

# 1A Snubber Damping Rectifier

## QJL3, QJCTL3

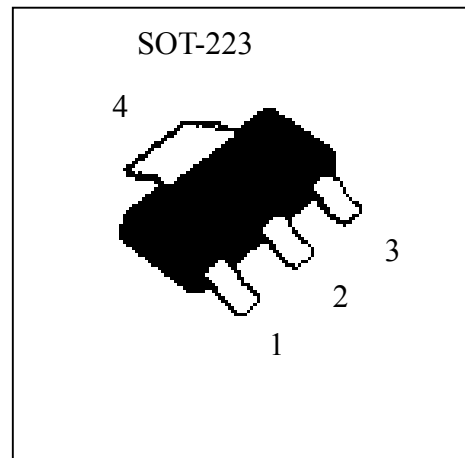
### Features

- High current capability
- Smoothly soft reverse recovery time (trr)
- Low profile surface mounted package in order to minimize board space
- Pb-free lead plating and halogen-free package

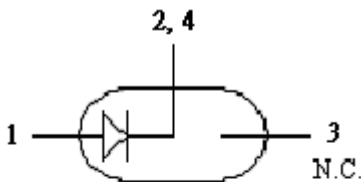
### Pinning

| Pin | Description |        |
|-----|-------------|--------|
|     | QJL3        | QJCTL3 |
| 1   | A           | A1     |
| 2   | K           | K1, K2 |
| 3   | NC          | A2     |
| 4   | K           | K1, K2 |

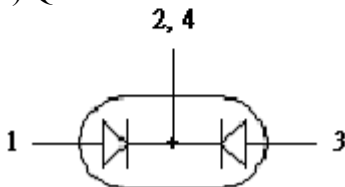
### Outline



### Diode configuration and symbol



(1) QJL3



(2) QJCTL3

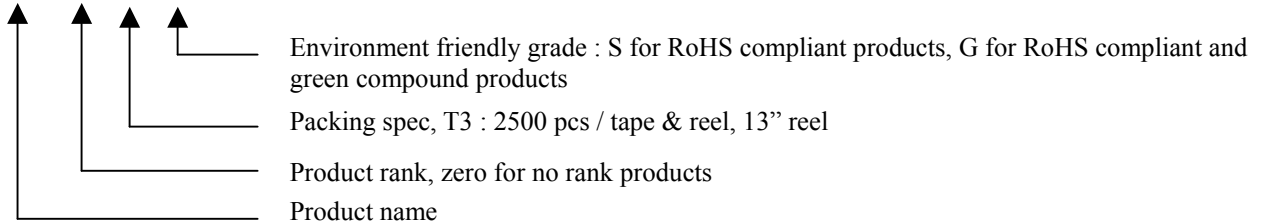
### Marking:

| Type   | Marking Code |
|--------|--------------|
| QJL3   | QJ           |
| QJCTL3 | QJCT         |



**Ordering Information**

| Device         | Package   | Shipping               |
|----------------|---|------------------------|
| QJL3-XX-T3-G   | SOT-223   | 2500 pcs / Tape & Reel |
| QJCTL3-XX-T3-G | (Pb-free lead plating and halogen-free package) |                        |



**Absolute Maximum Ratings** (TA=25°C, unless otherwise noted)

| Parameters                           | Conditions  | Symbol             | Value    |     | Units |
|--------------------------------------|---|--------------------|----------|-----|-------|
|                                      |   |                    | 65       | 70  |       |
| Repetitive peak reverse voltage      |   | V <sub>RRM</sub>   | 650      | 700 | V     |
| RMS voltage                          |   | V <sub>RMS</sub>   | 455      | 490 | V     |
| Continuous reverse voltage           |   | V <sub>R</sub>     | 650      | 700 | V     |
| Forward rectified current            | Single phase half wave, 60Hz @T <sub>J</sub> =25°C                    | I <sub>F(AV)</sub> | 1        |     | A     |
| Repetitive Peak Forward Current      | Single phase half wave, 60Hz @T <sub>J</sub> =25°C                    | I <sub>FRM</sub>   | 1.57     |     | A     |
| Forward surge current                | 8.3ms single half sine-wave superimposed on rated load (JEDEC method) | I <sub>FSM</sub>   | 10       |     | A     |
| Power Dissipation                    |   | P <sub>D</sub>     | 0.8      |     | W     |
|                                      | (Note 1)  |                    | 1.2      |     |       |
|                                      | (Note 2)  |                    | 3        |     |       |
| Maximum reverse recovery time        | I <sub>F</sub> =0.5A, I <sub>R</sub> =1.0A, I <sub>RR</sub> =0.25A    | t <sub>rr</sub>    | 3        |     | μs    |
| Storage temperature range            |   | T <sub>stg</sub>   | -55~+150 |     | °C    |
| Operating junction temperature range |   | T <sub>j</sub>     | -55~+150 |     | °C    |

**Thermal Data**

| Parameter   | Symbol              | Value | Unit |
|---|---------------------|-------|------|
| Thermal Resistance, Junction-to-ambient, max          | R <sub>th,j-a</sub> | 156   | °C/W |
| Thermal Resistance, Junction-to-ambient, max (Note 1) |                     | 104   |      |
| Thermal Resistance, Junction-to-ambient, max (Note 2) |                     | 42    |      |
| Thermal Resistance, Junction-to-case, max             | R <sub>th,j-c</sub> | 35    |      |

Note: \*1 When mounted on FR-4 PCB with area measuring 10×10×1 mm

\*2 When mounted on ceramic with area measuring 40×40×1 mm



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

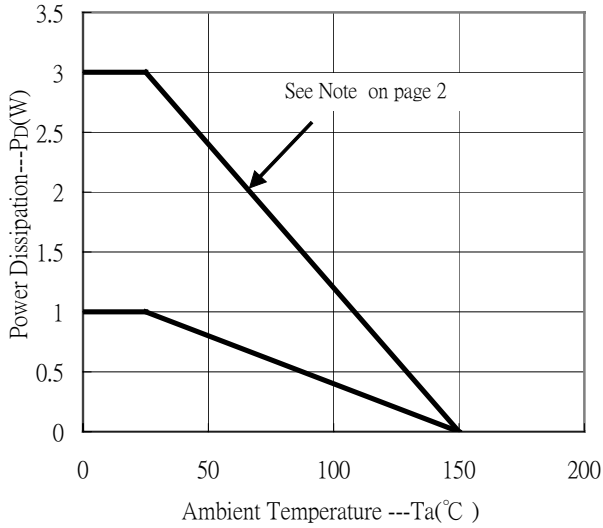
| Characteristic          | Symbol           | Condition                                   | Min. | Typ | Max. | Unit |
|-------------------------|------------------|---|------|-----|------|------|
| Breakdown Voltage       | V <sub>R</sub>   | I <sub>R</sub> =100μA                       | 650  | -   | -    | V    |
| Forward Voltage         | V <sub>F 1</sub> | I <sub>F</sub> =100mA                       | -    | -   | 0.95 | V    |
|                         | V <sub>F 2</sub> | I <sub>F</sub> =500mA                       | -    | -   | 1.2  |      |
| Reverse Leakage Current | I <sub>R</sub>   | V <sub>R</sub> =620V                        | -    | -   | 100  | nA   |
|                         | I <sub>R</sub>   | V <sub>R</sub> =620V, T <sub>A</sub> =125°C | -    | -   | 10   | μA   |
| Junction Capacitance    | C <sub>J</sub>   | V <sub>R</sub> =1V, f=1MHz                  | -    | 6   | -    | pF   |

**Classification by V<sub>R</sub>**

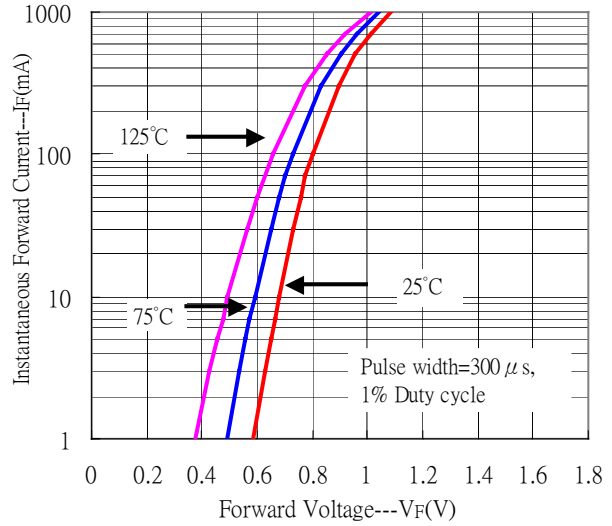
|       |       |       |
|-------|-------|-------|
| Rank  | 65    | 70    |
| Range | >650V | >700V |

## Typical Characteristics

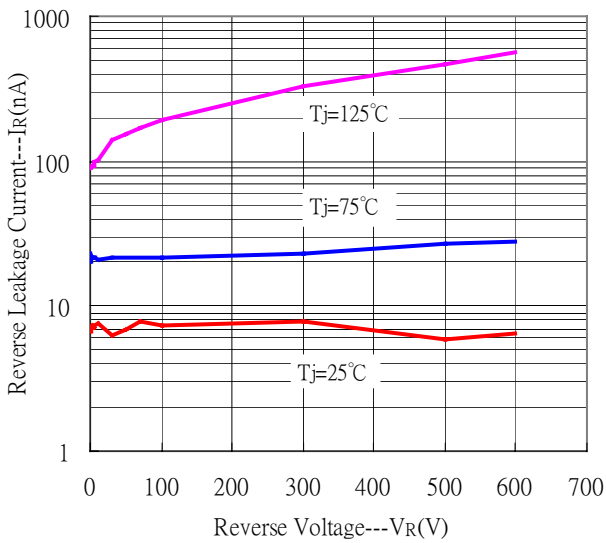
Power Derating Curves



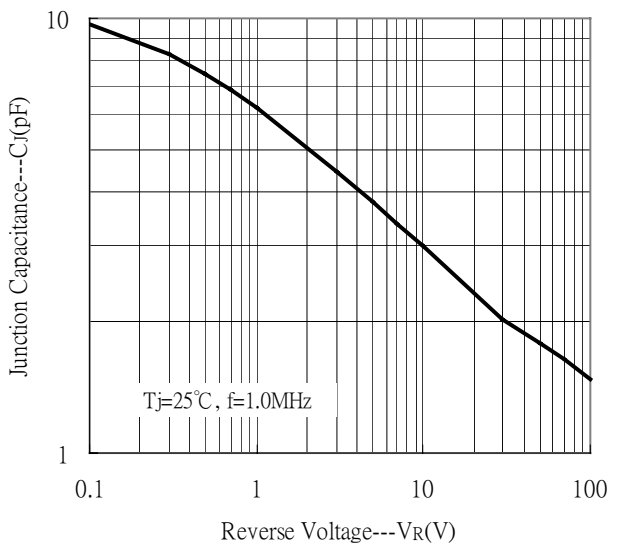
Forward Current vs Forward Voltage



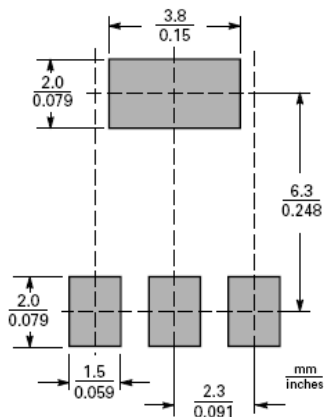
Reverse Leakage Current vs Reverse Voltage



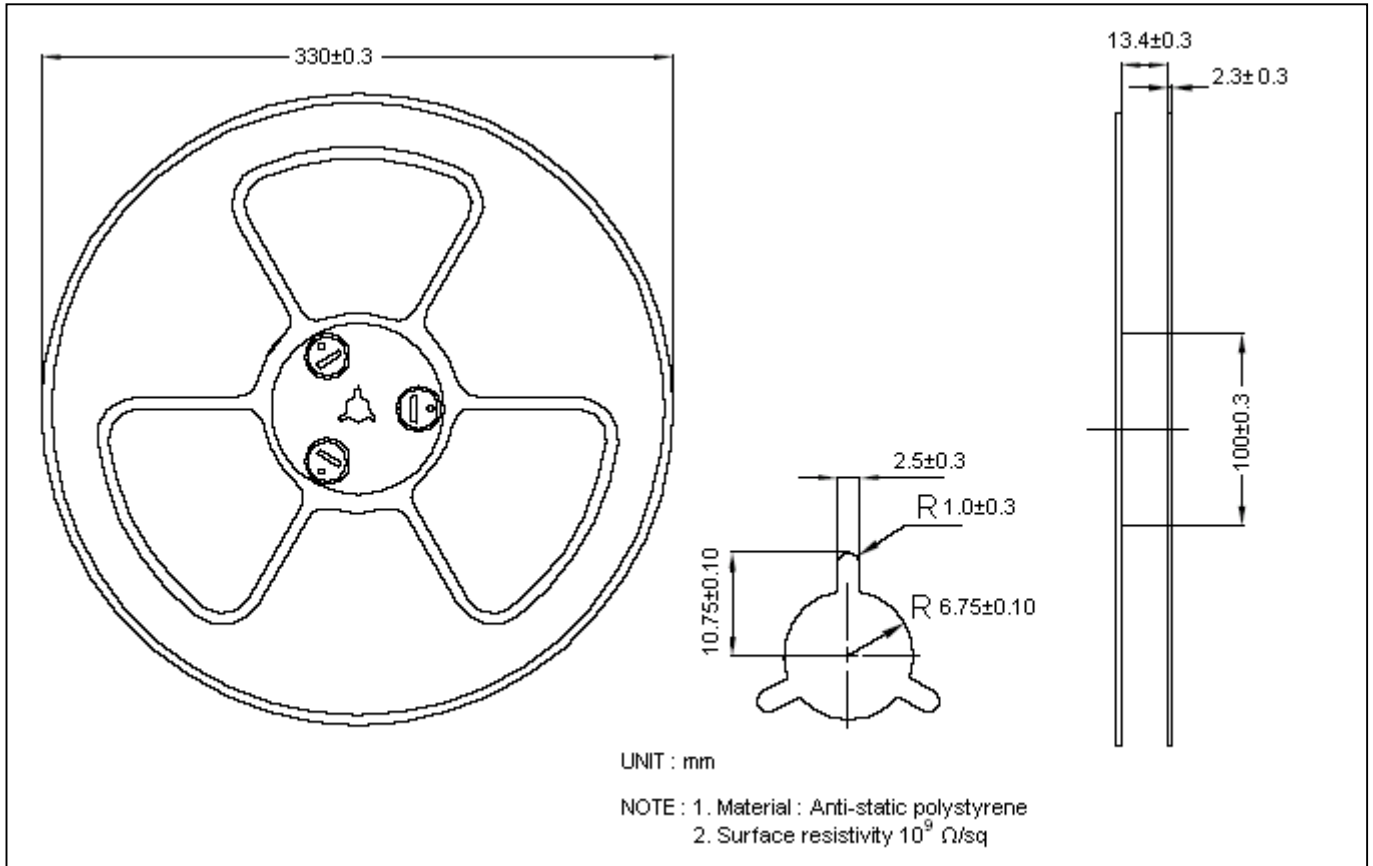
Junction Capacitance vs Reverse Voltage



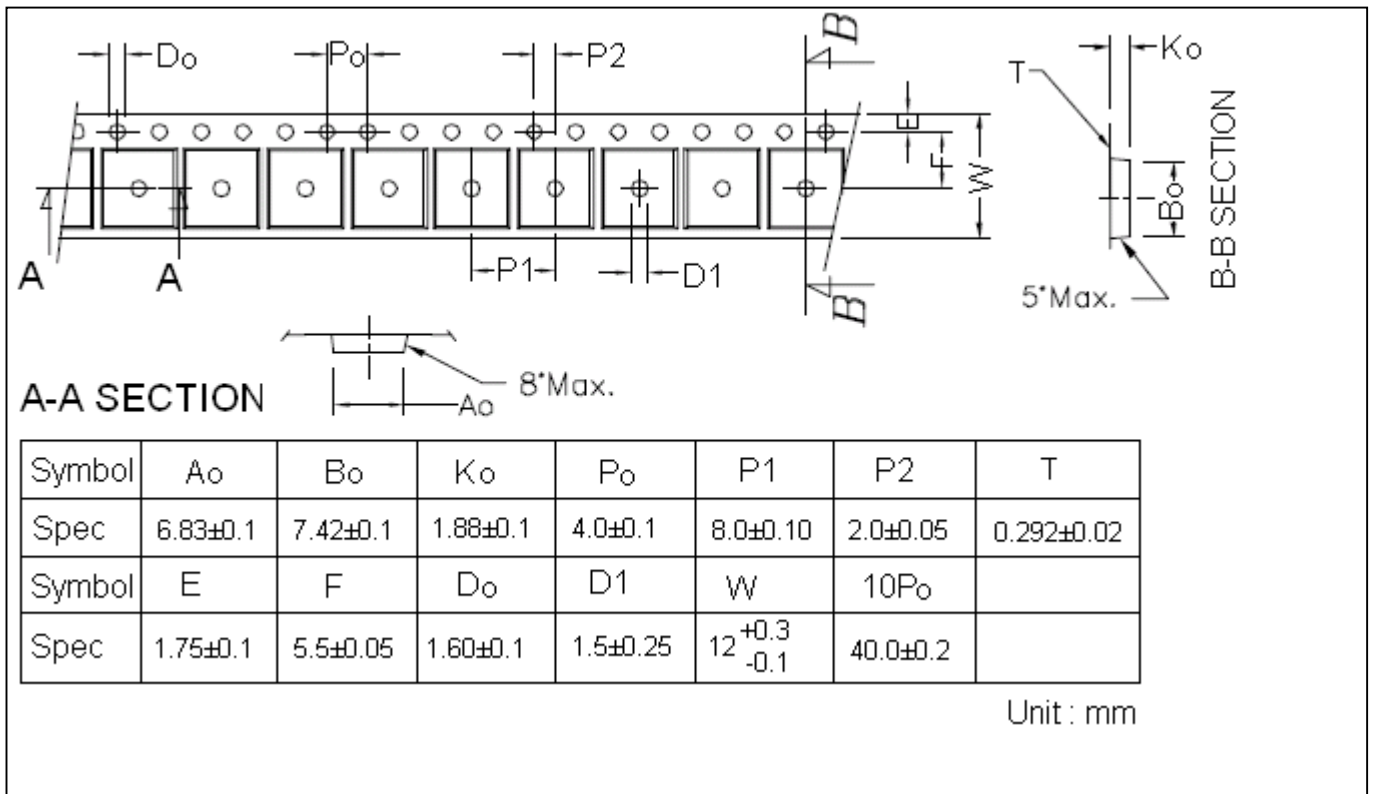
## Recommended soldering footprint



**Reel Dimension**



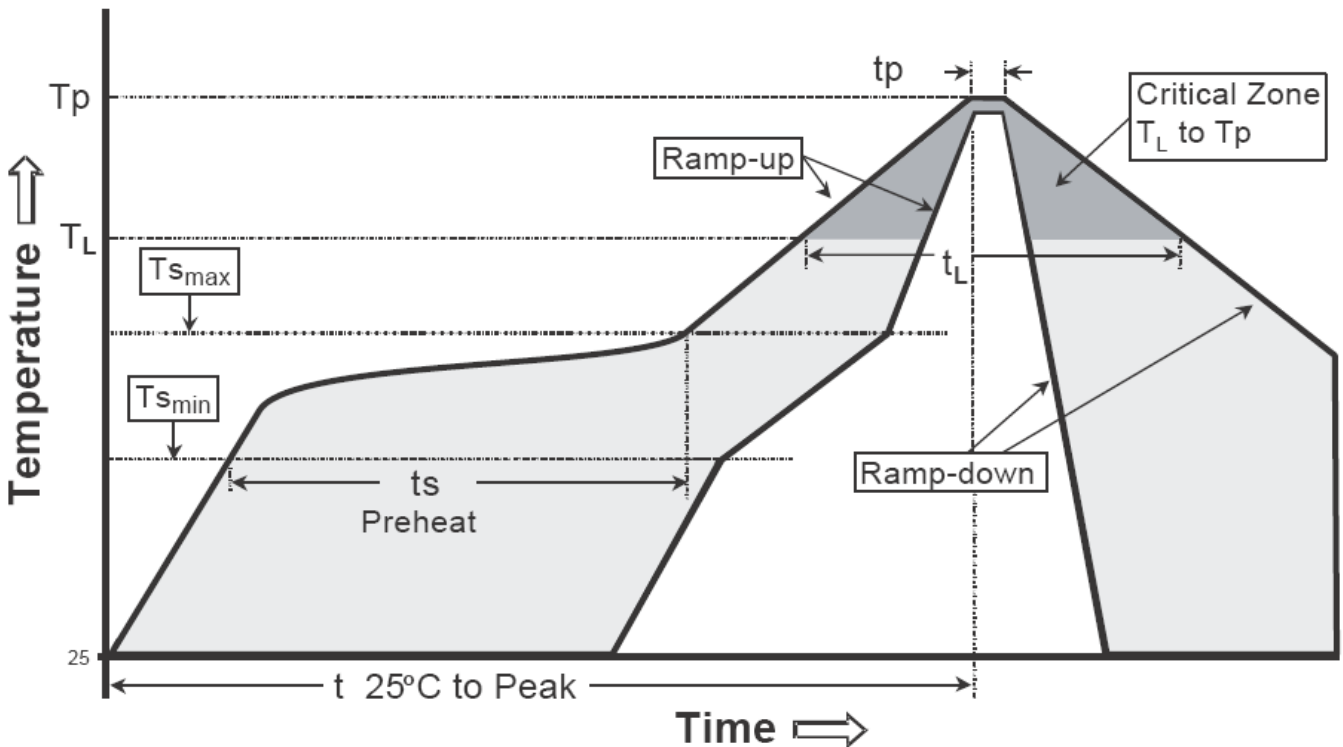
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

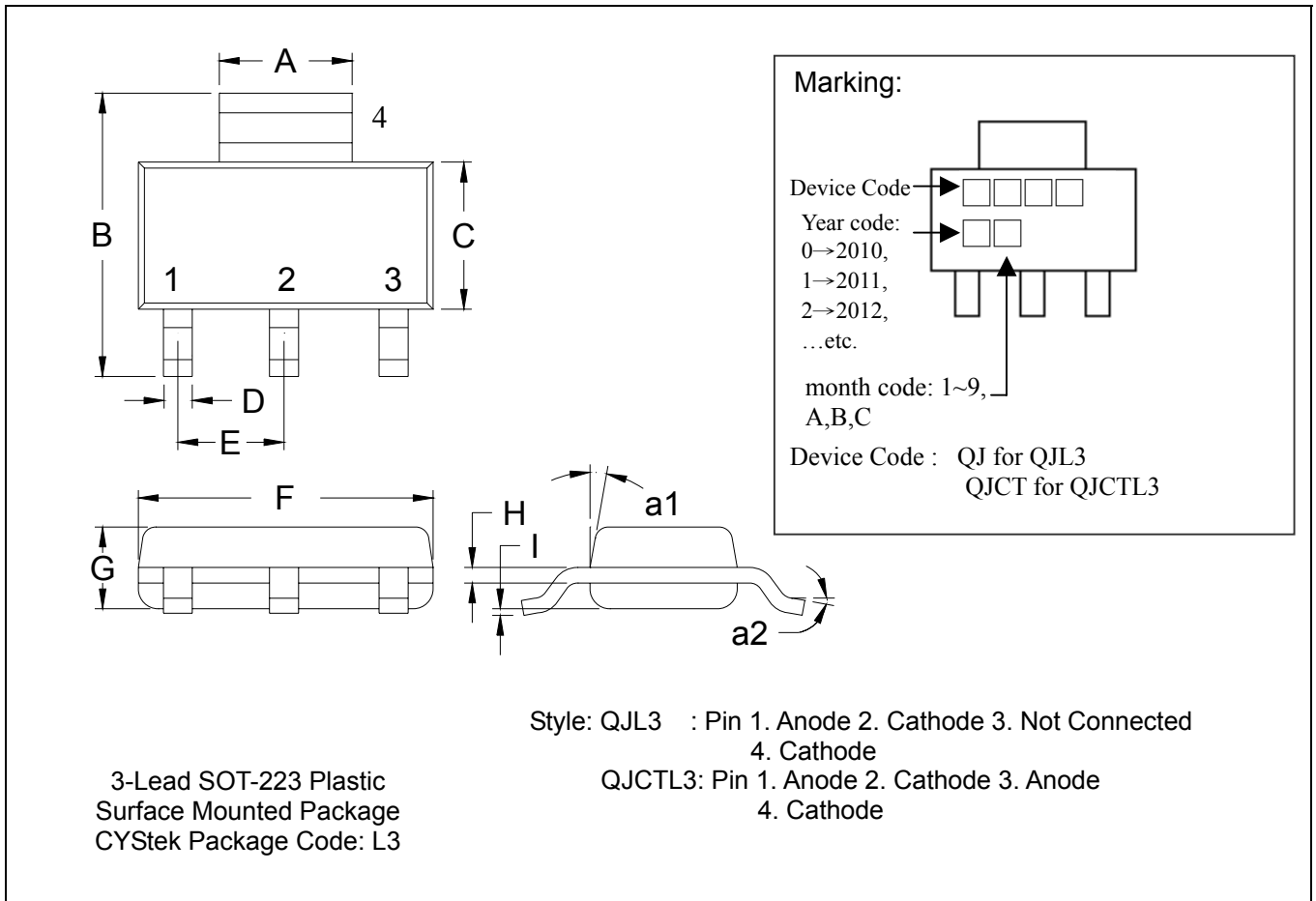
**Recommended temperature profile for IR reflow**



| Profile feature   | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|-------------------------|------------------|
| Average ramp-up rate (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-223 Dimension**



\*: Typical

| DIM | Inches  |        | Millimeters |      | DIM | Inches |        | Millimeters |      |
|-----|---------|--------|-------------|------|-----|--------|--------|-------------|------|
|     | Min.    | Max.   | Min.        | Max. |     | Min.   | Max.   | Min.        | Max. |
| A   | 0.1142  | 0.1220 | 2.90        | 3.10 | G   | 0.0551 | 0.0709 | 1.40        | 1.80 |
| B   | 0.2638  | 0.2874 | 6.70        | 7.30 | H   | 0.0098 | 0.0138 | 0.25        | 0.35 |
| C   | 0.1299  | 0.1457 | 3.30        | 3.70 | I   | 0.0008 | 0.0039 | 0.02        | 0.10 |
| D   | 0.0236  | 0.0315 | 0.60        | 0.80 | a1  | *13°   | -      | *13°        | -    |
| E   | *0.0906 | -      | *2.30       | -    | a2  | 0°     | 10°    | 0°          | 10°  |
| F   | 0.2480  | 0.2638 | 6.30        | 6.70 |     |        |        |             |      |

- 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.

**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.