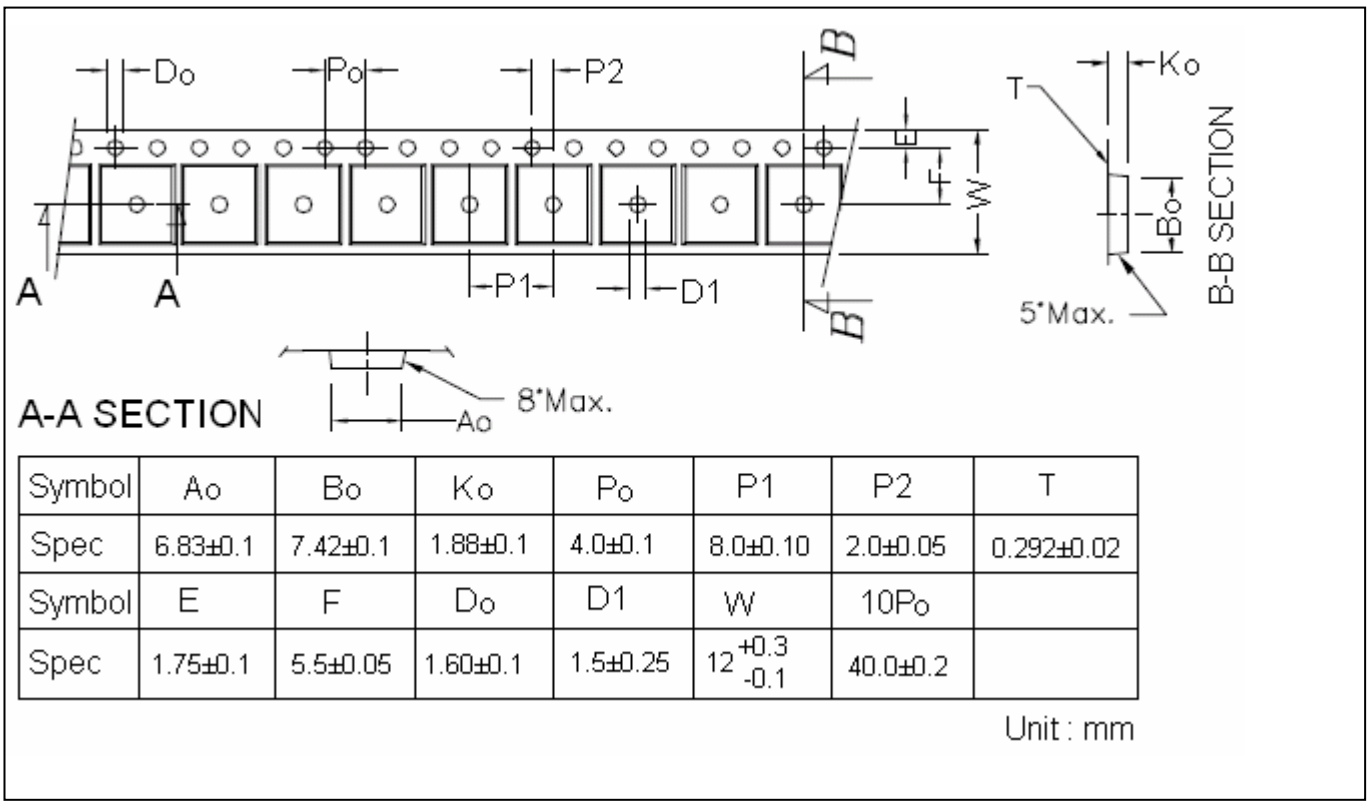

Power Derating Curve



## Reel Dimension




## Carrier Tape Dimension



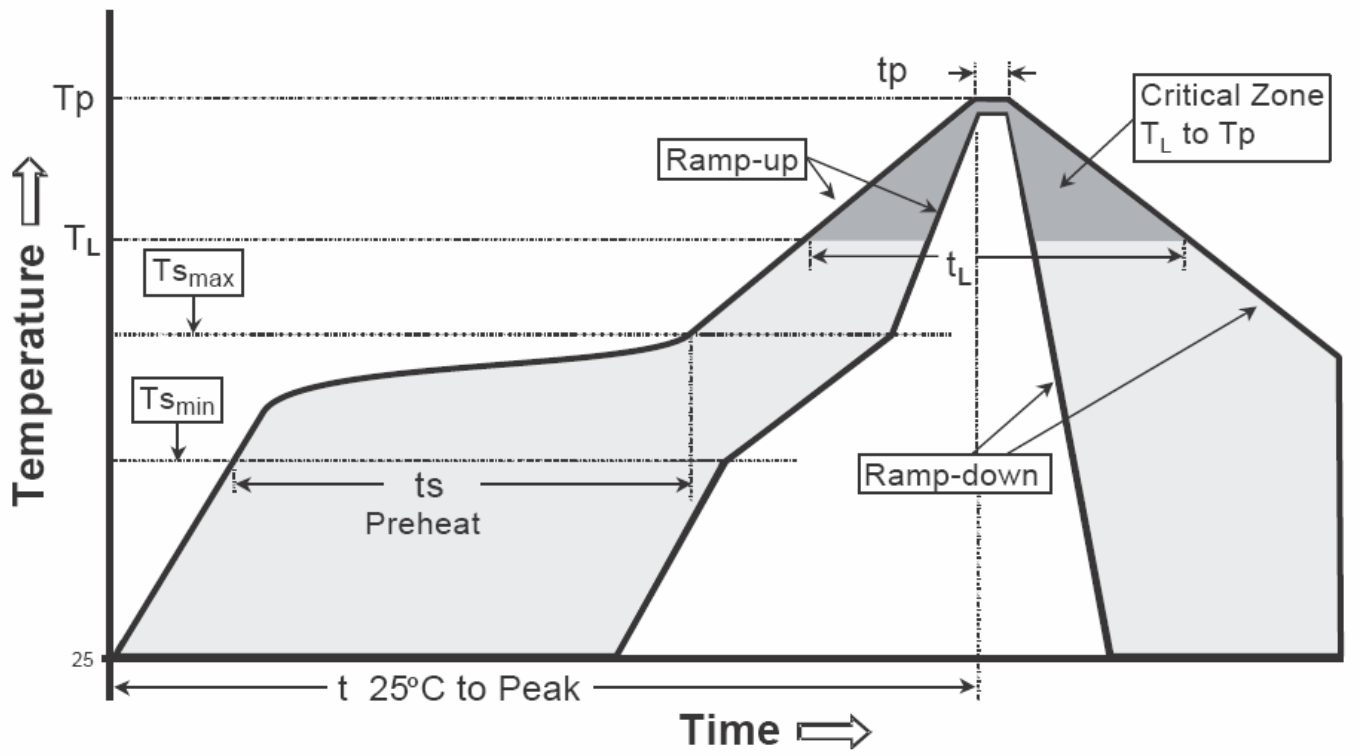

| Symbol | Ao | Bo | Ko | Po | P1 | P2 | T |
|---|---|---|---|---|---|---|---|
| Spec | 6.83±0.1 | 7.42±0.1 | 1.88±0.1 | 4.0±0.1 | 8.0±0.10 | 2.0±0.05 | 0.292±0.02 |
| Symbol | E | F | Do | D1 | W | 10Po | |
| Spec | 1.75±0.1 | 5.5±0.05 | 1.60±0.1 | 1.5±0.25 | $12^{+0.3}_{-0.1}$ | 40.0±0.2 | |

Unit : mm

## Recommended wave soldering condition

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

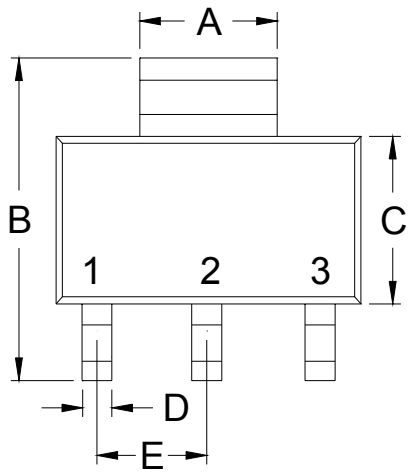
## Recommended temperature profile for IR reflow

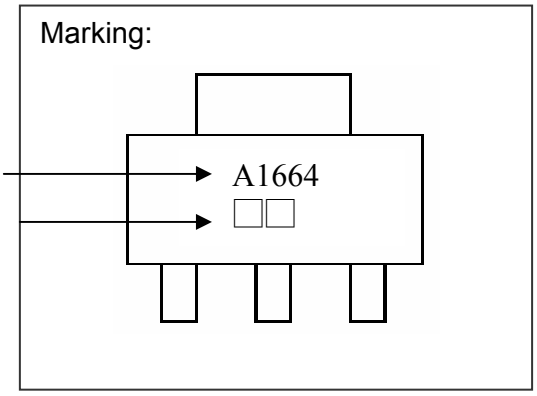



| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|---|---|
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3°C/second max. |
| Preheat<br>−Temperature Min($T_S$ min)<br>−Temperature Max($T_S$ max)<br>−Time($t_{s\ min}$ to $t_{s\ max}$) | <br>100°C<br>150°C<br>60-120 seconds | <br>150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>−Temperature ($T_L$)<br>− Time ($t_L$) | <br>183°C<br>60-150 seconds | <br>217°C<br>60-150 seconds |
| Peak Temperature($T_P$) | 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. |

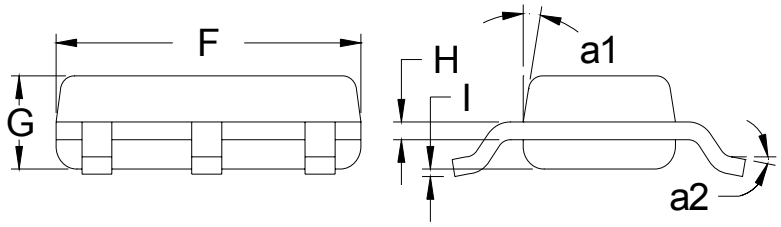
Note : All temperatures refer to topside of the package, measured on the package body surface.

## SOT-223 Dimension




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




3-Lead SOT-223 Plastic
Surface Mounted Package
CYStek Package Code: L3

*: Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.1142 | 0.1220 | 2.90 | 3.10 | G | 0.0551 | 0.0709 | 1.40 | 1.80 |
| B | 0.2638 | 0.2874 | 6.70 | 7.30 | H | 0.0098 | 0.0138 | 0.25 | 0.35 |
| C | 0.1299 | 0.1457 | 3.30 | 3.70 | I | 0.0008 | 0.0039 | 0.02 | 0.10 |
| D | 0.0236 | 0.0315 | 0.60 | 0.80 | a1 | *13° | - | *13° | - |
| E | *0.0906 | - | *2.30 | - | a2 | 0° | 10° | 0° | 10° |
| F | 0.2480 | 0.2638 | 6.30 | 6.70 | | | | | |

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.