

# NPN Epitaxial Planar Transistor

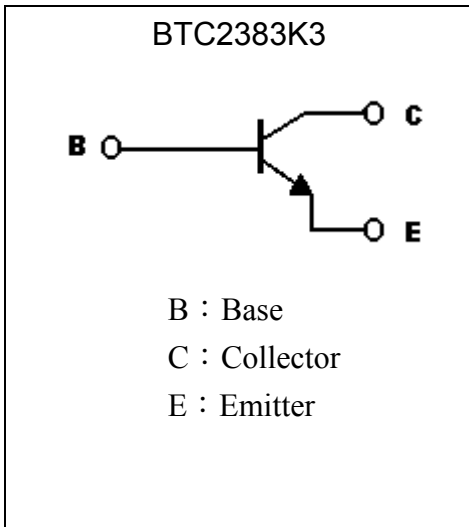
## BTC2383K3

|                  |            |
|------------------|------------|
| $BV_{CEO}$       | 160V       |
| $I_C$            | 1A         |
| $R_{CESAT(MAX)}$ | 1 $\Omega$ |

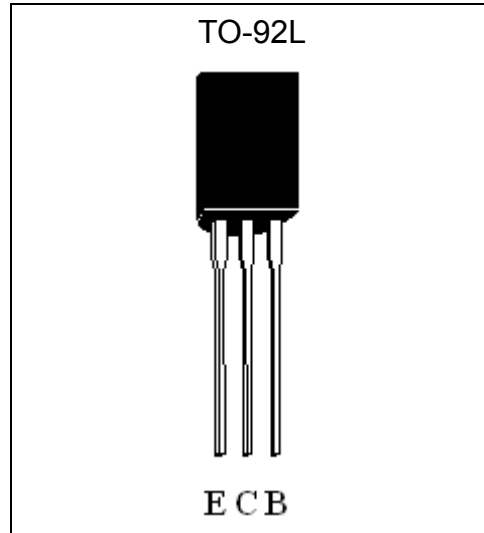
### Features

- High breakdown voltage ,  $BV_{CEO}=160V$
- Low Saturation Voltage,  $V_{CE(sat)}=0.2V(yp)@I_C=500mA, I_B=50mA$
- Complementary to BTA1013K3
- Pb-free lead plating and halogen-free package

### Symbol

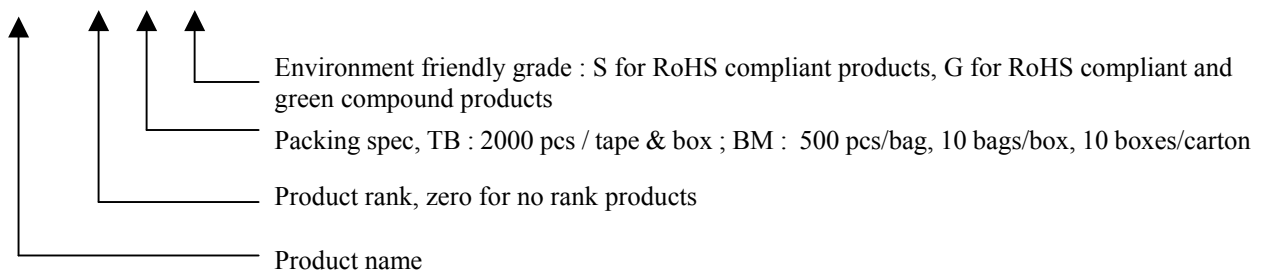


### Outline



### Ordering Information

| Device           | Package   | Shipping                                       |
|------------------|---|--|
| BTC2383K3-0-TB-G | TO-92L<br>(Pb-free lead plating and halogen-free package) | 2000 pcs / tape & box                          |
| BTC2383K3-0-BM-G | TO-92L<br>(Pb-free lead plating and halogen-free package) | 500 pcs / bag, 10 bags/box,<br>10 boxes/carton |





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

| Parameter  | Symbol                            | Limits   | Unit |
|--|-----------------------------------|----------|------|
| Collector-Base Voltage                           | V <sub>CB0</sub>                  | 200      | V    |
| Collector-Emitter Voltage                        | V <sub>CEO</sub>                  | 160      |      |
| Emitter-Base Voltage                             | V <sub>EBO</sub>                  | 6        |      |
| Collector Current(DC)                            | I <sub>C</sub>                    | 1        | A    |
| Collector Current(Pulsed)(Note 1)                | I <sub>CP</sub>                   | 3        |      |
| Base Current                                     | I <sub>B</sub>                    | 0.5      |      |
| Power Dissipation                                | P <sub>D</sub>                    | 900      | mW   |
| Thermal Resistance, Junction to Ambient          | R <sub>θJA</sub>                  | 139      | °C/W |
| Operating Junction Temperature and Storage Range | T <sub>j</sub> ; T <sub>stg</sub> | -55~+150 | °C   |

Note 1: Single pulse, Pw≤300μs, Duty Cycle≤2%.

**Characteristics (Ta=25°C)**

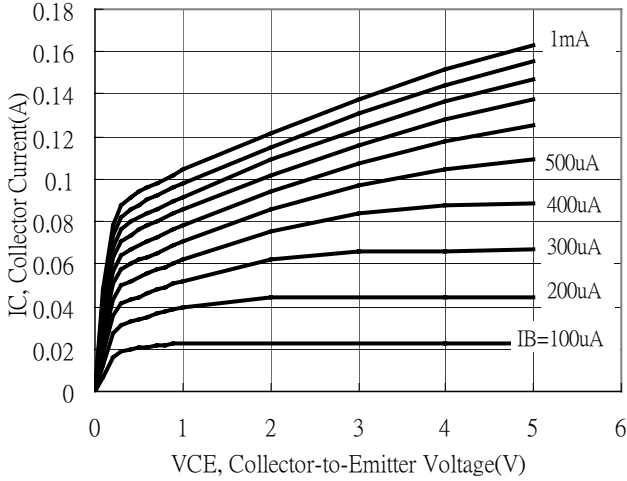
| Symbol                 | Min. | Typ. | Max. | Unit | Test Conditions                                  |
|------------------------|------|------|------|------|--|
| BV <sub>CB0</sub>      | 200  | 270  | -    | V    | I <sub>C</sub> =100μA                            |
| BV <sub>CEO</sub>      | 160  | 210  | -    | V    | I <sub>C</sub> =10mA                             |
| BV <sub>EBO</sub>      | 6    | 7.4  | -    | V    | I <sub>E</sub> =100μA                            |
| I <sub>CB0</sub>       | -    | 15   | 100  | nA   | V <sub>CB</sub> =200V                            |
| I <sub>EBO</sub>       | -    | 2    | 100  | nA   | V <sub>EB</sub> =6V                              |
| V <sub>CE(sat)</sub> * | -    | 200  | 500  | mV   | I <sub>C</sub> =500mA, I <sub>B</sub> =50mA      |
| R <sub>CE(sat)</sub> * | -    | 0.4  | 1    | Ω    | I <sub>C</sub> =500mA, I <sub>B</sub> =50mA      |
| V <sub>BE(sat)</sub> * | -    | 0.9  | 1.2  | V    | I <sub>C</sub> =500mA, I <sub>B</sub> =50mA      |
| V <sub>BE(on)</sub> *  | 0.45 | 0.62 | 0.75 | V    | V <sub>CE</sub> =5V, I <sub>C</sub> =5mA         |
| h <sub>FE</sub> *      | 160  | -    | 320  | -    | V <sub>CE</sub> =5V, I <sub>C</sub> =100mA       |
| f <sub>T</sub>         | 100  | 180  | -    | MHz  | V <sub>CE</sub> =10V, I <sub>C</sub> =50mA       |
| C <sub>ob</sub>        | -    | 6.2  | 20   | pF   | V <sub>CB</sub> =10V, I <sub>E</sub> =0A, f=1MHz |

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

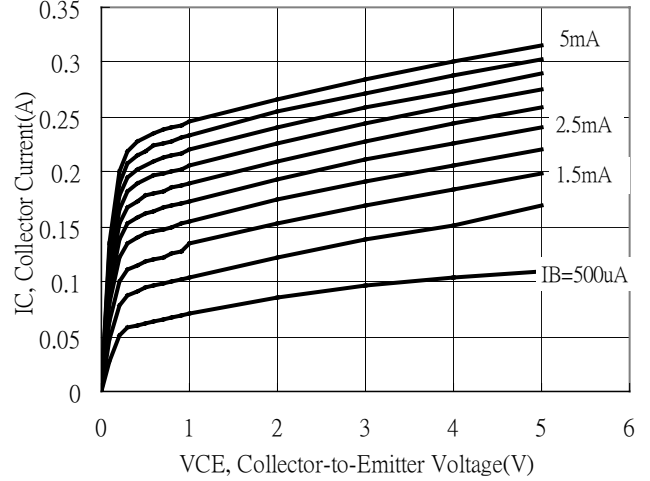


### Typical Characteristics

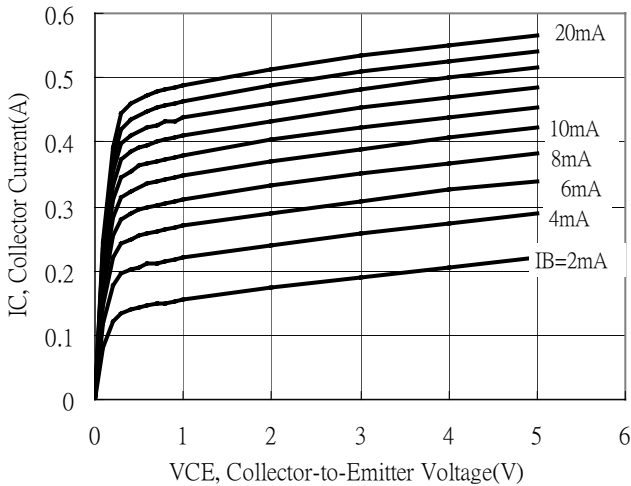
Emitter Grounded Output Characteristics



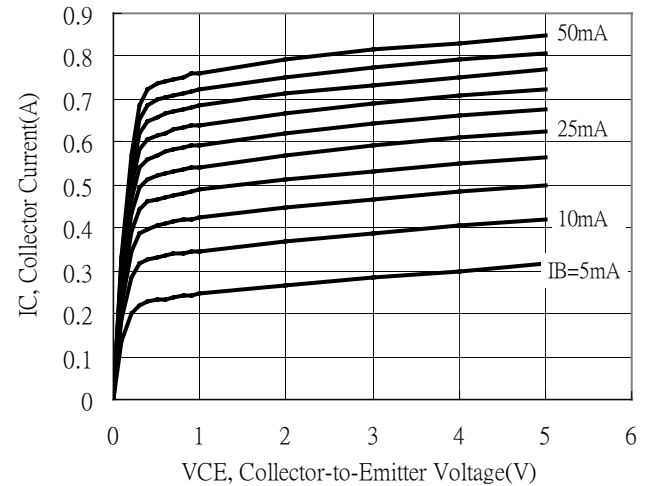
Emitter Grounded Output Characteristics



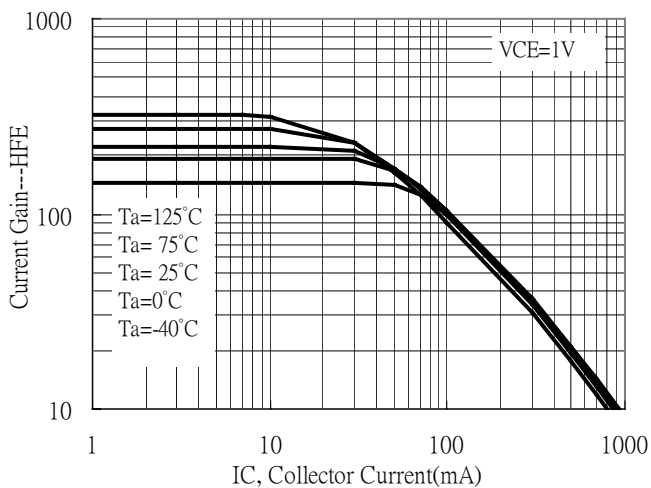
Emitter Grounded Output Characteristics



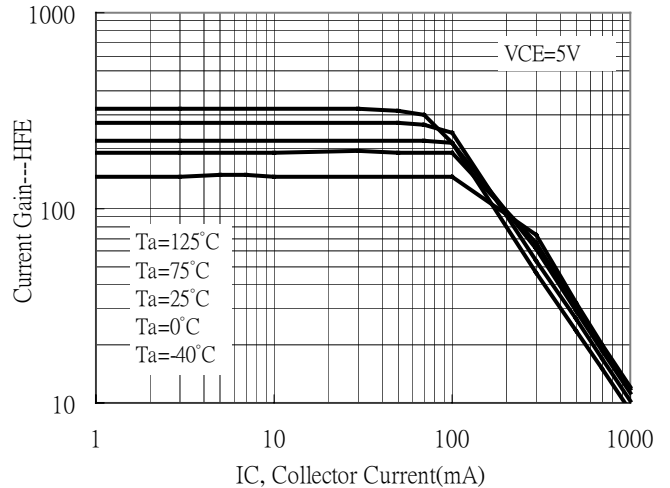
Emitter Grounded Output Characteristics



Current Gain vs Collector Current



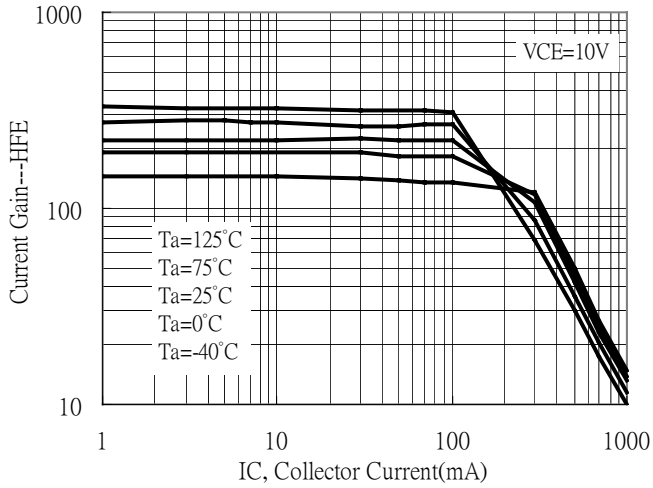
Current Gain vs Collector Current



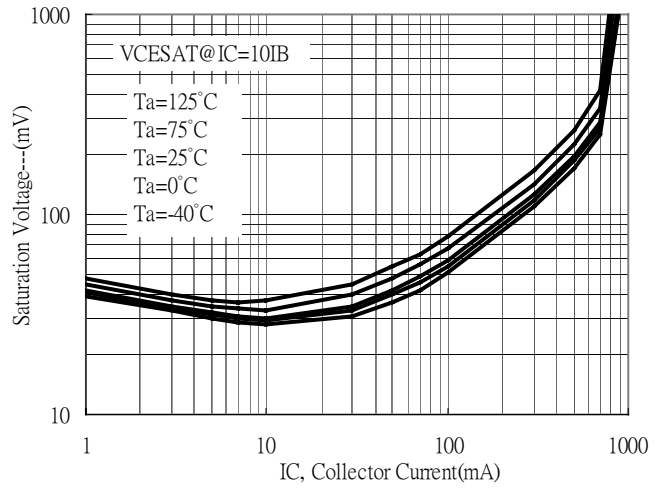


**Typical Characteristics(Cont.)**

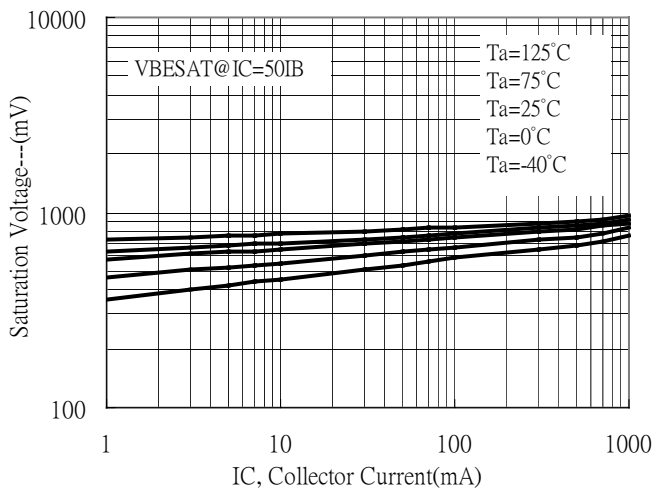
Current Gain vs Collector Current



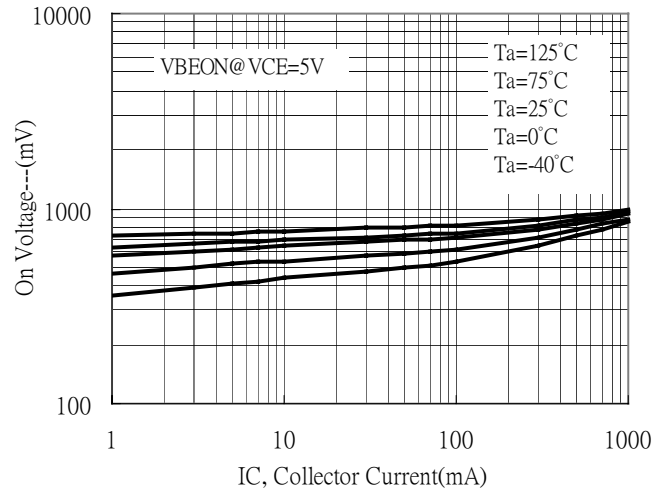
Saturation Voltage vs Collector Current



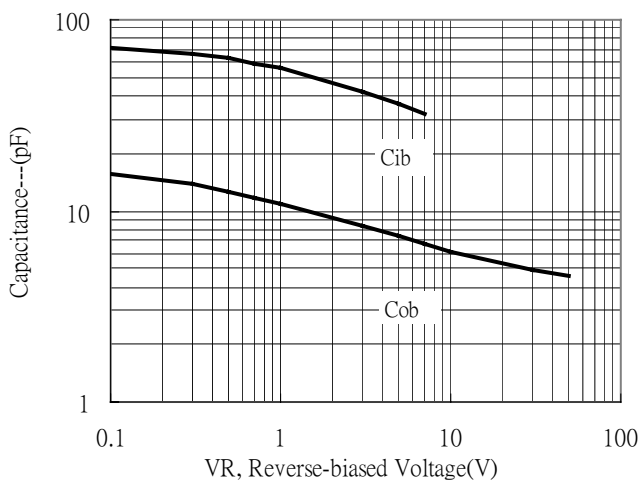
Saturation Voltage vs Collector Current



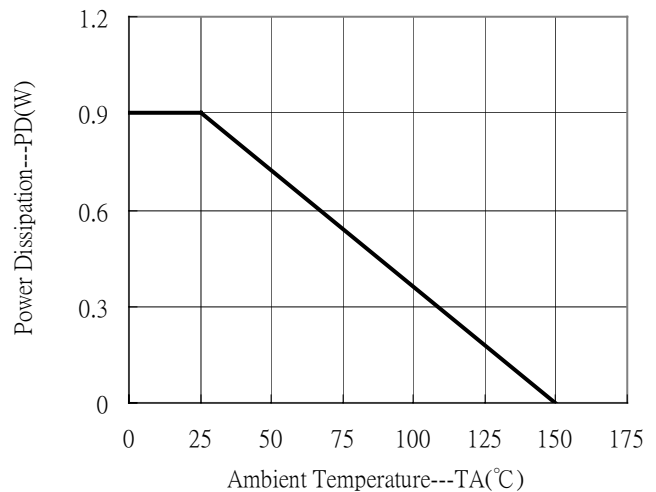
On Voltage vs Collector Current



Capacitance vs Reverse-biased Voltage

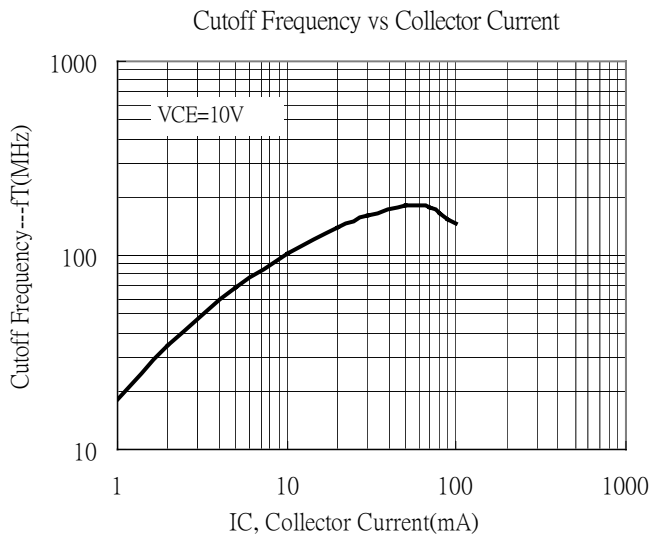


Power Derating Curve

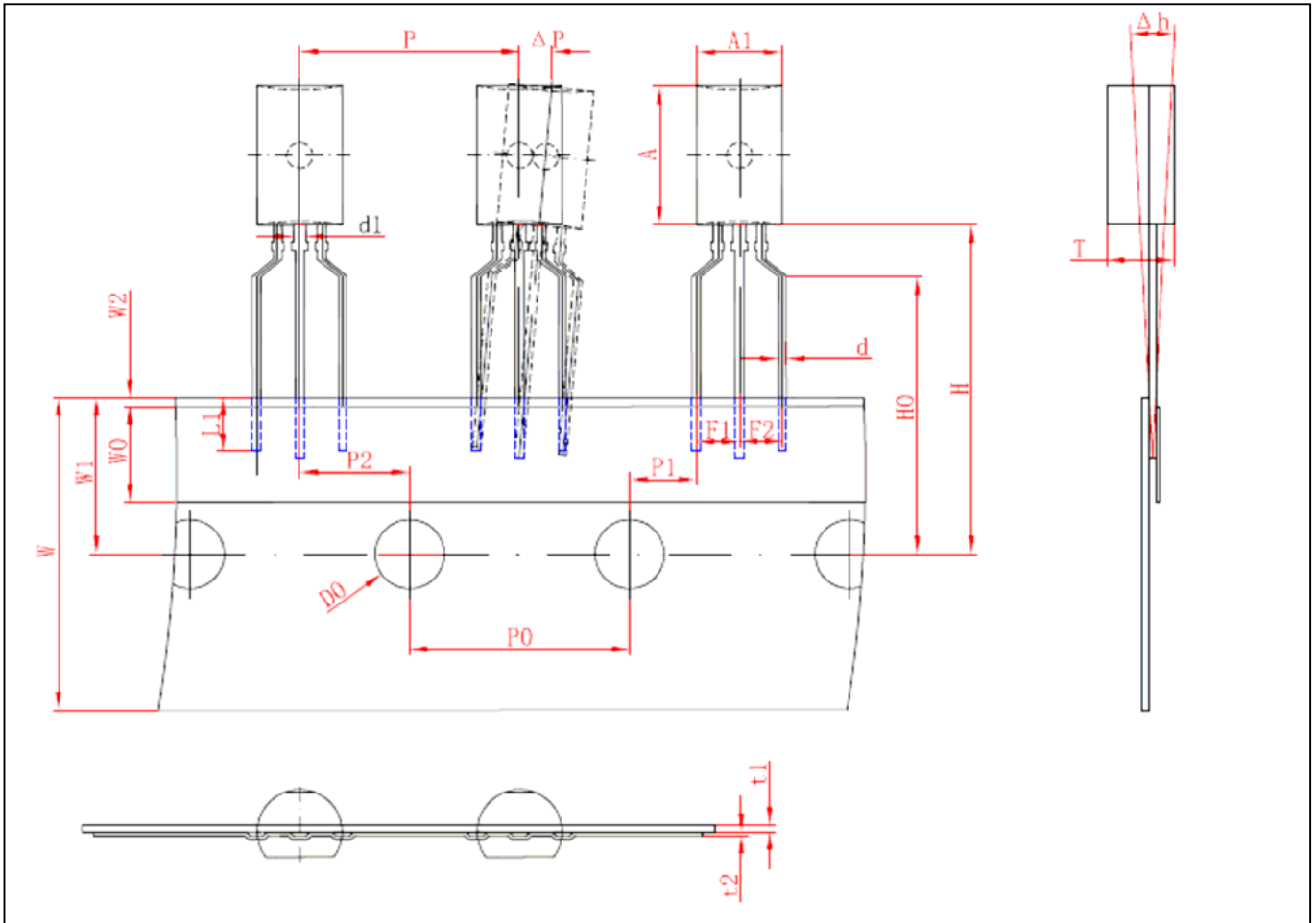




### Typical Characteristics(Cont.)



**TO-92L Taping Outline**

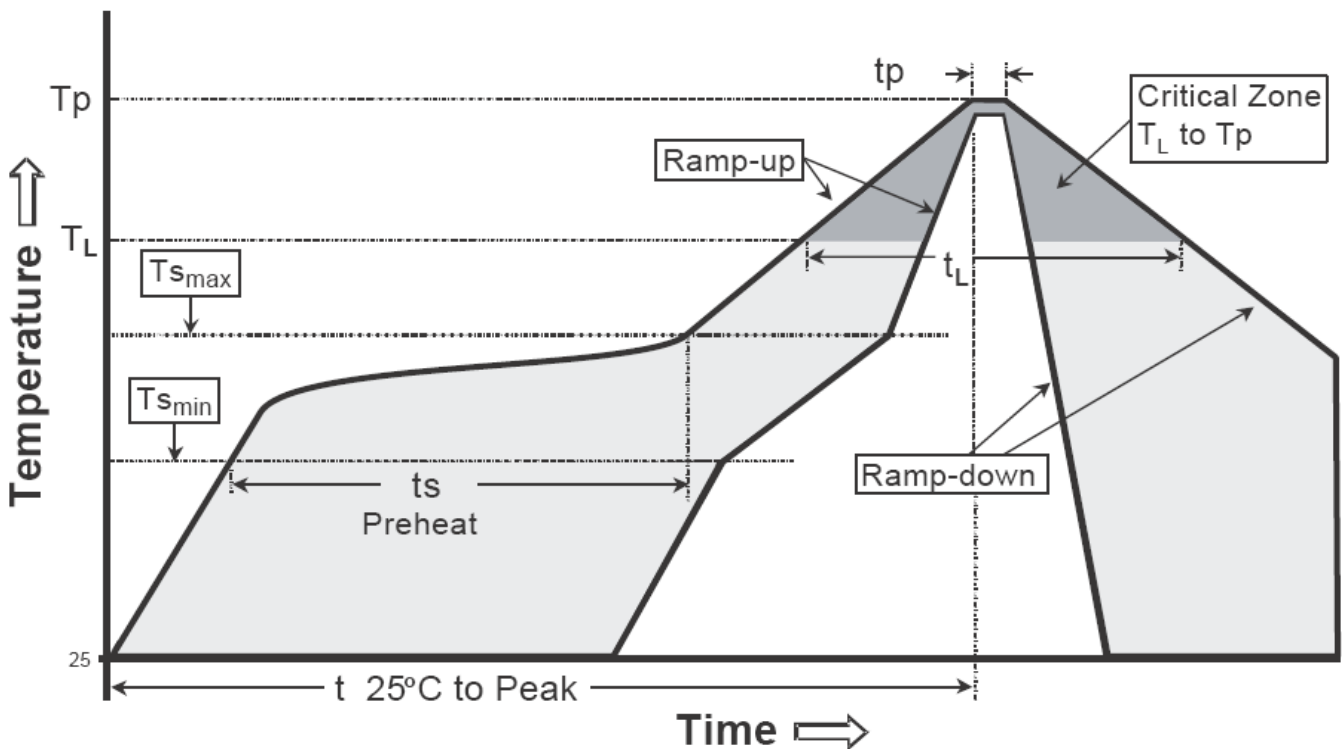


| DIM    | Item                                 | Millimeters |       |
|--------|--------------------------------------|-------------|-------|
|        |                                      | Min.        | Max.  |
| A1     | Component body width                 | 4.70        | 5.10  |
| A      | Component body height                | 7.80        | 8.20  |
| T      | Component body thickness             | 3.70        | 4.10  |
| d      | Lead wire diameter                   | 0.35        | 0.55  |
| d1     | Lead wire diameter 1                 | 0.60        | 0.80  |
| P      | Pitch of component                   | 12.40       | 13.00 |
| P0     | Feed hole pitch                      | 12.50       | 12.90 |
| P2     | Hole center to component center      | 6.05        | 6.65  |
| F1, F2 | Lead to lead distance                | 2.20        | 2.80  |
| Δh     | Component alignment, F-R             | -1.00       | 1.00  |
| W      | Tape width                           | 17.50       | 19.00 |
| W0     | Hole down tape width                 | 5.50        | 6.50  |
| W1     | Hole position                        | 8.50        | 9.50  |
| W2     | Hole down tape position              | -           | 1.00  |
| H      | Height of component from tape center | 19.00       | 21.00 |
| H0     | Lead wire clinch height              | 15.50       | 16.50 |
| L1     | Lead wire (tape portion)             | 2.50        | -     |
| D0     | Feed hole diameter                   | 3.80        | 4.20  |
| t1     | Taped lead thickness                 | 0.35        | 0.45  |
| t2     | Carrier tape thickness               | 0.15        | 0.25  |
| P1     | Position of hole                     | 3.55        | 4.15  |
| ΔP     | Component alignment                  | -1.00       | 1.00  |

**Recommended wave soldering condition**

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

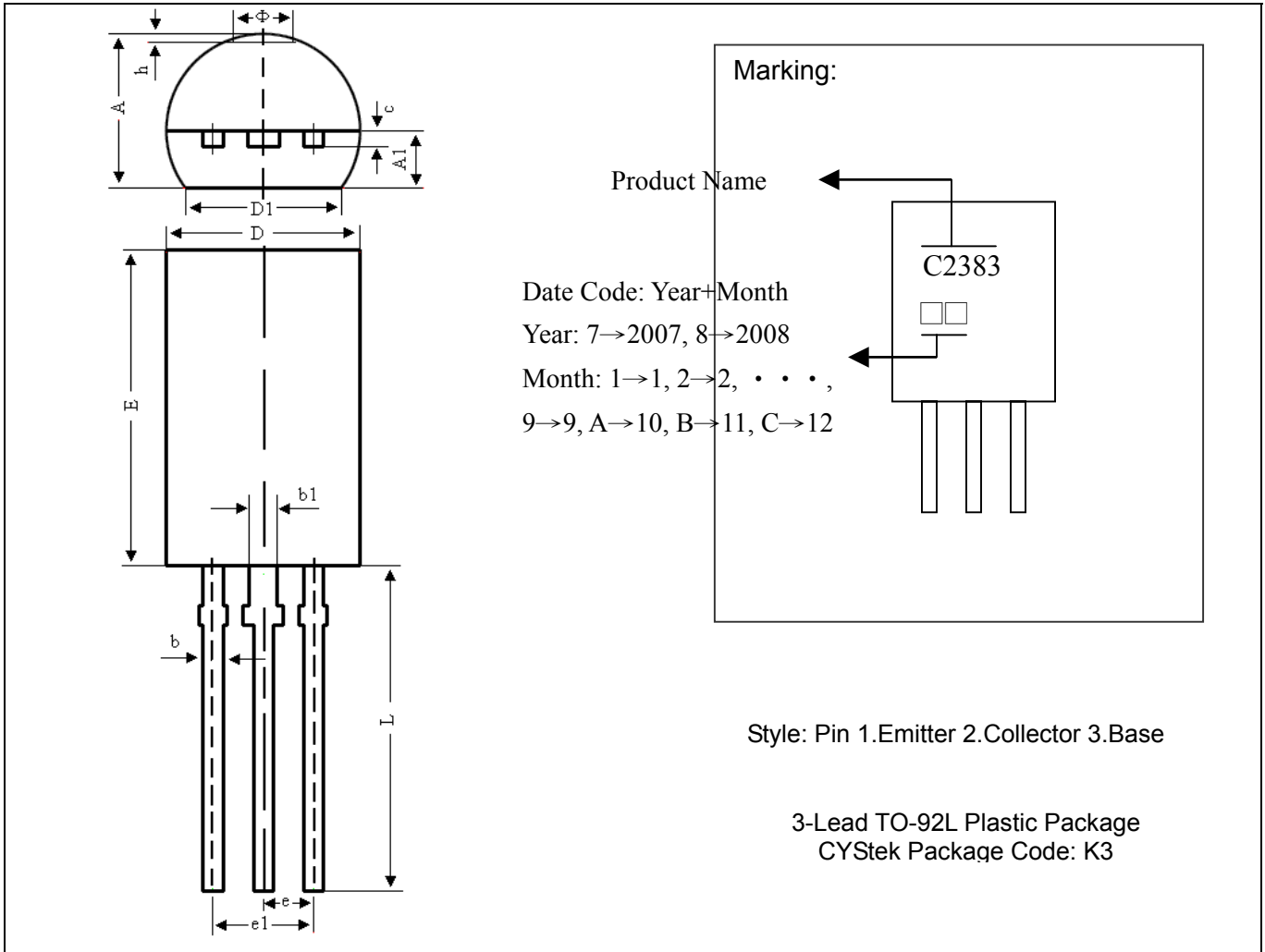
**Recommended temperature profile for IR reflow**



| Profile feature   | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|-------------------------|------------------|
| Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> ) | 3°C/second max.         | 3°C/second max.  |
| Preheat   |                         |                  |
| -Temperature Min(T <sub>s min</sub> )                       | 100°C                   | 150°C            |
| -Temperature Max(T <sub>s max</sub> )                       | 150°C                   | 200°C            |
| -Time(t <sub>s min</sub> to t <sub>s max</sub> )            | 60-120 seconds          | 60-180 seconds   |
| Time maintained above:                                      |                         |                  |
| -Temperature (T <sub>L</sub> )                              | 183°C                   | 217°C            |
| - Time (t <sub>L</sub> )                                    | 60-150 seconds          | 60-150 seconds   |
| Peak Temperature(T <sub>p</sub> )                           | 240 +0/-5 °C            | 260 +0/-5 °C     |
| Time within 5°C of actual peak temperature(t <sub>p</sub> ) | 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-92L Dimension**



\*: Typical

| DIM | Inches |       | Millimeters |       | DIM | Inches |       | Millimeters |        |
|-----|--------|-------|-------------|-------|-----|--------|-------|-------------|--------|
|     | Min.   | Max.  | Min.        | Max.  |     | Min.   | Max.  | Min.        | Max.   |
| A   | 0.146  | 0.161 | 3.700       | 4.100 | E   | 0.307  | 0.323 | 7.800       | 8.200  |
| A1  | 0.050  | 0.062 | 1.280       | 1.580 | e   | *0.05  |       | *1.270      |        |
| b   | 0.014  | 0.022 | 0.350       | 0.550 | e1  | 0.096  | 0.104 | 2.440       | 2.640  |
| b1  | 0.024  | 0.031 | 0.600       | 0.800 | L   | 0.543  | 0.559 | 13.800      | 14.200 |
| c   | 0.014  | 0.018 | 0.350       | 0.450 | φ   | -      | 0.063 | -           | 1.600  |
| D   | 0.185  | 0.201 | 4.700       | 5.100 | h   | 0.000  | 0.012 | 0.000       | 0.300  |
| D1  | 0.157  | -     | 4.000       | -     |     |        |       |             |        |

**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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