



## 200mW SOD-323 Zener Voltage Regulators

# ZD5221AS2 thru ZD5259AS2

### Description

The ZD52XXAS2 series zener diodes are packaged in a SOD-323 surface mount package that has a power dissipation of 200mW. They are designed to provide voltage regulation protection and are especially attractive in situations where space is at a premium. They are well suited for applications such as cellular phones, hand held portables, and high density PC boards.

### Features

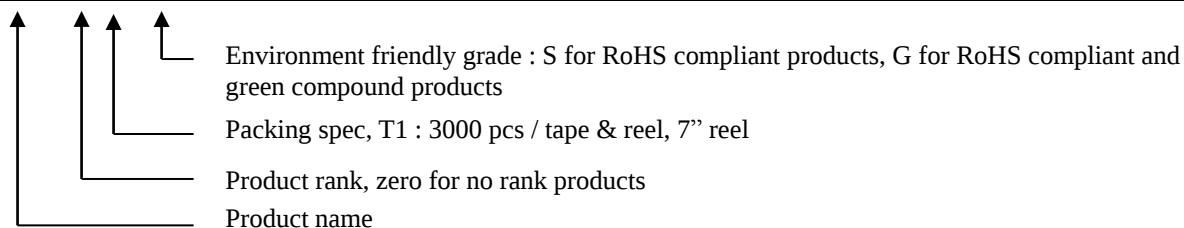
- Vz tolerance :  $\pm 2\%$
- Standard zener breakdown voltage range : 2.4V to 39V
- Steady state power rating of 200mW..
- Small body outline dimensions
- Low body height : 0.035 inches (0.9mm) max.

### Mechanical Data

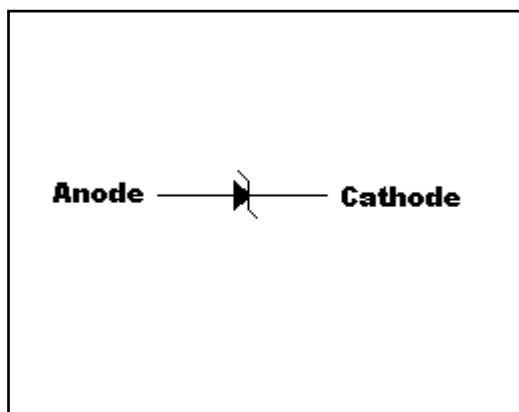
- Case : SOD-323 , molded plastic
- Terminals : Solderable per MIL-STD-750 method 2026
- Polarity : Cathode indicated by polarity band.
- Flammability rating : UL94 V-0
- Package weight : approx. 4.507 mg/unit
- Mounting position : Any

### Ordering Information

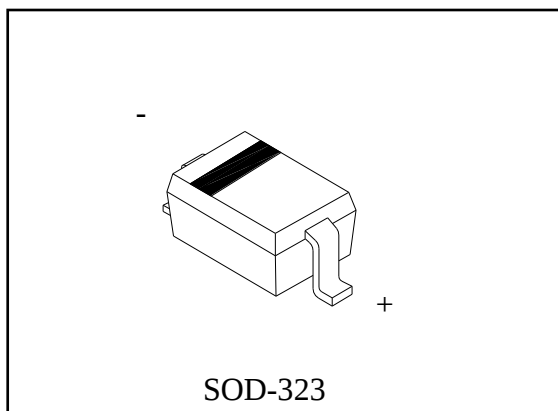
| Device           | Package                                                    | Shipping               |
|------------------|------------------------------------------------------------|------------------------|
| ZD52XXAS2-0-T1-G | SOD-323<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / tape & reel |



## Symbol



## Outline



## Absolute Maximum Ratings (Ta=25°C, unless otherwise specified)

- Maximum Temperatures
  - Storage Temperature Tstg..... -65~+150 °C
  - Junction Temperature Tj..... -65~ +150 °C
- Maximum Power Dissipation
  - Total Power Dissipation Ptot (Note 1) ..... 200 mW
- Thermal Resistance, Junction to Ambient Air RθJA.....625°C/W
- Thermal Resistance, Junction to Case RθJC.....400°C/W

Note 1: Parts mounted on ceramic board with area of 25mm².

## Electrical Characteristics (TA=25°C unless otherwise noted, VF=0.9V Max @IF=10mA for all types.)

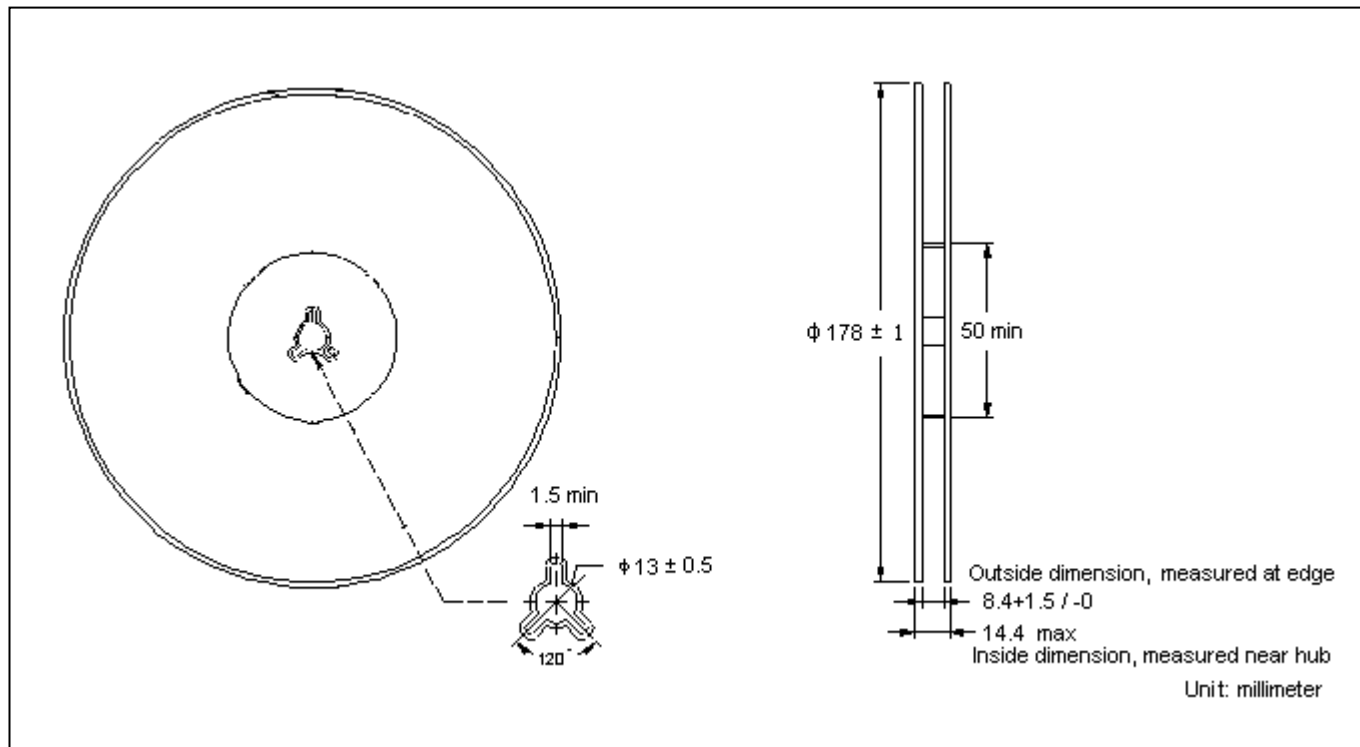
| Symbol | Parameter                     |
|--------|-------------------------------|
| VZ     | Reverse zener voltage @ IZT   |
| IZT    | Reverse current               |
| ZZT    | Maximum zener impedance @ IZT |
| IZK    | Reverse current               |
| ZZK    | Maximum zener impedance @ IZK |
| IR     | Reverse leakage current @ VR  |
| VR     | Reverse voltage               |



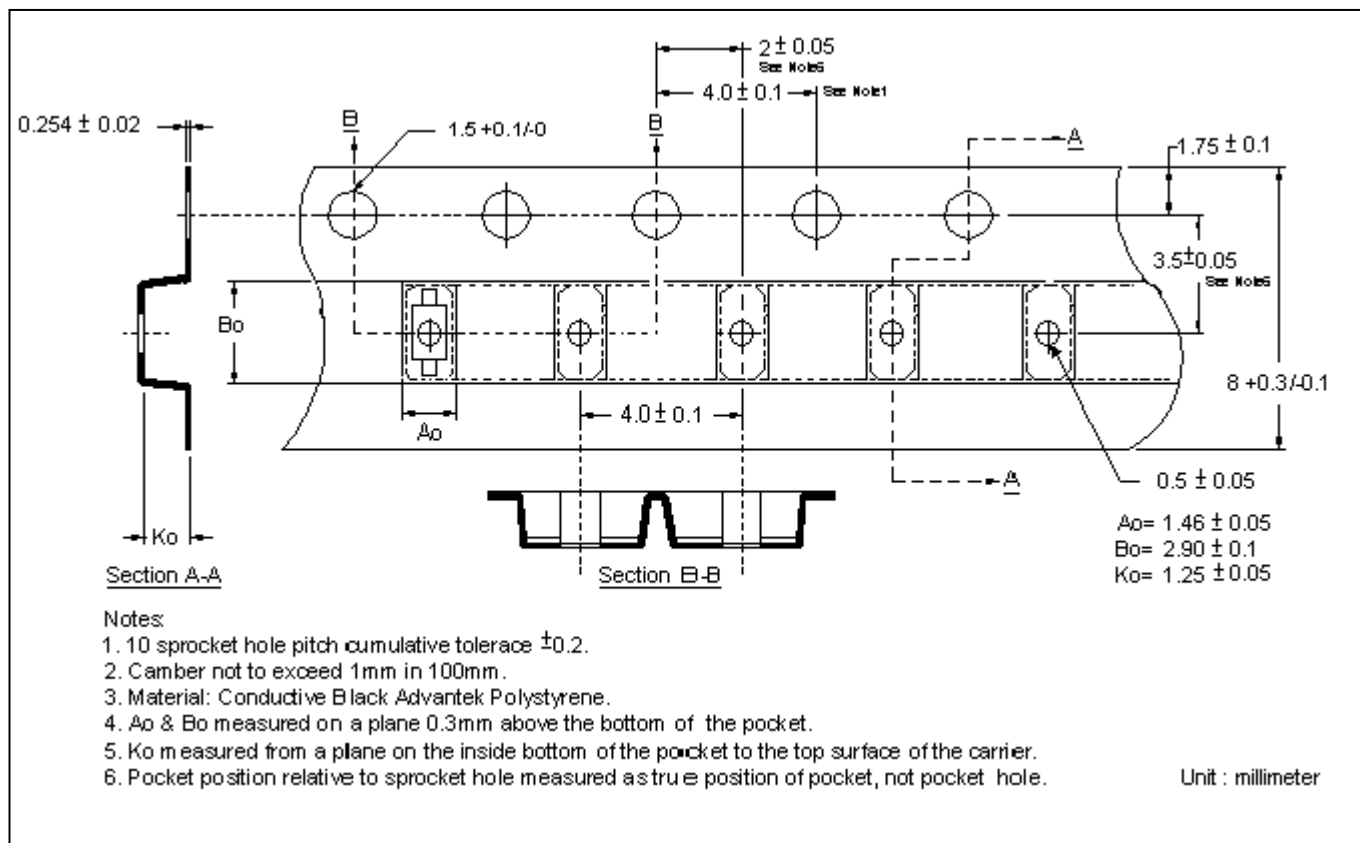
| Device  | Marking Code | Zener voltage(Note 2)  |     |       |                  | Maximum Zener impedance              |                                  |      | Maximum Reverse Leakage Current |     |
|---------|--------------|------------------------|-----|-------|------------------|--------------------------------------|----------------------------------|------|---------------------------------|-----|
|         |              | V <sub>Z</sub> (volts) |     |       | @I <sub>ZT</sub> | Z <sub>ZT</sub> @<br>I <sub>ZT</sub> | Z <sub>ZK</sub> @I <sub>ZK</sub> |      | I <sub>R</sub> @V <sub>R</sub>  |     |
|         |              | min                    | nom | max   | mA               | Ω                                    | Ω                                | mA   | μA                              | V   |
| ZD5221A | C1           | 2.35                   | 2.4 | 2.45  | 20               | 30                                   | 1200                             | 0.25 | 100                             | 1.0 |
| ZD5223A | C3           | 2.65                   | 2.7 | 2.75  | 20               | 30                                   | 1300                             | 0.25 | 75                              | 1.0 |
| ZD5225A | C5           | 2.94                   | 3.0 | 3.06  | 20               | 30                                   | 1600                             | 0.25 | 50                              | 1.0 |
| ZD5226A | G1           | 3.23                   | 3.3 | 3.37  | 20               | 28                                   | 1600                             | 0.25 | 25                              | 1.0 |
| ZD5227A | G2           | 3.53                   | 3.6 | 3.67  | 20               | 24                                   | 1700                             | 0.25 | 15                              | 1.0 |
| ZD5228A | G3           | 3.82                   | 3.9 | 3.98  | 20               | 23                                   | 1900                             | 0.25 | 10                              | 1.0 |
| ZD5229A | G4           | 4.21                   | 4.3 | 4.39  | 20               | 22                                   | 2000                             | 0.25 | 5                               | 1.0 |
| ZD5230A | G5           | 4.61                   | 4.7 | 4.79  | 20               | 19                                   | 1900                             | 0.25 | 5                               | 2.0 |
| ZD5231A | E1           | 5.00                   | 5.1 | 5.20  | 20               | 17                                   | 1600                             | 0.25 | 5                               | 2.0 |
| ZD5232A | E2           | 5.49                   | 5.6 | 5.71  | 20               | 11                                   | 1600                             | 0.25 | 5                               | 3.0 |
| ZD5233A | E3           | 5.88                   | 6.0 | 6.12  | 20               | 7                                    | 1600                             | 0.25 | 5                               | 3.5 |
| ZD5234A | E4           | 6.08                   | 6.2 | 6.32  | 20               | 7                                    | 1000                             | 0.25 | 5                               | 4.0 |
| ZD5235A | E5           | 6.66                   | 6.8 | 6.94  | 20               | 5                                    | 750                              | 0.25 | 3                               | 5.0 |
| ZD5236A | F1           | 7.35                   | 7.5 | 7.65  | 20               | 6                                    | 500                              | 0.25 | 3                               | 6.0 |
| ZD5237A | F2           | 8.04                   | 8.2 | 8.36  | 20               | 8                                    | 500                              | 0.25 | 3                               | 6.5 |
| ZD5238A | F3           | 8.53                   | 8.7 | 8.87  | 20               | 8                                    | 600                              | 0.25 | 3                               | 6.5 |
| ZD5239A | F4           | 8.92                   | 9.1 | 9.28  | 20               | 10                                   | 600                              | 0.25 | 3                               | 7.0 |
| ZD5240A | F5           | 9.80                   | 10  | 10.20 | 20               | 17                                   | 600                              | 0.25 | 3                               | 8.0 |
| ZD5241A | H1           | 10.78                  | 11  | 11.22 | 20               | 22                                   | 600                              | 0.25 | 2                               | 8.4 |
| ZD5242A | H2           | 11.76                  | 12  | 12.24 | 20               | 30                                   | 600                              | 0.25 | 1                               | 9.1 |
| ZD5243A | H3           | 12.74                  | 13  | 13.26 | 9.5              | 13                                   | 600                              | 0.25 | 0.5                             | 9.9 |
| ZD5245A | H5           | 14.70                  | 15  | 15.30 | 8.5              | 16                                   | 600                              | 0.25 | 0.1                             | 11  |
| ZD5246A | J1           | 15.68                  | 16  | 16.32 | 7.8              | 17                                   | 600                              | 0.25 | 0.1                             | 12  |
| ZD5248A | J3           | 17.64                  | 18  | 18.36 | 7.0              | 21                                   | 600                              | 0.25 | 0.1                             | 14  |
| ZD5250A | J5           | 19.60                  | 20  | 20.40 | 6.2              | 25                                   | 600                              | 0.25 | 0.1                             | 15  |
| ZD5251A | K1           | 21.56                  | 22  | 22.44 | 5.6              | 29                                   | 600                              | 0.25 | 0.1                             | 17  |
| ZD5252A | K2           | 23.52                  | 24  | 24.48 | 5.2              | 33                                   | 600                              | 0.25 | 0.1                             | 18  |
| ZD5254A | K4           | 26.46                  | 27  | 27.54 | 5.0              | 41                                   | 600                              | 0.25 | 0.1                             | 21  |
| ZD5255A | K5           | 27.44                  | 28  | 28.56 | 4.5              | 44                                   | 600                              | 0.25 | 0.1                             | 21  |
| ZD5256A | M1           | 29.40                  | 30  | 30.60 | 4.2              | 49                                   | 600                              | 0.25 | 0.1                             | 23  |
| ZD5257A | M2           | 32.34                  | 33  | 33.66 | 3.8              | 58                                   | 700                              | 0.25 | 0.1                             | 25  |
| ZD5258A | M3           | 35.28                  | 36  | 36.72 | 3.4              | 70                                   | 700                              | 0.25 | 0.1                             | 27  |
| ZD5259A | M4           | 38.22                  | 39  | 39.78 | 3.2              | 80                                   | 800                              | 0.25 | 0.1                             | 30  |

Note 2: Zener voltage is measured with a pulse test current I<sub>Z</sub> at an ambient temperature of 25°C.

## Reel Dimension



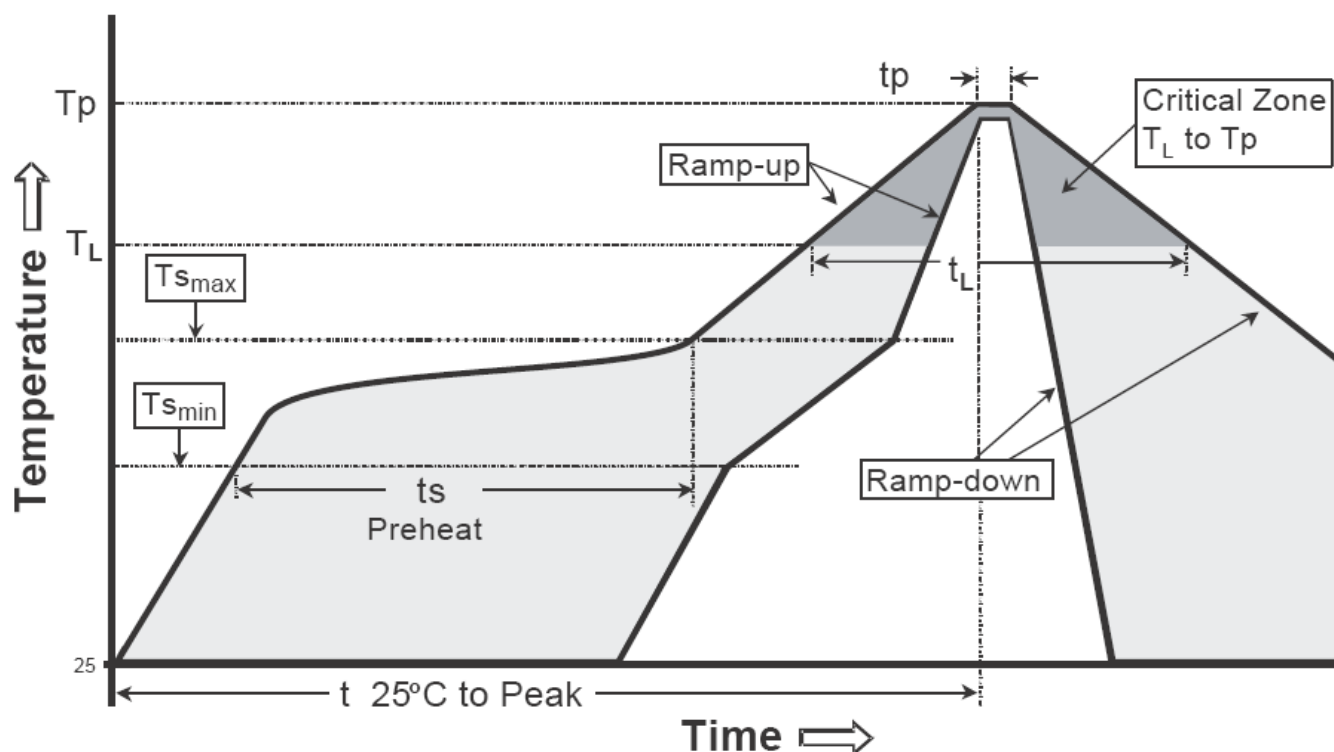
## Carrier Tape Dimension



## Recommended wave soldering condition

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

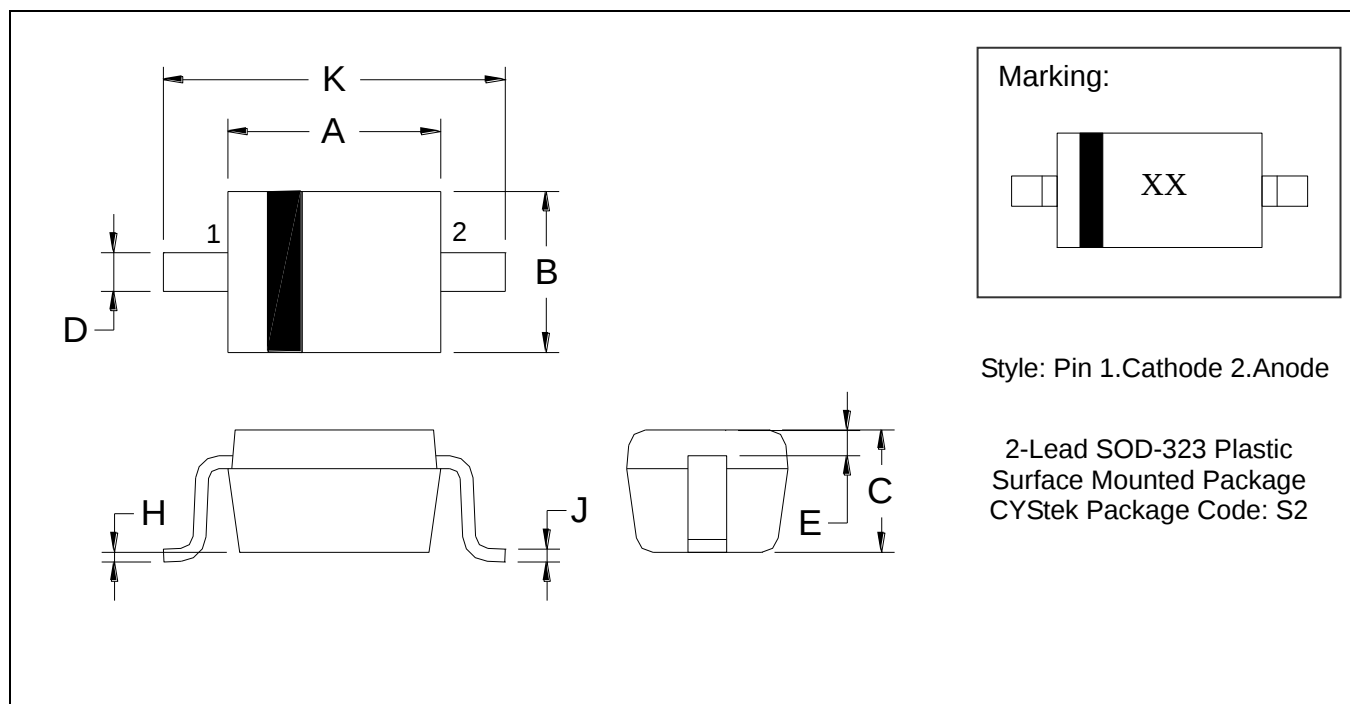
## Recommended temperature profile for IR reflow



| Profile feature                                                                                                  | Sn-Pb eutectic Assembly          | Pb-free Assembly                 |
|------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| Average ramp-up rate<br>( $T_{smax}$ to $T_p$ )                                                                  | 3°C/second max.                  | 3°C/second max.                  |
| Preheat<br>-Temperature Min( $T_{smin}$ )<br>-Temperature Max( $T_{smax}$ )<br>-Time( $t_{smin}$ to $t_{smax}$ ) | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>-Temperature ( $T_L$ )<br>- Time ( $t_L$ )                                             | 183°C<br>60-150 seconds          | 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( $t_p$ )                                                              | 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.

## SOD-323 Dimension



\*: Typical

| DIM | Inches |        | Millimeters |      | DIM | Inches |        | Millimeters |       |
|-----|--------|--------|-------------|------|-----|--------|--------|-------------|-------|
|     | Min.   | Max.   | Min.        | Max. |     | Min.   | Max.   | Min.        | Max.  |
| A   | 0.0630 | 0.0709 | 1.60        | 1.80 | E   | 0.0060 | -      | 0.15        | -     |
| B   | 0.0453 | 0.0531 | 1.15        | 1.35 | H   | 0.0000 | 0.0040 | 0.00        | 0.10  |
| C   | 0.0315 | 0.0394 | 0.80        | 1.00 | J   | 0.0035 | 0.0070 | 0.089       | 0.177 |
| D   | 0.0098 | 0.0157 | 0.25        | 0.40 | K   | 0.0906 | 0.1063 | 2.30        | 2.70  |

Notes: 1. Controlling dimension : millimeters.  
 2. Lead thickness specified per L/F drawing with solder plating.  
 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.

### Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek **semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.