



A Product Line of  
Diodes Incorporated



## SPECIFICATION FOR APPROVAL

CUSTOMER \_\_\_\_\_

NOMINAL FREQUENCY 20.000000 MHz

PRODUCT TYPE TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

SPEC. NO. ( P/N ) FL2000173Q

CUSTOMER P/N \_\_\_\_\_

ISSUE DATE May 2, 2018

VERSION A

| APPROVED | PREPARED | QA |
|----------|----------|----|
|          |          |    |

### Diodes Incorporated

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- \*Pb-free
- \*RoHS Compliant
- \*HF-Halogen Free
- \*REACH Compliant
- \*AEC-Q200 Compliant



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### ELECTRICAL SPECIFICATIONS

| Item   | Symbol | Specifications     | Units | Notes                              |
|--|--------|--------------------|-------|------------------------------------|
| Nominal Frequency  | Fn     | 20.000000          | MHz   |                                    |
| Mode of Oscillation  | MO     | AT Cut-Fundamental |       |                                    |
| Calibration Load Capacitance   | CL     | 8                  | pF    |                                    |
| Calibration Tolerance  | FL     | ±50                | ppm   | at 25°C±3°C                        |
| Operating Temperature Range  | TR     | -40 to +125        | °C    |                                    |
| Frequency Stability<br>(Frequency Deviation over the<br>Operating Temperature Range) | F/T    | ±150               | ppm   | Reference to the Frequency at 25°C |
| Operating Drive Level  |        | 10                 | μW    |                                    |
| Maximum Drive Level  |        | 200                | μW    |                                    |
| Equivalent Series Resistance   | ESR    | 100                | Ω     | Max                                |
| Shunt Capacitance  | C0     | 1.2                | pF    | ±30%                               |
| Motional Capacitance   | C1     | 3.59               | fF    | ±30%                               |
| Motional Inductance  | L1     | 17.6               | mH    | ±30%                               |
| Aging at 25°C  |        | ±10                | ppm   | Max, 10 years                      |
| Storage Temperature  |        | -55 to +125        | °C    |                                    |
| Insulation Resistance  |        | 500                | MΩ    | Min                                |

※ This product doesn't include harmful substance that stipulated by SONY SS-00259 Level 1 and S-AT2-001 Level 1 standard. RoHS Compliant (Pb - Free).

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### AEC-Q200 RELIABILITY TEST SPECIFICATIONS:

#### 1. Initial

- 1.1 Physical Dimensions: JESD22, Method JB1-100
- 1.2 External Visual: MIL-STD-883, Method 2009
- 1.3 Freq. Vs. Temperature: Per Specification/Datasheet

#### 2. Mechanical

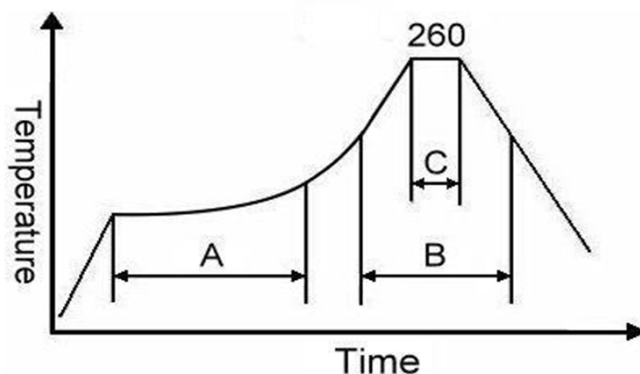
- 2.1 Mechanical Shock: MIL-STD-202 Method 213
- 2.2 Vibration: MIL-STD-202 Method 204
- 2.3 Solderability: J-STD-002
- 2.4 Board Flex: AEC Q200-005
- 2.5 Terminal Strength (SMD): AEC Q200-006

#### 3.Environmental

- 3.1 Temp Cycle: JESD22, Method JA-104
- 3.2 Resistance to Solder Heat: MIL-STD-202 Method 210
- 3.3 High Temperature Operating Life: MIL-STD-202, Method 108
- 3.4 High Temp Exposure: MIL-STD-202, Method 108
- 3.5 High Temp & High Humidity: MIL-STD-202, Method 103
- 3.6 Thermal Shock: MIL-STD-202, Method 107

### SUGGESTED IR REFLOW PROFILE

\*As per IPC-JEDEC J-STD-020D



Note:

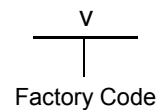
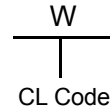
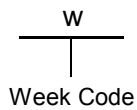
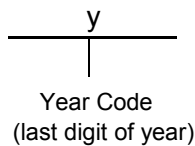
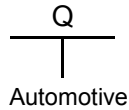
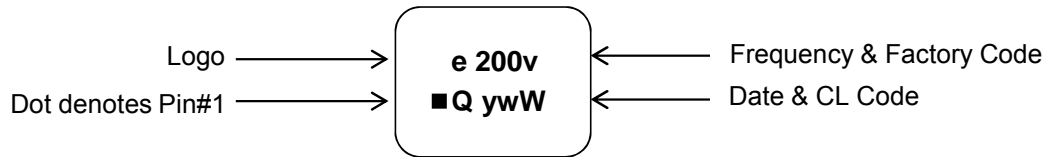
|   | Stage        | Temperature | Time       |
|---|--------------|-------------|------------|
| A | Preheat      | 150~200°C   | 60~120 Sec |
| B | Primary Heat | 217°C       | 60~150 Sec |
| C | Peak         | 260°C       | 10 Sec     |

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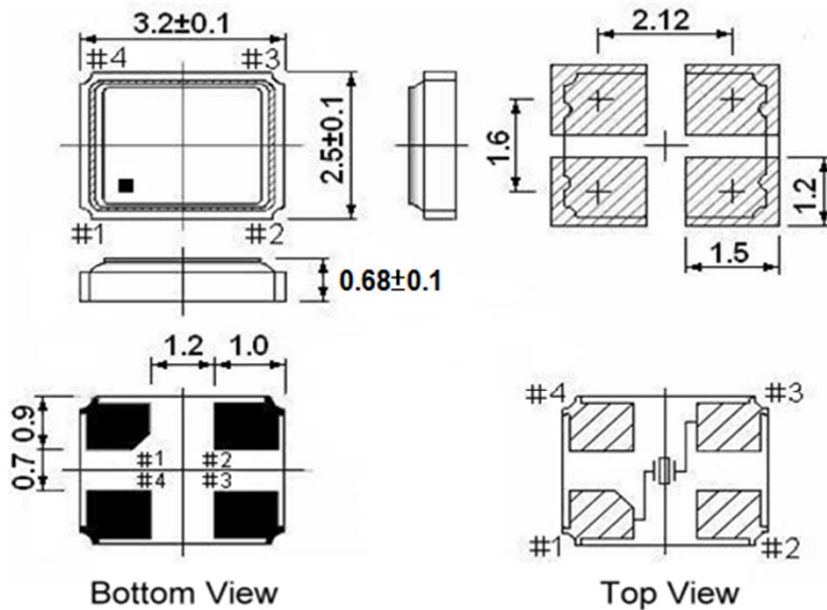
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### MARKING



### MECHANICAL DRAWINGS ( Scale: None. Dimensions are in mm.)

#### Recommended Land Pattern



\*\* Recommended - Pin 1 & 3 : CRYSTAL  
Pin 2 & 4 : GND

#### Notes:

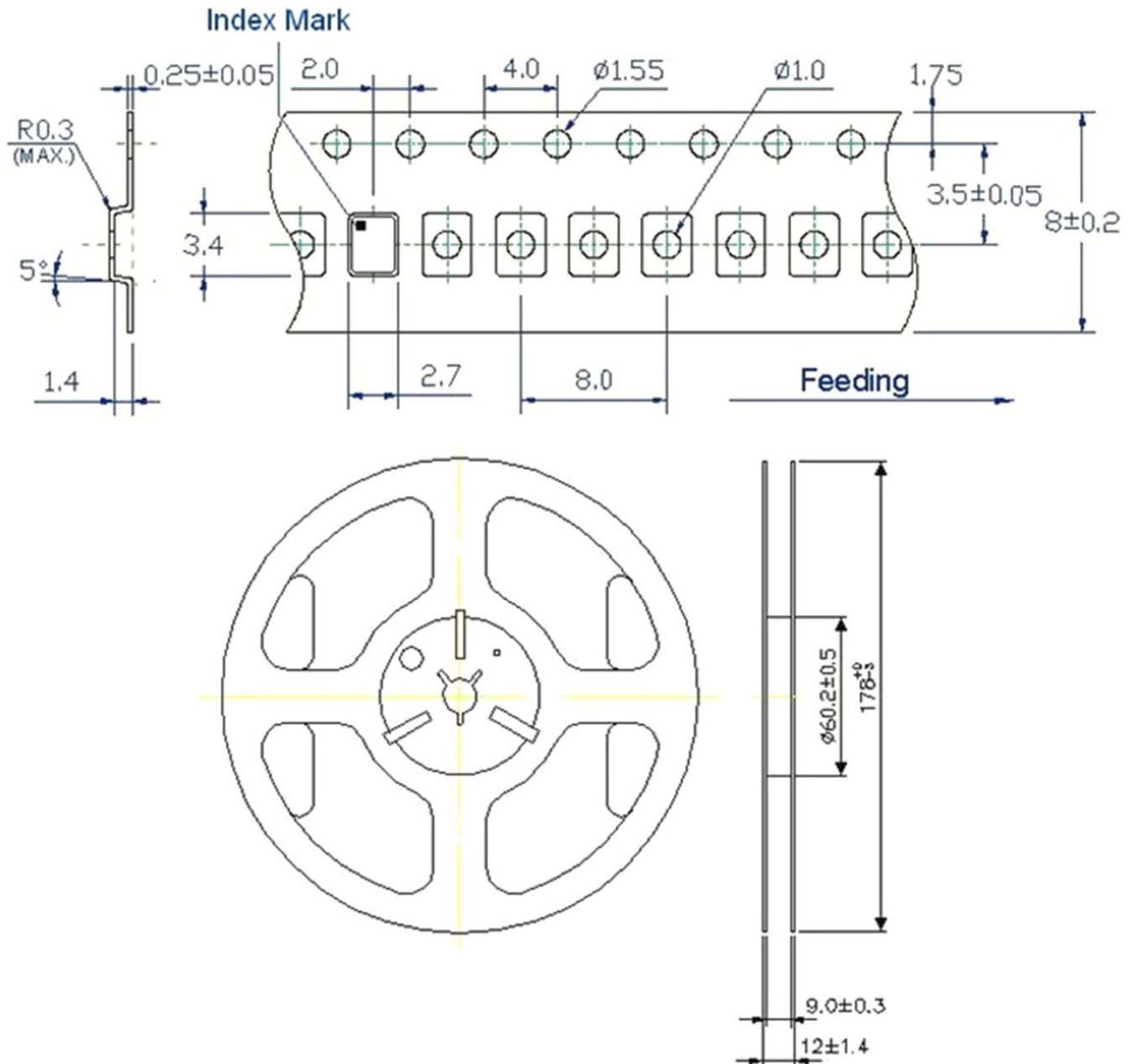
1. Package drawings are for reference only, and the appearances of objects may vary. Actual packages are based on the real product.
2. The marking dot denotes Pin#1.
3. The position and shape of the chamfer pin may vary and are based on the real product.

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### Tape & Reel



1. 230mm minimum leader which consist of carrier and/or tape followed by a minimum of 160mm of empty carrier tape sealed with cover tape.
2. 160mm minimum trailer of empty carrier tape sealed with cover tape.

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### PACKING

