

**Small Signal Schottky (double) diodes**

# BAT54S3/BAT54AS3

# BAT54CS3/BAT54SS3

**Description**

Planar silicon Schottky barrier diodes encapsulated in a SOT-323 very small plastic SMD package. Single diodes and double diodes with different pinning are available.

**Features**

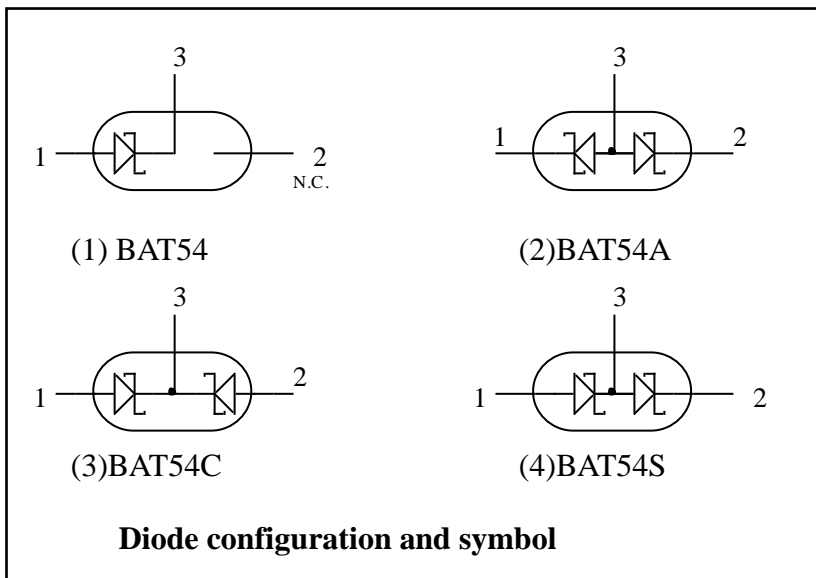
- Guard ring protected
- Low forward voltage drop
- Very small plastic SMD package
- Pb-free lead plating and halogen-free package

**Applications**

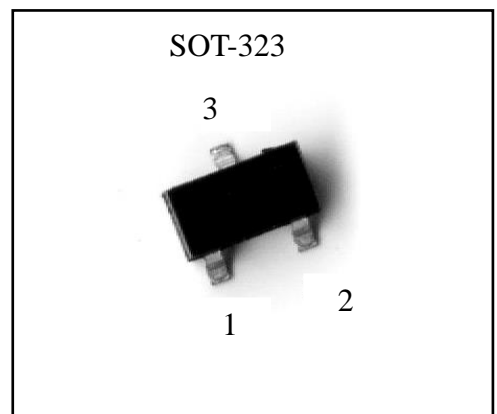
- Ultra high-speed switching
- Voltage clamping
- Protection circuits
- Blocking diodes

**Pinning**

| Pin | Description |        |        |        |
|-----|-------------|--------|--------|--------|
|     | BAT54       | BAT54A | BAT54C | BAT54S |
| 1   | A           | K1     | A1     | A1     |
| 2   | NC          | K2     | A2     | K2     |
| 3   | K           | A1,A2  | K1,K2  | K1,A1  |



**Outline**



**Marking:**

| Type     | Marking Code |
|----------|--------------|
| BAT54 S3 | B4           |
| BAT54AS3 | B7           |
| BAT54CS3 | 5C           |
| BAT54SS3 | B8           |

**Absolute Maximum Ratings**

| Symbol           | Parameter                             | Conditions             | Min | Max  | Unit |
|------------------|---------------------------------------|------------------------|-----|------|------|
| Per diode        |                                       |                        |     |      |      |
| V <sub>R</sub>   | continuous reverse voltage            |                        | -   | 30   | V    |
| I <sub>F</sub>   | continuous forward current            |                        | -   | 200  | mA   |
| I <sub>FRM</sub> | repetitive peak forward current       | tp≤1s, δ≤0.5           | -   | 300  | mA   |
| I <sub>FSM</sub> | non-repetitive peak forward current   | tp<10ms                | -   | 600  | mA   |
| P <sub>tot</sub> | total power dissipation (per package) | T <sub>amb</sub> ≤25°C | -   | 200  | mW   |
| T <sub>stg</sub> | storage temperature                   |                        | -65 | +150 | °C   |
| T <sub>j</sub>   | operating junction temperature        |                        | -65 | +150 | °C   |
| T <sub>amb</sub> | operating ambient temperature         |                        | -65 | +125 | °C   |

**Characteristics** (T<sub>a</sub>=25°C, unless otherwise specified)

| Parameter                        | Symbol             | Condition   | Min. | Max. | Unit |
|----------------------------------|--------------------|---|------|------|------|
| Reverse Breakdown Voltage        | V <sub>BR</sub>    | I <sub>R</sub> =100μA   | 30   | -    | V    |
| Forward Voltage (Note 1)         | V <sub>F</sub> (1) | I <sub>F</sub> =0.1mA   | -    | 240  | mV   |
|                                  | V <sub>F</sub> (2) | I <sub>F</sub> =1mA   | -    | 320  | mV   |
|                                  | V <sub>F</sub> (3) | I <sub>F</sub> =10mA  | -    | 400  | mV   |
|                                  | V <sub>F</sub> (4) | I <sub>F</sub> =30mA  | -    | 500  | mV   |
|                                  | V <sub>F</sub> (5) | I <sub>F</sub> =100mA   | -    | 800  | mV   |
| Reverse Leakage Current (Note 2) | I <sub>R</sub>     | V <sub>R</sub> =25V   | -    | 2    | μA   |
| Diode Capacitance                | C <sub>D</sub>     | V <sub>R</sub> =1V, f=1MHz  | -    | 10   | pF   |
| Reverse Recovery Time            | t <sub>rr</sub>    | when switched from I <sub>F</sub> = 10mA to I <sub>R</sub> =10mA; R <sub>L</sub> =100Ω; measured at I <sub>R</sub> =1mA | -    | 5    | ns   |

Notes: 1.pulse test, tp=380μs, duty cycle&lt;2%.

2.pulse test, tp=300μs, duty cycle&lt;2%.

**Thermal Characteristics**

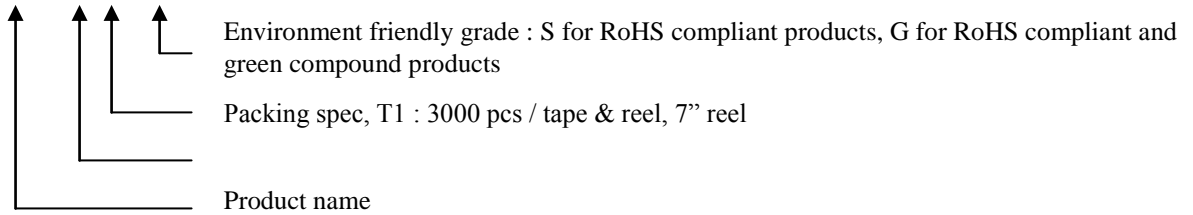
| Symbol              | Parameter                                   | Conditions | Value | Unit |
|---------------------|---|------------|-------|------|
| R <sub>th j-a</sub> | thermal resistance from junction to ambient | note 1     | 625   | K/W  |

Note 1 : Refer to SOT-323 standard mounting conditions.



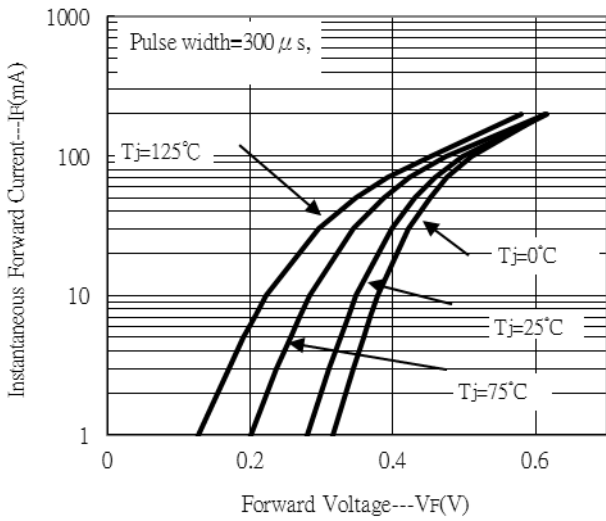
**Ordering Information**

| Device           | Package  | Shipping               | Marking |
|------------------|--|------------------------|---------|
| BAT54S3-0-T1-G   | SOT-323<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / Tape & Reel | B4      |
| BAT54AS3-0-T1-G  |  |                        | B7      |
| BAT54CS3-0-T1-G  |  |                        | 5C      |
| BAT540SS3-0-T1-G |  |                        | B8      |

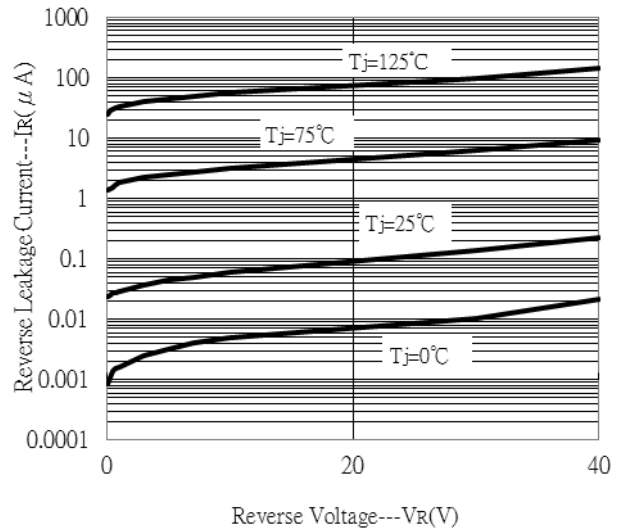


**Typical Characteristics**

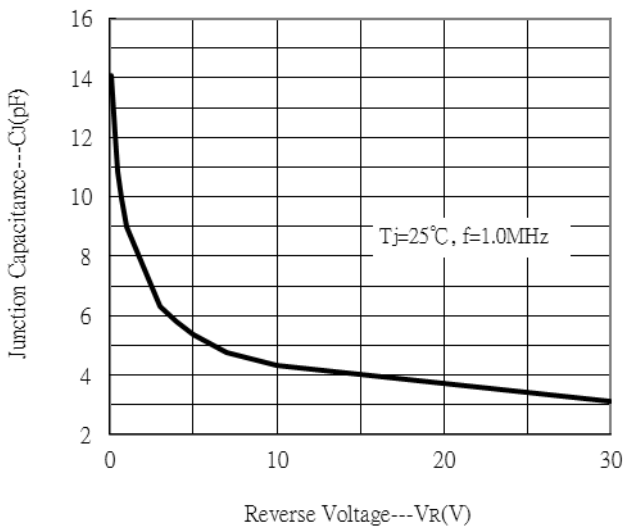
Forward Current vs Forward Voltage



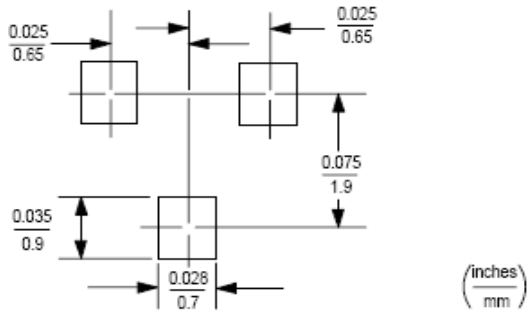
Reverse Leakage Current vs Reverse Voltage



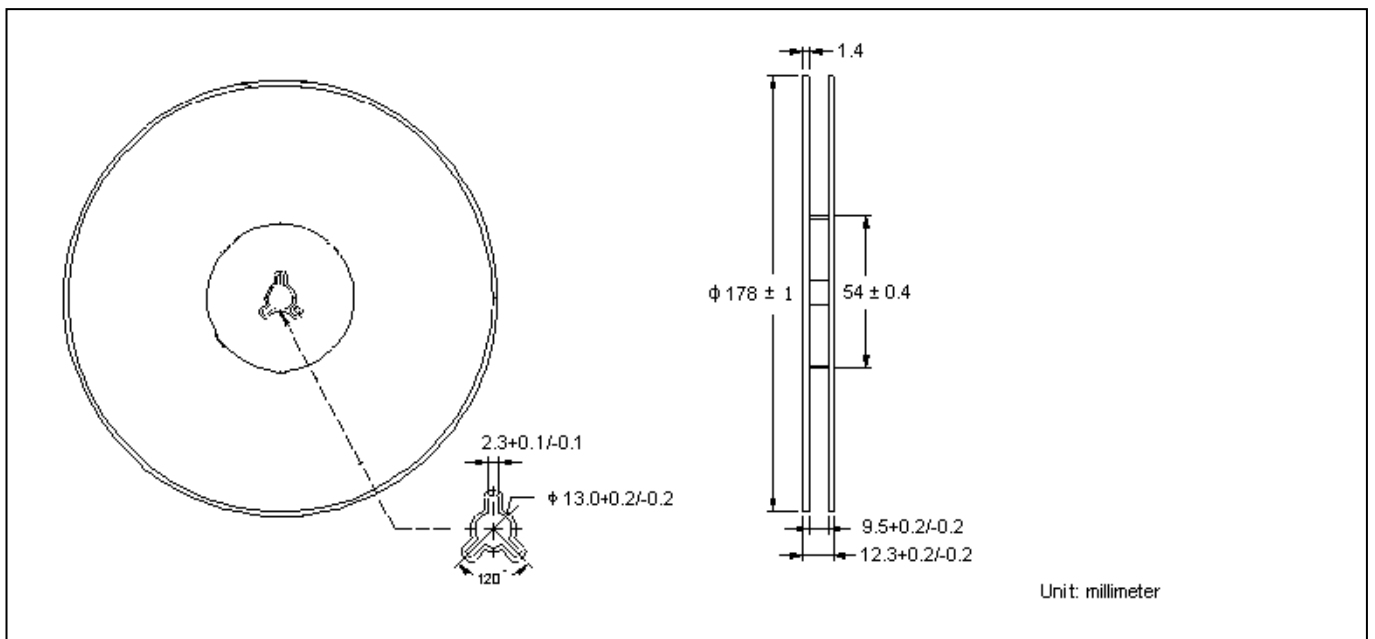
Junction Capacitance vs Reverse Voltage



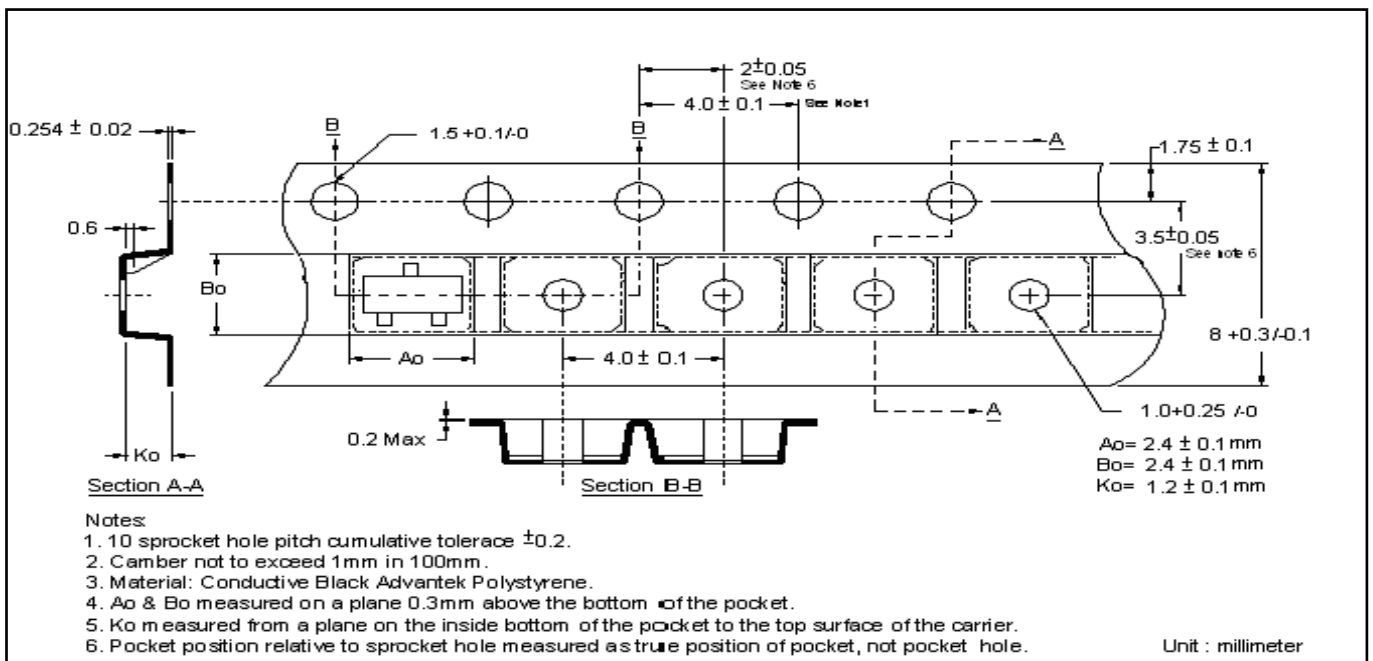
**Recommended Footprint**



**Reel Dimension**



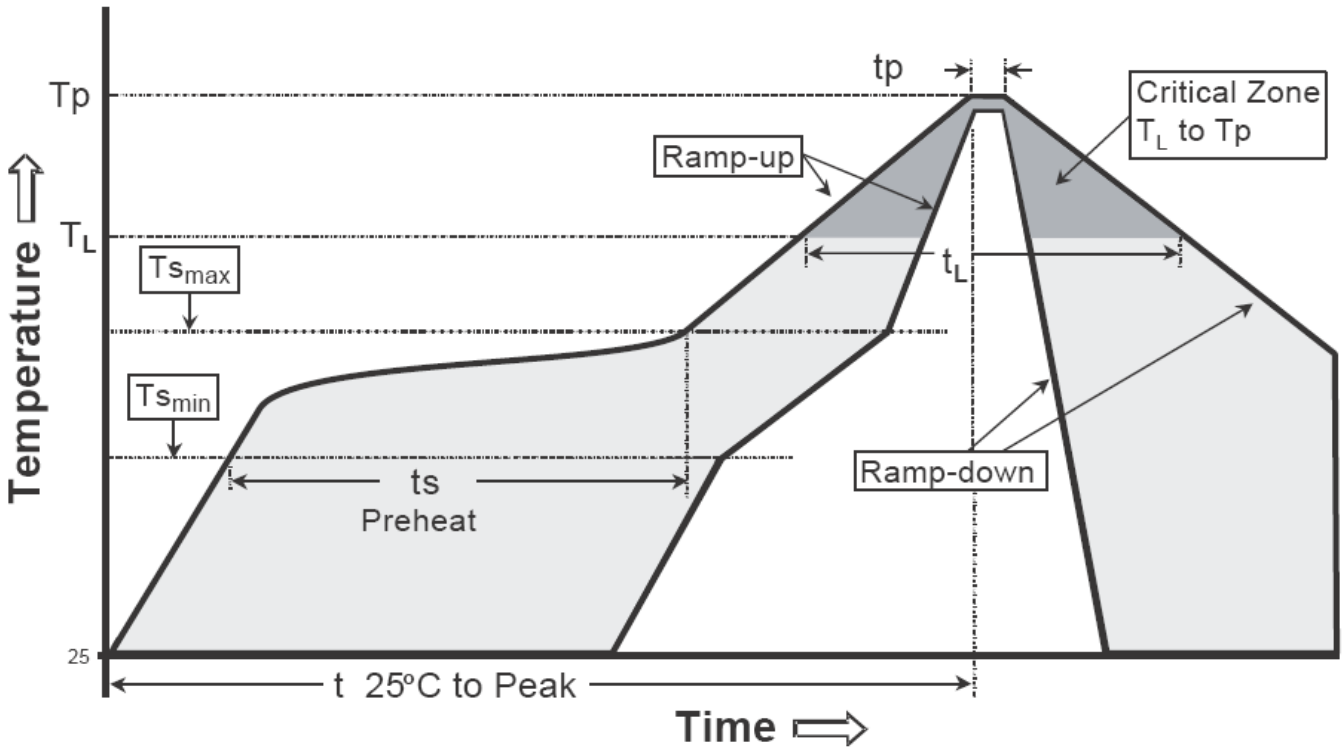
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

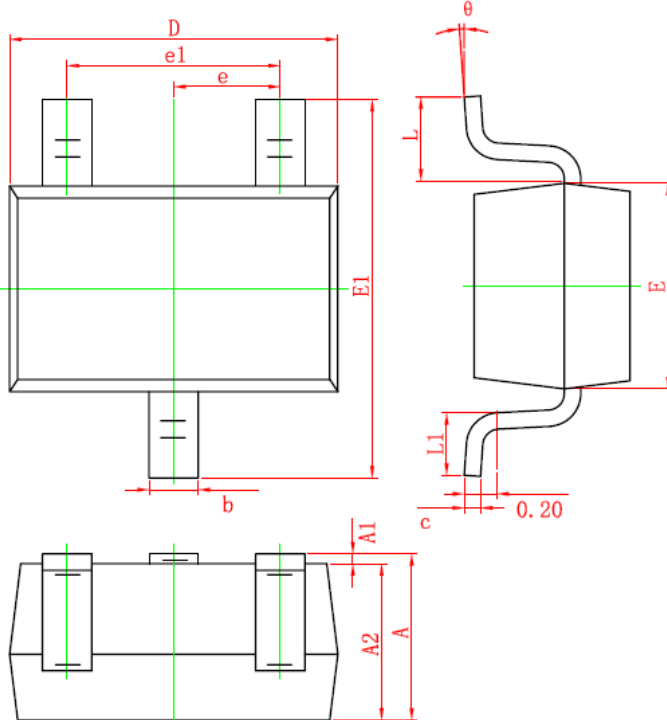
**Recommended temperature profile for IR reflow**



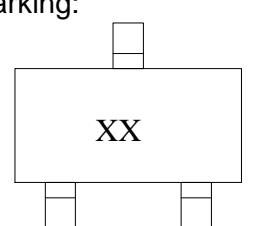
| Profile feature                                | Sn-Pb eutectic Assembly | Pb-free Assembly |
|--|-------------------------|------------------|
| Average ramp-up rate (Tsmax to Tp)             | 3°C/second max.         | 3°C/second max.  |
| Preheat  |                         |                  |
| -Temperature Min(Ts min)                       | 100°C                   | 150°C            |
| -Temperature Max(Ts max)                       | 150°C                   | 200°C            |
| -Time(ts min to ts max)                        | 60-120 seconds          | 60-180 seconds   |
| Time maintained above:                         |                         |                  |
| -Temperature (TL)                              | 183°C                   | 217°C            |
| - Time (tL)                                    | 60-150 seconds          | 60-150 seconds   |
| Peak Temperature(Tp)                           | 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.

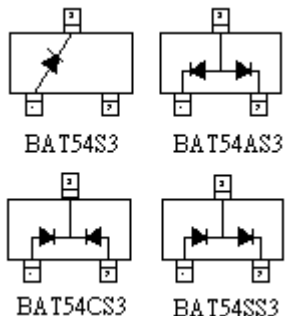
**SOT-323 Dimension**



**Marking:**



**Diagram:**



3-Lead SOT-323 Plastic Surface Mounted Package.  
CYStek Package Code: S3

- BAT54 S3 : Single Diode (Marking Code B4)
- BAT54AS3 : Common Anode. (Marking Code B7)
- BAT54CS3 : Common Cathode. (Marking Code 5C)
- BAT54SS3 : Series Connected. (Marking Code B8)

| 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 TYP   |       | 0.026 TYP |       |
| A2  | 0.900       | 1.000 | 0.035  | 0.039 | e1  | 1.200       | 1.400 | 0.047     | 0.055 |
| b   | 0.200       | 0.400 | 0.008  | 0.016 | 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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