

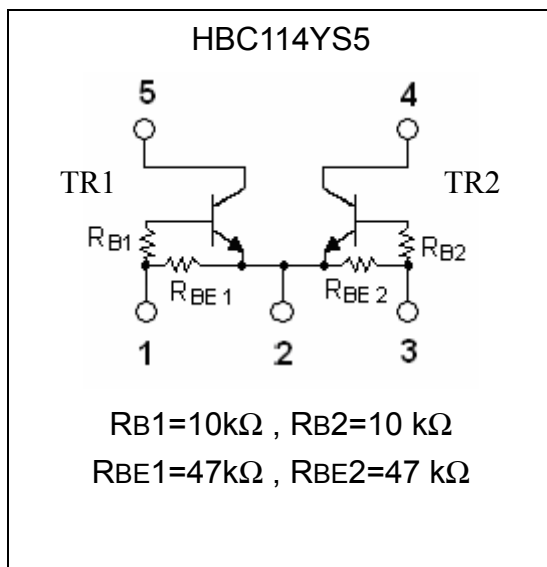
# Dual NPN Digital Transistors

## HBC114YS5

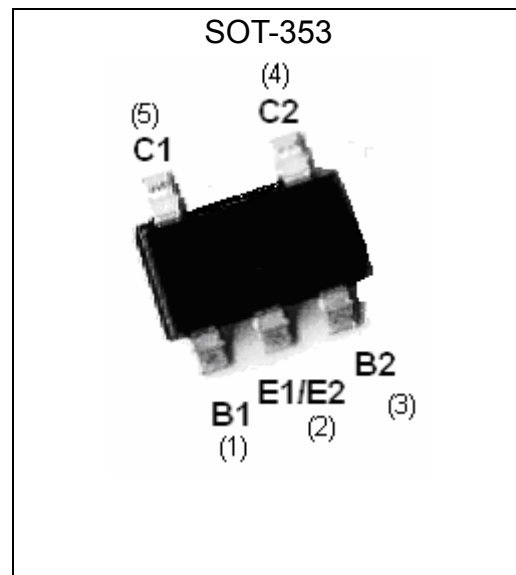
### Features

- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
- Only the on/off conditions need to be set for operation, making device design easy.
- Two DTC114Y chips in a SOT-353 package.
- Mounting by SOT-323 automatic mounting machines is possible.
- Mounting cost and area can be cut in half.
- Complements the HBA114YS5
- Pb-free package.

### Equivalent Circuit



### Outline



**Absolute Maximum Ratings** (Each Transistor, Ta=25°C)

| Parameter            | Symbol               | Limits     | Unit |
|----------------------|----------------------|------------|------|
| Supply Voltage       | V <sub>CC</sub>      | 50         | V    |
| Input Voltage        | V <sub>IN</sub>      | -6~+40     | V    |
| Output Current       | I <sub>O</sub>       | 70         | mA   |
|                      | I <sub>O(max.)</sub> | 100        | mA   |
| Power Dissipation    | P <sub>d</sub>       | 200 (Note) | mW   |
| Junction Temperature | T <sub>j</sub>       | 150        | °C   |
| Storage Temperature  | T <sub>stg</sub>     | -55~+150   | °C   |

Note: 150mW per element must not be exceeded.

**Electrical Characteristics** (Each Transistor, Ta=25°C)

| Parameter            | Symbol                         | Min. | Typ. | Max. | Unit | Test Conditions                                       |
|----------------------|--------------------------------|------|------|------|------|---|
| Input Voltage        | V <sub>I(off)</sub>            | -    | -    | 0.3  | V    | V <sub>CC</sub> =5V, I <sub>O</sub> =100μA            |
|                      | V <sub>I(on)</sub>             | 3    | -    | -    | V    | V <sub>O</sub> =0.3V, I <sub>O</sub> =1mA             |
| Output Voltage       | V <sub>O(on)</sub>             | -    | 0.1  | 0.3  | V    | I <sub>O</sub> /I <sub>I</sub> =5mA/0.25mA            |
| Input Current        | I <sub>I</sub>                 | -    | -    | 0.88 | mA   | V <sub>I</sub> =5V                                    |
| Output Current       | I <sub>O(off)</sub>            | -    | -    | 0.5  | μA   | V <sub>CC</sub> =50V, V <sub>I</sub> =0V              |
| DC Current Gain      | G <sub>I</sub>                 | 68   | -    | -    | -    | V <sub>O</sub> =5V, I <sub>O</sub> =5mA               |
| Input Resistance     | R <sub>I</sub>                 | 7    | 10   | 13   | kΩ   | -   |
| Resistance Ratio     | R <sub>2</sub> /R <sub>1</sub> | 3.7  | 4.7  | 5.7  | -    | -   |
| Transition Frequency | f <sub>T</sub>                 | -    | 250  | -    | MHz  | V <sub>CE</sub> =10V, I <sub>C</sub> =5mA, f=100MHz * |

\* Transition frequency of the device

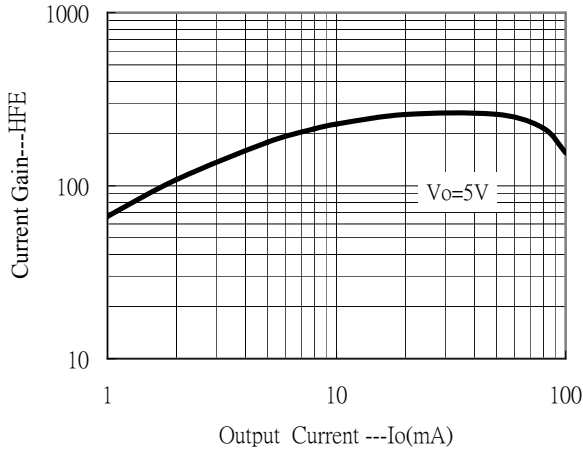
**Ordering Information**

| Device    | Package              | Shipping               | Marking |
|-----------|----------------------|------------------------|---------|
| HBC114YS5 | SOT-353<br>(Pb-free) | 3000 pcs / Tape & Reel | G5      |

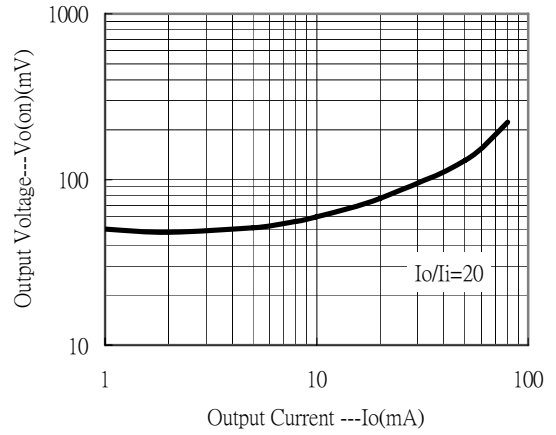


### Characteristic Curves

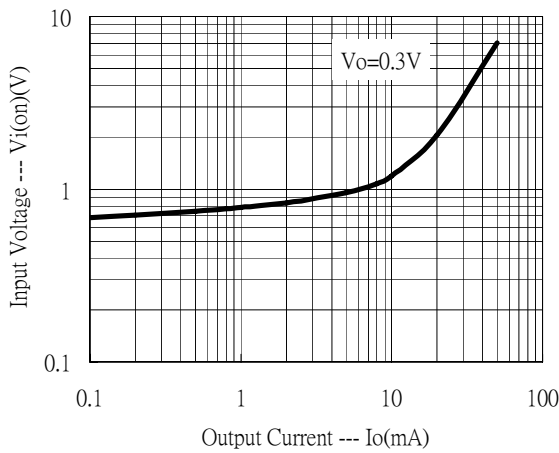
DC Current Gain vs Output Current



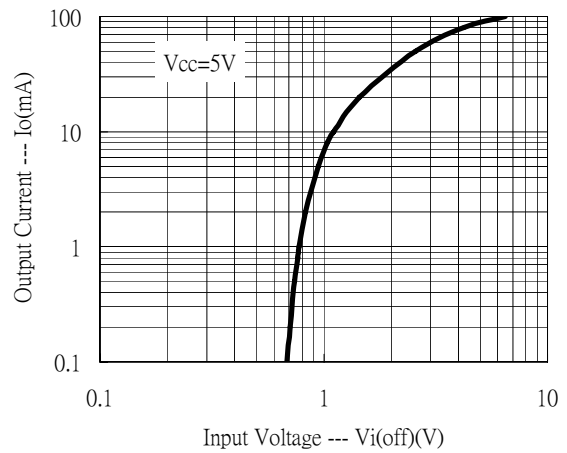
Output Voltage vs Output Current



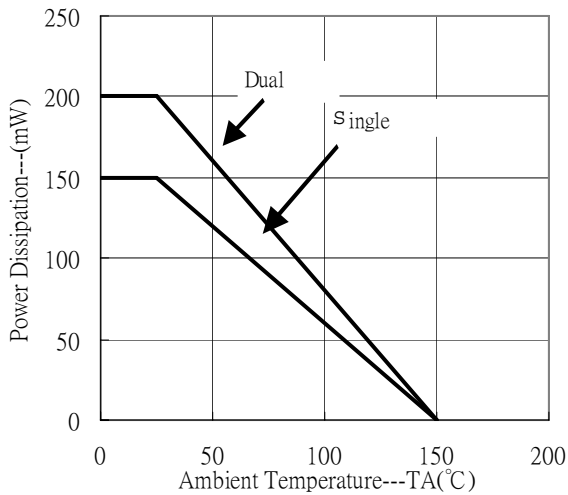
Input Voltage vs Output Current (ON Characteristics)



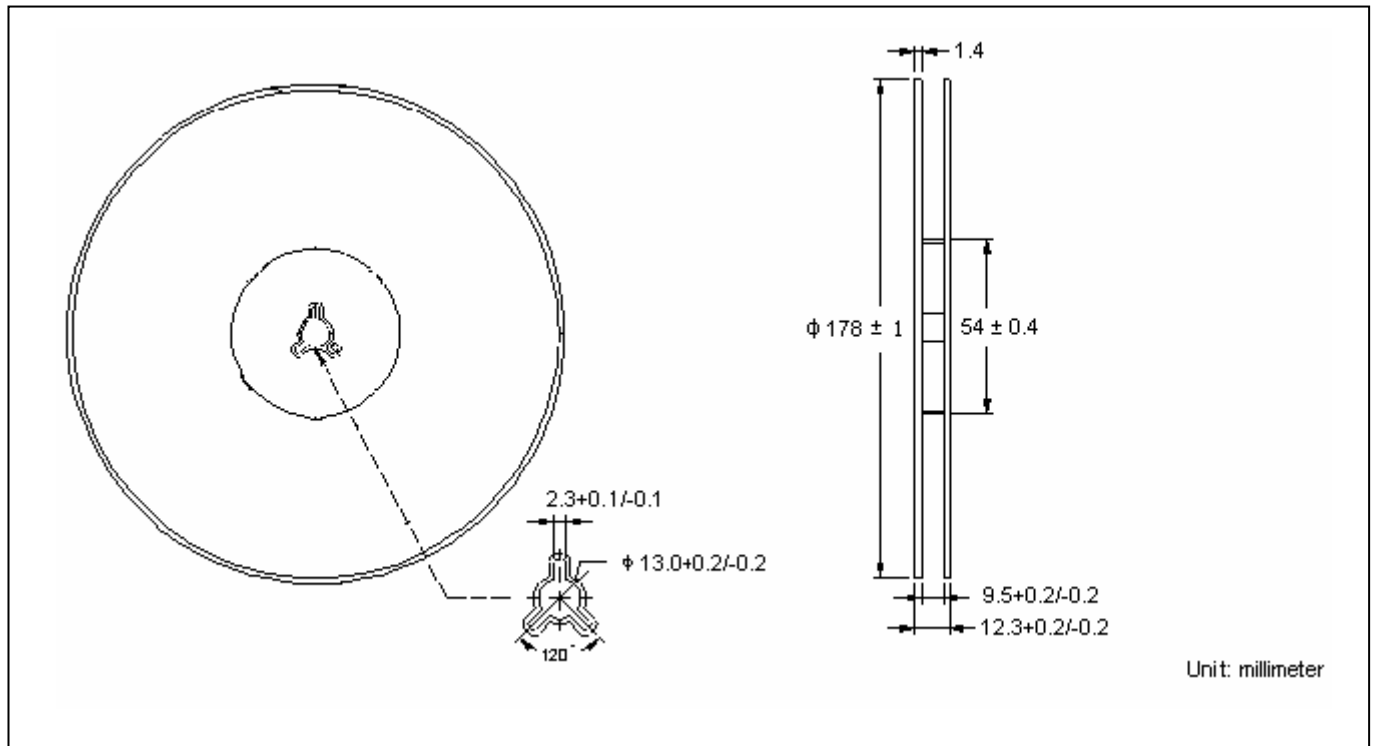
Output Current vs Input Voltage (OFF Characteristics)



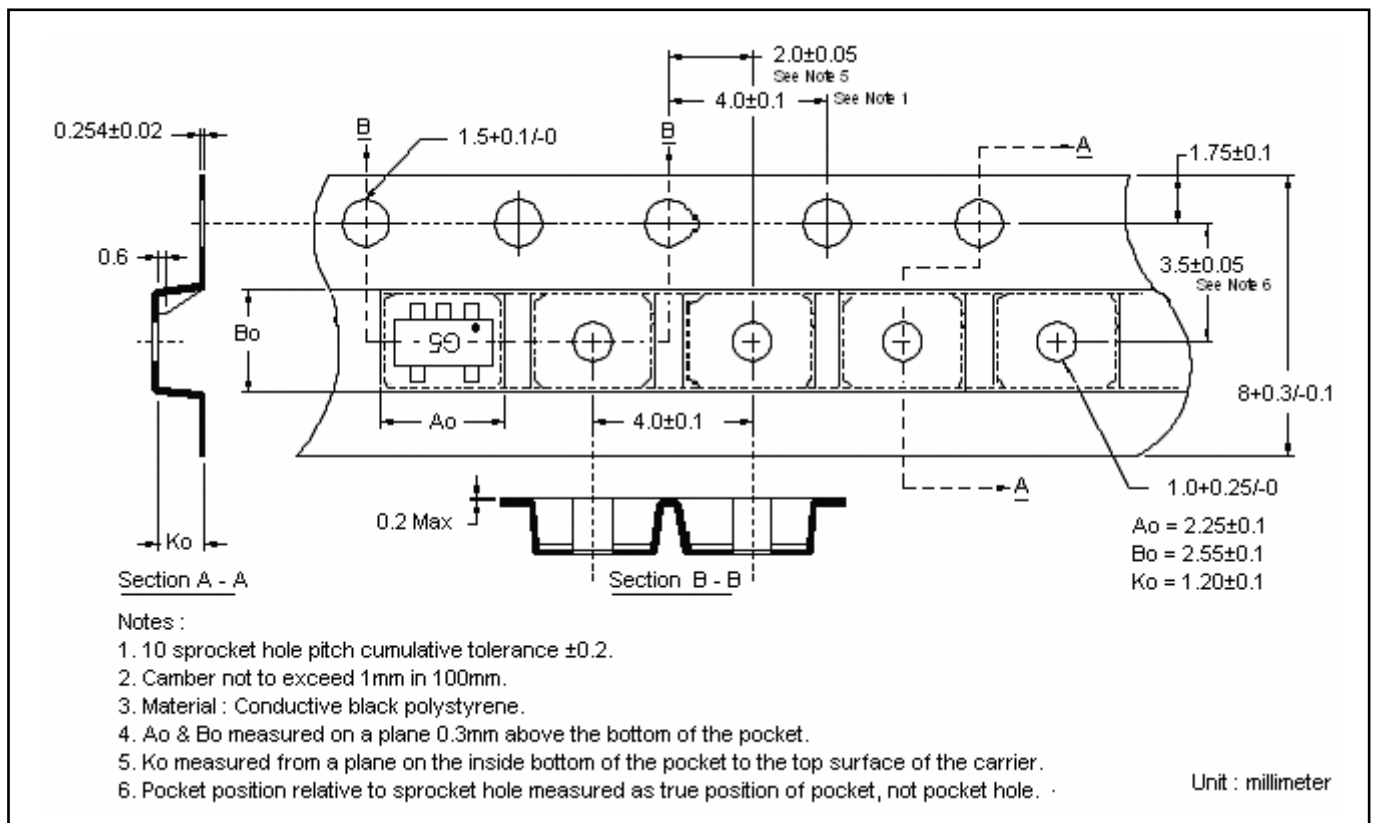
Power Derating Curves



### Reel Dimension



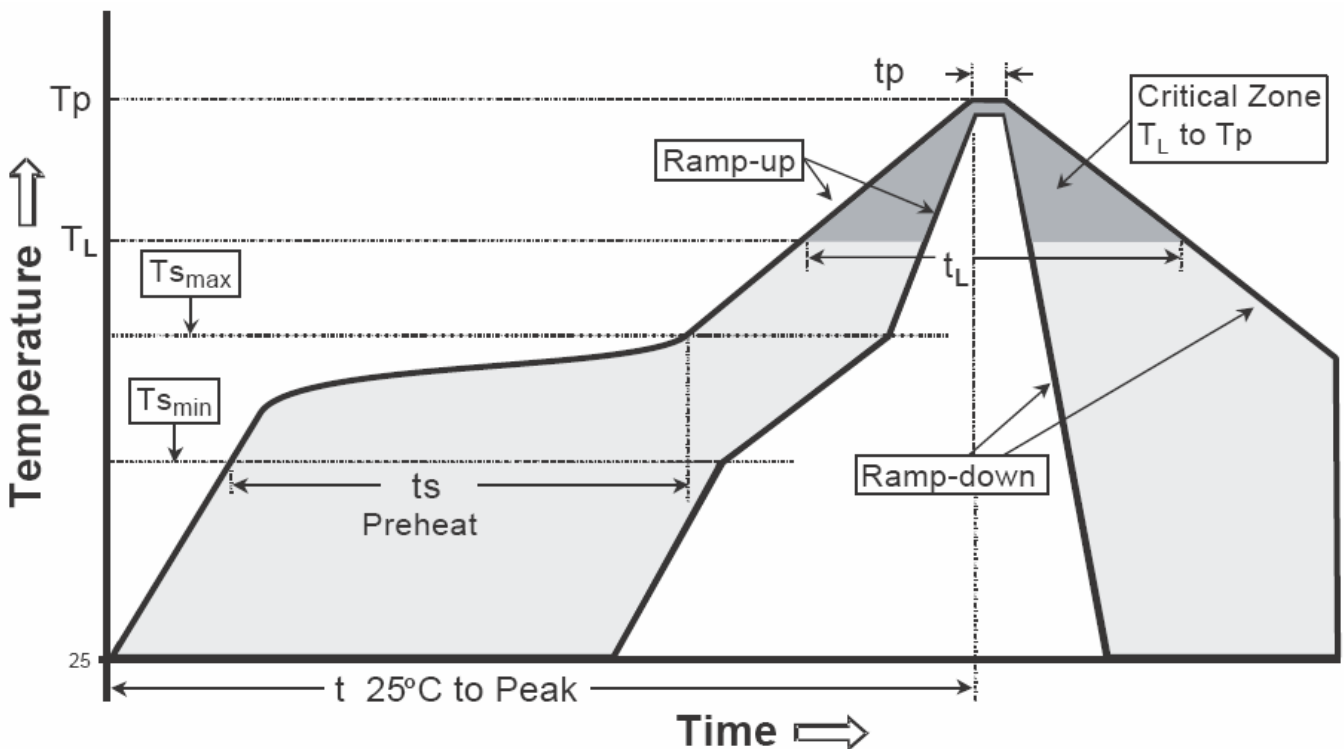
### Carrier Tape Dimension



**Recommended wave soldering condition**

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

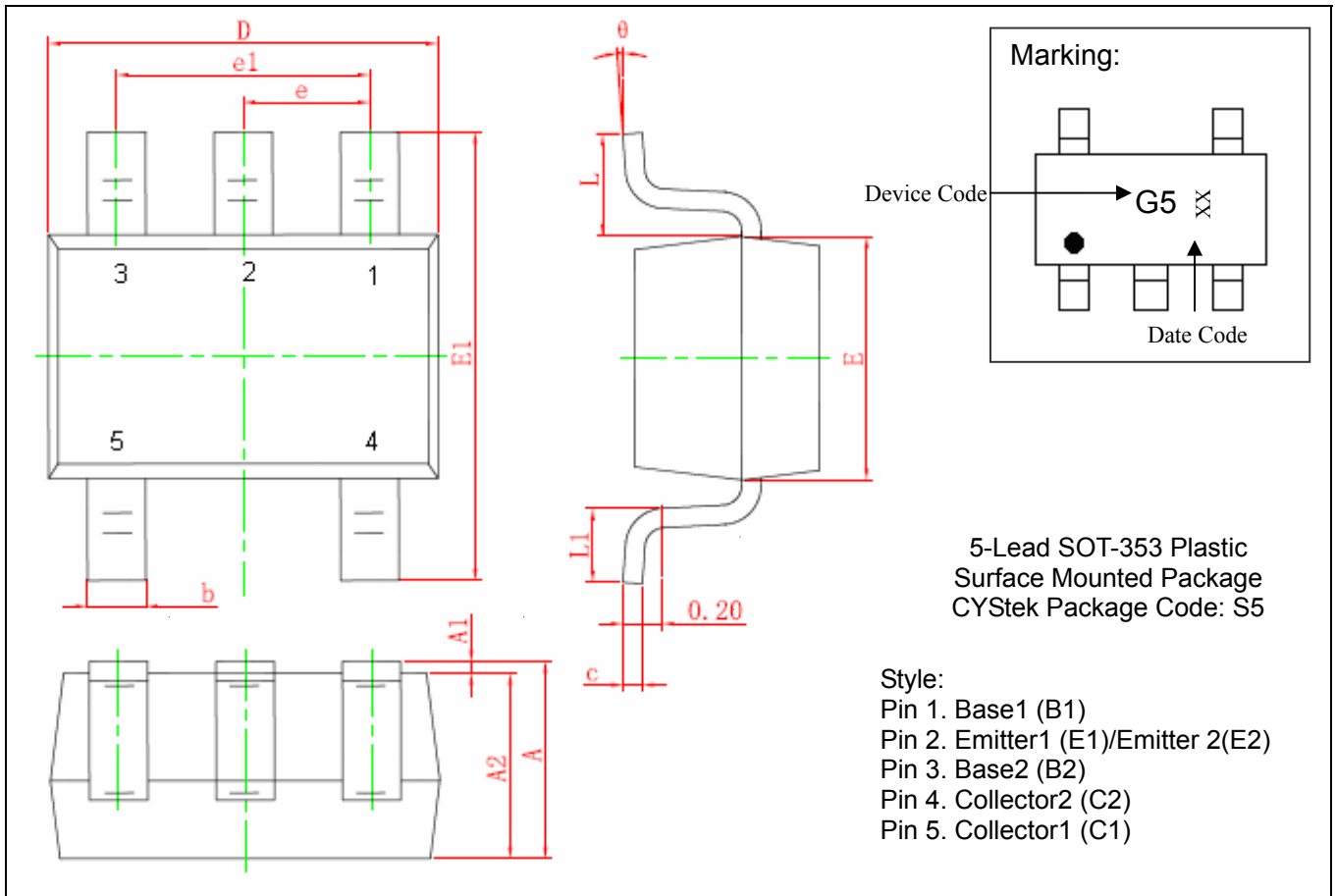
**Recommended temperature profile for IR reflow**



| 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(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-353 Dimension**



\*:Typical

| DIM | Millimeters |       | Inches |       | DIM | Millimeters |       | Inches |       |
|-----|-------------|-------|--------|-------|-----|-------------|-------|--------|-------|
|     | Min.        | Max.  | Min.   | Max.  |     | Min.        | Max.  | Min.   | Max.  |
| A   | 0.900       | 1.100 | 0.035  | 0.043 | E1  | 2.150       | 2.450 | 0.085  | 0.096 |
| A1  | 0.000       | 0.100 | 0.000  | 0.004 | e   | 0.650*      |       | 0.026* |       |
| A2  | 0.900       | 1.000 | 0.035  | 0.039 | e1  | 1.200       | 1.400 | 0.047  | 0.055 |
| b   | 0.150       | 0.350 | 0.006  | 0.014 | L   | 0.525       | REF   | 0.021  | REF   |
| c   | 0.080       | 0.150 | 0.003  | 0.006 | L1  | 0.260       | 0.460 | 0.010  | 0.018 |
| D   | 2.000       | 2.200 | 0.079  | 0.087 | θ   | 0°          | 8°    | 0°     | 8°    |
| E   | 1.150       | 1.350 | 0.045  | 0.053 |     |             |       |        |       |

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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