

**500mW Zener Diode Series**

# ZD52XXBSH

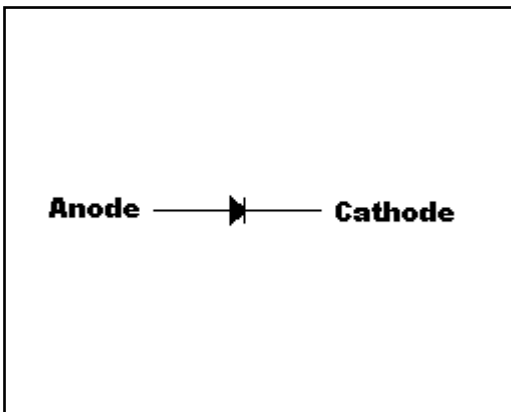
**Description**

The ZD52XXBSH series covers zener voltage range from 2.4V to 75V, and is encapsulated in SOD-123 package, very suitable for low cost, low power voltage regulation application.

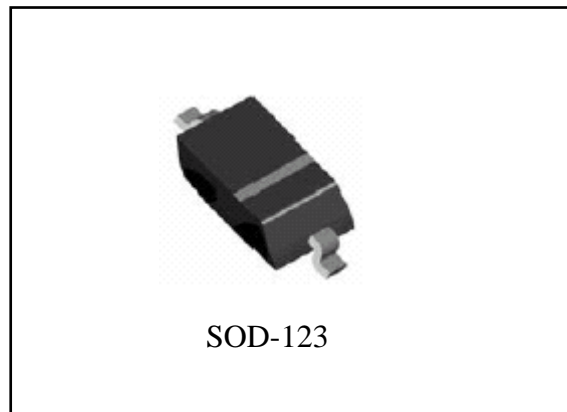
**Features**

- Ultra small surface mount package
- General purpose, medium current
- Planar die construction
- Pb-free lead plating and halogen-free package

**Symbol**

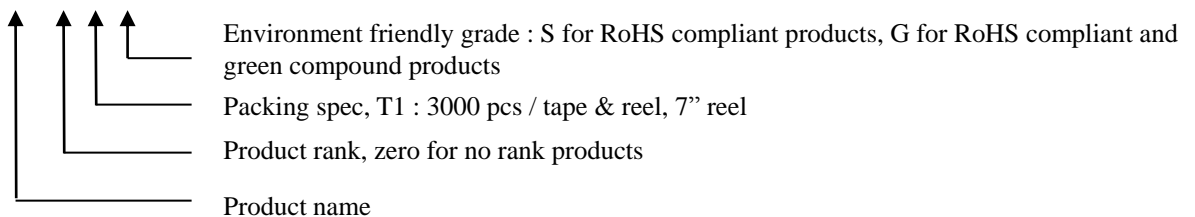


**Outline**



**Ordering Information**

| Device           | Package  | Shipping               |
|------------------|--|------------------------|
| ZD52XXBSH-0-T1-G | SOD-123<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / tape & reel |





**Absolute Maximum Ratings**(Tj=25°C, unless otherwise specified)

- Maximum Temperatures  
 Operating and Storage Temperature Range Tj, Tstg ..... -65~+150 °C
- Maximum Forward Voltage @ If=10mA .....0.9V
- Maximum Power Dissipation  
 Total Power Dissipation @TL=75 °C Ptot (Note 1) .....500 mW
- Thermal Resistance, Junction to Ambient Air RθJL (Note 1).....150°C/W
- Maximum Z-current..... Ptot/Vz mA
- ESD susceptibility (Note 2)..... 30KV

Note : 1. Parts mounted on FR-5 board with area of 3.5inch × 1.5inch.  
 2. Human body model.

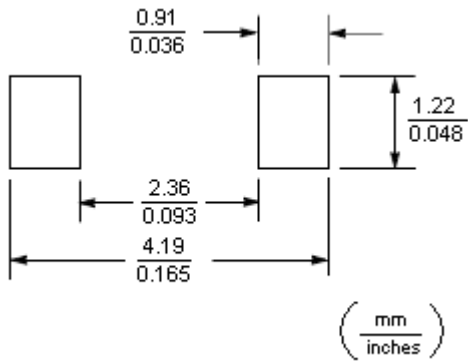
**Electrical Characteristic** (Ta=25°C, unless otherwise noted)

| Device  | Type Code | Nom. Zener Voltage |       |       |      | Max. Zener Impedance |      |          |      | Max. Zener Current | Max. Reverse Leakage Current |     |
|---------|-----------|--------------------|-------|-------|------|----------------------|------|----------|------|--------------------|------------------------------|-----|
|         |           | Vz@IzT             |       |       |      | ZZT@ IzT             |      | ZZK@ IzK |      |                    | IzM@Ta                       | IR  |
|         |           | Nom.               | Min.  | Max.  | IzT  | ZZT                  | IzT  | ZZK      | IzK  | (mA)               |                              |     |
| (V)     | (V)       | (V)                | (mA)  | (Ω)   | (mA) | (Ω)                  | (mA) |          |      |                    |                              |     |
| ZD5221B | C1        | 2.4                | 2.28  | 2.52  | 20   | 30                   | 20   | 1200     | 0.25 | 188                | 100                          | 1.0 |
| ZD5223B | C3        | 2.7                | 2.57  | 2.84  | 20   | 30                   | 20   | 1300     | 0.25 | 167                | 75                           | 1.0 |
| ZD5225B | C5        | 3.0                | 2.85  | 3.15  | 20   | 30                   | 20   | 1600     | 0.25 | 150                | 50                           | 1.0 |
| ZD5226B | G1        | 3.3                | 3.14  | 3.47  | 20   | 28                   | 20   | 1600     | 0.25 | 138                | 25                           | 1.0 |
| ZD5227B | G2        | 3.6                | 3.42  | 3.78  | 20   | 24                   | 20   | 1700     | 0.25 | 126                | 15                           | 1.0 |
| ZD5228B | G3        | 3.9                | 3.71  | 4.10  | 20   | 23                   | 20   | 1900     | 0.25 | 115                | 10                           | 1.0 |
| ZD5229B | G4        | 4.3                | 4.09  | 4.52  | 20   | 22                   | 20   | 2000     | 0.25 | 106                | 5.0                          | 1.0 |
| ZD5230B | G5        | 4.7                | 4.47  | 4.94  | 20   | 19                   | 20   | 1900     | 0.25 | 97                 | 5.0                          | 2.0 |
| ZD5231B | E1        | 5.1                | 4.85  | 5.36  | 20   | 17                   | 20   | 1600     | 0.25 | 89                 | 5.0                          | 2.0 |
| ZD5232B | E2        | 5.6                | 5.32  | 5.88  | 20   | 11                   | 20   | 1600     | 0.25 | 81                 | 5.0                          | 3.0 |
| ZD5233B | E3        | 6.0                | 5.70  | 6.30  | 20   | 7.0                  | 20   | 1600     | 0.25 | 76                 | 5.0                          | 3.5 |
| ZD5234B | E4        | 6.2                | 5.89  | 6.51  | 20   | 7.0                  | 20   | 1000     | 0.25 | 73                 | 5.0                          | 4.0 |
| ZD5235B | E5        | 6.8                | 6.46  | 7.14  | 20   | 5.0                  | 20   | 750      | 0.25 | 67                 | 3.0                          | 5.0 |
| ZD5236B | F1        | 7.5                | 7.13  | 7.88  | 20   | 6.0                  | 20   | 500      | 0.25 | 61                 | 3.0                          | 6.0 |
| ZD5237B | F2        | 8.2                | 7.79  | 8.61  | 20   | 8.0                  | 20   | 500      | 0.25 | 55                 | 3.0                          | 6.5 |
| ZD5238B | F3        | 8.7                | 8.27  | 9.14  | 20   | 8.0                  | 20   | 600      | 0.25 | 55                 | 3.0                          | 6.5 |
| ZD5239B | F4        | 9.1                | 8.65  | 9.56  | 20   | 10                   | 20   | 600      | 0.25 | 50                 | 3.0                          | 7.0 |
| ZD5240B | F5        | 10                 | 9.5   | 10.5  | 20   | 17                   | 20   | 600      | 0.25 | 45                 | 3.0                          | 8.0 |
| ZD5241B | H1        | 11                 | 10.45 | 11.55 | 20   | 22                   | 20   | 600      | 0.25 | 41                 | 2.0                          | 8.4 |
| ZD5242B | H2        | 12                 | 11.4  | 12.6  | 20   | 30                   | 20   | 600      | 0.25 | 38                 | 1.0                          | 9.1 |
| ZD5243B | H3        | 13                 | 12.35 | 13.65 | 9.5  | 13                   | 9.5  | 600      | 0.25 | 35                 | 0.5                          | 9.9 |
| ZD5244B | H4        | 14                 | 13.3  | 14.7  | 9    | 15                   | 9    | 600      | 0.25 | 32                 | 0.1                          | 10  |
| ZD5245B | H5        | 15                 | 14.25 | 15.75 | 8.5  | 16                   | 8.5  | 600      | 0.25 | 30                 | 0.1                          | 11  |
| ZD5246B | J1        | 16                 | 15.2  | 16.8  | 7.8  | 17                   | 7.8  | 600      | 0.25 | 28                 | 0.1                          | 12  |
| ZD5248B | J3        | 18                 | 17.1  | 18.9  | 7.0  | 21                   | 7.0  | 600      | 0.25 | 25                 | 0.1                          | 14  |
| ZD5250B | J5        | 20                 | 19    | 21    | 6.2  | 25                   | 6.2  | 600      | 0.25 | 23                 | 0.1                          | 15  |



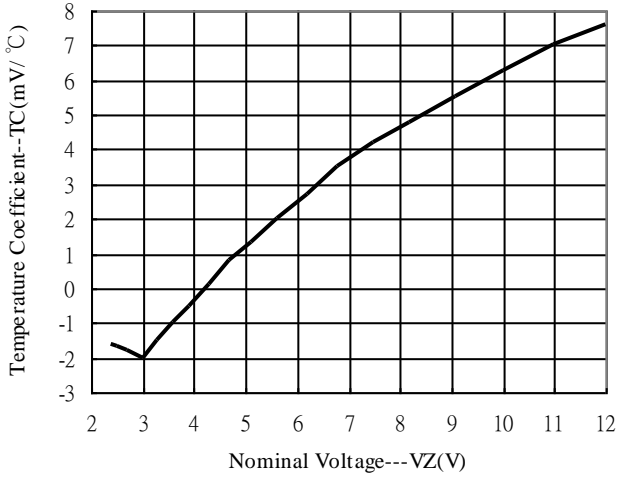
|         |    |    |       |       |     |     |     |      |      |      |     |    |
|---------|----|----|-------|-------|-----|-----|-----|------|------|------|-----|----|
| ZD5251B | K1 | 22 | 20.9  | 23.1  | 5.6 | 29  | 5.6 | 600  | 0.25 | 21   | 0.1 | 17 |
| ZD5252B | K2 | 24 | 22.8  | 25.2  | 5.2 | 33  | 5.2 | 600  | 0.25 | 19.1 | 0.1 | 18 |
| ZD5254B | K4 | 27 | 25.65 | 28.35 | 5.0 | 41  | 5.0 | 600  | 0.25 | 16.8 | 0.1 | 21 |
| ZD5255B | K5 | 28 | 26.6  | 29.4  | 4.5 | 44  | 4.5 | 600  | 0.25 | 16.2 | 0.1 | 21 |
| ZD5256B | M1 | 30 | 28.5  | 31.5  | 4.2 | 49  | 4.2 | 600  | 0.25 | 15.1 | 0.1 | 23 |
| ZD5257B | M2 | 33 | 31.35 | 34.65 | 3.8 | 58  | 3.8 | 700  | 0.25 | 13.8 | 0.1 | 25 |
| ZD5258B | M3 | 36 | 34.2  | 37.8  | 3.4 | 70  | 3.4 | 700  | 0.25 | 12.6 | 0.1 | 27 |
| ZD5259B | M4 | 39 | 37.05 | 40.95 | 3.2 | 80  | 3.2 | 800  | 0.25 | 11.6 | 0.1 | 30 |
| ZD5260B | M5 | 43 | 40.85 | 45.15 | 3   | 93  | 3   | 900  | 0.25 | 10.6 | 0.1 | 33 |
| ZD5261B | N1 | 47 | 44.65 | 49.35 | 2.7 | 105 | 2.7 | 1000 | 0.25 | 9.6  | 0.1 | 36 |
| ZD5262B | N2 | 51 | 48.45 | 53.55 | 2.5 | 125 | 2.5 | 1100 | 0.25 | 8.8  | 0.1 | 39 |
| ZD5263B | N3 | 56 | 53.20 | 58.80 | 2.2 | 150 | 2.2 | 1300 | 0.25 | 8.0  | 0.1 | 43 |
| ZD5264B | N4 | 60 | 57.00 | 63.00 | 2.1 | 170 | 2.1 | 1400 | 0.25 | 7.5  | 0.1 | 46 |
| ZD5265B | N5 | 62 | 58.90 | 65.10 | 2.0 | 185 | 2.0 | 1400 | 0.25 | 7.3  | 0.1 | 47 |
| ZD5266B | P1 | 68 | 64.60 | 71.40 | 1.8 | 230 | 1.8 | 1600 | 0.25 | 6.6  | 0.1 | 52 |
| ZD5267B | P2 | 75 | 71.25 | 78.75 | 1.7 | 270 | 1.7 | 1700 | 0.25 | 6.0  | 0.1 | 56 |

**Recommended Soldering Footprint**

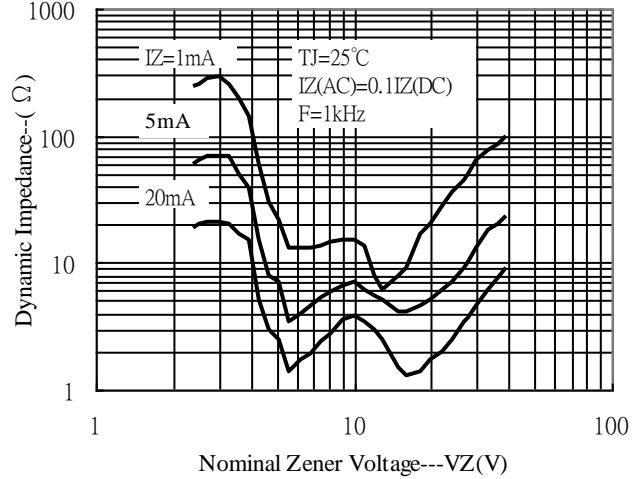


**Typical Characteristics**

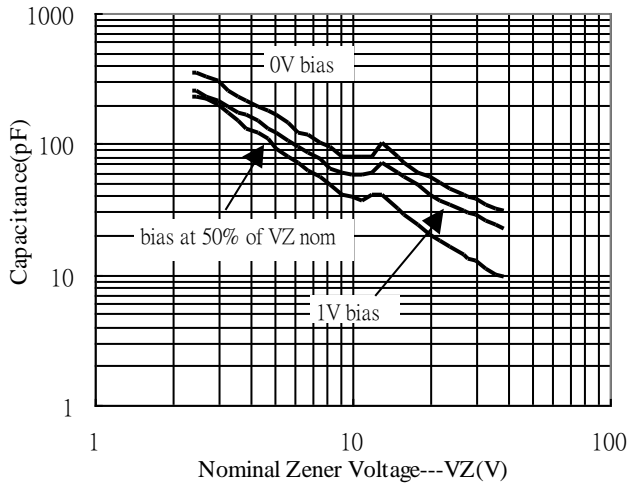
Typical Temperature Coefficient



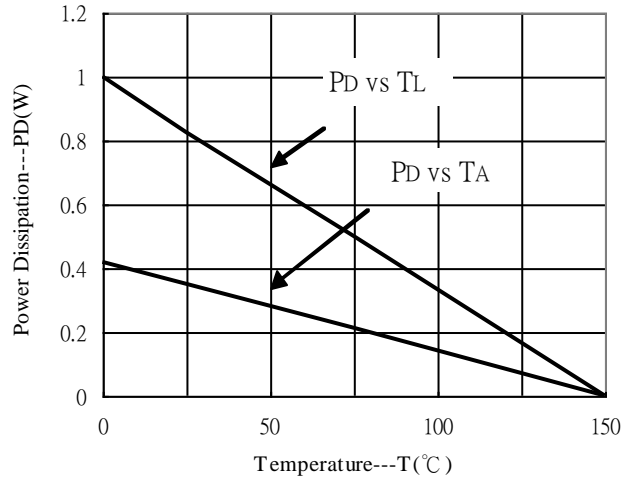
Dynamic Impedance



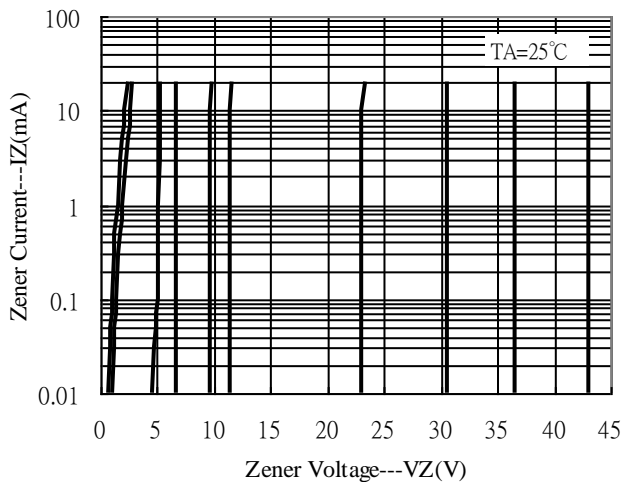
Typical Capacitance



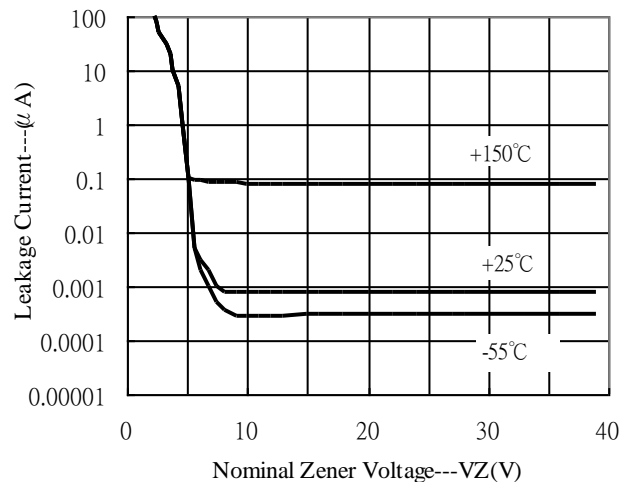
Power Derating Curve



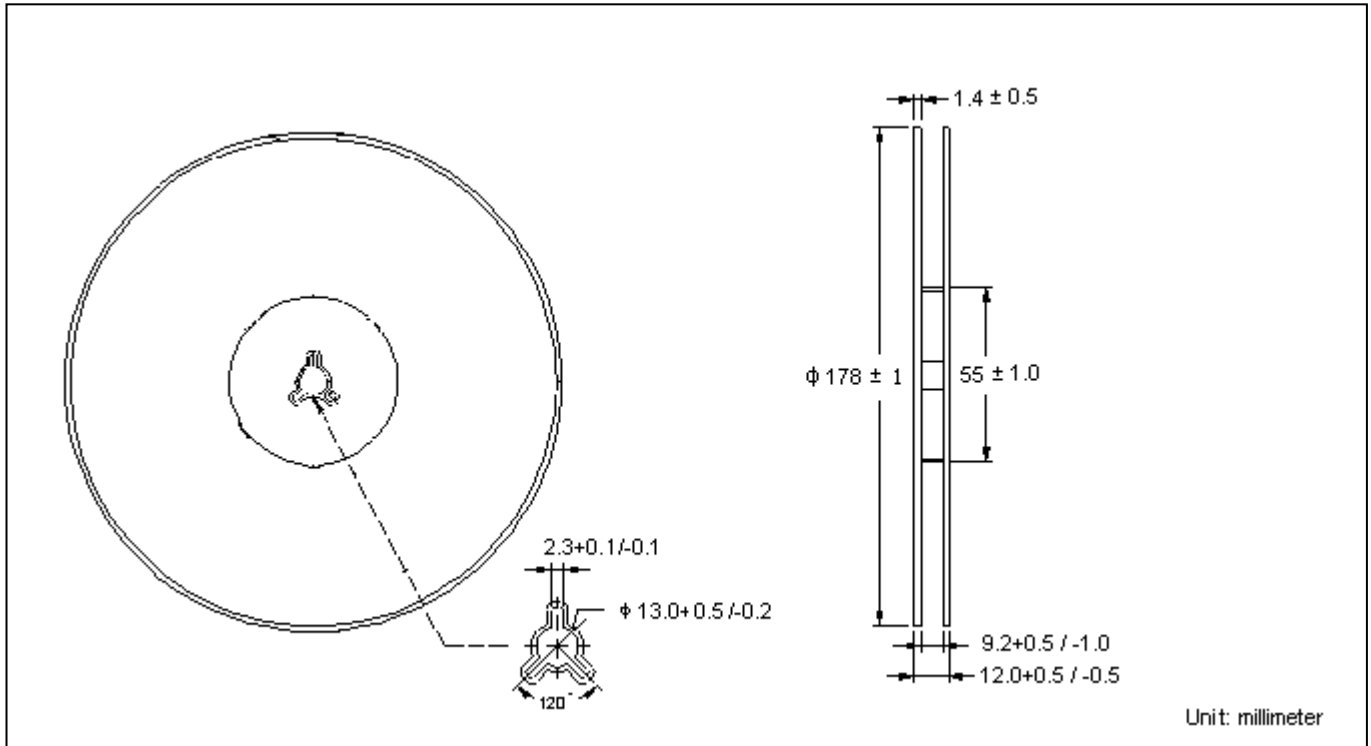
Zener Current vs Zener Voltage



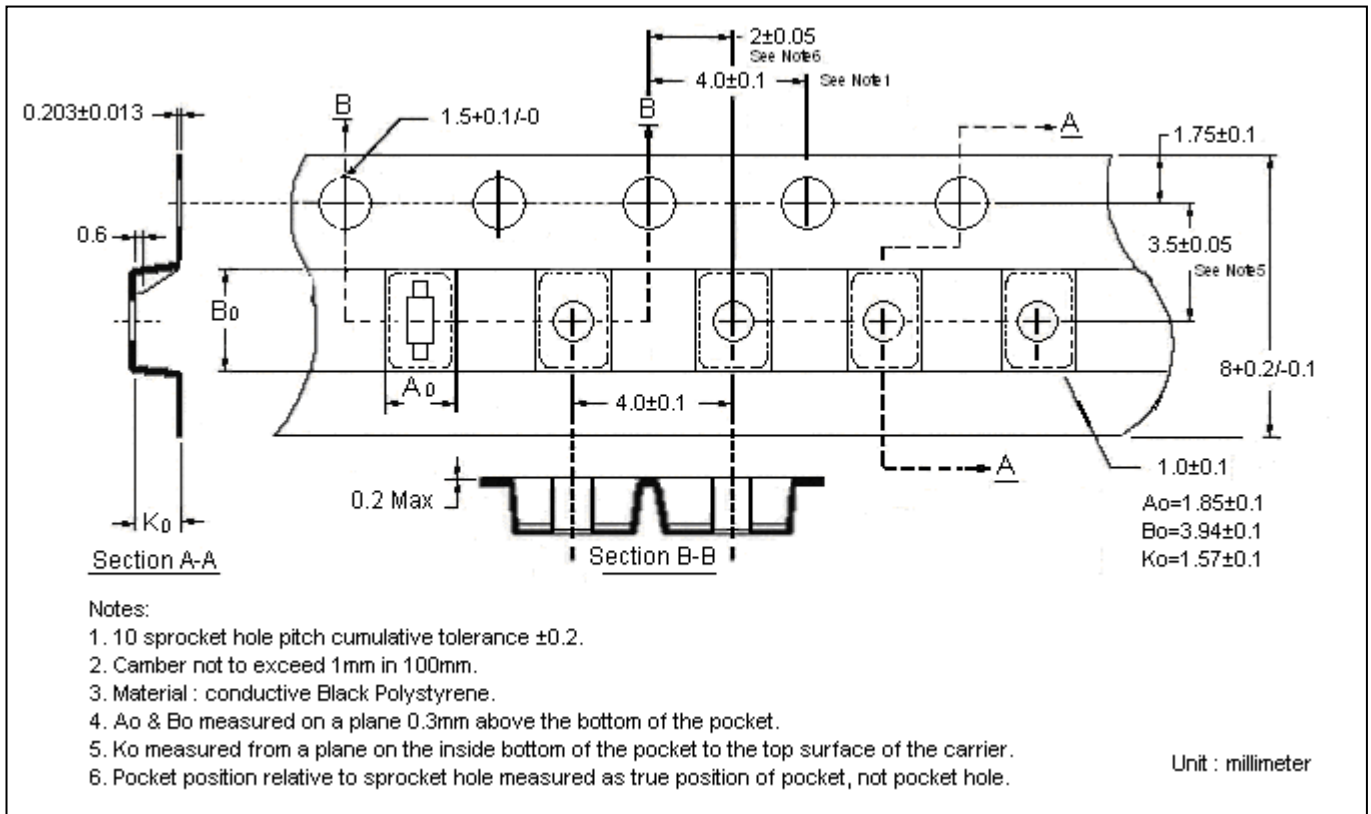
Typical Leakage Current



### 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 |

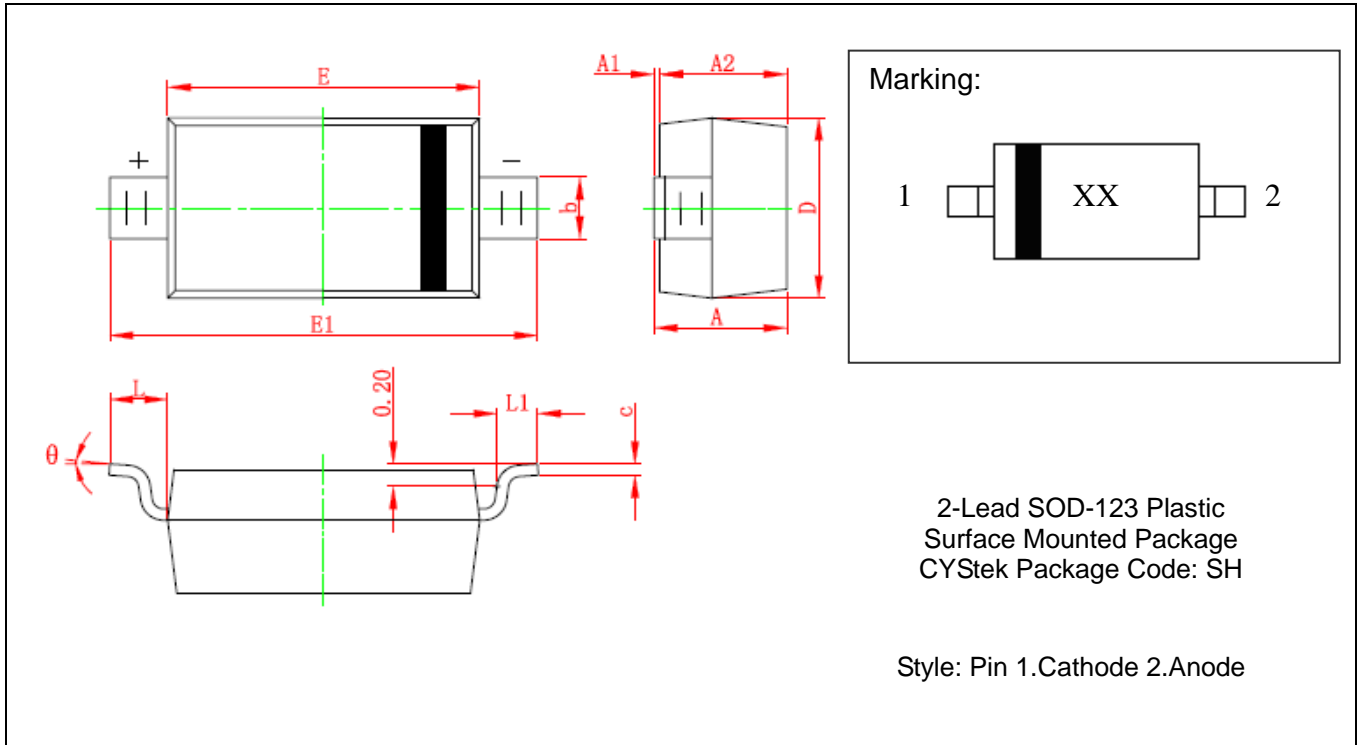
**Recommended temperature profile for IR reflow**



| 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(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.

**SOD-123 Dimension**



| DIM | Millimeters |       | Inches |       | DIM | Millimeters |       | Inches    |       |
|-----|-------------|-------|--------|-------|-----|-------------|-------|-----------|-------|
|     | Min.        | Max.  | Min.   | Max.  |     | Min.        | Max.  | Min.      | Max.  |
| A   | 1.050       | 1.250 | 0.041  | 0.049 | E   | 2.600       | 2.800 | 0.102     | 0.110 |
| A1  | 0.000       | 0.100 | 0.000  | 0.004 | E1  | 3.550       | 3.850 | 0.140     | 0.152 |
| A2  | 1.050       | 1.115 | 0.041  | 0.045 | L   | 0.500 REF   |       | 0.020 REF |       |
| b   | 0.450       | 0.650 | 0.018  | 0.026 | L1  | 0.250       | 0.450 | 0.010     | 0.018 |
| c   | 0.080       | 0.150 | 0.003  | 0.006 | θ   | 0°          | 8°    | 0°        | 8°    |
| D   | 1.500       | 1.700 | 0.059  | 0.067 |     |             |       |           |       |

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.

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