



A Product Line of  
Diodes Incorporated



# SPECIFICATION FOR APPROVAL

CUSTOMER

NOMINAL FREQUENCY

**38.400000 MHz**

PRODUCT TYPE

**TYPE FW 2.0x1.6 SEAM SEALED CRYSTAL**

PART NUMBER

**FW3840013**

CUSTOMER P/N

ISSUE DATE

**May 15, 2018**

VERSION

**D**

APPROVED	PREPARED	QA
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## Diodes Incorporated

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\*Pb-free

\*RoHS Compliant

\*HF-Halogen Free

\*REACH Compliant

# TYPE FW 2.0x1.6 SEAM SEALED CRYSTAL

**FW3840013**

VER.D 15-MAY-18

## ELECTRICAL SPECIFICATIONS

Item	Symbol	Specifications	Units	Notes
Nominal Frequency	Fn	38.400000	MHz	
Mode of Oscillation	MO	AT Cut-Fundamental		
Calibration Load Capacitance	CL	8	pF	
Calibration Tolerance	FL	$\pm 10$	ppm	at 25°C $\pm 3^{\circ}\text{C}$
Operating Temperature Range	TR	-30 to +85	°C	
Frequency Stability(Frequency Deviation over the Operating Temperature Range)	F/T	$\pm 10$	ppm	Reference to the Frequency at 25°C
Operating Drive Level		10	$\mu\text{W}$	
Maximum Drive Level		100	$\mu\text{W}$	
Equivalent Series Resistance	ESR	60	$\Omega$	Max.
Shunt Capacitance	C0	5	pF	Max.
Aging at 25°C		$\pm 2$	ppm	Max, 1st year
Storage Temperature		-55 to +125	°C	
Insulation Resistance		500	M $\Omega$	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).

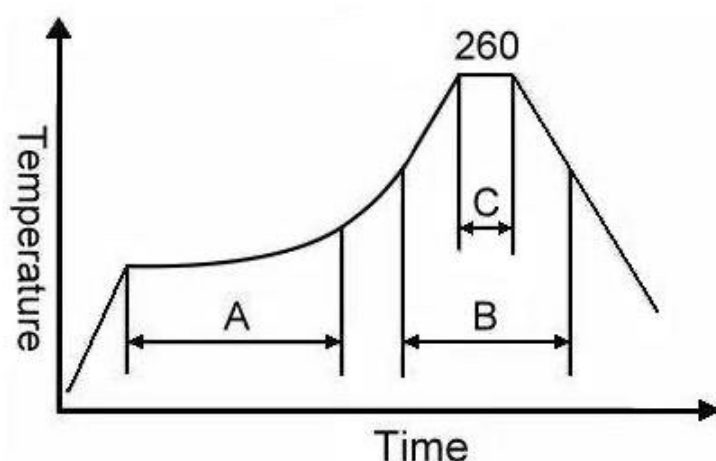
### RELIABILITY SPECIFICATIONS

#### MECHANICAL AND ENVIRONMENTAL RATINGS:

- a) FINE LEAK TEST: JESD22-A109 (Condition 1A)
- b) GROSS LEAK TEST: JESD22-A109 (Condition C)
- c) MOISTURE RESISTANCE: JESD22-A113
- d) SHOCK: JESD22-B104 (Condition B)
- e) SOLDERABILITY : (RoHS version): J-STD-002
- f) VIBRATION: JESD22-B103
- g) SOLVENT RESISTANCE: JESD22-B107
- h) RESISTANCE TO SOLDERING HEAT (RoHS version): J-STD-020D Table 5.2 Pb free devices (3 cycles max)

### SUGGESTED IR REFLOW PROFILE

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



Note:

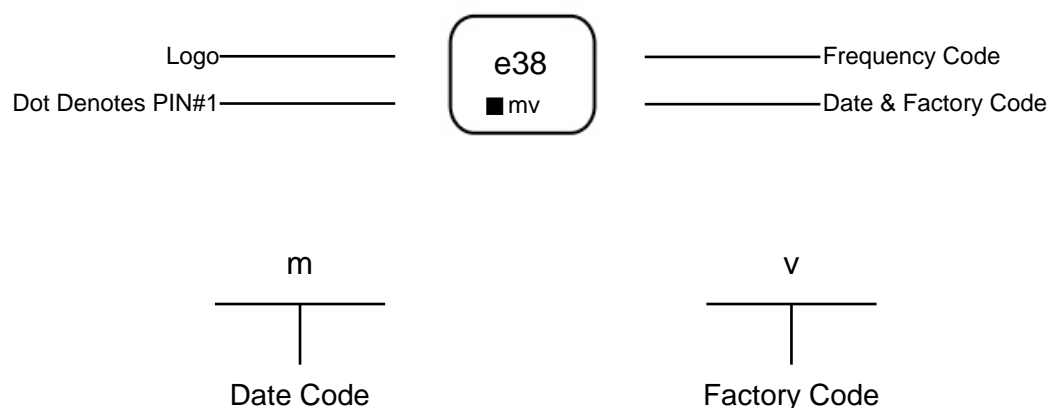
	Stage	Temperature	Time
A	Preheat	150~200°C	60~120 Sec
B	Primary Heat	217°C	60~150 Sec
C	Peak	260°C	10 Sec

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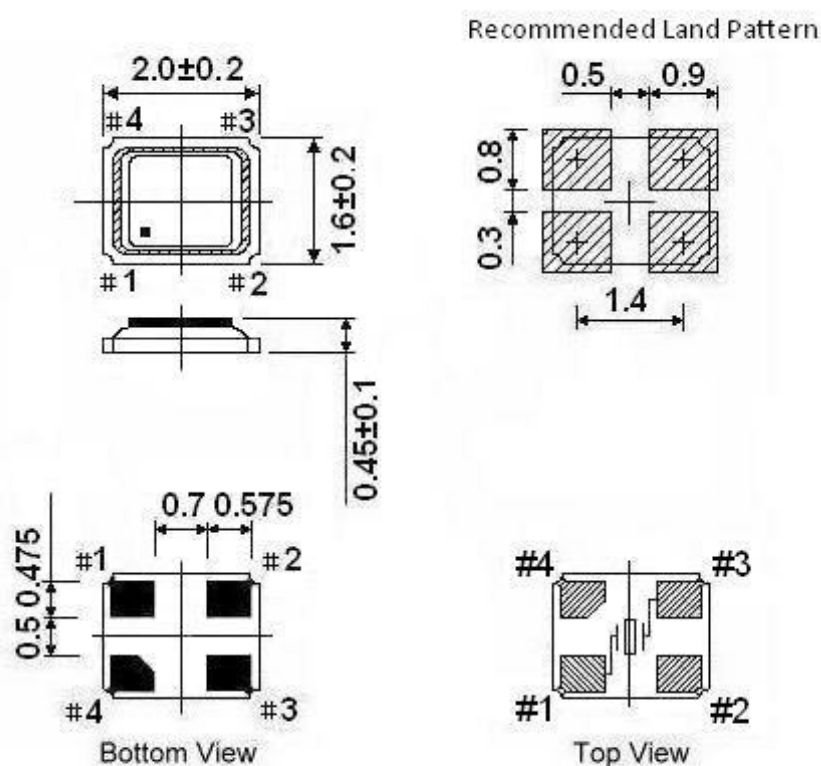
**FW3840013**

VER.D 15-MAY-18

## MARKING



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



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

### Notes:

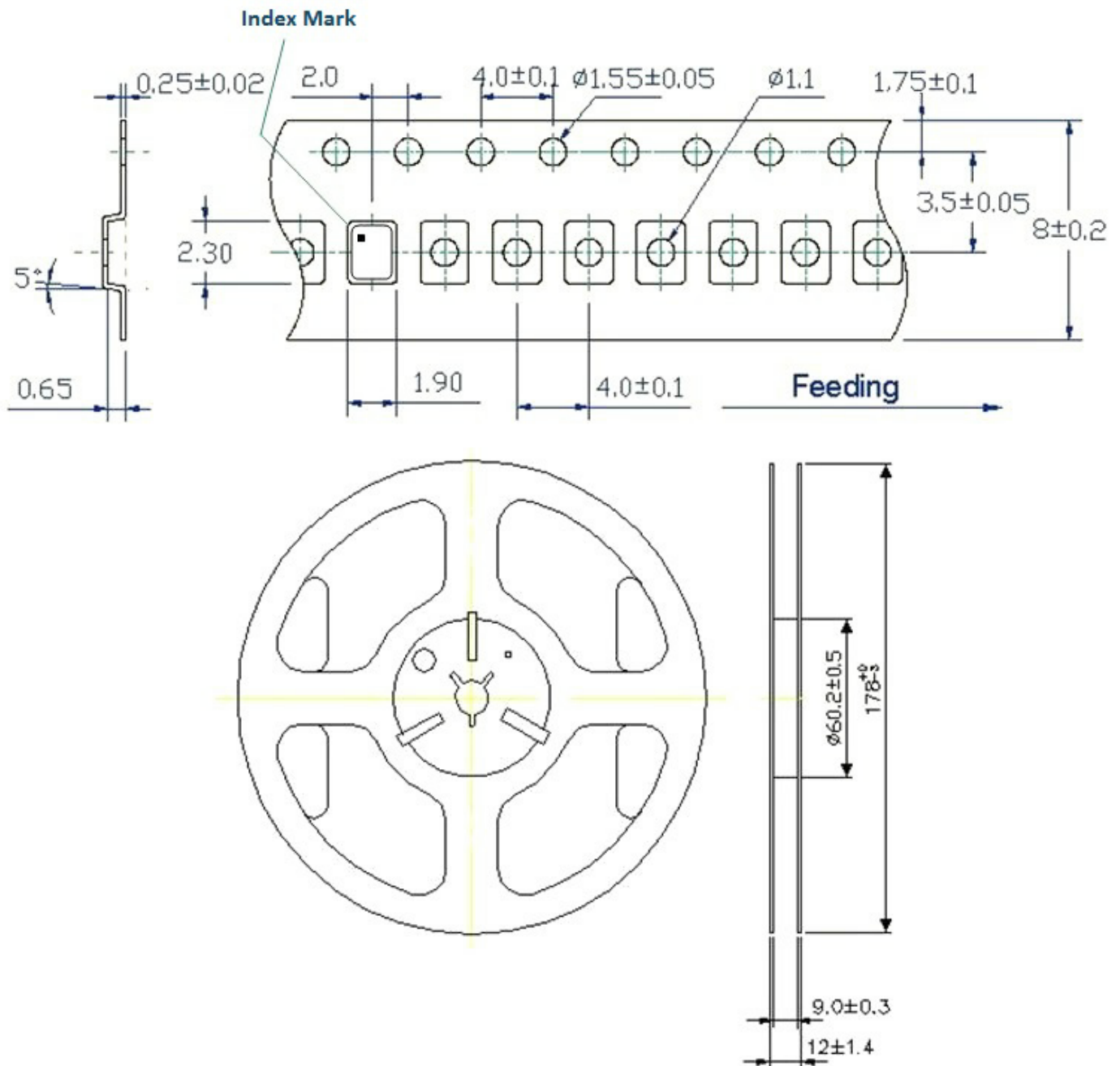
- Package drawings are for reference only, and the appearances of objects may vary.  
Actual packages are based on the real product.
- The marking dot denotes Pin#1.
- The position and shape of the chamfer pin may vary and are based on the real product.

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**FW3840013**

VER.D 15-MAY-18

## Tape & Reel



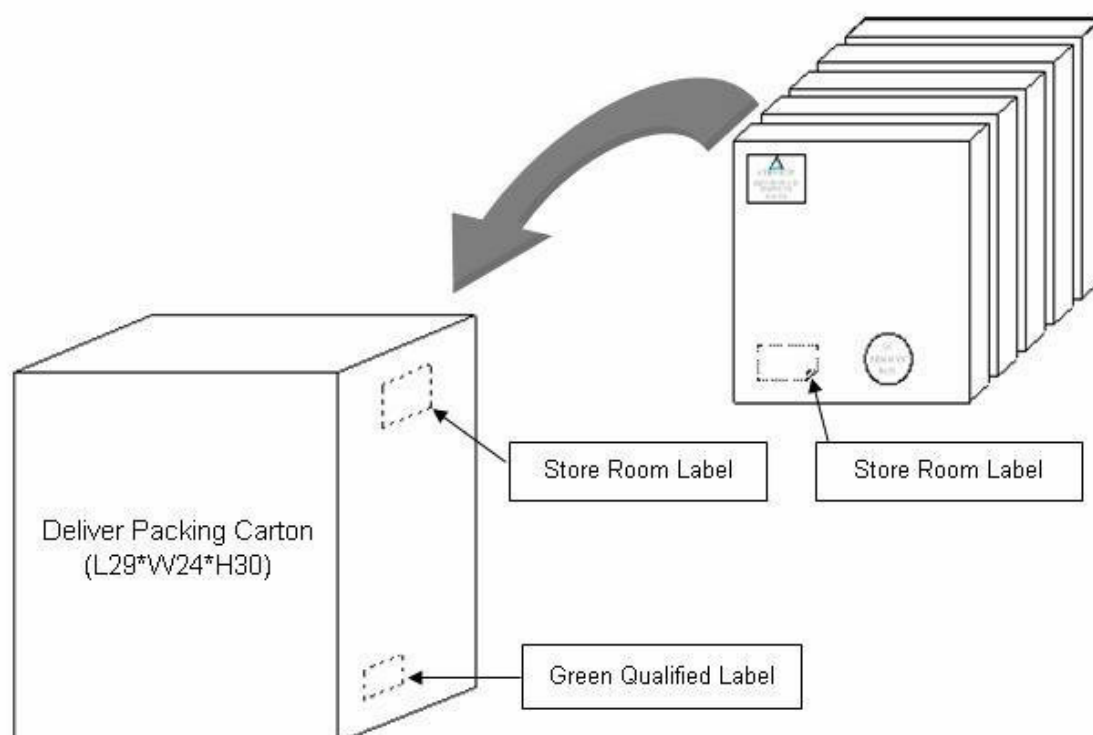
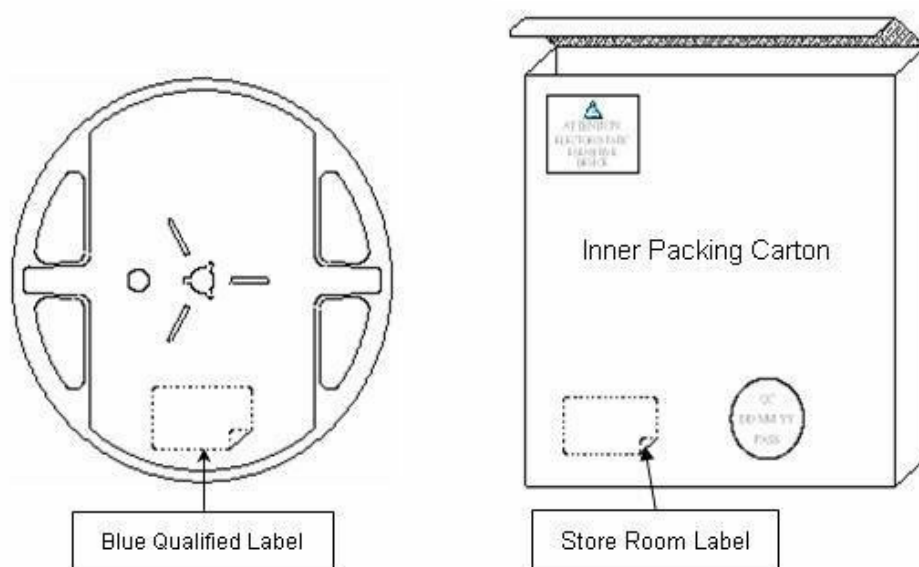
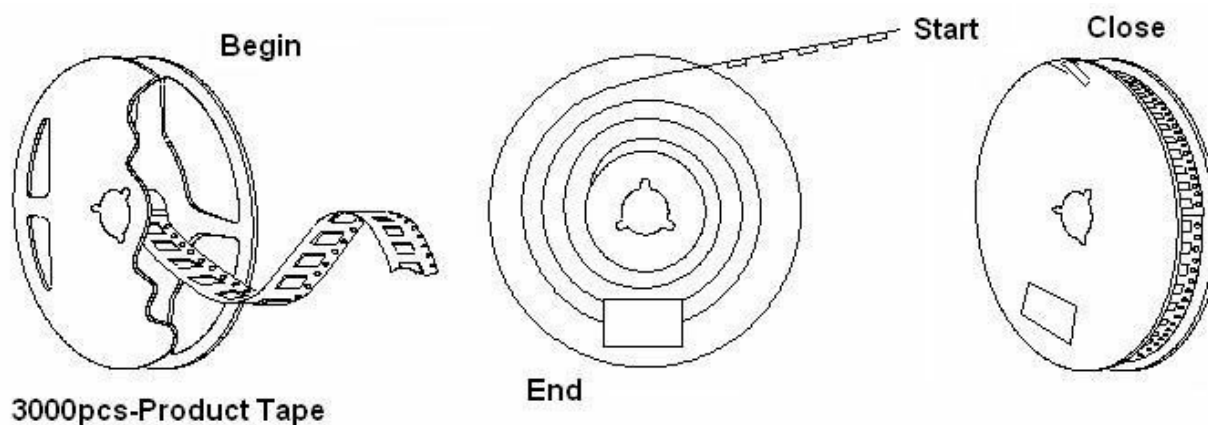
1. 230mm minimum leader which consist of carrier and/or tape followed by a minimum of 160mm of empty carrier tape sealed with cover tape.
2. 160mm minimum trailer of empty carrier tape sealed with cover tape.

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**FW3840013**

VER.D 15-MAY-18

## PACKING



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***FW3840013***

VER.D 15-MAY-18

## VERSION HISTORY

Version No.	Version Date	Description	Notes
A	Jun. 22, 2011	Initial Release	
B	Jun. 29, 2011	Changed Operating Temperature Range from -30~70'C to -30~85'C	
C	Aug. 13, 2012	Changed tolerance in mechanical drawing	
D	May. 15, 2018	Updated Logo	